

**An Examination of the Informativeness of Corporate
Income Tax Provision to Explain Future Tax Cash Flows:
Evidence from UK**

by

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*A Thesis Submitted in Partial Fulfilment of the Requirement for the
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Declaration

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Abstract

As corporate income taxes possess a material proportion of earnings, understanding the relationship between income tax provision and future cash tax consequences can help users of financial statement in evaluating firms' future commitment for internal funds (Ciconte et al. 2013). This is consistent with the contention of standard setters and regulators that reported financial information should facilitate users to assess the 'amount, timing and uncertainty' of firms' future net cash flows. However, there is a lack of empirical evidence with respect to the ability of income tax provision to explain future tax cash flows, particularly the evidence in the U.K. setting.

This study examines the informativeness of corporate income tax provision to explain future tax cash flows in the UK setting. Results of this study indicate that income tax accruals are incrementally informative over cash tax paid in explaining future tax cash flows in the UK setting. The incremental informativeness of income tax accruals is significantly lower for firms that 1) engage in tax planning activities or; 2) exhibit strong incentives to avoid reporting an apparent decline in the post-tax profits. Higher levels of analysts coverage and institutional shareholding are found to play a significant role in attenuating the negative relation between the informativeness of income tax accruals and the managements' incentives to avoid reporting an apparent decline in the post-tax profits. However, corporate governance mechanisms examined in this study are not significantly important in attenuating the negative impact of tax planning activities on the informativeness of income tax accruals. In addition, this study finds a significant downward trend in the informativeness of income tax accruals to explain future tax cash flows over the past three decades in the UK.

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Abbreviations

AIM	Alternative Investment Market	HMRC	Her Majesty's Revenue and Customs
ASB	Accounting Standard Board	IFRS	International Financial Reporting Standard
ASC	Accounting Standard Committee	IAS	International Accounting Standard
BLUE	Best Linear Unbiased Estimation	IASB	International Accounting Standard Board
BEPS	Base Erosion and Profit Shifting	IASC	International Accounting Standard Committee
CTP	Cash Tax Paid	I/B/E/S	Institutional Brokers Estimate System
CFO	Chief Financial Officer	ICBIN	Industry Classification Benchmark Industry Name
CEO	Chief Executive Officer	IRS	Internal Revenue Service
CTA	Corporate Tax Act	ICAEW	Institute of Chartered Accountants in England and Wales
CAA	Capital Allowance Act	KPMG	Klynveld Peat Marwick Goerdeler
CSR	Corporate Social Responsibility	LSE	London Stock Exchange
Cash ETR	Cash Effective Tax Rate	NOL	Net Operating Losses
ETR	Effective Tax Rate	OECD	The Organisation for Economic Co-Operation and Development
EU	European Union	OLS	Ordinary Least Square
ED	Exposure Draft	PPE	Plan Property and Equipment
ERC	Earnings Return Coefficient	PwC	PricewaterhouseCoopers
FTSE	Financial Time Stock Exchange	R^2	R square
FRS	Financial Reporting Standard	R&D	Research and Development
FRC	Financial Reporting Council	SSAP	Statements of Standard Accounting Practice
FRRP	Financial Reporting Review Panel	TEI	Tax Executives Institute
FRSSE	Financial Reporting Standard for Small Entities	TTE	Total Tax Expense
FIN 48	FASB Interpretation No. 48	UK	United Kingdom
FA	Finance Act	US	United States of America
FRED	Financial Reporting Exposure Draft	UTB	Uncertain Tax Benefit
GAAP	Generally Accepted Accounting Principles	UITF	Urgent Issues Task Force
GLS	Generalised Least Square	VIF	Variance Inflation Factor

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Chapter 1

Introduction

1.1. Research Motivation and Research Questions

Under UK GAAP and IAS 12, firms are required to provide a breakdown of income tax expense by reporting current and deferred taxes distinguishingly, which both have significant impacts on the computation of firms' net earnings (Wahab and Holland 2012; Edgely and Holland 2018; Dhaliwal et al. 2004). As a result, the income tax expense recognised in firms' income statement for a particular accounting period consists of both the current and future tax consequence of firms' performance for that accounting period¹.

As corporate income taxes possess a material proportion of earnings, it is important to investigate the informativeness of income tax provision in explaining future tax-related cash flows. This is because that standard setters and regulators, such as the International Accounting Standard Board (IASB), highlight the importance of the representation and prediction of the 'amount, timing, and uncertainty' of firms' net cash flows. Understanding the relationship between income tax provision and future cash tax consequences can help users of financial statement in evaluating firms' future commitment for internal funds (Ciconte et al. 2013). A lack of significant relationship between corporate income tax provision and future tax-related cash flows could compromise the value relevance of reported effective income tax rate and, thus, adversely impact the accuracy of investors' forecasts about firms' future net cash flow, as the tax rate they have applied to their valuation model may not necessarily represent firms' future tax-related cash flows² (Brouwer et al. 2018). However, there is a lack of empirical evidence with respect to the ability of corporate income tax provision to explain future tax cash flows, particularly the evidence in the U.K. setting.

¹ Under current UK GAAP and IAS 12, current income tax consequences are included in the financial statements by recognising the amounts that are payable or refundable to the tax authorities with respect to taxable profit for the current period. Future tax consequences are recognised with respect to the difference between the carrying amount of assets and liabilities for book purposes and the carrying amount of assets and liabilities for tax purpose. Differences between the carrying amount of assets and liabilities for book purpose and tax purpose indicate that the recovery of assets and the settlement of liabilities may result in additional tax payments or refunds in the future (Telford et al. 2014; Brouwer et al. 2018).

² Weber (2009), Bratten et al. (2017) and Edgely and Holland (2018) provide evidence that investors and analysts use income-tax-related information (i.e., GAAP effective tax rate; tax expense or book-tax difference) to forecast firms' future after-tax performance. However, the interview evidence from Edgely and Holland (2018) highlights that investors, even the professional investors, tend to put the effective tax rate into their valuation model to forecast the after-tax cash flow without understanding the informativeness and usefulness of the tax rate they use or possessing the technical tax knowledge underpinning the tax rate.

Therefore, this study is motivated to provide the first evidence concerning the informativeness of income tax provision to explain firms' future tax cash flows in the UK setting, which focuses its attention on investigating the following research questions³:

1. Whether income tax accruals are incrementally informative over cash tax paid in explaining future tax cash flows?

Corporate income tax provision is made up of two components, i.e., income tax accruals and cash tax paid for an accounting period⁴. The first research question is designed to examine how well the income tax provision tracks future tax cash flows, through investigating whether the income tax accruals are incrementally informative over the cash tax paid to explain future one- to five-year ahead tax cash flows.

2. How managers' incentives to undertake tax management activities affect the informativeness of income tax accruals?

Similar with other accruals, income tax accruals require managerial estimation to be made and subject to managements' discretion. For this reason, it can be reasonable to expect that there are variations in the incremental informativeness of income tax accruals across firms due to the inherent differences in firms' characteristics and management behaviours. Thus, if the investigation of the first research question shows that income tax accruals are able to explain future tax cash flows on average, the second research question will attempt to investigate the determinative factors that cause cross-sectional variations in the informativeness of income tax accruals, with the primary interests in seeking answers on how managers' tax management incentives affect the informativeness of income tax accruals.

3. Whether effective corporate governance mechanisms play a significant role in attenuating the negative impacts of managers' tax management incentives on the informativeness of income tax accruals?

It can be reasonable to expect that effective corporate governance mechanisms are effective in restricting self-interested managers from engaging in opportunistic tax management activities. Thus, if the investigation of the second research question provides evidence that

³ In this study, all references to 'income taxes', 'income tax provision' and 'income tax accruals' are to 'corporate income taxes', 'corporate income tax provision' and 'corporate income tax accruals'.

⁴ See Section 2.4 for detailed information.

firms with strong incentives to opportunistically manage taxes have significantly lower informativeness of income tax accruals, the third research question will attempt to find out whether corporate governance mechanism is important in moderating the negative relationship between the informativeness of income tax accruals and managers' tax management incentives.

4. Whether the incremental informativeness of income tax accruals to explain future tax cash flows has deteriorated or improved over time in the U.K.?

Over the past three decades, accounting methods for deferred taxes have evolved dramatically in the U.K. As deferred tax is an important component of income tax accruals, changes in the accounting methods for deferred taxes may lead to changes in the informativeness of income tax accruals. Therefore, the fourth research question in this thesis is designed to investigate the time-series trend in the ability of income tax accruals to explain future tax cash flows, to show whether the informativeness of income tax accruals has deteriorated or improved over time in the U.K.

1.2. Research Findings and Research Contributions

This study examines the informativeness of income tax provision to explain future tax cash flows in the UK setting. Using a panel dataset of publicly-traded non-financial UK companies for the period 1992 to 2016, this study provides evidence that income tax accruals are incrementally informative over cash tax paid in explaining future tax cash flows. The incremental informativeness of income tax accruals is significantly lower for firms that 1) engage in tax planning activities or; 2) exhibit strong incentives to avoid reporting an apparent decline in the post-tax profits. There is no significant evidence indicating that the incentives to avoid missing analysts' forecasted earnings and to avoid reporting a post-tax loss strongly motivate managers to distort the income tax accruals.

Higher levels of analysts coverage and institutional shareholding are found to play a significant role in attenuating the negative relation between the informativeness of income tax accruals and managers' incentives to avoid reporting an apparent decline in the post-tax profits. However, corporate governance mechanisms examined in this study are not significantly important in attenuating the negative impact of tax planning activities on the informativeness of income tax accruals. In addition, this study finds that the incremental informativeness of

income tax accruals about future tax cash flows has deteriorated over time in the UK, implying that the adoption of partial provision method of deferred taxes provides income tax accruals with significantly greater ability to explain future tax cash flows as compared to the full provision methods of deferred taxes.

The contribution of this study is fivefold:

1. Through providing the first evidence concerning the informativeness of income tax provision to explain firms' future tax cash flows in the UK setting, this study extends the literature that examines the value relevance of reported accounting information in financial statements.
2. This study extends the agency perspective of corporate tax management and shows that tax-planning activities could add opacity and obfuscation to financial statements and reduce the informativeness of reported income tax information.
3. This study contributes to the literature that examines the impacts of earnings management on the reliability and relevance of reported accounting information, by showing how management's incentives to meet specific earnings targets through biasing income tax provision affect the informativeness of income tax accruals.
4. This is one of the first studies, to the researcher's knowledge, to empirically examine the role of corporate governance in attenuating the negative impacts of managers' tax management incentives on the informativeness of income tax accruals, which extends the literature on understanding how corporate governance affects managerial performance.
5. This study contributes to the literature that compares the information value of the partial with that of the full provision method of deferred taxes. By showing a significant downward trend in the informativeness of income tax accruals to explain future tax cash flows, this study provides evidence that the accounting standard setters' focus on restricting managerial discretion can reduce managers' ability to convey private information about future tax outcomes and, thus, compromising the informativeness of the reported tax information.

1.3. Thesis Structure

The thesis is composed of seven chapters, including 1) Introduction, 2) UK Accounting and Taxation Environment, 3) Literature Review and Theoretical Framework, 4) Hypothesis Development and Research Design, 5) Sample Selection and Descriptive Statistics, 6) Regression Analysis and Results, and 7) Conclusion, Implication and Limitation.

Chapter 2 of this thesis discusses the background and institutional knowledge with respect to the UK accounting and taxation environment. This chapter begins with the description of the development of financial accounting standards available for UK listed entities to comply with when preparing their financial statement, and is followed by the discussion of advantages and disadvantages of the financial accounting information provided under the international financial accounting standards. The subsequent section of chapter 2 provides an insight into the tax accounting system in the UK, which includes the evaluation of the link between accounting and taxation system in the UK; the evolution of tax accounting standards in the UK; and the tax treatments of basic accounting issues in the UK. The final section of this chapter discusses the components of income tax provision and the definition of income tax accruals.

Chapter 3 of this thesis reviews previous literature evidence that is relevant to the research topics of this thesis. This chapter begins with the section that reviews previous literature on corporate tax management. In this section, the definition of corporate tax management is discussed; theories related to corporate tax management (Scholes-Wolfson effective tax management theory; cost and benefit theory and agency theory) are presented; and the determinative factors that cause variations in firms' engagements in tax management activities (objectives; benefits and motivation; costs and constraints; firm characteristics of corporate tax management) are evaluated. The subsequent section reviews previous literature on the relationship between corporate governance mechanism and corporate tax management. This section begins with the theories of corporate governance mechanism which are inclusive of the agency theory and stakeholder theory; and is followed by reviewing previous evidence on how corporate governance mechanisms (i.e., ownership structure, board of directors, external monitoring and corporate social responsibility) affect managers' decisions of engaging in tax management activities. The final section of chapter 3 reviews previous literature on the association between corporate tax management, corporate governance mechanism and the informativeness of income tax provision. Previous value-relevance accounting and taxation

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studies provide the theoretical and methodological foundation for assessing the informativeness of income tax provision. Therefore, the final section of chapter 3 begins with the review of value-relevance accounting and taxation studies; and is followed by discussing the joint impact of corporate governance mechanism and corporate tax management on the informativeness of income tax provision.

Chapter 4 of this thesis presents the hypotheses development and research design. The development of the hypotheses is based on the background and institutional knowledge obtained from chapter 2 and the previous literature evidence reviewed in chapter 3. Specifically, the hypotheses development section presented in chapter 4 consists of three parts. The first part is related to the hypothesis that investigates whether the income tax accruals are able to provide incremental explanatory power about future tax cash flows on average. The second part raises hypotheses that investigate the cross-sectional determinates of the informativeness of income tax accruals to explain future tax cash flows, including the investigations of 1) how managers' tax management incentives to engage in tax planning and tax-induced earnings management affect the informativeness of income tax accruals; 2) how firms' innate characteristics affect the informativeness of income tax accruals; and 3) whether corporate governance mechanisms moderate the impact of managers' tax management incentives on the informativeness of income tax accruals. The third part raises the hypothesis that examines the time-series trend in the informativeness of the income tax accruals in the UK. In the research design section, estimation models for testing each hypothesis of this study are constructed, and the potential econometric issues related to the multivariate regression analysis are discussed.

Chapter 5 of this thesis begins with the details of the data screening and sample selection process; and is followed by the description of the summary statistics of the sample employed in this study.

Chapter 6 of this thesis provides the multivariate regression results for each hypothesis test. In summary, this study finds that income tax accruals are incrementally informative over cash tax paid in explaining future tax cash flows. The incremental informativeness of income tax accruals is significantly lower for firms that 1) engage in tax planning activities or; 2) exhibit strong incentives to avoid reporting an apparent decline in the post-tax profits. Moreover, this study finds that higher levels of analysts coverage and institutional shareholding play a significant role in attenuating the negative relation between the informativeness of income tax

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accruals and managers' incentives to avoid reporting an apparent decline in the post-tax profits. In addition, this study finds that the incremental informativeness of income tax accruals about future tax cash flows has deteriorated over time in the UK. This study further conducts several additional tests to show the sensitivity and robustness of the research findings.

Chapter 7 concludes the whole thesis. In this chapter, the summary of this study is provided; the limitations that may inhibit generalising the results of this study to other samples are discussed; and the practical implications of the research findings are evaluated.

The following figure 1 and figure 2 exhibit the research framework and structure of this thesis.

Figure 1.1 Research Framework

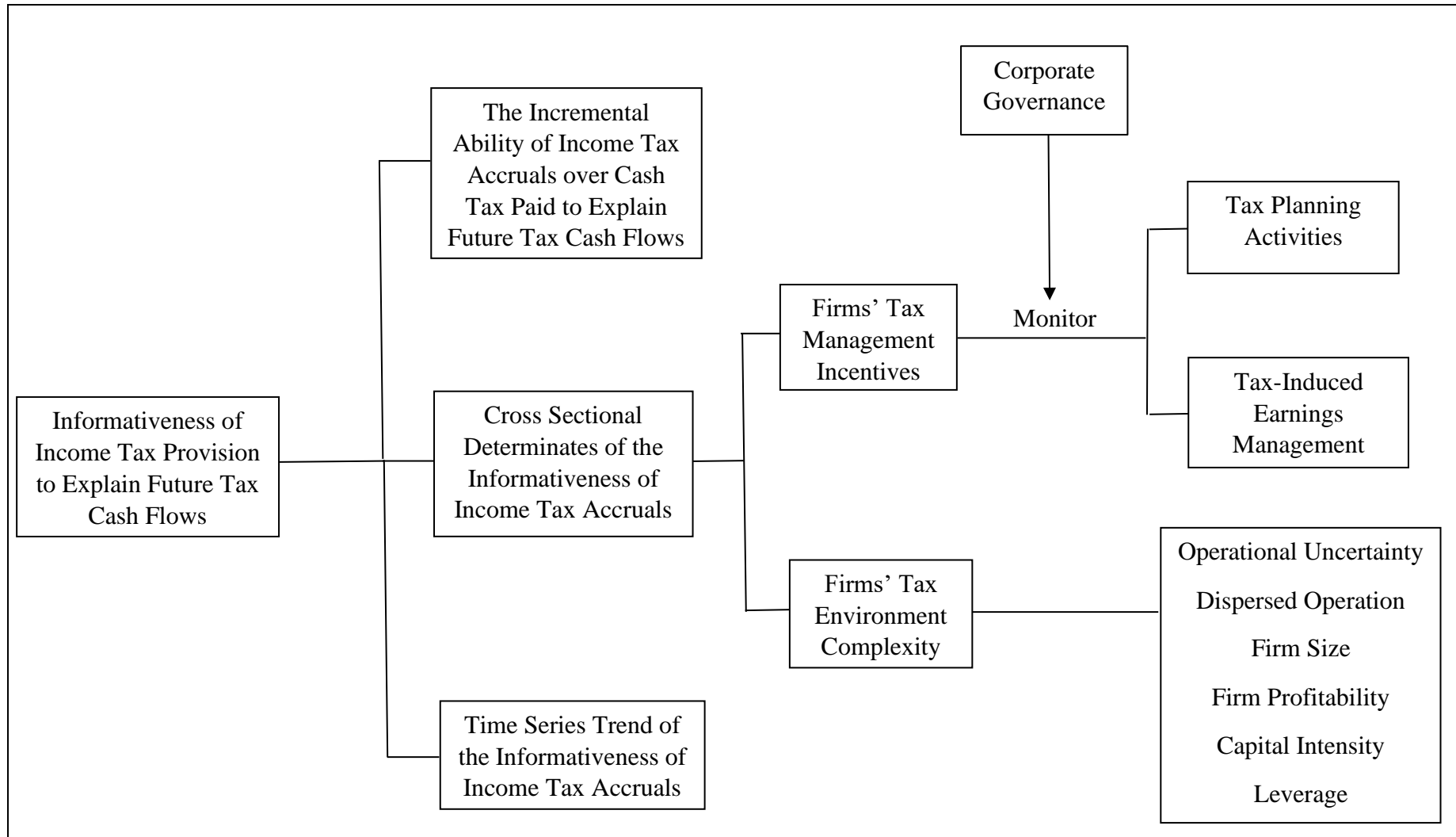
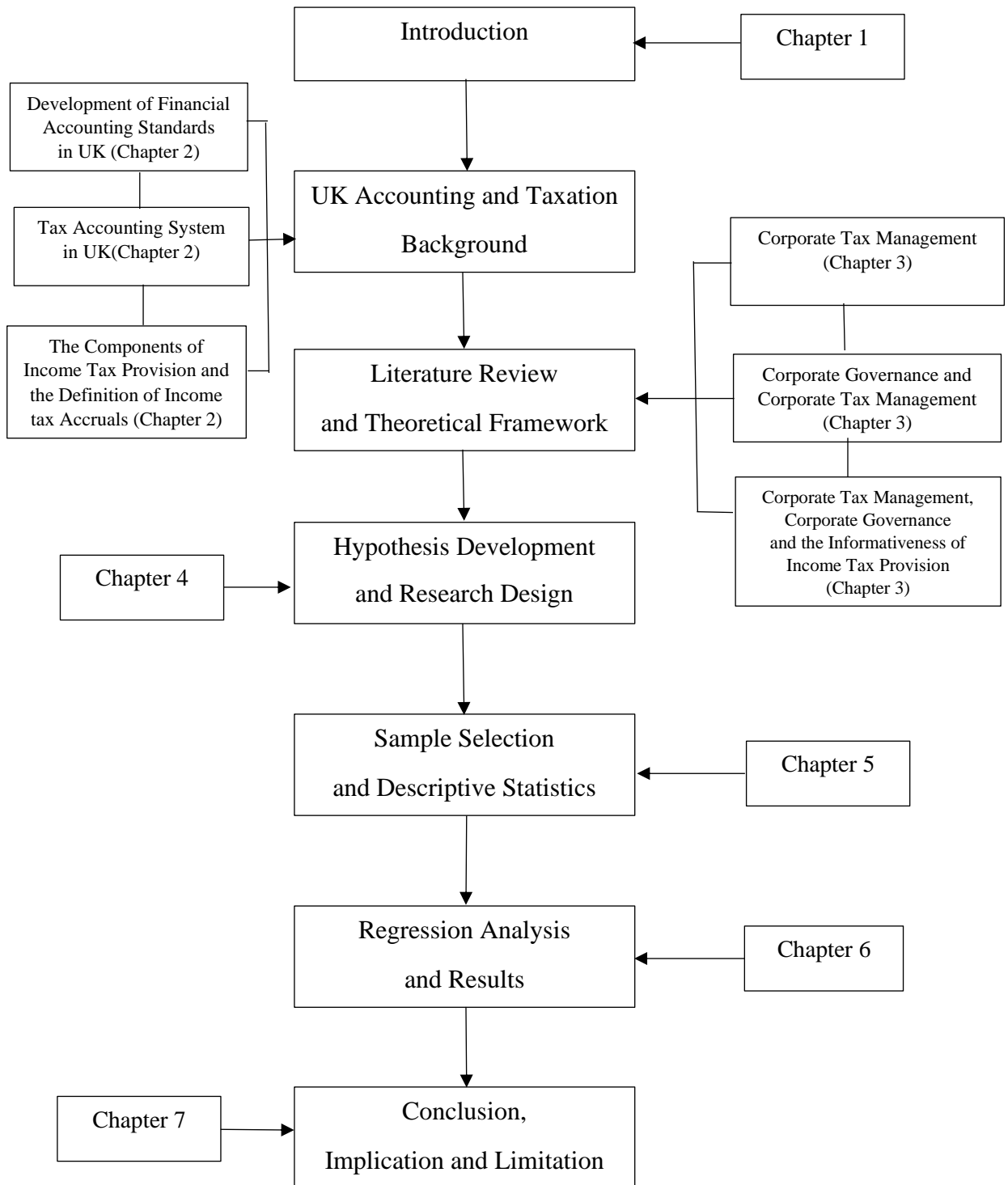


Figure 1.2 Thesis Structure



Chapter 2

UK Accounting and Taxation Environment

2.1. Introduction

This chapter aims to provide an insight into the background and institutional knowledge regarding the UK accounting and taxation environment. This chapter begins with an overview of options of the financial accounting standards available for UK listed entities to comply with when preparing their financial statements, and is followed by the discussion of the advantages and disadvantages of the financial accounting information provided under the international financial accounting standards. The UK tax accounting system is further discussed in this chapter to show the link between accounting and taxation system; the evolution of tax accounting standards in the UK; and the tax treatments of basic accounting issues in the financial reporting process in the UK. Subsequently, this chapter provides an understanding of the income tax provision by showing how individual components of income tax provision cause the reported income tax expense to differ from cash tax incurred for an accounting year. The final section concludes the chapter.

2.2. Financial Accounting Standards in the UK

This section aims to provide the institutional framework and background information about the development of financial accounting standards in the UK. This section begins with an overview of options of the financial accounting standards available for UK listed entities to comply with when preparing their financial statements. In the following subsection, the advantages and disadvantages of the adoption of international accounting standards for financial reporting purposes are evaluated to provide insights into the current financial reporting practices adopted by UK listed entities.

2.2.1. The development of financial accounting standards in the UK

All UK listed entities are required to comply with company law and must prepare financial statements in accordance with the generally accepted accounting principles (i.e., GAAP), with the aim of providing shareholders with a true and fair view of their underlying performance. For the year up to 2004, schedule 4 of Companies Act 1986 and UK GAAP were in force for the consolidated and unconsolidated financial reporting of UK listed entities. A listed UK entity

should adopt the same set of accounting standards for financial reporting purposes in its consolidated group accounts and unconsolidated individual account until the year 2004⁵.

Initially, the Statements of Standard Accounting Practice (SSAPs) were issued by Accounting Standard Committee (ASC). In 1990, the Financial Reporting Council (FRC) was established to be responsible for setting accounting standards in the UK. FRC consists of two main subsidiary bodies, i.e., the Accounting Standard Board (ASB) which is responsible for promulgating accounting standards; and the Financial Reporting Review Panel (FRRP) which is responsible for the implementation and enforcement of accounting standards (Fearnley and Hines 2018). On transition, the ASB adopted several SSAPs that were issued by ASC and issued its own Financial Reporting Standards (FRSs) from the year 1990. The newly issued FRSs together with the adopted SSAPs have been in use until 31 December 2014⁶. In addition, the ASB introduced simplified accounting standards for small entities, i.e., the Financial Reporting Standard for Small Entities (FRSSE) and provided authorised guidance on emerging accounting issues which require a prompt reaction, i.e., Urgent Issues Task Force (UITF) abstracts. For accounting periods commencing on or after 1 January 2015, all existing SSAPs, FRSs, FRSSE and UITF Abstracts were superseded by the new accounting standards issued by FRC⁷ (Day 2000; Alexander and Nobes 2004).

In the year 2004 to 2005, the European Union (EU) introduced a requirement for all listed companies whose securities (i.e., both equity and debt instruments) are listed in an EU regulated market to apply international financial reporting standards (IFRS) for their consolidated group reporting purpose⁸. The requirements of IFRS adoption were enacted in the UK by *regulation (EC) 1606/2002* (i.e., ‘the IAS regulation’). Since the IAS regulation is only applicable to consolidated group accounts of UK listed entities, UK listed entities which are

⁵ See <https://www.icaew.com/library/subject-gateways/accounting-standards/knowledge-guide-to-uk-accounting-standards>

⁶ See <https://www.icaew.com/library/subject-gateways/accounting-standards/uk-frs>

⁷ The new accounting standards issued by FRC for accounting periods on or after 1 January 2015 include:

FRS 100 *Application of Financial Reporting Requirements*;

FRS 101 *Reduced Disclosure Framework*;

FRS 102 *The Financial Reporting Standard applicable in the UK and Republic of Ireland*;

FRS 103 *Insurance Contracts*.

FRS 104 *Interim Financial Reporting*

FRS 105 *The Financial Reporting Standard applicable to the Micro-Entities Regime*

Source: <https://www.icaew.com/library/subject-gateways/accounting-standards/knowledge-guide-to-uk-accounting-standards>

⁸ All listed companies in the European Union (EU) countries, that is, about 7,000 to 8000 companies, are required to mandatorily prepare their consolidated financial statements in accordance with IFRS for periods commencing on January 2005 (Pacter 2017).

not groups are not required to apply IFRS. Regarding the unconsolidated individual accounts, Companies Act 2006 allows the parent company and the subsidiaries of the UK listed entities to choose between IFRS and UK GAAP for statutory financial reporting purposes. In addition, companies listed on the Alternative Investment Market (AIM) are not regulated by the IAS regulation, but the AIM introduced similar rules of requiring companies listed on AIM to prepare their consolidated group accounts under IFRS (Telford and Oats 2014). Options of accounting standards available for the UK listed companies to prepare their financial statements are summarised in the following table 2.1:

Table 2.1: Options Available for UK Listed Companies

<u>Before 2004</u>	<u>UK GAAP</u>		
Group	Must		
Parent/Subsidiary	Must		
Stand-alone (e.g. VCT)	Must		
<u>2004-2015</u>	<u>IFRS</u>	<u>UK GAAP</u>	
Group	Must	/	
Parent/Subsidiary	Option	Option	
Stand-alone (e.g. VCT)	Option	Option	
<u>After 2015</u>	<u>IFRS</u>	<u>New UK GAAP</u>	<u>New UK GAAP</u>
		<u>FRS 101</u>	<u>FRS 102</u>
Group	Must	/	/
Parent/Subsidiary	Option	Option	Option
Stand-alone (e.g. VCT)	Option	/	Option

Source : Telford and Oats 2014, ICAEW website

2.2.2. The advantages and disadvantages of IFRS adoption

It has long been the goal for the International Accounting Standards Board (IASB) and its processor, the International Accounting Standards Committee (IASC) to develop and promote a uniform set of accounting standards, with the aim of reducing the costs of international communication and transaction and improving the comparability of financial reporting among different jurisdictions⁹. As stated in IFRS Foundation Constitution, the objectives of IASB are:

“To develop, in the public interest, a single set of high quality, understandable, enforceable and globally accepted financial reporting standards based upon clearly articulated principles; to promote the use and rigorous application of those standards; and to promote and facilitate adoption of International Financial Reporting Standards (IFRSs)...through the convergence of national accounting standards and IRFSs¹⁰”.

Therefore, it can be concluded that the primary objective of IFRS is to enhance the comparability and transparency of reported financial information at an international level. The European Commissioner for the Internal Market, Frits Bolkestein, highlights that the adoption of IFRS “*helps investors and other stakeholders to be able to compare like with like. It will help European firms to compete on equal terms when raising capital on world markets*” (GAAP Convergence 2002). When making cross-border investments, the major concerns of investors could relate to costs of obtaining and understanding financial information about foreign companies’ underlying performance; and difficulties in identifying and reconciling the international differences in financial reporting standards (Bradshaw et al. 2004; Chan et al. 2005; Covrig et al. 2007). The adoption of IFRS, which leads to standardised and uniform

⁹ Over 80 per cent of countries permit or require the use of IFRS, that is, approximately 140 jurisdictions permit, and 126 jurisdictions require the use of international financial reporting standards (IFRS) for financial reporting. Only four large economies around the world have not yet to adopted IFRS, including China, Japan, USA and India. China has not mandatorily adopted IFRS but has recently reconfirm its work towards full adoptions of IFRS. The new Chinese Accounting Standards for Business Enterprises (ASBEs) have been largely converged with IFRSs, except for certain modifications (e.g. the reversal of impairment loss on long term assets is disallowed). Companies in Japan adopt IFRS voluntarily since 2010 and the number of Japanese companies that adopt IFRS grows rapidly. More than 120 Japanese companies which represent 20 per cent of the Japanese market capitalization have already adopted IFRS. The U.S. continues to use US GAAP but permits foreign companies listed on US stock exchanges to use IFRS. India has not mandatorily adopted IFRS but the Indian Accounting Standards (Ind AS) are based on and have been largely converged with IFRS from 1 April 2016 (Deloitte 2017). Source: <https://www.iasplus.com/en-gb/resources/ifrs-topics/use-of-ifrs-g20>

¹⁰ Source: <http://www.iasb.org/about/constitution.asp>

financial reporting formats, could directly benefit investors by providing ‘high quality, transparent and comparable’ financial information with reduced information-processing costs. Consequently, the adoption of IFRS is expected to result in more-informed valuation by equity investors and reduced adverse-selection risk of less-informed investors who are not familiar with local accounting standards (Ball 2006, pp. 11). In addition, the increased transparency and comparability promised by IFRS may indirectly benefit investors by reducing the information asymmetry between managers and shareholders, because more transparent and comparable reported financial information would make it harder for managers to exploit financial statements for the purpose of manipulating earnings; concealing negative operating outcomes; and misleading investors (Ball 2006, pp. 12).

Several studies provide evidence that IFRS adoption improves the quality and comparability of reported financial information. Byard et al. (2011) find that the analyst forecast accuracy is improved for mandatory IFRS adopters with substantial and rigorous application of IFRS¹¹. Similarly, Horton et al. (2013) find that analyst forecast accuracy is increased after the mandatory transition of IFRS. The improvement in analyst forecast accuracy is found to be driven by the enhanced accounting comparability and information quality, rather than by the increased ability of managers to beat or meet analysts’ forecasts due to their increased flexibility and discretion in accruals adjustments allowed under the principle-based IFRS. Defond et al. (2011) find that foreign mutual fund investment increases following the mandatory adoption of IFRS in countries with credible implementation¹², suggesting that credible IFRS adoption enhances the comparability of financial statements and thereby leading to greater cross-border investment. Daske et al. (2008) find an increase in market liquidity, a decrease in cost of capital and an increase in equity valuation around the introduction of mandatory IFRS financial reporting. However, they find that the capital market benefits associated with IFRS adoption are strongly related to countries’ IFRS enforcement regimes and firms’ incentives to be transparent during the financial reporting process¹³.

¹¹ Specifically, Byard et al. (2011) use high-level differences between domestic accounting standards and IFRS to measure substantial adoption effect of IFRS. Rigorous application of IFRS is measured using the ‘rule of law’ proxy constructed by the World Bank.

¹² Defond et al. (2004) argue that comparability can only be achieved when the reported financial information “faithfully represents what it purports to represent”. They measure the credible implementation of IFRS using the earnings quality score developed in Leuz et al. (2003) which is computed as the average rank combining four individual aspects of country-level earnings quality, including two measures of earnings smoothness; one measure of earnings magnitude of firms’ accruals; and one measure of loss avoidance.

¹³ Daske et al. (2008) measure the enforcement strength of IFRS using the ‘rule of law’ proxy constructed by the World Bank and measure the strength of firms’ incentives to be transparent in financial reporting using the earnings quality score developed by Leuz et al. (2003).

However, there are several reasons which may cause IFRS adoption to render the financial reporting less informative. First, although the increased comparability of reported financial information is an expected desired consequence of applying a uniform set of financial reporting standards across countries, the improved uniformity is only expected to lead to enhanced comparability when the uniform reporting standards are evenly and fairly implemented (DeFond et al. 2011, pp. 241). The enforcement of IFRS, however, is found to be uneven across the world because the ‘political and economic influences’ on the application of IFRS remain local (Ball 2006, pp. 15; Armstrong et al. 2010). Overemphasising on uniformity therefore may result in additional information losses and information-processing costs, because the regional differences regarding the economic and political influences on financial reporting quality are concealed by the veneer of uniformity at a deeper and less observable level, misleading investors and other financial statements’ users into believing that the financial reporting practices and reporting quality become uniform at the international level (Ball et al. 2000; Ball 2006).

Second, the accruals-based and principles-orientated IFRS increasingly relies on management judgements, providing managers with flexibility, subjectivity and discretion in the process of financial reporting. Specifically, in the process of financial measurements and reporting, all accrual accounting systems allow managers to make reliable assumptions and estimations about firms’ future cash flows, which may provide self-interested managers with latitude and leeway to deliberately manage earnings through distorting income accruals (Gu et al. 2003; Lang et al. 2010; Ahmed et al. 2013). The principle-based accounting standards typically require managers to exercise judgements rather than providing detailed rules and authoritative implementation guidance in the process of accounting for transactions and events, which may in turn facilitate managers to exercise judgements for the purpose of opportunistically influencing the reported earnings (Benston et al. 2006). Even if the financial statements are faithfully prepared without opportunistic managerial intentions, the exercise of professional judgments may lead to different financial outcomes for similar transactions and events across firms, leading to reduced cross-sectional comparability of the reported financial information (Schipper 2003).

Third, IFRS gives priority to fair value accounting¹⁴, with the aim of providing more relevant and incremental financial information to better reflect the reporting entities' present and future financial state. However, the fair-value orientation of IFRS may lead to increased managerial estimation errors and manipulation in financial statements (Ball 2006; Benston et al. 2006; Landsman 2007). This is because that market price from a liquid market can be subject to substantial uncertainty and volatility. The transitory nature of fair value obtained from a liquid market therefore may give rise to noise and estimation errors in financial statements. If the relevant liquid market prices are not available, fair value should be determined from management' appraisals and estimations using relevant pricing models, which may be subject to opportunistic managerial behaviours such as the manipulation of the choice of pricing models or the procedure of simulating market prices (Ball 2006; Benston et al. 2006). The informativeness and decision usefulness of reported financial information about firms' current and future performance can be compromised if the reported financial information is accompanied by substantial managerial errors and manipulations.

In summary, through providing a uniform set of accounting standards, IFRS adoption is aimed at improving the transparency and the comparability of the reported financial information at an international level, thereby reducing the information processing costs of investors and the information asymmetry between shareholders and managers. However, it is likely that many potential benefits promised by IFRS can be curtailed by the uneven implementation of IFRS and the management judgments and estimations allowed under the principle-based and fair-value-orientated IFRS.

¹⁴ For example, *IAS16* revaluation of property, plant and equipment should be made with sufficient regularity to ensure that "the carrying amount does not differ materially from the fair value at the end of the reporting period" (para 31); *IAS36* requires asset impairments (and impairment reversals) to fair value; *IAS38* the cost of an intangible asset "acquired as a part of business combination is its fair value at the acquisition date" (para 33); *IAS38* provides an option to "revalue intangible assets to the fair value at the revaluation date, less any accumulated depreciation and subsequent accumulated impairment loss" (para 72); *IAS 39* requires "fair value for financial instruments other than loans and receivables that are not held for trading, securities held to maturity; and qualifying hedges" (para 9); *IAS 40* provides "a fair value option for investment property, managers may choose its accounting policy to carry the investment properties at fair value or at cost less depreciation and impairment charges".(para 30); *IFRS 2* requires share-based payments (stock, option, etc.) to be accounted at fair value (para 10); *IFRS3* acquisitions by an investment entity of a subsidiary are "required to be measured at fair value through profit or loss" (para 2A) (Ball 2006; PwC 2015).

2.3. Tax Accounting System in the UK

This section aims at providing the institutional framework and background information about UK tax accounting system. It begins with discussing about the relationship between financial accounting and income tax system in the UK to show how financial reporting and tax reporting articulate. The following subsection outlines the evolution of UK tax accounting standards and compares the similarities and differences between IAS 12 and UK GAAP in respect of deferred tax provision, to show the impact of changes in deferred tax accounting methods on tax reporting practices over the past fifty years in the UK. The final subsection provides an insight into the tax treatments of basic accounting issues in the financial reporting process in the UK.

2.3.1. Links between accounting and taxation in the UK

Based on the view that income tax expense is an outcome of transactions or events that bring about the accounting profits, tax accounting system is designed to translate a firm's tax payments and obligations into accounting disclosures to match the income tax expense with the pre-tax income provided under financial reporting standards (i.e., the generally accepted accounting principle)¹⁵ (Hanlon 2003; Brouwer et al. 2015, Edgley and Holland 2018). Under current UK tax laws, corporate tax treatment relies heavily on the individual legal entity's accounting profit which is calculated and reported in accordance with generally accepted accounting practice¹⁶ (HMRC 2017). Specifically, tax legislation in the UK defines taxable profits as "*profits of a trade calculated in accordance with generally accepted accountancy practice, subject to any adjustment required or authorised by law in calculating profits for corporate tax purposes*" (Corporation Tax Act 2009, Section 46)¹⁷. In areas where the Tax Acts do not explicitly require adjustments, i.e., transactions are accounted for in the same manner under tax law and financial accounting standards, the amount of taxable income would be

¹⁵ The UK tax accounting system perceives income tax as an expense for which accrual accounting should be applied to allocate income taxes within accounting periods. By contrast, some argue that income tax is solely a distribution similar to dividends rather than an expense, thereby should not be matched with the reported accounting profit (Brouwer et al. 2015). The "flow through method", which is not a widely accepted accounting method for taxation among major accounting jurisdictions, is based on the principle that income tax is a distribution arising from taxable profit of that period. Under the flow through method, tax payable is charged in respect of a period when taxable profit occurs without attempts to reconcile differences between accounting profits and taxable profits, and therefore will not allocate tax within accounting periods by reference to timing differences (Davies et al. 1997; Lewis and Pendrill 2004).

¹⁶ This means that the starting point in computing taxable profits is the individual legal entity's accounting profit which is prepared in accordance with generally accepted accounting practice.

¹⁷ Section 46 CTA 2009.

dependent on the adopted accounting methods. However, in areas where the Tax Acts require adjustments in calculating taxable income, i.e., transactions are treated differently for tax and accounting purposes, accounting methods adopted for financial reporting purposes will be irrelevant for the computation of taxable profit. In this situation, the taxable profit which is governed by tax laws can be different from the accounting profit prepared under the financial accounting standards (Davies et al. 1997; Ng 2009).

For example, whether a company adopts the straight-line method or the reducing-balance method for its depreciation charge is irrelevant for the calculation of taxable income, as UK tax law disallows depreciation for tax purpose and instead grants capital allowance on qualifying capital assets. In addition, a general doubtful debt provision could be recognised for accounting purpose “*when there is objective evidence that a firm will not be able to collect the debt*”, while tax relief of it is based on the extent to which the doubtful debt is estimated to be bad but a general provision is not allowable for tax deductions¹⁸.

The differences between accounting and tax treatments bring the concepts of ‘timing difference’ and ‘permanent difference’ into existence. Timing difference¹⁹ is the difference between taxable profit and accounting profit that arises from the recognition of incomes and expenses in financial statements in periods different from those in which incomes and expenses are included in tax assessments (Hanlon 2003). Permanent difference²⁰ between accounting profit and taxable profit arises mainly because that some items are required to be recognised as one measure of income are never required to be recognised as the other (Hanlon 2005, pp 140).

Permanent and timing differences between accounting and taxable income arise mainly because the purpose of taxation is different from that of financial accounting (James and Nobes 2016). For example, the general purpose of financial accounting is to “*provide financial information about the reporting entity that is useful to existing and potential investors, lenders and other creditors in making decisions about providing resources to the entity. Those decisions involve buying, selling or holding equity and debt instruments, and providing or*

¹⁸ See <https://www.gov.uk/hmrc-internal-manuals/corporate-finance-manual/cfm80230>

¹⁹ An example of the timing difference between book and taxable income is the accelerated tax depreciation of a fixed asset which causes the taxable income to be lower than book income during the early life of this asset, but the difference between book and taxable income will reverse over time during the latter part of the asset’s life.

²⁰ For example, the entertainment fines and expenses that are not exclusively for business purpose are deductible for book purpose but are not allowed to be deductible for tax purpose under UK tax law, since providing corporate tax relief for them can be considered as against social benefits as a whole. This creates a permanent difference between book and taxable income (Telford and Oats 2014).

settling loans and other forms of credit" (IASB 2006, Conceptual Framework, OB2). GAAP often provide considerable discretions in the process of financial reporting which allow managers to exercise judgments in choosing appropriate accounting methods, such as determining the amount of reserve allowance (e.g., bad/doubtful debt or warranty allowance); or estimating the useful economic lives of fixed or intangible assets to determine the associated depreciation or amortisation (Watts et al. 1986; Mills 1998; Hanlon 2005, pp. 141). By comparison, the primary goal of taxation is to equitably collect revenue, in order for governments to provide public goods, distribute resources and maintain economic stability (Oats et al. 2017). Thus, conservatism or prudence is vital for financial reporting purposes to inform investors and stakeholders about firms' underlying economic substance, while the principle of the income tax system focuses primarily on accuracy and fairness with less discretion allowed in the calculation of taxable income (Harris 2013).

Besides book-tax differences resulting from the explicit differences between accounting and tax treatments, the aggressive reporting for book or tax purpose constitutes an additional source of book-tax difference (Hanlon 2003). Book-tax differences can arise from firms' engagement in tax management activities that are designed to reduce taxable income relative to book income, or from firms' earnings management activities that are designed to opportunistically overstate the reported book income relative to taxable income (Hanlon 2003; Erickson et al. 2004). For instance, a firm can engage in strategic transfer-pricing arrangement to shift income from high-tax jurisdictions to low-tax jurisdictions, to reduce its worldwide tax burden relative to its overall pre-tax income and record an increased permanent book-tax difference in the financial statements²¹ (Frank et al. 2009). By comparison, a firm can engage in income-increasing accounting procedures such as temporarily inflating the fair value of investment assets or opportunistically lengthening the depreciable lives of its tangible or capitalised intangible assets. Such behaviour could inflate a firm's book income without significantly affecting its current taxable income, leading to the recognition of additional temporary book-tax differences in financial statements (Erickson et al. 2004).

²¹ By overstating income in low-tax jurisdiction and understating income in high-tax jurisdiction, firms are able to reduce their overall effective tax rate if they make the reasonable assumption that the overseas earnings will be reinvested abroad permanently, since under SSAP 15, FRS 19 and IAS 12, deferred taxes are not required to be recognised in the consolidated accounts if there is no intention to remit the overseas earnings. This accounting treatment avoids the disclosure of both current and deferred tax obligations and creates a permanent difference between book and taxable income.

2.3.2. Evolution of tax accounting standards in the UK

Accounting method for income tax is normally segregated into two components, i.e., the method for current tax and the method for deferred tax. Current tax is defined as “*the amount of tax estimated to be payable (refundable) in respect of the taxable profit (tax loss) for the current period or past reporting periods, along with adjustments to estimates in respect of previous periods*”. Deferred tax is defined as “*income tax payable or recoverable in respect of the taxable profit or tax loss for future reporting periods resulting from past transactions or events*” (Telford and Oats 2014, pp 108; IAS 12, para 5). As a result, the tax expense recognised in a firm’s income statement consists of both current and future tax consequence²² of firms’ current period’s transactions and activities (Hanlon 2003; Wahab and Holland 2012).

Accounting method for current tax is relatively straightforward. In general, current tax is determined by the current taxable profit calculated as adjusting the accounting profit reported in financial statements in accordance with the requirements of tax laws. The unpaid tax for current and prior periods, which is the tax charge for the current period plus any current taxes of previous periods not yet settled less any tax payments made and recognised on the income tax account, should be recognised as a liability. The prepayment of taxes, which is the excess amount of tax paid for current and previous period over the amount due for those periods, should be recognised as an asset²³ (FRS 16, para 5; IAS 12, para 12; FRS 102, para 29.3; Telford and Oats 2014, pp. 110).

Accounting for deferred tax is a controversial and complex area which has experienced four exposure drafts (ED 11 in 1973, ED 19 in 1977, ED 33 in 1982 and FRED 19 in 1999) and five full standards (SSAP 11 in 1975, SSAP 15 in 1978, FRS19 in 2000, IAS 12 in 2004 and FRS 102 in 2015) from the 1970s to the present. Accounting methods for deferred tax have long been the subject of debate among policymakers, corporate managers, academics and accountants in terms of the calculating approach (i.e., the deferral approach or the liability

²² Under current UK GAAP and IAS 12, current income tax consequences are included in the financial statements by recognising the amounts that are payable or refundable to the tax authorities with respect to taxable profit for the current period. Future tax consequences are recognised with respect to the difference between the carrying amount of assets and liabilities for book purposes and the carrying amount of assets and liabilities for tax purpose. Differences between the carrying amount of assets and liabilities for book purpose and tax purpose indicate that the recovery of assets and the settlement of liabilities may result in additional tax payments or refunds in the future (Telford and Oats 2014; Brouwer et al. 2018).

²³ Tax loss which can be carried back to recover current tax of a previous period should also be recorded as an asset (IAS 12, para 13).

approach); the provision basis (i.e., full provision or partial provision); and whether to discount the deferred tax balance or not. As stated by Mura (2000), deferred tax “*questions the definitions of liability, asset, reserve, expense and distribution, the relationship between the ‘prudence’, ‘going concern’, and ‘accrual’ concepts, and the relative role between balance sheet and profit and loss account*” (pp 1).

The deferral approach (i.e., the income-statement-based approach) places emphasis on the extent to which the profit and loss account has been affected by tax deferrals arising from the timing differences (Davis et al. 1997). Deferred tax account provided under the deferral approach is maintained using the tax rate that is applied to the originating timing differences, without being subsequently updated according to changes in tax rate between the origination and the reversal of timing differences. On reversal, the amount of the deferred taxes recognised in the profit and loss account is the amount which was accrued when the timing difference originates (Davis et al. 1997, pp. 1182; Lewis and Pendrill 2004). By contrast, the liability approach (i.e., the balance-sheet-based approach) focuses on the balance sheet rather than the profit and loss account. Under the liability approach, deferred tax is calculated at the tax rate that is ‘estimated to be applicable’ when the timing/temporary differences²⁴ reverse. This means that if there are any changes in the tax rate, the deferred tax account will be adjusted by recalculating the accumulated timing/temporary differences with the enacted (or substantively enacted) tax rate by the end of the reporting period (Davis et al. 1997; Lewis and Pendrill 2004). As compared to the deferral approach, deferred taxes provided under the liability approach can be perceived as a future liability or asset rather than a deferred revenue or expenditure originated in a past period.

Partial provision method requires deferred taxes to be recognised under managers’ reasonable estimations regarding the extent to which a liability or an asset will crystallise in the foreseeable future. Under the partial provision method, the full amount of deferred taxes should be calculated. However, only the amount of deferred taxes that are expected to reverse in the

²⁴ The temporary difference can be broader than, and include, timing difference (Telford and Oats 2014, pp 127). For example, since incomes or losses from revaluation are included in book income but are not allowable for tax purpose, the revaluation of fixed assets to fair value creates a temporary difference between the tax base of the assets and their carrying amount, even if there is no intention to sell the fixed assets (IAS 12, para 20). However, the revaluation induced differences between book and taxable income does not constitute timing difference unless there are binding agreements to sell the revalued assets or the gains and losses associated with selling the revalued assets have been recognised (FRS 19, para 14).

foreseeable future will be recognised in the financial accounts. Any amounts that are not expected to crystallise in the foreseeable future should only be disclosed in the notes rather than in the accounts. By contrast, the full provision method requires the full amount of deferred tax asset and liability arising from the timing/temporary difference to be recognised in the deferred tax account, regardless of whether the liability or asset is expected to crystallise in the foreseeable future or not (Davies et al. 1997; Citron 2001).

Another controversial issue related to deferred tax provision is whether to provide deferred taxes on a nominal basis or on a discount basis²⁵. It is argued that discounting deferred taxes based on the time until they reverse could make the deferred tax account more value relevant and better reflect their economic value. One reason for this is that deferred tax liabilities involve postponements of tax payments to tax authorities and, hence, can be perceived as taking an interest-free loan from tax authorities. Consequently, discounting the deferred tax liability based on the period of the deferment can better reflect the benefits associated with the postponement (Nurnberg 1972; Rayburn 1987; Davies et al. 1997). However, discounting deferred tax could be highly complex and impractical since it requires managers to clearly schedule the timing of the reversal of each individual deferred taxes (Brouwer 2018, pp. 211). In addition, previous studies suggest that it is the timing of expected future tax cash flows associated with deferred tax liabilities and assets rather than the timing of reversals affects the value of deferred taxes, thereby discounting the deferred tax assets or liabilities based on their expected timing of reversal may be irrelevant²⁶ (Dotan 2003; Guenther et al. 2000; 2004; Laux 2013). Specifically, deferred taxes which are included in GAAP prior to taxable income are expected to result in future tax-related cash flows. For these types of deferred taxes, their timing of reversals affects the timing of when future taxes will be paid and, thus, is value relevant. However, deferred taxes included in GAAP after taxable income are not expected to have future cash flows implications, thereby their timing of reversals may not be value relevant²⁷ (Guenther et al. 2004; Laux 2013).

²⁵ Specifically, FRS 19 permits but not requires the discounting of deferred tax balances. FRS 19 states that the discount rates are “the post-tax yields to maturity that could be obtained at the balance sheet date on government bonds with maturity dates and in currencies similar to those of the deferred tax assets and liabilities”. (FRS 19, para 52). FRS 19 also states that the discounting period is “the number of years between the balance sheet date and the date on which it is estimated that the underlying timing difference will reverse” (FRS 19, para 47). FRS 102 and IAS 12 prohibit the discounting of deferred tax balances.

²⁶ FRS 19 which permits but not requires to discount deferred tax balances states that “it is therefore valid to discount deferred tax balances only if they can be viewed as representing future cash flows that are not already measured at their present value” (pp. 89).

²⁷ An example of deferred taxes included in GAAP income before taxable income is the deferred tax assets arising from warranty cost and expense. Warranty costs and expenses are included for financial reporting purposes in

The rest of this section will discuss about the changes in the UK accounting standards for deferred taxes over the past four decades. Two tables will be presented at the end of this section. One table summarises the evolution process of the accounting methods for deferred taxes in the UK, and the other one compares the key similarities and differences between different UK tax accounting standards.

SSAP 11

In May 1973, the Accounting Standard Committee (ASC) issued the exposure draft ED 11 “*Accounting for Deferred Taxation*” as its first attempt to standardise the method of accounting for deferred taxation. It requires that “*deferred taxation should be accounted for on all material differences, using the deferral method*” (ASC 1973, para 33). This means that entities are required to provide deferred tax in full using the deferral approach. In August 1975, the exposure draft ED 11 was converted into a formal accounting standard—SSAP 11. SSAP 11 requires deferred taxation to be provided according to all material timing differences but permits entities to use either the deferral method or the liability method. However, SSAP 11 was under strong criticism on the ground that it is unfair to reduce shareholders’ asset by the amount of deferred tax liability which is not expected to be payable in the foreseeable future (Mura 2000). Among others, the Confederation of British Industry and the Committee of London Clearing Bankers suggested limiting the deferred taxes provisioning on short-term timing differences which are expected to crystallise within future five years (The Accountant 1976 June 24th, pp 730).

SSAP 15

The exposure draft ED 19 “*Accounting for Deferred Taxation*” was published in May 1977 with a fundamentally different approach compared to SSAP 11. ED 19 laid the foundations for the partial provision method of deferred tax by differentiating the short-term timing differences from timing differences that are not expected to reverse in the foreseeable future (Davies et al.

periods when the related sales and revenues are recognised while they are not allowed to be tax deductible until the underlying liability is settled, which creates a timing difference and therefore giving rise to a deferred tax asset. This type of deferred taxes is able to signal future tax cash flows that will occur when the associated timing differences reverse. An example of deferred taxes included in GAAP income after taxable income is the deferred tax liabilities arising from the accelerated tax depreciation. The underlying tax cash flows from capital allowance are generally occurred and included in the taxable income before the reversal of the associated timing differences.

1997). Finally, SSAP 11 was withdrawn and SSAP 15, which was converted from ED 19, was initially issued in 1978 and subsequently revised twice in 1985 and 1995.

SSAP 15 (revised version) “*Accounting for Deferred Taxation*” requires entities to provide deferred taxes using the liability approach on the partial provision basis. That is, entities are required to recognise deferred taxes to the extent that the corresponding timing differences are probable to reverse in the foreseeable future²⁸, using the tax rate that is estimated to be applicable when the timing differences reverse (SSAP 15, para 4-25). Therefore, the provisioning of deferred taxes under SSAP 15 requires firm managers to make ‘reasonable assumptions’ about whether or not the deferred taxes will reverse in the foreseeable future. Those assumptions should be based on managers’ private information about firms’ financial plans or projections to assess and predict the likely pattern of future tax liabilities or assets resulting from firms’ current activities (Davis et al. 1997, pp 1209). Therefore, deferred tax provided under the partial provision basis can provide managers with opportunities to convey their private information about firms’ future tax consequences. However, the complexity, discretion and judgements associated with the partial provision approach may facilitate managers to manipulate deferred taxes for the purpose of deliberately influencing net earnings (Holland and Jackson 2004). As a result, entities in similar economic and operational condition can make significantly different provisions for deferred taxes (Lewis and Pendrill 2004).

FRS 19

The Financial Reporting Exposure Draft 19 (FRED 19) “*Deferred Tax*” was issued in the year 1999. After that, the FRS 19 “*Deferred Tax*” was effective for periods commencing on or after 23 January 2002 with only a few adjustments to the requirements of FRED 19. In 2004/2005, the EU required all listed companies to use IFRS in their consolidated financial reporting. Under IFRS, IAS 12 “*Income Taxes*” is used to prescribe the income tax reporting practices. Parent company and subsidiaries within a group can choose between IFRS and the UK GAAP for financial reporting purpose. This indicates that the consolidated financial reports of UK listed companies must follow IAS 12 for tax reporting purpose, while the individual accounts of parent companies and each of their subsidiaries can choose between IAS 12 and FRS 16/19

²⁸ SSAP 15, Appendix, para 4 states that “*the forecasting period may be relatively short-say three to five years*”. Under SSAP 15, entities are required to account for the aggregated position of deferred tax provision by netting off various effects of each timing difference.

for tax reporting. In 2013, the Financial Reporting Council issued a series of new accounting standards which superseded all existing SSAPs and FRSs plus UITF Abstracts for accounting periods commencing on or after 1 January 2015. After 2015, the consolidated financial report of UK listed companies should be prepared in accordance with IFRS, while the individual accounts prepared by the parent companies and the subsidiaries can choose between IFRS and the new accounting standards, i.e., the FRS 101 or the FRS 102²⁹.

FRS 19 (and FRED 19), IAS 12 and FRS 102 all reject the partial provision approach in favour of the full provision approach for deferred tax disclosures. However, the requirements of full provisions for deferred tax disclosures are different among those three standards. Specifically, FRS 19 *Deferred Tax* requires deferred taxes to be provided in full using a so-called “incremental timing-difference approach”. The Financial Reporting Council highlights that FRS 19 adopts a ‘conceptually different’ approach as compared to IAS 12, since it perceives that “*the conceptual arguments underpinning the requirements of IAS 12 could lead to companies making excessive provisions*”³⁰.

FRS19 requires the provision of deferred tax on all timing differences but with a narrower range as compared to IAS 12. For instance, under FRS 19, deferred taxes would not be provided on valuation gains or losses if there is no binding commitment to sell the asset (FRS 19, para 44). Deferred taxes will not be provided on realised gains or losses on disposal of assets if the assets are rolled over into replacement assets (FRS 19, para 42). In terms of earnings from subsidiaries associates and joint ventures, deferred taxes would not be provided if the earnings are not accrued as receivable or there are no binding agreements to distribute the earnings in the future (FRS 19, para 43). By comparison, IAS 12 is based on the “comprehensive balance-sheet approach” to account for future tax consequences by recognising deferred taxes in respect of all temporary book-tax differences³¹. Lewis and Pendrill (2004) therefore argue that FRS 19

²⁹ FRS 101 combines the recognition and measurement requirements of IFRS with the presentation and disclosure requirements of UK GAAP and CA 2006. Therefore, it is equivalent with IFRS in respect of tax treatment since presentation and disclosure requirements are generally not relevant with tax consequences. FRS 102 is the new UK GAAP that is based on International Financial Reporting Standards for small and medium sized entities (Telford and Oats 2014).

³⁰Source: <https://www.frc.org.uk/accountants/accounting-and-reporting-policy/uk-accounting-standards/standards-in-issue/frs-19-deferred-tax>.

³¹ Under IAS 12, deferred taxes should be recognised for all temporary differences besides several exemptions. For instance, deferred tax liability should not be recognised for the initial recognition of goodwill and should not be recognised on the initial recognition of an asset (or liability) which is not a business combination, and at the time of recognising the asset (or liability), affects neither the accounting nor tax profit (IAS 12 para 15). IAS 12 para 39 also states that deferred tax liabilities associated with investments in subsidiaries, joint ventures and associates are not recognised if the parent or investors are able to control the timing of the reversal of the temporary

“rests on very shaky foundations” since its requirement of full provision for deferred taxes rests upon the accruals or matching concepts, which is contradicted to the balance sheet orientation of the full provision method (pp 350). In addition, FRS 19 permits but not requires the discounting of deferred tax liabilities or assets. This means that preparers of financial accounts are allowed to choose as their accounting policies to discount the long-term deferred tax balances to reflect the time value of money (FRS 19, para 42).

Through reducing the permissible latitude and discretion that can be exploited by managers to achieve the desired amount of deferred taxes, deferred tax account prepared on the full provision basis may reduce the opportunities for earnings management via manipulating deferred tax provisioning as compared to the partial provision approach required by SSAP 15. However, deferred tax provisioning “remains a relatively complex area of accounting”, since FRS 19 still requires firm managers to “form expectations concerning the future, apply judgement and make choices in accounting for deferred tax”³² (Holland and Jackson 2004, pp 104).

IAS 12

IAS 12 *Income Taxes* requires deferred taxes to be accounted for using the so-called “comprehensive balance-sheet approach”, i.e., deferred taxes should be recognised on a comprehensive basis with respect to temporary differences between “the carrying amount of an asset or liability in the statement of financial position and its tax base” (IAS 12, para 5). Specifically, IAS 12 requires deferred tax liabilities to be recognised in respect of all taxable temporary differences, except when certain specific exemptions apply³³ (IAS 12, para 15). By

difference, or it is probable that this temporary difference will not reverse in the foreseeable future. In addition, IAS 12 para 24 require a deferred tax asset should be recognised only if it is probable that sufficient taxable profit will be available against the deductible temporary differences.

³² For example, under FRS 19, “a deferred tax asset is recognised in respect of timing differences and tax losses to the extent that it is more likely than not that the deferred tax asset will be recovered” (FRS 19, para 23). As a result, when making decisions on whether to recognise a deferred tax asset, managers still need to use their judgements to estimate the expected timing of reversal of the deferred tax asset and whether there will be sufficient taxable profits available against which the deferred tax asset can be utilised at the time of reversal.

³³ Except that the deferred tax liabilities arise from the “initial recognition of goodwill; the initial recognition of an asset or liability in a transaction which is not a business combination and affects neither accounting profit nor taxable profit (or tax loss) at the time of the transaction” (IAS 12, para 15). An entity shall recognise a deferred tax liability for all taxable temporary differences from “investments in subsidiaries, branches and associates, except to the extent that the parent, investor, joint venture or joint operator is able to control the timing of the reversal of the temporary difference or it is probable that the temporary difference will not reverse” (IAS 12, para 39).

comparison, deferred tax assets are required to be recognised in respect of all deductible temporary differences to the extent that “it is probable that there will be sufficient taxable profit available against which the deductible temporary differences can be utilised”³⁴ (IAS 12, para 24). IAS 12 requires entities to determine the expected manner in which the carrying amount of assets is recovered and the carrying amount of liabilities is settled at the end of the reporting period to determine the corresponding tax base (IAS 12, para 51). In addition, deferred tax assets and liabilities should be measured at the enacted (or substantively enacted) tax rate that is expected to be applicable by the end of the reporting period (IAS 12, para 47). In this situation, IAS 12 places emphasis on the balance sheet and perceives deferred taxes as a future liability or asset with future tax consequences resulting from the settlement of liabilities or the recovery of the assets, rather than perceiving deferred taxes as a deferred revenue or expense originated in the past.

The justification for the tax accounting method underlying IAS 12 is that it aims to faithfully represent³⁵ an entity’s current and future tax positions on a comprehensive basis, with the attempts to reduce the latitudes for opportunistic managerial behaviours via deferred tax provisioning. However, the comprehensive nature of IAS 12, which requires deferred tax liabilities recognised with respect to all taxable temporary differences³⁶, may restrict managers’ ability to convey their private information about firms’ future tax consequences and, thus, compromising the value relevance of information reported in tax accounts to explain future tax cash flows³⁷ (Brouwer 2015).

IFRS Conceptual Framework requires that “*all items in the balance sheet, other than shareholders’ equity, must be either assets or liabilities as defined in the framework*”. An asset

³⁴ Except that the deferred tax assets arise from the “initial recognition of an asset or liability in a transaction which is not a business combination and affects neither accounting profits nor taxable profit (tax loss) at the time of transaction” (IAS 12, para 24). An entity shall recognise a deferred tax asset for all deductible temporary differences arising from “investments in subsidiaries, branches and associates to the extent that it is probable that the temporary difference will reverse in the foreseeable future and taxable profit will be available against which the temporary difference can be utilised” (IAS 12, para 44).

³⁵ The conceptual framework of IFRS standards requires the faithful recognition. It requires a depiction to be “complete, neutral and free from error” and to include “all information necessary for a user to understand the phenomenon being depicted” (IFRS QC12-13).

³⁶ Except certain specific exemptions, see footnote 26

³⁷ Besides faithful representation, relevance is another important qualitative characteristic highlighted in IFRS Conceptual Framework. IFRS Conceptual Framework states that “if financial information is to be useful, it must be relevant and faithfully represent what it purports to represent” (IFRS QC4). Relevant financial information should have predictive value or confirmatory or both, in order to be capable of making a difference in users’ decision-makings (IFRS QC6-QC7).

should be recognised in the balance sheet “*when it is probable that the future economic benefits will flow to the entity and the asset has a cost or value that can be measured reliably*”. A liability should be recognised in the balance sheet “*when it is probable that an outflow of resources embodying economic benefits will result from the settlement of a present obligation and the amount at which the settlement will take place can be measured reliably*” (IASB 2006, Conceptual Framework, para 4.44-4.46). Thus, the definition of an asset and a liability stated in the IFRS Conceptual Framework is explicitly linked to an expected future inflow or outflow of economic benefits (Brouwer et al. 2018). However, only the recognition requirements of deferred tax assets under IAS 12 are applied with the probability threshold of future cash tax realisation, while deferred tax liabilities provided under IAS 12 are recognised on all temporary differences regardless of whether they have future cash tax consequences (Brouwer et al. 2018). As a result, the asymmetrical verification requirement of IAS 12 could result in the recognised deferred tax liabilities divergent from the criterion of a liability defined in the IFRS Conceptual Framework, because some deferred tax liabilities are not expected to reverse any time in the future owing to their nearly permanent nature³⁸ (Loftus 2003).

FRS 102

Under FRS 102, deferred tax is provided using a so-called “*timing difference plus approach*”. That is, deferred taxes are calculated with respect to timing differences between “*the taxable profits and total comprehensive income as stated in the financial statements that arise from the inclusion of income and expenses in tax assessments in periods different from those in which they are recognised in financial statements*” (FRS 102, para 29.6). The ‘plus’ part of the deferred tax is achieved by extinguishing certain exemptions that are required by FRS 19.

For instance, FRS 102 requires deferred tax to be provided on revaluation gains or losses through other comprehensive income, while FRS 19 does not require recognising deferred tax on revalued assets unless there was a binding commitment to dispose of. FRS 102 requires deferred taxes to be recognised in a business combination when the fair value of assets (other than goodwill) and liabilities acquired differs from the amount attributed for tax purposes, while no deferred taxes are required under FRS 19 regarding business combination. FRS 102

³⁸ For example, IAS 12 requires deferred tax liabilities arising from upward revaluation of fixed assets to be provided, even if the taxable gain from disposal of a fixed asset will be indefinitely deferred or rolled over into a replacement asset with rollover relief. This type of deferred tax is nearly permanent in nature since no tax will become payable in the future until the replacement assets are disposed in the absence of rollover relief.

requires deferred tax to be recognised for timing differences where income or expenses from a subsidiary, associate, branch or joint venture are recognised in the financial statements in periods different from those in which taxable or deductible for tax purpose³⁹, while FRS 19 only requires deferred taxes to be recognised to the extent that the unremitted earnings have been accrued as receivable or there are binding agreements to distribute those earnings (FRS 102, para 29.6-29.11).

In light of the above discussions, it can be concluded that accounting methods for deferred taxes are in a continual process of development and modification over the past fifty years in the UK. Table 2.2 below summarises the significant milestones in the evolution process of accounting methods for deferred taxes in the UK. Table 2.3 below provides a detailed insight into key similarities and differences between tax accounting standards for UK listed companies in terms of the recognition, presentation and disclosure of deferred taxes, to show how different accounting methods for deferred taxes affect the tax reporting practices⁴⁰.

³⁹ Except that the entity can “control the reversal of the timing difference and it is probable that the difference will not reverse in the foreseeable future” (FRS 102, para 29.9).

⁴⁰ Until the year 2004, consolidated and unconsolidated financial reporting of UK companies were under Schedule 4 to the Companies Act 1985 and UK GAAP (i.e., SSAP 15 and FRS 19 for income tax purposes). For 2005 onwards, IFRS (i.e., IAS 12 for income tax purposes) was mandatorily applied to consolidated financial statements of listed UK companies.

Table 2.2: Evolution of Accounting Methods for Deferred Taxes in UK

1973	ED 11	<ul style="list-style-type: none">• Until 1973, deferred tax was not mandatory and followed a variety of practices.• Under ED 11, deferred tax should be “accounted for all material differences using deferral method” (ASC 1973, para 33).• It emphasises on profit and loss account rather than balance sheet.• Deferred taxation balance is seen as deferred revenue or deferred expense, as opposite to a future liability or repayment.
1975	SSAP 11	<ul style="list-style-type: none">• It was effective for periods beginning on or after 1 January 1976.• Deferred taxes should be “accounted for all material timing differences, using either deferral method or liability method”.
1976	ED 18	<ul style="list-style-type: none">• Opposite to SSAP 11, deferred taxes should be accounted for, “on the liability method, in respect of the tax reduction arising from all originating timing differences of material amount other than any tax reduction which can be seen with reasonable probability to continue for the foreseeable future” (ASC, 1976)
1976	SSAP 11	<ul style="list-style-type: none">• SSAP 11 was put off and then suspended.
1977	ED 19	<ul style="list-style-type: none">• ED 19 follows the approach set out in ED 18 and laid down conditions for partial provisions of deferred tax by differentiating short-term timing differences from timing differences that would not reverse in the foreseeable future.• It states that “provision should be made in full for short-term differences, but that the remaining timing differences should be considered jointly to see whether it could be established that some part of the potential liability need not be provided”.
1978	SSAP 15 (original)	<ul style="list-style-type: none">• SSAP 11 was withdrawn and SSAP 15 which is based on ED 19 was issued.• The liability method is no longer mandated, but it does not explicitly mention the liability method or deferral method.

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| 1983 | ED 33 | <ul style="list-style-type: none">• Deferred tax should be provided based on partial provision to the extent that “it is probable that a liability would crystallise and not set up to the extent that it would not”.• It states that liability method should be used since that deferral method was not compatible with the partial provision concept. |
| 1985 | SSAP 15 | <ul style="list-style-type: none">• It is similar to ED 33 with following changes: |
| 1995 | (First and second revised) | <ul style="list-style-type: none">• It explicitly states that the liability method was the required method for deferred tax provision.• It drops the proposal in ED 33 to require the disclosure of the period or periods of time in which the liability was expected to crystallise.• It states that no deferred tax to be provided in respect of unremitted overseas earnings. |
| 1992 | FRED 2 | <ul style="list-style-type: none">• It requires “either the full provision basis or the partial provision basis may be used in accounting for the deferred tax implications of pensions and other post-retirement benefits”. |
| 1999 | FRED 19 | <ul style="list-style-type: none">• Deferred tax should be provided on full provision basis.• Although the Accounting Standard Board (ASB) claimed FRED 19 is aimed at international harmonisation, there are differences between FRED 19 and IAS 12.• Inconsistent with IAS 12, FRED 19 does not require deferred tax to be provided on valuation gains or losses unless the company is committed to selling the asset; the unremitted earnings of subsidiaries, associates and joint ventures unless earnings have been accrued or there is an obligation to distribute the earnings.• Inconsistent with IAS 12, FRED 19 suggests that deferred tax accounts should not include large, long-term liabilities at their full value, and requires discounting the long-term deferred tax balances if their effect is material. |
| 2000 | FRS 19 | <ul style="list-style-type: none">• It is effective for accounting period ending on or after 2002.• There are only a few changes compared to FRED 19.• It requires deferred tax to be provided on full provision basis using the “incremental balance-sheet” approach. It requires deferred tax to be provided on all timing differences but with a narrower range compared to IAS 12. |

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- It permits but not require the discounting of long-term deferred tax balances.
- 2004 IAS 12
- All UK listed companies are required to prepare their consolidated financial reports in accordance with International Accounting Standards for periods on or after 2004.
 - IAS 12 requires deferred taxes to be provided in full under the “comprehensive balance-sheet” approach in respect of all temporary differences except certain exemptions.
 - IAS 12 prohibits the discounting of deferred tax balances.
- 2015 FRS 102
- FRS 102 requires deferred taxes to be provided in full using a “timing differences plus” approach, besides certain exceptions.
 - FRS 102 prohibits the discounting of deferred tax balances
-

Table 2.3: Similarities and Differences between IAS 12 and UK GAAP in terms of Deferred Tax Provision

SUBJECT	SSAP 15 (revised)	FRS 19	IAS12	SUMMARY
Validity period for UK listed companies	From 1985 to 2001	From 2002 to 2004	From 2004 to the present	
Approach	Liability approach on partial provision basis.	Liability approach on full provision basis, i.e., “incremental timing-difference approach”.	Liability approach on full provision basis, i.e., “comprehensive balance-sheet approach”.	<ol style="list-style-type: none"> 1) SSAP 15, FRS 19 and IAS 12 all employ liability approach. 2) SSAP 15 requires deferred taxes to be provided under a partial provision basis while FRS 19 and IAS 12 require deferred taxes to be provided under a full provision basis
Definition	Deferred tax is the “tax attributable to timing differences” (SSAP 15, para 17).	Deferred tax is the “estimated future tax consequences of transactions and events recognised in the financial statements for current and previous periods in respect of timing differences between the recognition of gains and losses in the financial statements and their recognition for tax purposes” (FRS 19, para 2).	“Deferred tax liabilities under IAS 12 are the amount of income taxes payable in future periods in respect of taxable temporary difference. Deferred tax assets under IAS 12 are the amounts of income taxes recoverable in future periods in respect of deductible temporary differences; and the carry-forward of unused tax losses and tax credits” (IAS 12, para 5).	
Temporary difference	No concept of temporary differences in SSAP 15.	No concept of temporary difference in FRS 19.	<p>Fundamentally different from SSAP 15 and FRS 19, a temporary difference under IAS 12 is “the difference between the carrying amount of an asset or liability and its tax base” (IAS 12, para 5). The temporary difference is broader than, and includes timing difference.</p> <p>Temporary difference focuses on the balance sheet, i.e., the tax payable of assets at the balance sheet date for their carrying values (Telford and Oats 2014, pp 127).</p> <p>In short, “temporary difference is the difference between the tax and financial</p>	IAS 12 recognises deferred taxes in respect of temporary differences with emphasis on the balance sheet.

			reporting base of asset or liabilities” (James and Nobes 2016, pp 284).	
Timing difference	<p>“Timing differences are differences between profits or losses as computed for tax purposes and results as stated in financial statements, which arise from the inclusion of items of income and expenditure in tax computations in periods different from those in which they are included in financial statements. Timing differences originate in one period and are capable of reversal in one or more subsequent periods” (SSAP 15, para 18)</p>	<p>“Timing difference are differences between an entity’s taxable profit and total comprehensive income as stated in the financial statements that arise from the inclusion of income and expenses in tax assessments in periods different from those in which they are recognised in financial statements” (FRS 19, para 2)</p> <p>Timing differences focus on the profit and loss account, i.e., the impacts from future reversal (Telford and Oats 2014, pp 127). In short, “timing difference is the reversible difference between revenues/expenses for accounting and tax” (James and Nobes 2016, pp 284).</p>	No concept of timing difference in IAS 12	SSAP 15 and FRS 19 recognise deferred taxes in respect of timing differences with emphasis on profit and loss account.
Recognition	<p>“Deferred tax should be accounted for in respect of the net amount by which it is probable that any payment of tax will be temporarily deferred or accelerated by the operation of timing differences which will reverse in the foreseeable future without being replaced. Partial provision recognises that, if an enterprise is not expected to reduce the scale of its operations significantly, it will often have what amounts to a hardcore of timing differences so that the payment of some tax will be permanently deferred. On this basis, deferred taxes should be provided only where it is probable that tax will become payable as a result of the reversal of timing differences” (SSAP 15, para 12)</p>	<p>Deferred taxes “should be recognised in respect of all timing differences that have originated but not reversed by the balance sheet date, i.e., should be recognised as a liability if the transactions or events give the entity an obligation to pay additional tax in the future or as an asset if the transactions or events give the entity a right to pay less tax in the future” (FRS 19, para7)</p> <p>“Deferred tax assets should be recognised to the extent that it is more likely than not that there will be suitable taxable profits from which the future reversal of the underlying timing differences can be deducted” (FRS 19, para 23)</p>	<p>“Deferred tax liabilities should be recognised for all taxable temporary difference, except the extent to which the deferred tax liability arises from:</p> <ul style="list-style-type: none"> • The initial recognition of goodwill; or • The initial recognition of an asset or liability in a transaction which is not a business combination and at the time of transaction, affects neither accounting profit nor taxable profit or loss” (IAS 12, para 15) <p>“Deferred tax assets should be recognised for all deductible temporary differences to the extent that it is probable that taxable profit will be available against which the deductible temporary difference can be utilised, except the deferred tax assets arise from the initial recognition of an asset or liability in a transaction that:</p> <ul style="list-style-type: none"> • Is not a business combination; • At the time of the transactions, affects neither accounting profit nor taxable profit (tax loss)” (IAS 12, para 24) 	<ol style="list-style-type: none"> 1) SSAP 15 and FRS 19 account for deferred taxes arising from differences in the timing of recognition of revenues and expenses for accounting and tax purposes. By considering between the carrying amount and tax value of the assets and liabilities, IAS 12 aims at providing tax effects of liquidating the carrying amounts of all the assets and liabilities in the balance sheet 2) SSAP 15 is based on a partial provision method to account for deferred taxes. It requires to recognise the amount of deferred taxes that are expected to reverse in the foreseeable future. FRS 19 and IAS 12 are based on the full provision method to recognise deferred taxes in respect of all timing/temporary differences.

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Permanent difference	Permanent differences are differences between taxable profits and accounting profits that are not reverse and have no effects on other periods.	“Permanent differences are differences between an entity’s taxable profits and its total comprehensive income as stated in the financial statements, that arise because certain types of income and expenditure are non-taxable or disallowable other than timing differences” (FRS 19, para7)	There is no separate concept of permanent difference in IAS 12.	SSAP 15 and FRS 19 separately define permanent difference while IAS 12 does not.
Deferred tax asset	“Net deferred tax debit balances (i.e., arising from tax losses or the effect of timing differences) should not be carried forward as a deferred tax asset, except that it is assured beyond reasonable doubt that they are expected to be recoverable without being replaced by equivalent debit balances” (SSAP 15, para 30).	“A deferred tax asset is recognised in respect to timing differences and tax losses to the extent that it is more likely than not that the deferred tax asset will be recovered” (FRS 19, para 23).	<p>“Deferred tax asset should be recognised for all deductible temporary differences to the extent that it is probable that taxable profit will be available against which the deductible temporary difference can be utilised”, except certain exemptions (IAS 12, para 24).</p> <p>“The carrying amount of deferred tax assets are reviewed at the end of each reporting period and reduced to the extent that it is no longer probable that sufficient taxable profit will be available to allow the benefit of part or all of that deferred tax asset to be utilised. The reduction is reversed when it subsequently becomes probable that sufficient taxable profit will be available” (IAS 12, para 37)</p>	When recognising deferred tax assets, both FRS 19 and IAS 12 apply the probability threshold of future cash tax realisation regarding the recoverability of deferred tax assets. SSAP 15 recognises deferred tax assets to the extent that they will not be replaced by new deferred tax assets.
Asset carried at fair value	SSAP 15 provides guidelines towards the revaluation of fixed assets in respect of the tax consequences arising from the disposal of the fixed assets at their revalued amounts. Specifically, “the revaluation of an asset (including an investment in an associated or subsidiary company) will create a timing difference when it is incorporated into the balance sheet, insofar as the profit or loss that would result from realisation at the revalued amount is taxable, unless disposal of the revalued asset and of any subsequent replacement assets would not result in a tax liability, after taking account of any expected rollover relief” (SSAP 15, para 20).	<p>FRS 19 requires recognising deferred taxes “when an asset is continuously revalued to fair value, with changes in fair value being recognised in the profit and loss account” (FRS 19, para 12).</p> <p>“No deferred tax is recognised on a revaluation gain in respect of a non-monetary asset unless:</p> <ul style="list-style-type: none"> • The entity entered into a binding agreement to sell the revalued non-monetary asset. • Gain and losses expected to arise on the sale are recognised (FRS 19, para 14)”. <p>If it was more likely than not that a rollover claim would be made on disposal, no</p>	<p>“The difference between the carrying amount of a revalued asset and its tax base is a temporary difference which gives rise to deferred tax assets or liabilities (IAS 12, para 20).</p> <p>This is true even if the entity does not intend to dispose of the asset or tax or capital gains is deferred if the proceeds of the disposal of the asset are invested in similar assets” (IAS 12, para 20).</p>	<ol style="list-style-type: none"> 1) There are significant differences between SSAP 15, FRS 19 and IAS 12 in terms of assets revaluation. It can be common that no deferred taxes are necessary to be recognised in respect of fixed assets revaluation under SSAP 15 (Dewis et al. 1997). However, this is not the case under FRS 19 and IAS 12. 2) IAS 12 provides deferred taxes in respect of assets revaluation no matter whether the entity intends to sell the asset or not. FRS 19 recognises deferred tax on revalued assets only when the entity has entered into a binding agreement to sell the asset or the associated gains

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	However, SSAP 15 provides no explicit guidelines towards the impacts of revaluation on deferred tax provision in respect of “timing differences between the amounts of depreciation charged in the accounts and of capital allowances in the tax computation” (SSAP 15, para 20).	provision was necessary (FRS 19, para 15).		and losses have already been recognised
Unremitted earnings of subsidiaries, associates and joint ventures	<p>“The retention of earnings overseas will create a timing difference therefore related deferred tax only if:</p> <ul style="list-style-type: none"> • There is an intention or obligation to remit them; • The remittance would result in a tax liability after taking account of any related double tax relief (SSAP 15, para 21)” 	<p>“Deferred tax is recognised only to the extent that, at the balance sheet date:</p> <ul style="list-style-type: none"> • Earnings from subsidiaries, associates and joint ventures have been accrued as receivable; and • A binding agreement to distribute the past earnings in the future has been entered into by the subsidiary, associate or joint venture, those refer to timing differences between the periods for accounting purpose and the periods for tax purpose (FRS 19, para 21)”. 	<p>An entity is required to “recognise a deferred tax liability for all taxable temporary differences associated with investments in subsidiaries, branches and associates, and interests in joint arrangements, except to the extent that both of the following conditions are satisfied:</p> <ul style="list-style-type: none"> • The parent, investor, joint venture or joint operator is able to control the timing of the reversal of the temporary difference; and • It is probable that the temporary difference will not reverse in the foreseeable future (IAS 12, para 39)”. <p>An entity is required to “recognise a deferred tax asset for all deductible temporary differences arising from investments in subsidiaries, branches and associates, and interests in joint arrangements, to the extent that, and only to the extent that, it is probable that:</p> <ul style="list-style-type: none"> • The temporary difference will reverse in the foreseeable future and • Taxable profit will be available against which the temporary difference can be utilised (IAS 12, para 44)”. 	<p>1) SSAP 15, FRS 19 and IAS 12 do not require the recognition of deferred taxes in respect of timing differences arising from the remittance of earnings from a subsidiary, associate or joint venture, if the remittance of the earnings is not expected to take place in the future.</p> <p>2) FRS 19 explicitly prohibits the recognition of deferred tax arising from the remittance of earnings from a subsidiary, associate or joint venture, if no commitment has been made to remit the earnings.</p>
Business combination	No explicit requirement for deferred taxes arising from business combination.	<p>In general, no deferred taxes arises on business combinations.</p> <p>When there are adjustments of an acquired entity’s assets and liabilities to fair value, the treatment of those adjustments is in the</p>	Assets and liabilities should be recognised “at their fair value at the acquisition date. Deferred tax thereby should be recognised in respect of temporary differences that arise when the tax base of the identifiable assets and liabilities are not affected by or	FRS 19 requires deferred taxes to be recognised with respect to timing differences arising from business combination, while IAS 12 requires deferred taxes to be recognised in

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		same way as if there were timing differences arising in the acquiring entity's own financial statements. For example, deferred taxes should be recognised only when there are binding agreements to sell the revalued non-monetary asset (FRS 7, para 74).	affected differently by the business combination. Deferred taxes from business combination are recognised to reflect future tax consequences with corresponding adjustments to goodwill" (IAS 12, para 19-66).	respect of temporary differences arising from business combination.
Measurement	<p>Deferred taxes provided in financial statements should be measured at the tax rate "that is expected to be applicable to the period when the timing differences reverse. Deferred taxes which are not provided in financial statements should be measured "at the expected long-term tax rate" (SSAP 15, para 23; Lewis and Pendrill 2004)</p> <p>Whether deferred tax liabilities or assets will crystallise in the foreseeable future or not should be assessed on the basis of reasonable and realistic assumptions. Plans and projections are required to be reviewed regularly since their tax consequences can be affected by many factors, including "the reassessment of asset lives, a decision to close part of the business which renders certain assets no longer needed, or the provision of a sum in respect of the permanent diminution of an asset" (Lewis and Pendrill 2004, pp. 1209; SSAP 15, para 27-28).</p>	Deferred taxes should be measured "using tax rates that have been enacted or substantively enacted at the balance sheet date and that are expected to apply in the periods when the timing differences are expected to reverse" (FRS 19, para 37).	Deferred taxes should be measured using "the tax rates that are expected to apply to the period when the asset or liability is realised or settled, based on tax rates that have been enacted or substantively enacted by the end of the reporting period" (IAS 12, para 47).	<p>SSAP 15, FRS 19 and IAS 12 all use liability approach to account for deferred tax balances.</p> <p>Tax rate employed is the rate expected to be applicable to the period when the timing differences reverse or when the assets or liabilities that give rise to temporary differences realised or settled, rather than the tax rate that is applied to the originating timing/temporary differences.</p>
Disclosure	Timing differences should be considered "in aggregate rather than individually for the purpose of determining the overall net reversal, except timing differences with respect to post-retirement benefits which are considered separately and provided in full because of the amendments to	Reconciliation is required between the "current tax charge or credit on ordinary activities for the period reported in the profit and loss account and the current tax charge that would result from applying a relevant standard rate of tax to the profit on ordinary activities before tax. No requirements of reconciliation in terms of deferred taxes" (FRS 19, para 64(a))	<p>"The relationship between total income tax expense (current and/or deferred) and accounting profit should be explained in either or both of the following ways:</p> <ul style="list-style-type: none"> • A numerical reconciliation between income tax expense and the accounting profit multiplied by the applicable tax rates 	1) There are no explicit requirements in SSAP 15 regarding the disclosure of reconciliation items between tax expense and accounting profit, while FRS 19 and IAS 12 require disclosing the relationship between tax expense and accounting profit by disclosing reconciliation items.

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	SSAP 15” (SSAP 15, Appendix para 4)		<ul style="list-style-type: none"> • A numerical reconciliation between the average effective tax rate and the applicable tax rate” (IAS 12, para 81(c)) 	2) The reconciliation items disclosed under FRS 19 focuses only on current taxes while IAS 12 focuses on both deferred and current taxes.
Prior year adjustment	Before FRS 3 was issued, “the effect of changes in the tax system should be treated as an extraordinary item if it was sufficiently material” (Lewis and Pendrill 2004, pp 1220).	Prior year adjustments in terms of errors correction are required to be recognised “only when errors are identified as being fundamental” and “should be separately disclosed within the tax charge on the face of the profit and loss account” (FRS 3, para 23)	IAS 12 requires the separate disclosures of any adjustments of taxes of prior periods, “including the adjustments of the current and deferred tax of the prior periods; the adjustments relating to temporary differences that have impacts on current year’s tax expense; the adjustments relating to unrecognised tax losses and credits or temporary differences of a prior period; and the adjustments of deferred tax expense (or income) relating to changes in tax rates or the imposition of new taxes in the year when the errors or the changes are identified” (IAS 12, para 39-49).	<p>1) IAS 12 requires the separate disclosure of adjustments of estimation errors in current or deferred taxes or changes in accounting estimates when the estimation errors or the changes are identified. This is contrary to SSAP 15 and FRS 3 that prior year adjustments are required only when errors are identified as being fundamental.</p> <p>2) Therefore, it is likely that prior year adjustments in terms of estimation errors are more frequent under IAS 12.</p>
Uncertain tax position	No specific requirements for uncertain tax position	There are no specific guidelines on uncertain tax position under FRS 16/19. Entities can make an accounting policy choice to quantify the uncertain tax position if the likelihood of the uncertainty is greater than 50%, using either a single best estimate or a probability-weighted average of the possible outcomes (PwC 2015).	<p>IAS 12 does not provide specific guidelines for uncertain tax treatments. If “it is probable that a tax authority will accept an uncertain tax treatment, then an entity determines whether it needs to disclose the potential effect of the uncertainty as a tax-related contingency. Disclosures associated with tax-related contingent liabilities require an estimate of the financial effect; an indication of the uncertainties relating to the amount; or time of any outflow and the possibility of reimbursement” (KPMG 2017).</p> <p>Changes in “facts and circumstances or new information will generally result in a reassessment of the judgment or estimate used”.</p> <p>“IFRS standards do not specifically address the accounting for interest and penalties related to income taxes. If a particular amount payable or receivable of</p>	There are no explicit guidelines on uncertain tax position in SSAP 15, FRS 19 and IAS 12. However, under certain circumstances, entities can determine whether or not to disclose their uncertain tax positions.

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			interests and penalties are considered as income taxes, then they are accounted for under IAS 12. If such interest and penalties related to uncertain tax treatment, then IAS 37 will be considered”.	
Offsetting	“Deferred tax liabilities should be reduced by deferred tax debit balances in respect of separate categories of timing differences” (SSAP 15, para 29-30) “SSAP 15 allows unrelieved tax losses to be netted off against deferred tax liabilities” (Lewis and Pendrill 2004, pp. 1218).	“Deferred tax assets and liabilities cannot be offset unless they: <ul style="list-style-type: none"> • Relate to taxes levied by the same tax authority; and • Arise in the same taxable entity or different taxable entities within a tax group” (FRS 19, para 56-57) 	Similar to FRS 19 (IAS 12, para 71-75).	Compared to SSAP 15, rules in respect of offsetting deferred taxes are more restricted under FRS 19 and IAS 12.
Recognition in the comprehensive income statements or directly into equity	SSAP 15 requires the disclosure of the “amount of deferred tax charged or credited in the profit and loss account with separate disclosures of deferred taxes that associated with ordinary activities and those associated with any extraordinary items” (SSAP 15, para 33-34).	“Deferred tax should be recognised in the profit and loss account for the period, except to the extent that it is attributable to a gain or loss that is or has been recognised directly in the statement of total recognised gains and losses”. Deferred taxes are not recognised directly to equity (FRS 19, para 34-35; PwC 2015).	Can be different from FRS 19. Deferred taxes shall be recognised in the same way with transactions or events that give rise to tax expense, i.e., deferred taxes should be recognised outside the profit and loss accounts in other comprehensive income or directly in equity, if their related transactions or events are recognised in other comprehensive income or directly in equity (IAS 12, para 61A).	Deferred taxes can be recognised outside the profit and loss accounts in accordance with transactions or events that give rise to the deferred taxes.
Discount	There are no explicit guidelines about discounting deferred tax balances in SSAP 15.	FRS 19 permits but not requires discounting of deferred tax balances	IAS 12 prohibits discounting of deferred tax balances	There are no explicit guidelines on discounting deferred taxes under SSAP 15. FRS 19 permits but not requires the discounting of deferred taxes while IAS 12 prohibits it.

Source: Lewis and Pendrill 2004; PwC 2015; Telford and Oats 2014/2015; James and Nobes 2016/2017; KPMG 2017⁴¹; Brouwer et al. 2018; IAS website; FRC website

⁴¹ See: <https://home.kpmg.com/content/dam/kpmg/us/pdf/2017/10/tnf-wnit-gaap.pdf>

2.3.3. Tax treatment of basic accounting issues in the UK

This section briefly discusses the tax treatments of basic accounting issues in UK companies, in order to show how tax consequences regarding the key accounting events which may arise in UK companies are computed and presented to financial statements. The basic accounting events discussed in this section include intangible asset, lease, financial instrument, inventory, plant, property and equipment, employee benefits and investment property. Understanding the tax treatments of accounting issues is important for solving this study's research questions, as it provides an insight into identifying how deferred taxes might occur and how income tax provision reported in firms' financial statement might be informative about firms' future tax payments (e.g., certain cash tax deductions can be serially correlated over time). A table briefly summarising key events that trigger the recognition of deferred taxes and revenue tax deductions will be presented at the end of this section.

2.3.3.1. Intangible asset

Goodwill

This section briefly discusses the tax treatments of basic accounting issues in UK companies, in order to show how tax consequences regarding the key events which may arise in UK companies are computed and presented to financial statements. Understanding the tax treatments of accounting issues is important for solving this study's research questions, as it provides an insight into how deferred taxes might occur and how income tax provision reported in firms' financial statement might be informative about firms' future tax payments (e.g., certain cash tax incentives can be serially correlated over time).

Accounting for goodwill and intangibles assets is governed by FRS 10 *Goodwill and Intangible Assets* and IAS 38 *Intangible Assets*. FRS 10 requires that “*positive purchased goodwill should be capitalised and classified as an asset on the balance sheet*” (para 7). Goodwill and intangibles assets that are regarded as having limited useful economic lives should be amortised on a systematic basis over their useful economic lives. For goodwill and intangible assets that are regarded as having infinite useful economic lives, they are not permitted to be amortised but are subject to impairment tests at each balance-sheet date (FRS 10, para 15-17). By contrast,

IAS 38 forbids amortising goodwill but requires firms to perform impairment tests of goodwill annually⁴² (IAS 36, para. 96).

According to section 8 Corporation Tax Act 2009 (CTA 2009)⁴³, corporate tax reliefs are provided for goodwill and intangible assets acquired from an unrelated party. This implies that under CTA 2009, either the systematic amortisation or impairment of goodwill/intangible assets is normally allowable to reduce taxable income when the amortisation or impairment expenditure is recognised in financial statements. Alternatively, companies may elect to write down the goodwill for tax purpose at a fixed 4% per annum in which case the accounting methods for goodwill become irrelevant (CTA 2009, s871-s873)⁴⁴. However, after 8 July 2015, tax deductions are no longer allowable for any goodwill in respect of amortisation or impairment expenditures, regardless of whether the goodwill is acquired from a related or an unrelated party or is created by the company⁴⁵ (CTA 2009, s861A)⁴⁶.

Research and Development Costs

SSAP 13 *Accounting for Research and Development* is consistent with IAS 38 *Intangible Assets* in distinguishing costs incurred during the research phase from costs incurred during the developing phase. Under SSAP 13 and IAS 38, research cost does not give rise to intangible assets. Instead, it should be recognised as an expense in the profit and loss account when it is incurred (IAS 38, para 54-56; SSAP 13, para 8). Under SSAP 13, entities have the accounting policy choice either to recognise the development cost as an expenditure and write it off to the profit and loss account when incurred, or to capitalise the development cost and carry it forward as an intangible asset on balance sheet if certain criteria are met⁴⁷ (SSAP 13, para 25). IAS 38 does not provide the accounting policy choice but requires entities to capitalise costs incurred

⁴² IAS 38 distinguishes goodwill from other intangible assets in terms of measurements subsequent to acquisition. Intangible assets which are classified as having finite useful economic lives should be amortised over their lives, while intangible assets which are classified as having indefinite lives are not required to be amortised, instead, they should be assessed for impairment. However, the requirement of IAS 38 in terms of goodwill is different from that of the other intangible assets as IAS 38 does not allow goodwill to be amortised (IAS 38, para 85-111).

⁴³ Section 8 Corporate Tax Act 2009.

⁴⁴ Section 871-section 873 Corporate Tax Act 2009.

⁴⁵ See <https://www.gov.uk/government/publications/restriction-of-corporation-tax-relief-for-business-goodwill-amortisation>

⁴⁶ Section 861A Corporate Tax Act 2009.

⁴⁷ The criteria include: “1) there is a clearly defined project; 2) expenditure is separately identifiable; 3) the project is commercially viable; 4) the project is technically feasible; 5) project income is expected to outweigh cost; 6) and resources are available to complete the project” (SSAP 13, para 25).

in the development phase if certain criteria are met⁴⁸ (IAS 38, para 57). Therefore, the primary difference between SSAP 13 and in IAS 38 in terms of research and development costs is that companies following IAS 38 are more likely to capitalise the development cost and recognise it as an intangible asset.

The tax treatment of research and development expenditures follows their accounting treatment in terms of whether the expenditure is classified as a capital or a revenue expenditure (Telford and Oats 2014, pp.167). UK tax legislation provides 100% capital allowances for capital expenditure on research and development. That is, capital expenditure on research and development can be fully deductible for tax purpose during the accounting period when the expenditure is incurred (CAA 2001, s441)⁴⁹. By comparison, the incurred revenue expenditure on research and development is eligible for enhanced tax reduction, depending on the size of the companies⁵⁰ (CTA 2009, s1043-s1079)⁵¹. Once the development cost has been capitalised and recognised as an intangible asset, deferred taxes related to the capitalised cost may need to be provided when the carrying value of the intangible asset differs from its tax base.

Software and Website Development Costs

FRS 10 *Goodwill and Intangible Assets* requires the software development costs that are “directly attributable to bring a computer system or other computer-operated machinery into working condition” to be recognised as a tangible fixed asset rather than an intangible asset (para 2). UITF 29 *Website Development Costs* requires that the website development costs should be classified and recognised as a tangible fixed asset if they are expected to create enduring assets and generate future economic benefits (para 5-6). IAS 38 requires that the computer software cost should be treated as a tangible asset if it is ‘an integral part’ of the related hardware without which a computer-controlled machine tool cannot operate. When the software cost does not constitute ‘an integral part’ of the related hardware, it should be

⁴⁸ The criteria include: “1) the technical feasibility of completing the intangible asset; 2) its intention to complete the intangible asset and use or sell it; 3) its ability to use or sell the intangible asset; 4) the ability of the intangible asset to generate probable future economic benefits; 4) the availability of adequate technical, financial and other resources to complete the development and to use or sell the intangible asset; 5) the ability to measure reliably the development expenditure” (IAS 38, para 57).

⁴⁹ Section 441 Capital Allowance Act 2001.

⁵⁰ For SMEs, i.e., companies with less than 500 employees and either an annual turnover not exceeding €100m or a balance sheet total not exceeding €86m, 230% of qualifying R&D expenditure can be claimed for enhanced deductions. For large companies, 130% of qualifying R&D expenditure can be claimed.

⁵¹ Section 1043-section 1079 Corporate Tax Act 2009.

recognised as an intangible asset (IAS 38, para 4). Under IAS 38, the website development cost falls into intangible regime if it is probable that the website development cost will generate future economic benefits and the cost can be reliably measured (IAS 38, para 21; SIC-32)

When the software and website development costs are recognised as intangible assets, the tax treatment would generally follow the accounting treatment to provide tax relief on the amortisation and impairment expenses written off to the profit and loss account⁵² (HMRC 2017; CTA 2009, s181)⁵³. When software and website development costs are classified as tangible fixed assets, depreciation calculated for accounting purpose will not be allowable for tax deductions, while plant and machinery capital allowance will be granted according to tax laws⁵⁴ (CTA 2009, s804)⁵⁵. However, managers can effectively choose between claiming capital allowances or amortisation on software and website development expenditures. The election, which is irrevocable, should be made within two years when the expenditures were incurred (CTA 2009, s815)⁵⁶.

2.3.3.2. Lease

Operating Lease

A lease is defined as “*an agreement whereby the lessor conveys to the lessee in return for a payment or series of payments the right to use an asset for a specified period of time*” (Telford and Oats 2014, pp. 193). Accounting methods for leases are governed by SSAP 21 *Accounting for Leases and Hire Purchase Contracts*; UITF Abstract 28 *Operating Lease Incentives*; and IAS 17 *Leases*⁵⁷. A lease is classified as an ‘operating lease’ if the lessor retains the risk and reward identical to ownership of the underlying asset (SSAP 21, para 7; IAS 17, para 4). The rental payments under an operating lease should be written off over the lease term to the profit and loss accounts (SSAP 21, para 37-43; IAS 17, para 33-35).

⁵² According to HMRC (2017), under the corporate intangible asset regime, “*sums written off intangible fixed assets are usually deductible so long as their treatment is in accordance with GAAP*”. See <https://www.gov.uk/hmrc-internal-manuals/corporate-intangibles-research-and-development-manual/cird10115>

⁵³ Section 181 Corporate Tax Act 2009.

⁵⁴ See <https://www.gov.uk/hmrc-internal-manuals/business-income-manual/bim35801> and <https://www.gov.uk/hmrc-internal-manuals/business-income-manual/bim35805>

⁵⁵ Section 804 Corporate Tax Act 2009

⁵⁶ Section 815 Corporate Tax Act 2009

⁵⁷ IAS 17 will be superseded by IFRS 16 for periods beginning on or after 1 January 2019. For lessees, IFRS 16 would no longer separately define an ‘operating’ lease and a ‘finance’ lease.

The tax treatment of operating lease generally follows its accounting treatment, i.e., the lease rental payments are tax-deductible when they are charged to the profit and loss account⁵⁸ (HMRC 2017). In terms of operating lease incentives, UITF Abstract 28 requires that the lease incentives should be spread to the next rent review, while IAS 17 requires a lessee entity to treat the lease incentives as a reduction of lease expense and recognise the lease incentives over the lease term⁵⁹ (UITF Abstract 28, para 14; SIC-15). Since the tax treatment of operating lease follows its accounting treatment, the different accounting methods of operating lease incentives may alter the amount and the timing of rental expenses recognised for tax purposes. Specifically, the switch from UK GAAP to IFRS may result in higher rental payments and therefore lower taxable profits over the earlier period of the lease (HMRC 2017; Ng 2009).

Finance Lease

A lease is classified as a ‘finance lease’ if the substantial risk and reward identical to ownership of the lease assets have been transferred to the lessee (IAS 17, para 4; SSAP 21, para 8). The classification of a lease as a finance lease or an operating lease should depend “*on the substance of the transaction rather than the form*” (IAS 17, para 10). SSAP 21 requires a lease to be classified as a finance lease “*if the present value of the minimum lease payments, including any initial payment, amounts to substantially all (i.e., 90% or more) of the fair value of the leased asset*” (SSAP 21, para 15). The initial accounting treatment of a finance lease is to capitalise the leased asset and recognise a lease liability to represent the obligation to pay future rentals in the lessees’ balance sheet (IAS 17, para 20; SSAP 21, para 32). Under a finance lease, an annual charge written off to the profit and loss account should equal to the depreciation of the lease-asset (i.e., the capital repayment) plus the interest payment (i.e., the finance cost). The depreciation of assets under finance lease must be consistent with the depreciation policy of firms’ other assets and the interest payment is dependent on the total rental payments and the carrying value of the lease-asset⁶⁰ (IAS 17, para 31; SSAP 21, para 32).

⁵⁸ See <https://www.gov.uk/hmrc-internal-manuals/business-leasing-manual/blm00510>

⁵⁹ For example, a company is considering a 10-year operating lease with the first two years being rent free. The next rent review due at the end of Year 5. The annual rent is £10,000. Under SSAP 21, the free rent fees are spread over the period to the date of the review, i.e., over the first 5 years, resulting in an annual rental expense of £6,000 ($£10,000 \times 3/5$) over the first 5 years and £10,000 for the rest 5 years. Under IFRS 16, the free rental fees for the first two years should spread over the 10-year lease term, which will result in an annual rental expense of £8,000 ($£10,000 \times 8/10$).

⁶⁰ The interest rate used to calculate the interest payment should be the discount rate that “*causes the aggregate present value of the minimum lease payments and the residual value to be equal to the fair value of the leased assets*” (Telford and Oats 2014; pp 194).

In April 1991, the Statement of Practices *SP3/91* confirmed that the finance-lease-induced depreciation and interest charge written off to the profit and loss account according to GAAP are allowable for tax deductions. The concept of long-funding assets was introduced in FA 2006 *Sch 8*⁶¹ and was applied to periods on or after 1 April 2006. Where a lease is classified as long-funding lease, i.e., a funding-lease⁶² with a life more than seven years, the lessee is entitled to capital allowance, and the related finance component of the rental payments can be deducted for tax purpose over the life of the lease. The lessors, on the other hand, need to include the finance element of the lease rental into their taxable income (FA 2006, s81)⁶³.

2.3.3.3. Financial Instrument

A financial instrument is “any contract that gives rise to a financial asset of one entity and a financial liability or equity instrument of another entity” (IAS 32, para 11). In the UK, listed entities are mandatory to comply with IFRS (as embodied in IAS 39 *Financial Instruments: Recognition and Measurement*; IAS 32 *Financial Instrument: Presentation*; IFRS 7 *Financial Instrument: Disclosures* and IFRS 9 *Financial Instruments*) in dealing with financial instruments in their group account. FRS 26 *Financial Instrument: Recognition and Measurement*, which is aligned to IAS 39 in terms of accounting methods for financial instruments, applies to unlisted companies whose financial statements are prepared in accordance with fair value accounting rules (Telford and Oats 2014). Under IFRS 9 and FRS 26, financial assets are classified into three categories, including financial assets measured at fair value through profit or loss; financial assets measured at fair value through other comprehensive income; and financial assets measured at amortised costs⁶⁴. Financial liabilities are classified into two categories including financial liabilities carried at fair value through profit or loss and other financial liabilities measured at amortised cost (IFRS 9, para 4.1.1-4.2.1; FRS 26, para 9-12).

⁶¹ Schedule 8 Financial Act 2006

⁶² A funding lease is “a plant or machinery lease that meets one or more of the following: 1) the finance lease test, i.e., a lease is classified by GAAP as a finance lease; 2) the lease payments test, i.e., the present value of the minimum lease payment is 80% or more of the fair value of the assets; 3) the useful economic life test, i.e., the term of the lease is more than 65% of the remaining useful economic life of the asset” (CAA 2001, s 70K-70P).

⁶³ Section 81 Financial Act 2006.

⁶⁴ Held-for-trading financial assets are “initial recognised and subsequently measured at fair value with fair value changes recognised in profit and loss account”. Available-for-sale financial assets are “measured at fair value with fair value changes directly recognised in equity through the statement of changes in equity”. Loans and receivables and held-to-maturity assets “are measured at amortised cost” (IAS 39, para 46-47; FRS 26, para 9-21).

Under current UK tax law, the tax treatments of financial instruments normally fall within loan relationships rules (under CTA 2009, Part 5); non-lending money debts rules (treated as loan relationships under CTA 2009, Part 6)⁶⁵; or derivative contracts (under CTA 2009, Part 7)⁶⁶. The accounting treatments of financial instrument are therefore generally followed for tax purposes, given that the corporation tax treatments of loan relationships and derivative contracts are accounts-based under CTA 2009 part 5-7. In addition, UK tax legislation in respect of loan relationship and derivative contracts requires that the amounts recognised to determine taxable profits are not confined to those recognised in profit and loss accounts. Amounts that are recognised directly to equity or to reserves through 'Statement of Total Recognised Gains and Losses' or 'Other Comprehensive Income' should also be brought into account in the same way as if they were recognised to profit and loss account in determining taxable profits⁶⁷. As a result, to the extent that financial instruments are measured at fair value, either with fair value changes recognised in profit and loss accounts or in other comprehensive income, these fair value movements should be accounted for tax purposes under current UK tax law⁶⁸.

2.3.3.4. Inventory

Accounting methods for inventories are governed by SSAP 9 *stock and long-term contracts* and IAS 2 *inventories*. SSAP 9 defines inventories as “*goods purchased for resale, consumable stores, raw materials, work in progress, long-term contract balances and finished goods*” (SSAP 9, para 16). IAS 2 defines inventories as “*assets held for sale in the ordinary course of business; in the process of production of such sake; or in the form of materials or supplies to be consumed in the production process or in the rendering of services*” (IAS 2, para 6). Under SSAP 9 and IAS 2, inventories are initially measured at cost and subsequently measured at the

⁶⁵ CTA 2009 Part 6 brings the money debts that do not meet the definition of “loan relationship”, i.e., do not arise from a transaction for the lending of money, within the loan relationship regime. CAT 2009 s483 treats exchange gains or losses on currency holdings or liabilities within loan relationship regime (Telford and Oats 2014, pp. 228)

⁶⁶ See <https://www.gov.uk/government/publications/accounting-standards-the-uk-tax-implications-of-new-uk-gaap/frs-102-overview-paper-new>

⁶⁷ Before 2005, UK tax law required "accruals" accounting to be followed on a realisation basis. Where a company used a mark-to-market method to account for financial instrument under which gains and losses are recognised into accounts by reference to a fair value at the end of each accounting period, UK tax law required to treat those gains and losses as they were accrued.

See http://webarchive.nationalarchives.gov.uk/+http://www.hmrc.gov.uk/practitioners/int_accounting.htm

⁶⁸ There are, however, certain exceptions where the tax legislation overrides accounting treatment. For example, CTA 2009 section 349 requires that the taxable profits should be calculated on an amortised cost basis if there is a loan relationship between connected parties.

lower of cost or net realisable value⁶⁹. SSAP 9 allows to use the FIFO (i.e., first in first out), LIFO (i.e., last in first out) or weighted average price for valuation of inventories, but exceptionally points out that the LIFO method for stock valuation may lead to misstatements in financial statements. Where the LIFO method is adopted, directors must assure that the employment of this method enables the account to give a true and fair view (SSAP 9, para 37-39). However, the LIFO method for stock valuation is prohibited by IAS 2 (IAS 12, para IN13).

Under FA 1998, s42 and CTA 2009, s46⁷⁰, the tax treatments of stock or inventories generally follow their GAAP accounting treatments⁷¹. As Freeney (2017) document, “*any method of computing the value of stocks and work in progress which is recognised by the accountancy profession is an acceptable method of valuation for taxation purposes provided the method is consistently applied and does not conflict with taxing statutes as interpreted in the case law*”⁷²(pp 319). Consequently, the accounting methods of stock valuation can be relevant for tax purpose. When the inventory price is rising, the use of FIFO method will result in lower costs of goods sold and therefore higher accounting and taxable incomes as compared to those provided under the LIFO method and/or weighted average costing method.

Provisions that reduce stocks from cost to net realisable value may need to be made on a justifiable basis considering the ages, the past and future movements and the estimated scrap value of the stocks (SSAP 9, para 16). When there are circumstances that costs of inventories incurred, i.e., resulting from deterioration, obsolescence or changes in demand, are not likely to be recovered from sufficient future revenue, the irrecoverable amount of costs should be directly charged to profit and loss account when the write-down occurs (IAS 2, para 6). For tax purpose, the general provisions against inventory values are not tax deductible. Instead, allowable provisions and write-downs should be estimated with sufficient accuracy, i.e.,

⁶⁹ Costs include the costs of purchase (i.e., the purchase price, import duties, transport); cost of conversions (i.e., the direct overhead, direct labour, direct expense); production overheads and other costs (i.e., costs bring inventories to their present location and condition) (IAS 2, para 10-15; SSAP 9, para 17-20). The net realisable value is defined as the estimated selling price in the normal course of business, less costs to complete and sell (IAS 2, para 6; SSAP 9, para 5).

⁷⁰ Section 42 Financial Act 1998; Section 46 Corporate Tax Act 2009.

⁷¹ There are some exceptions. First, if the stock is transferred to a connected party, in which case an arm’s length value should be used for tax purposes (CAT 2009, s166). Second, if the stock is taken for private use, the selling prices (i.e., the market value) should be used for tax purposes (CAT 2009, s157). HMRC does not permit LIFO for tax purposes (BIM33100).

⁷² Similarly, HMCR states that “typically stock is measured for accounting purposes at the lower of cost and net realisable value and this is followed for tax purposes”. See:

<https://www.gov.uk/government/publications/accounting-standards-the-uk-tax-implications-of-new-uk-gaap/frs-102-overview-paper-income-tax-implications#inventories---stock>

formulae (such as the age-related formulae) used to derive the provisions and the write-downs should “reflects a realistic appraisal of the future income from the particular category of stock and results in the stock being included at a reasonable estimate of its net realisable value” (HMRC 2013, BIM33145).

2.3.3.5. Plant, Property and Equipment

Accounting for plant, property and equipment is governed by FRS 15 *Tangible Fixed Assets* and IAS 16 *Property, Plant and Equipment*. Plant, property and equipment (PPE) should be recognised as an asset “when it is probable that economic benefits resulting from utilising the PPE will flow to the entity in the future and when its cost can be measured reliably” (FRS 15, para 20; IAS 16, para 7). Plant, property and equipment should be initially measured at cost⁷³ and subsequently measured using either the cost model or the revaluation model (FRS 15, para 42; IAS 16, para 31). When the cost model is adopted, the carrying amount of the plant, property and equipment should be measured at cost less any accumulated amortisation and impairment losses. When the revaluation model is adopted, the carrying amount of the plant, property and equipment should be measured at fair value (the term “current value” is used under FRS 15) at the revaluation date less any subsequent accumulated depreciation and impairment losses (IAS 16, para 29-31; FRS 15, para 45-68). FRS 15 and IAS 16 require the revaluation of plant, property and equipment to be carried out on a regular basis⁷⁴.

UK tax legislations depart from the accounting standards by disallowing depreciations and revaluations of tangible assets but instead grant capital allowance on qualified capital assets⁷⁵. Depreciation and revaluation with respect to plant, property and equipment therefore are typically not relevant for tax purposes; and changes in accounting treatments regarding

⁷³ FRS 15 and IFRS are similar in defining costs of plant, property and equipment. Costs is the amount of cash or cash equivalents paid to bring the asset into working condition for its intended use, which include not only the purchase price but also cost of preparation and clearance; cost of delivery and handling; installation cost and professional fees; and the estimated costs of dismantling and removing the asset and restoring the site (FRS 15, para 10; IAS 16, para 16-17).

⁷⁴ IAS 16 requires that revaluation should be carried out annually for property, plant and equipment that are significantly volatile in fair value. For property, plant and equipment with only insignificant changes in fair value, the revaluation can be conducted every three to five years (para 34). FRS 15 requires that a full valuation should be carried out at least every five years and an interim valuation in year 3 (para 45).

⁷⁵ The qualifying capital expenditure arising from a qualifying plant, property and machinery is entitled to capital allowances, with different type and rate of capital allowances available for different classes of plant, property and machinery, including the annual investment allowance (AIA), first year allowance (FYA), writing down allowance (WDA) and balancing allowance. Among the four types of capital allowance, AIA and FYA can only be claimed when the assets are purchased. FYA was largely replaced by AIA from 1 April 2008 (Miller et al. 2017).

depreciation and revaluation of plant, property and equipment may not have significant tax impacts⁷⁶. It is important to note that rather than claiming the full amount of the available capital allowance, a firm can choose to make reduced claim of capital allowance for the purpose of maximising its accounting loss for a specific accounting period, which may “*influence both the immediate exposure to tax and the allowances available in subsequent accounting period*” (Miller et al. 2017, pp 111). In addition, FRS 15 and IAS 23 permit the capitalisation of the borrowing costs as part of the asset cost if the borrowing costs are directly attributable to the “*acquisition, construction or production of a qualifying asset*” (FRS 15, para 22; IAS 23, para 10). UK tax law provides tax reliefs to the capitalised borrowing costs on tangible fixed assets as if they were debit to the profit and loss accounts⁷⁷ (Miller et al. 2017).

Unlike capital expenditures, the tax treatment of revenue expenditures related to property, plant and machinery follows the timing and amount recognised in the profit and loss account (HMRC 2013, BIM 31060). FRS 15 is different from IAS 16 in permitting renewals accounting on infrastructure assets, in which case the estimated annual expenditure arising from maintaining the operating capacity is treated as depreciation and charged to the profit and loss account (FRS 15, para 98). Where the renewals accounting method is adopted, HMRC allows the estimated annual expenditure to be deductible for tax purpose on an on-going basis (HMRC 2013, BIM 31065). IAS 16 prohibits the employment of the renewals accounting.

2.3.3.6. Employee benefits

Until the application of IAS 19 *Employee Benefits*, there was no general guidance on accounting methods for costs associated with employment in the UK. IAS 19 defines employee benefits as “*all forms of consideration given by an entity in exchange for service rendered by employees or for the termination of employment*” (para 8). Under IAS 19, employee benefits fall into four categories, including short-term employee benefits, post-employment benefits, other long-term employee benefits and termination benefits.

⁷⁶ However, accounting methods of property, plant and equipment in terms of depreciation and revaluation can be relevant for the timing and amount of the provided deferred taxes, since the difference between the book net written down value of a plant, property and machinery and its tax written down value can give rise to temporary differences between the tax base of the asset and its carrying amount.

⁷⁷ However, tax reliefs in respect of borrowing costs are only restricted to tangible fixed assets and projects rather than intangible assets and work in progresses.

Short-term employee benefits, such as paid absences and profit-sharing and bonus plans, are items expected to be settled wholly within twelve months after the end of the accounting year in which employees render their services (IAS 19, para 9). The expected costs related to short-term employee benefits payable should be recognised as a liability and an expense in financial statements when employees are entitled to such benefits (IAS 19, para 11). For example, an entity should recognise the expected costs of paid absences (e.g., holiday pay or sick pay) when employees render their services that increase their entitlement to future paid absences, and should recognise the expected cost of profit-sharing and bonus payments when this entity has a present obligation to make such payments. For tax purposes, costs related to the short-term-employee benefits are not allowed for tax deduction until the amounts are paid⁷⁸ (CTA 2009, Part 20)⁷⁹. In this case, timing difference (and therefore deferred tax assets) may arise because the liabilities in respect of employee benefits are accrued, but tax deductions are only allowed when the expected costs are paid in a later period.

Post-employment benefits, such as pension schemes, can be classified as either the defined contribution plans or defined benefit plans (IAS 19, para 27). Under the defined contribution plan, amounts required to be recognised for an accounting period is limited to the agreed contributions payable to the scheme within that period (IAS 19, para 28). Under the defined benefit plan, amounts required to be recognised are dependent on actuarial assumptions about the pension costs and the fair value of the plan assets. Any actuarial risk that makes the pension cost more than expected or investment risk that reduces the value of the plan asset may cause an increase in entities' obligation associated with the post-employment benefits (IAS 19, para 30 and 56). Surpluses or deficiencies arising from differences between the fair value of the net assets of the pension scheme and the amount of the accrued liability to pay future pension costs should be measured and recorded at the end of each reporting period (IAS 12, para 58; Telford and Oats 2014). For tax purposes, the contribution payments to a pension scheme are revenue expenses allowable for tax deductions when the contribution is paid and if the payments are wholly and exclusively for business purposes (FA 2004, s196; CTA 2009, s1290)⁸⁰. Deferred taxes therefore should be provided in accordance with the timing differences arising because the contributions charged in an accounting period are not tax deductible until a later period

⁷⁸ In order to be tax deductible, the amount of payments should be made with in the year, or within nine months after the end of the year (CTA 2009, Part 20).

⁷⁹ Part 20 Corporate Tax Act 2009.

⁸⁰ Section 196 Financial Act 2004; Section 1290 Financial Act 2009.

when they are actually paid. Movements associated with the net defined liability (asset) should be reflected in the adjustments of deferred taxes.

Other long-term employee benefits such as sabbatical leave should be accounted for by accruing the costs when employees' services are rendered (IAS 19, para 153). Termination benefits should be included as a liability and expenses when the entity is committed to terminate the employment before the retirement date or when an employee has accepted the offer of benefits in exchange for voluntary redundancy⁸¹ (IAS 19, para 159 and 165). The accounting figures of expenses charged in an accounting period are irrelevant for tax purposes, since tax reliefs are given on a paid basis rather than on accrued basis, which can give rise to timing differences and the corresponding deferred taxes.

2.3.3.7. Investment Property

Accounting for investment property is governed by SSAP 19 *Accounting for Investment Properties* and IAS 40 *Investment Property*. Investment property is defined as “*a property that is held to earn rentals or for capital appreciation or both, rather than for use in the production or supply of good or for administrative purposes or for sale in the ordinary course of business*” (IAS 40, para 7; SSAP 19, para 7). Under SSAP 19, investment property should be initially measured at the open market value with subsequent changes in value recognised in revaluation reserves (para 11-14). Investment properties are not subject to systematic annual depreciation charges as their disposal value is not expected to be materially reduced by “consumption, effluxion of time or obsolescence through technology or market changes”⁸² (SSAP 19, para 1 and 10). IAS 40 requires investment properties to be initially measured at costs but allows entities to choose as their accounting policy either to subsequently measure investment properties at fair value or at costs (IAS 40, para 30). Gains and losses arising from movements of the fair value of investment properties is required to be recognised in profit and loss account when they occur (IAS 40, para 35).

⁸¹ Termination benefits should be recognised in financial statements as a liability and expenses when there is no possibility to withdraw the offer of those benefits (IAS 19, para 165)

⁸² Except properties held on lease which should be subject to systematic annual depreciations.

Under current UK tax legislation, movements in fair value of investment properties are not taxable until the investment properties are disposed of with a chargeable gain⁸³. However, deferred taxes may need to be provided in respect of changes in the fair value of investment properties when the carrying amount of the revalued properties are different from their tax base. Revenue rental incomes should be included in taxable income when the incomes are recognised in profit and loss accounts. Revenue rental expenses which are incurred wholly and exclusively for business purposes are allowed to be tax deductible⁸⁴ (CTA 2009, s210)⁸⁵.

This section discusses the tax treatments of basic accounting issues that may arise in UK companies, including the tax treatments of intangible assets, lease, financial instrument, inventory, plant, property and equipment, employee benefits and investment property. The following table summarises the discussion of this section and concludes the key accounting events that might trigger the recognition of deferred taxes and annual cash tax deductions in companies' financial statements.

Table 2.4: Key Events that Trigger the Recognition of Deferred Taxes and Revenue Tax Deductions	
Goodwill	<p>The recognition of deferred taxes on the temporary differences that arises from the initial recognition of goodwill is exempted. However, any temporary differences between the carrying amount and the tax base of the goodwill arising after the initial recognition should be recognised as deferred taxes.</p> <p>The systematic amortisation or impairment of goodwill/intangible assets is normally allowable for tax purpose when it is recognised in financial statements.</p>
Research and Development Expenditure	<p>When the research and development expenditure is recognised as capital expenditure according to the relevant requirements, deferred taxes might occur if the carrying amount of the capital expenditure is different from its tax base (e.g., the annual accounting depreciation of the capital expenditure is different from its annual tax deduction).</p> <p>When the research and development expenditure is recognised as revenue expenditure, enhanced tax reduction depending on the size of the companies might occur.</p>

⁸³ See: <https://www.gov.uk/corporation-tax> and <https://www.gov.uk/government/publications/accounting-standards-the-uk-tax-implications-of-new-uk-gaap/frs-102-overview-paper-new#investment-property>

⁸⁴ See: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/652420/Property_Rental_toolkit_17.pdf

⁸⁵ Section 210 Corporate tax Act 2009.

Software and Websites Development Costs	<p>When software and website development costs are classified as tangible fixed assets according to the relevant requirements , deferred taxes might occur if the carrying amount of the asset is different from its tax base (e.g., the accounting depreciation is different from the granted capital allowance for tax deductible purpose).</p> <p>When software and website development costs are classified as intangible assets, annual cash tax relief based on the annual amortisation and impairment expenses might occur.</p>
Operating Lease	The annual lease rental payments are generally tax-deductible for the lessee. However, this will not trigger the recognition of deferred taxes on the lessee’s financial statements.
Finance Lease	<p>Under the finance lease, the lessee is entitled to capital allowance if the lease asset is classified as long-term lease. Therefore, deferred taxes might occur on the lessee’s financial statements if the carrying amount of the lease asset is different from its tax base.</p> <p>The relevant annual finance component of the rental payments can be deducted for tax purpose over the life of the lease.</p>
Financial Instrument	Deferred taxes might occur when the financial instrument is revalued to fair value for accounting purpose, but the revaluation is not allowed for tax purpose.
Inventory	Deferred taxes might occur when the provision that reduce stocks from cost to net realisable value is not allowable for tax purpose.
Plant Property and Equipment	UK tax legislations depart from the accounting standards by disallowing depreciations and revaluations of tangible assets, but instead grant capital allowance on qualified capital assets Therefore, deferred taxes might occur if the carrying amount of the asset is different from its tax base.
Employee Benefits	Deferred tax assets might occur since the employee benefits should be recognised as a liability and an expense in financial statements when employees are entitled to such benefits, but they are not tax deductible until the expected costs are paid in a later period.
Investment Property	Deferred taxes might occur when the investment property is revalued to fair value for accounting purpose, but the revaluation is not allowed for tax purpose.

2.4. Tax Information Reported in Income Tax Provision

Corporate income tax disclosures in a firm’s financial statements are the key source for financial statements’ consumers, such as investors, analysts and creditors, to assess this firm’s income tax position. According to Graham et al. (2012), “one common misunderstanding is that the number reported as income tax expense is merely the cash tax paid” (pp. 415). However, a firm’s reported income tax expenses, which are prepared under the same

accounting standard that governs the reporting of other economic transactions or events of this firm, rarely equals the cash tax incurred for a respective reporting year⁸⁶. This section attempts to discuss components that cause the reported income tax expense of a firm to differ from its cash tax incurred for an accounting year, as well as their implications for future tax-related cash flows.

As discussed in section 2.3.2, the income tax expense reported in the financial statements consists of both current and deferred taxes. Specifically, the current portion of taxes is intended to capture firms' tax liability for the current reporting year, while the deferred portion of taxes is the taxable or deductible amount that will be payable or recoverable in a future period as a result of firms' current transactions or events (Hanlon 2003; Graham et al. 2012; Telford and Oats 2014). Thus, one apparent reason that causes the income tax expense reported in financial statements for an accounting period to differ from the cash tax paid for the same period is the inclusion of deferred taxes in the income tax accounts. This is because deferred taxes are intended to represent a firm's future or deferred tax consequences resulting from its current period's transactions or events.

However, even without deferred taxes, the remainder of the income tax expense (i.e., the current portion of income taxes) is hardly equal to cash tax incurred during a respective reporting year due to several reasons. First, because financial statements are usually prepared months before when the tax return is filed to tax authorities, current income taxes reported in financial statements are primarily based on managerial estimates of firms' eventual tax return for the current reporting year⁸⁷ (Hanlon 2003; Graham et al. 2012; Choudhary et al. 2016). Corporate taxes are paid in instalments in the UK. The total amount of the instalment payments is based on firms' estimates of their corporation tax liability for the current accounting year, while each instalment payment is a quarter of the estimated total tax liability. For a twelve-month accounting period, firms are required to make four equal annual instalments due on the "14th day of the seventh, tenth, thirteenth and sixteenth month after the start of the accounting

⁸⁶ Cash flow arising from income taxes during a period can be found in the statement of cash flows. The tax cash flow disclosed in the statement of cash flows is the net taxes paid during the current period, including actual tax paid based on the estimated current tax expenses; cash tax refunds upon tax return filed in previous periods; or additional taxes and interests required upon audits of tax returns of previous periods (Dyreg et al. 2008).

⁸⁷ According to HMRC, the deadline for a firm to fill tax return is 12 months after the end of the accounting period it covers. See <https://www.gov.uk/company-tax-returns>.

year”⁸⁸ (Lewis and Pendrill 2004, pp 339). At the end of an accounting year, the difference between the current tax expense (i.e., the estimated tax payable for the current full accounting year) and the two instalments which have been paid during the year should be recognised as a liability, which represents the income tax accrued but not yet paid in respect of taxable profit for the current accounting period (Lewis and Pendrill 2004, pp. 339; Maas 2017).

Second, due to the complex nature of corporate tax affairs and the prudent administrative approaches adopted by tax authorities, it could take more than one year for the eventual agreements on firms’ final tax liability for a respective reporting period. Current income taxes disclosed in firms’ financial statements therefore may contain unsettled estimates regarding firms’ previous periods’ tax outcomes, which will not show in the cash tax incurred until the tax authority makes the final decision (Wahab and Holland 2018).

Third, even if there are no accrued or unsettled tax liabilities in respect of taxable profits for the current or previous accounting periods, the current income tax expense is not necessarily equal to the cash tax incurred, because some financial accounting standards could cause the current income tax expense to be over- or under-stated relative to the cash tax incurred during an accounting period (Hanlon 2003; Choudhary et al. 2016).

For example, the current tax expense reported in a firm’s financial statements does not represent its total tax owed on all type of corporate activities and transactions for an accounting year. Instead, it only represents the portion of taxes on continuing activities. Although earnings from discontinued operations and extraordinary items affect the cash tax incurred for an accounting period, they are often reported net of income taxes separately below the continuing activities (Hanlon 2003; IAS 12, para 81h). As a result, the current tax expense can be understated relative to cash tax incurred due to the fact that discontinued transactions and activities are reported net of income tax expenses. In addition, employee share options would normally be expensed for financial accounting purposes based on their fair value at the grant date (IAS 12, para 68A). However, no tax deduction is available regarding the employee share option until the share option is exercised. Thus, there is a deductible temporary book-tax difference

⁸⁸ For example, for a firm with an accounting year end on 31th December, the due dates of the four instalment payments will be 14th July and 14th October during the accounting period, and 14th January and 14th April following the accounting period. The instalment payment rule was effective for accounting periods ending after 30th June 2002. Before the instalment payment rule was effective in UK, cash taxes are required to be paid within 9 months and one day after the end of the accounting period. See <https://www.gov.uk/guidance/corporation-tax-paying-in-instalments>.

which requires firms to recognise a deferred tax asset at the time when the share option is expensed for financial accounting purposes. To the extent that the tax deduction (or estimated future tax deduction) with respect to the employee share option exceeds its related financial accounting expense, the excessive amount of the associated tax deduction should be recognised directly to equity rather than reducing current tax expense (IAS 12, para 68C). In this situation, the current tax expense will be overstated relative to the cash tax paid by the amount of the excessive tax deduction associated with employee stock option⁸⁹. The financial-accounting-standards induced differences between current tax expense and cash tax payments are not expected to have future cash tax implications because they are not intended to reflect firms' ex-post cash tax outcomes (Choudhary et al. 2016).

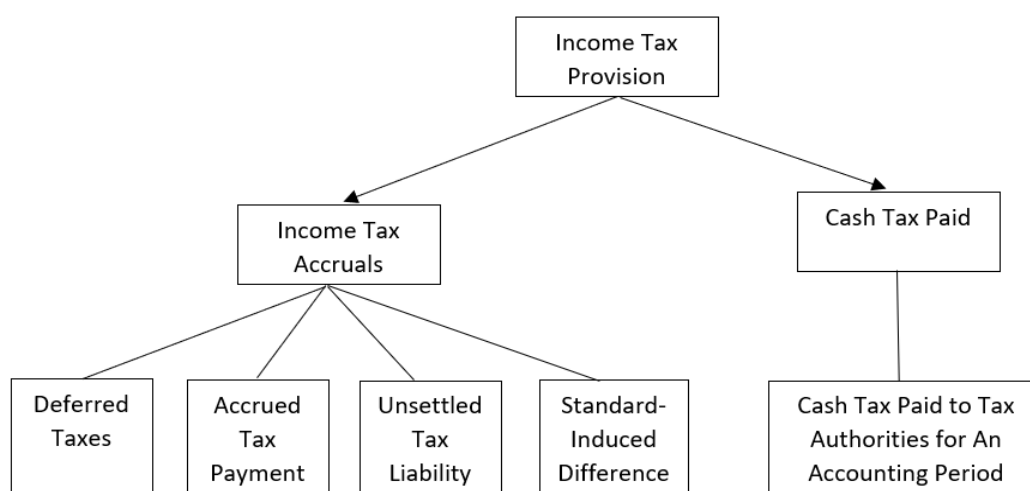
Following Hribar and Collins (2002) who define accrual as the difference between the income statement revenue or expense and the related cash flows, Choudhary et al. (2016) define the income tax accruals as the difference between the total income tax expense and the cash tax incurred for a respective accounting period. Based on the above discussion, it can be concluded that a firm's income tax expense reported in financial statements for a financial reporting year rarely equals the cash tax incurred during the same reporting period. Income tax accruals, i.e., the differences between the income tax expense and the cash tax incurred, could arise because of 1) the inclusion of the deferred taxes in income tax expense which are intended to represent firms' future tax consequences of their current period's transactions or events; 2) the inclusions of income taxes accrued but not yet paid in respect of taxable profit for the current accounting period; 3) the inclusion of the unsettled tax liabilities in respect of previous periods' tax outcomes in income tax expense; 4) the financial-accounting-standards induced differences between the current tax expenses and the cash tax paid. Therefore, income tax accruals are expected to have explanatory power about future tax cash flows which would occur when the deferred, accrued or unsettled taxes are settled/realised. The relationship between income tax provision, income tax accruals and cash tax paid can be illustrated from the following figure 2.1.

⁸⁹ Besides discontinued operation, extraordinary items and employee stock option, tax effects of several other items are required or permitted to be credited or charged outside profit and loss accounts, i.e., either in other comprehensive income or directly in equity. Examples of such items includes 1) adjustments of retained earnings due to changes in accounting policy or the correction of an error; 2) exchange differences due to translation of the financial statements of a foreign operation; 3) revaluation of assets for tax purposes which is related to an accounting revaluation of an earlier period, or to one that is expected to be carried out in a future period (IAS 12, para 61A-65). Hanlon (2003) demonstrates that "*these items are more technical in nature and are generally not as common or as large as the stock option deduction*" (pp 843).

Similar with other accruals, the calculation of income tax accruals requires managerial estimation and subjects to managements' discretion. Therefore, the ability of income tax provision to explain the realizability of future tax cash flows largely depends on the precision of estimated income tax accruals to reflect firms' underlying tax obligations. Management' estimation errors in the income tax accruals, either intentional or unintentional, could lead managers to revise the income tax account and adjust the cash tax payments in a future accounting period⁹⁰, making the ex-ante estimated amount of income taxes reported in financial statements differ from the ex-post realisation of tax cash flows. Moreover, the financial-accounting-standards induced differences between current tax expenses and cash tax paid are not expected to have future cash tax implications, thereby could obfuscate the ability of income tax accruals to explain future tax-related cash flows.

Figure 2.1

Relationship between Income Tax Provision, Income Tax Accruals and Cash Tax Paid



⁹⁰ Since the incurred instalment tax payments within an accounting year are based on the estimated corporate tax liabilities, it may be necessary to revise the estimates of firms' tax liabilities and therefore adjusting the incurred instalment tax payments as the accounting period progresses, which could also result in additional tax payments or claim back during a future accounting period.

See <https://www.gov.uk/guidance/corporation-tax-paying-in-instalments#make-an-instalment-payment>

2.5. Conclusion

This chapter evaluates the UK accounting and taxation environment, with the aim of providing a systematic understanding of the background and institutional knowledge relevant in answering the research questions of this thesis. This chapter begins with an evaluation of financial accounting standards for UK listed entities and is followed by an overview of the tax accounting system in the UK. The final section of this chapter provides an insight into components inherent in income tax provision that cause the reported income tax expense to differ from the cash tax incurred for an accounting period, as well as their implications for explaining future tax cash flows. Based on the discussions in this chapter, it can be concluded that:

First, the adoption of IFRS as the current financial reporting practices for UK listed companies is aimed to enhance the comparability and transparency of financial reporting information at an international level. However, the uneven implementation of IFRS and the principle-based and fair-value-orientated IFRS may curtail the benefits promised by IFRS and compromise the informativeness of accounting information reported in financial statements.

Second, under current UK tax laws, corporate tax treatment relies heavily on entities' accounting profit prepared in accordance with generally accepted accounting practice.

Third, accounting methods for deferred taxes have evolved dramatically in the UK from the partial to the full provision approach. The partial provision approach, which is based on managers' projections about the expected reversals of the deferred taxes in the foreseeable future, can provide opportunities for managers to convey their private information about firms' future tax consequences. However, it is criticised that the partial provision approach allows too much discretion for managers during the deferred tax provisioning process. By contrast, the full provision approach, whereby deferred tax liability is provided on all taxable timing (or temporary) differences, is likely to reduce the latitudes for opportunistic managerial behaviours via deferred tax provisioning, but may restrict managers' ability to convey their private information about firms' tax consequences in the foreseeable future.

Fourthly, the tax treatments of certain accounting events might depart from their accounting treatments, which may trigger the recognition of deferred tax liabilities or assets representing

a firm's future tax consequences resulting from its current period's transactions or events. In addition, the revenue tax deductions of certain accounting events might be serially correlated overtime. For example, under UK tax legislation, the systematic annual amortisation or impairment expenditure of intangible assets are allowable for tax deductions over their useful lives.

Finally, the reported income tax expense for an accounting period is rarely equal to the cash tax paid for the same accounting period. The difference between the income tax expense and the cash tax paid is defined as the income tax accruals. Income tax accruals consist of the deferred taxes; the income taxes accrued but not yet paid; the unsettled tax liabilities; and the financial-accounting-standards induced over- or under-statements of the current tax expense relative to the cash tax incurred. Therefore, income tax accruals should be representative about future cash tax consequences that would occur when the accrued or unsettled income taxes are realised or when the carrying amount of tax assets (liabilities) is recovered (settled). The calculation of income tax accruals requires managerial estimation and subjects to managements' discretion. Both the intentional and unintentional estimation errors in income tax accruals can obfuscate the ability of income tax provision to reflect firms' real tax obligation and compromise its informativeness to explain future tax-related cash flows.

Chapter 3

Literature Review and Theoretical Framework

3.1. Introduction

This chapter aims to review previous literature that is relevant to the research topics of this thesis. This chapter begins with the section that reviews previous literature on corporate tax management, which includes discussing the definition of corporate tax management; evaluating theories related to corporate tax management; and assessing the determinative factors that cause variations in firms' engagements in tax management activities. Reviewing previous literature about the definition, theories and determinations of corporate tax management aims to introduce the principle and concept of corporate tax management and provide a general understanding of the motivation and consequence of firms' tax management behaviours.

The subsequent section of this chapter reviews previous literature on the impact of corporate governance mechanism on corporate tax management behaviours. Corporate governance mechanism can be vital in explaining corporate tax management behaviours, since it represents how the decisions and actions made by managers are monitored to mitigate the conflicting interests between managers and firm owners. This section begins with an overview of the agency theory and is followed by reviewing previous evidence on how corporate governance mechanisms might affect managers' incentives to engage in tax management activities.

Previous value-relevance literature provides a theoretical and methodological foundation for justifying and developing the key topic of this thesis, i.e., the informativeness of income tax provision. Therefore, the following section of this chapter begins with discussing the theoretical foundation and methodology employed by the existing value-relevance accounting and taxation studies. This section further reviews previous studies relevant with the joint impact of corporate governance and corporate tax management on the informativeness of income tax provision, with the aim of showing the research gap that exists in the literature and interpreting this study's research framework under the context of the existing literature.

The final section concludes this chapter.

3.2. Corporate Tax Management

This section reviews previous literature about the definition, theories and determinations of corporate tax management. The aim of this section is to introduce the principle and concept of corporate tax management and provide a general understanding of the benefits and costs of firms' tax management behaviours.

3.2.1. Definition of corporate tax management

Corporate tax management is 'a highly significant activity' that forms the major source of the estimated corporate tax gap, i.e., the difference between the theoretical tax liability and the amount that HMRC collected⁹¹ (Wahab and Holland 2012, pp 111). There is no universally accepted definition of corporate tax management. Hoffman (1961) defines tax management as "*tax payer's capacity to arrange his financial activity in such a manner as to suffer a minimum expenditure for taxes*" (pp 274). Tiley (2005) defines tax management as "*what all sensible people do in order to reduce their tax liabilities*" (pp 94). Those definitions of tax management are consistent with the legal facts of *Helvering v. Gregory* (1935), in which Judge Learned Hand wrote: "*Anyone may so arrange his affairs that his taxes shall be as low as possible; he is not bound to choose that pattern which will best pay the Treasury; there is not even a patriotic duty to increase one's taxes*". Similarly, the judge Lord Tomlin stated in the case of *IRC v. Duke of Westminster* (1936) as: "*Every man is entitled, if he can, to order his affairs so that the tax attaching under the appropriate Acts is less than it otherwise would be. If he succeeds in ordering them so as to secure this result, then, however unappreciative the Commissioners of Inland Revenue or his fellow tax-payers may be of his ingenuity, he cannot be compelled to pay an increased tax*".

Under the above cases, corporate tax management refers to an activity that is undertaken by taxpayers to reduce their tax liabilities by means of legitimately arranging their financial and business affairs to take advantage of the available tax resources, including the utilisation of

⁹¹ HMRC defines the theoretical tax liability as representing the tax that "would be paid if all individuals and companies complied with both the letter of the law and HMRC's interpretation of the intention of parliament in setting law (i.e., the spirit of the laws)". The tax gap in the U.K. for the year 2015/2016 was estimated to be £34 billion (HMRC 2017). The corporate element of the tax gap accounts for 9%. In particular, £2.5 billion of the gap arises from tax avoidance, £4.9 billion from differences of opinion in the legal interpretation of tax law, and £4.4 billion from tax evasion.

allowance, reliefs, deductions, exemptions and other tax concessions. Corporate tax management therefore is designed to reduce tax liabilities through effective managements of the business and financial affairs in such a way that statutory requirements of tax laws and tax accounting standards are accurately interpreted and applied; taxable consequences of business or transactions are anticipated and monitored; and tax audits, penalties and prosecutions are settled. According to Agrawal (2007), corporate tax planning can be perceived as the pivot that ensures the drawing up of the tax strategies and goals. Corporate tax management, on the other hand, is the revolving wheel that translates the tax strategies and goals into expected results⁹².

Corporate tax management can be perceived as legitimate steps taken by taxpayers to reduce their tax burden, if it “*involves no criminal activity, and no failure to make a required disclosure*” (Devereux 2012, pp 3). However, this does not necessarily result in successfully achieving the objective of effectively managing tax liabilities⁹³. A seemingly-legitimate tax planning strategy and its related tax management devices can be successfully challenged by tax authorities and become ineffective, if they are conducted to obtain tax benefits through taking advantages of ambiguities in tax laws or using dubious devices, in which case the statute is followed in strict words, but the true spirit of the statute is violated⁹⁴ (Sikka 2010, Devereux 2012). For example, the Supreme Court in *McDowell & Co. v. CIT* (1985) has observed that “*tax planning may be legitimate provided it is within the framework of the law. Colourable devices cannot be part of tax planning and it is wrong to encourage or entertain the belief that it is honourable to avoid payment of tax by resorting to dubious methods*”. Similarly, the OECD Guidelines highlight the importance of following both the letter and the spirit of tax laws, by stating that “*it is important that enterprises contribute to the public finances of host countries by making timely payment of their tax liabilities. In particular, enterprises should comply with both the letter and spirit of the tax laws and regulations of the countries in which they operate. Complying with the spirit of the law means discerning and following the intention of the legislature*” (OECD 2012, pp. 210). Thus, it can be concluded that in order to be legal and effective in managing corporate tax liabilities, transactions and management devices with respect to corporate tax management should be conducted correctly in both form and substance.

⁹² Unless otherwise stated, this study will equally treat the terms “tax planning” and “tax management”.

⁹³ Devereux (2012) documents that HMRC has recently won cases against taxpayers’ tax planning strategies, even though the law in that area is unclear and other cases have been lost. He notes that the approach of the courts can vary over time, and in some cases courts at different level can make very different conclusions (pp 4).

⁹⁴ Weisbach (2002) argues that “viewing something as a right usually means that there is something profound or inviolate about it. But if the so-called right is based merely on language in the statute, nothing stops Congress from changing the language” (pp 221).

It is essential to distinguish between tax avoidance and tax evasion when understanding the concepts and the effectiveness of a firm's tax management practices. In explaining the relationship between tax avoidance and tax evasion, Hoffman (1961) states that "*tax avoidance is usually the ultimate goal to be achieved by tax planning. In this sense, the exercise of legal prerogatives may aid in the avoidance of taxes. Tax evasion, however, connotes the misrepresentation or omission of key financial information in an effort to evade the taxes that are largely enforceable. One is fraudulent and abhorrent to any decent and honest practitioner, and the other is completely acceptable*" (pp 274-275). Killian and Kolitz (2007) document that "*tax avoidance can be described as the avoidance, reduction or postponement of a taxpayer's liability for tax by means that are legal and within the provisions of the law. In contrast, tax evasion can be described as an illegal, dishonest activity that entails the evasion of a taxpayer's existing liability for tax on income, for example, either by the taxpayer not declaring the income or by claiming deductions against income to which he is not entitled*" (pp 235). Similarly, Rego (2003) defines tax avoidance as any tax-management methods that are employed by taxpayers to reduce their income tax burdens legally. Definitions stated in Hoffman (1961), Killian and Kolitz (2004) and Rego (2003) imply that the key difference between tax avoidance and tax evasion, i.e., the two important components that constitute the tax management/planning continuum, is legality. In particular, the term 'tax avoidance' refers to working within the law to minimise tax liability in a way either intended or unintended by tax law or the government. Tax evasion, on the other hand, is a legal offence which involves criminal tax deduction activities such as underreporting revenues or concealing key financial information (Oats et al. 2017).

However, it can be disputed to perceive corporate tax avoidance as 'completely acceptable', as the line of demarcation between 'acceptable' and 'unacceptable' tax avoidance is ambiguous and blurred. Different reasonable people can have different points of views towards what constitutes 'acceptable' tax avoidance practice (Devereux 2012; Oats et al. 2017). According to ActionAid (2015), "*tax planning rules, and opportunities to exploit them, may be very different in the context of different countries' economies, tax regimes and revenue authorities. What is acceptable and unacceptable tax practice may vary accordingly*" (pp. 13). Thus, although tax avoidance is described as a lawful activity to reduce corporate tax liabilities, what constitutes an 'acceptable' tax avoidance practice remains ambiguous and can be highly dependent on the courts' interpretation and all the surrounding information (Oats 2005;

Devereux 2012. pp. 3)⁹⁵. As Sikka (2010) highlights, “*some interpretations may appear as acceptable ‘avoidance’ but once challenged in the court can be classified as ‘evasion’*” (pp 4). However, despite a lack of clear line between ‘acceptable’ and ‘unacceptable’ tax avoidance, both practices may have negative impacts on fiscal revenues, because they could both result in “*a loss of tax revenues, impair the chance of realising the distributional or equity goal of taxation, and, if they become widespread, then more taxpayers may lose faith in the tax administration system and may be tempted to join the ranks of tax evader*” (Spicer 1975, pp 152; He and Li 1996, pp 38).

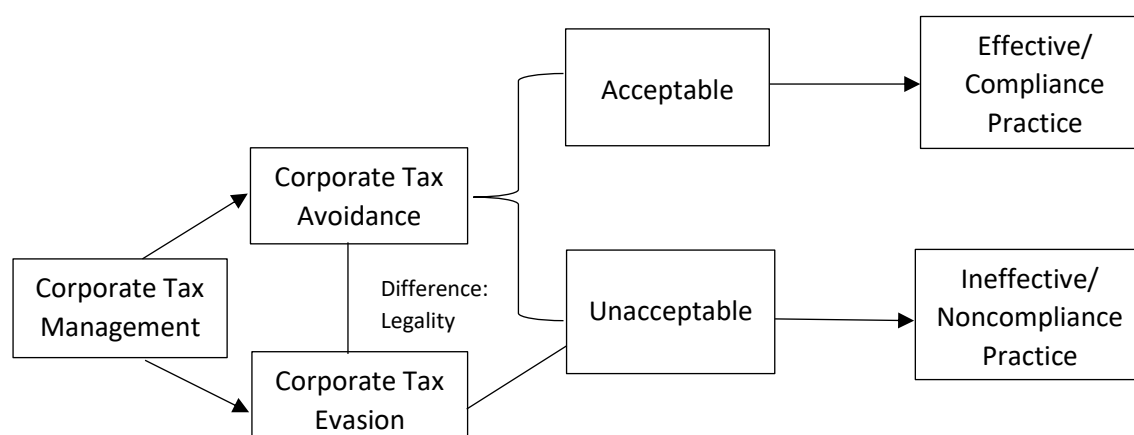
In summary, corporate tax management/planning can be largely interpreted as managing to reduce a firm’s tax liabilities. Tax avoidance and tax evasion, as described above, constitute important components of the corporate tax management/planning continuum. Although tax avoidance is generally perceived as working within the law to reduce tax liability, the distinction between ‘acceptable’ and ‘unacceptable’ tax avoidance is often unclear, which makes it hard to clarify the difference between tax avoidance and tax evasion⁹⁶. However, despite the lack of a clear line between ‘tax avoidance’ and ‘tax evasion’, both practices may exert negative effects on fiscal revenues and prevent the economic and social developments. Due to the difficulties in empirically investigating and determining the legality of firms’ tax practices, this study will not attempt to differentiate between tax avoidance and tax evasion when examining corporate tax management/planning behaviours⁹⁷. The following figure illustrates the relationship between tax management, tax avoidance and tax evasion based on the above discussions.

⁹⁵To be specific, Devereux (2012) argues that “no basis for a right to tax plan other than statements made up out of thin air by a few judges using questionable theories of statutory interpretation. Congress can limit or expand the scope of the right to tax plan with the stroke of a pen. If it is desirable to restrict tax planning, it should be restricted notwithstanding that doing so would reduce the scope of allowable planning permitted under current law” (pp 222).

⁹⁶ According to Oats et al. (2017), tax avoidance can be subdivided into ‘acceptable’ and ‘unacceptable’ avoidance. Unacceptable tax avoidance and tax evasion can be grouped together and labelled as non-compliance (pp. 14).

⁹⁷ Unless otherwise stated, this study will equally treat the terms “tax planning” and “tax management”, and define tax planning/management broadly as all activities undertaken by companies to reduce their explicit taxes.

Figure 3.1: Relationship between Tax Management, Tax Avoidance and Tax Evasion



3.2.2. Theories related to corporate tax management

3.2.2.1. Scholes-Wolfson effective tax management paradigm

Management strategies in all business and organisational activities involve achieving the fundamental goal of maximising firm value, through choosing a pattern of interrelated and multifaceted actions and decisions based upon firms' specific strengths and weakness (Hambrick 1983; Miller 1987; Porter 2004). Consistent with this notion, the Scholes-Wolfson framework adopts a multilateral approach to explain the role of effective tax management in achieving the organisational goal, i.e., the maximisation of firms' after-tax returns (Scholes et al. 1992; 2016). Scholes et al. (1992; 2016) document that the optimal scale for effective tax management should be achieved through a pattern of decisions and actions that consider three important themes, including the tax implications for all associated contracting parties; the importance of implicit taxes; and the impact of non-tax costs. Specifically, effective tax management *“requires the tax planner to consider the tax implications of a proposed transaction for all of the parties to the transaction”*; *“requires the planner, in making investment and financing decisions, to consider not only explicit taxes but also implicit taxes”*; and *“requires the planner to recognize that taxes represent only one among many business costs, and all costs must be considered in the planning process”* (Scholes et al. 2016, pp 19).

According to Shackelford et al. (2001), the three themes of Scholes-Wolfson framework (i.e., all parties, all taxes and all costs) provide a widely accepted analytical structure of corporate tax management, which can be used to explain the role of taxes in achieving organisational goals⁹⁸ (pp 323). First, all contracting parties associated with tax management transactions should be taken into account. From a contractual perspective, all contracting parties could refer to employers, employees, shareholders, customers, suppliers, lenders and tax authorities. Effective tax management therefore involves trade-offs of the benefits and long-term goals regarding corporate tax activities required by all contracting parties (Scholes et al. 2016, pp 22). Second, when making investment and financing decisions, effective tax management requires the consideration of not only the explicit taxes, i.e., the tax burden required to be paid to tax authorities, but also the implicit taxes that may take the form of tax-planning-induced reductions in firms' pre-tax rate of return⁹⁹. Third, effective tax management requires the consideration of the impacts of both tax and non-tax costs when making tax-related decisions. Tax just represents one among many business costs. Thus, effective tax management can be fundamentally different from tax minimisation activities, since tax minimisation activities may result in an increase in non-tax costs, such as management incentive costs¹⁰⁰; fees paid to tax expertise to accomplish tax management activities; or penalties incurred when the tax management transactions are challenged by tax authorities. The increased non-tax costs may result in an overall reduction in firms' after-tax wealth, if the expected benefits of the tax reduction activity are lower than its associated costs (Scholes et al. 2016, pp 142).

In summary, the Scholes-Wolfson effective tax management framework implies that tax minimisation activities do not necessarily result in effective tax management. Instead, in making effective tax management decisions and achieving tax management goals, tax planners must organise a competitive and efficient tax management structure to consider the impacts of

⁹⁸ Shackelford et al. (2001) further point out that Scholes-Wolfson framework is less effective for rigorous tests as non-tax costs are difficult to quantify, which leads to difficulties in interpreting the results drawn from the framework.

⁹⁹ According to Scholes et al. (2016), due to market competition, lower explicit tax rates will lead to higher implicit taxes, which is reflected in the form of the differences between pre-tax returns on fully taxed investments and the pre-tax returns on partially or tax-exempt investments. For example, compared to fully taxable corporate bond with fully taxable interests, the tax-exempt municipal bond can have lower pre-tax rate of return due to the market competition which bids up its bond price and reduce its pre-tax rate of return.

¹⁰⁰ In addition, Scholes et al. (2016) document that as tax-related information is asymmetrically distributed among agents, tax management activities may involve information-related costs such as costs incurred to align managers' performance with the owners' interests. See section 1.3.3.2. for detailed discussions about direct and indirect costs associated with corporate tax management.

corporate tax management on all themes based on a multilateral perspective. The themes in the Scholes-Wolfson framework implicitly assume that if all contractual parties; the explicit and the implicit taxes; and the tax and non-tax costs are all considered and controlled within the tax management structure, it can be expected that the tax management activities are ‘rational and predictable’ in increasing firms’ after-tax net wealth (Shackelford et al. 2001, pp. 323).

3.2.2.2. Cost and benefit trade-off theory

By adapting Becker’s (1968) model of the economics of crime, Allingham and Sandmo (1972) developed a deterrence model to evaluate the choice of an individual taxpayer regarding whether and how much to avoid tax. In this model, taxpayers make decisions about avoiding tax to maximise their expected benefits in the similar manner as making any risky decisions or gambles (Slemrod 2007, pp 36). This model implies that the level of tax compliance of individual taxpayers is dependent on the amount of tax required to be paid; the probability of getting detected and penalised; the size of the penalties; and the level of taxpayers’ risk aversion (Hanlon et al. 2010). Many of those factors have been applied to the examination of corporate tax compliance from a cost-benefit perspective.

On the one hand, corporate tax management has been perceived as an extension of tax-favoured activity that is designed to transfer wealth from the government to firm owners (Desai et al. 2009; Kim et al. 2011). For example, Graham et al. (2006) argue that one common feature of tax management transactions is that “*they effectively produce deductions that can be used to offset income or gains*” (pp 569). Based on the view that corporate tax management is a tax-favoured activity, previous studies provide empirical evidence that corporate tax management increases earnings per share which in turn increases market capitalisation (McGill and Outslay 2004); serves as a substitute for debt-induced tax deductions thereby reducing leverage (DeAngelo and Masulis 1980; Graham et al.2006); and generates cash tax savings thereby increasing financial slack and reducing the covenant violation risk and the cost of debt (Lim 2011; Edward et al. 2015).

On the other hand, the benefits of corporate tax management can be offset by various costs associated with corporate tax management activities. In particular, costs associated with corporate tax management refer to cash outflows that are inevitably incurred to achieve tax management goals, including fees paid to external tax expertise for soliciting tax guidance;

salaries paid to in-house tax departments for maintaining tax-related records; tax and nontax costs incurred when tax management transactions are challenged by tax authorities (i.e., repaid taxes, hefty penalties, reputation damage costs and potentially more rigorous scrutiny from tax administrations in the future); or the implicit costs that may take the form of tax-management-induced reduction in the reported book income¹⁰¹ (Mills 1998; Hansan et al. 2014).

In summary, the cost and benefit trade-off theory, which perceives corporate tax management activity as a mere tax-saving device, implies that tax planners put emphasis on balancing between the benefits from corporate tax management and its associated costs when making tax-management decisions. However, the cost and benefit trade-off theory only considers the impacts of ‘all costs’ and ‘all taxes’ inherent in the Scholes-Wolfson framework when evaluating corporate tax management behaviours, without addressing any agency dimensions through taking into account of the conflicting interests in the contractual relationship between managers and shareholders (i.e., ‘all parties’).

3.2.2.3. Agency theory

The view of corporate tax management as a mere tax-favoured activity overlooks an important characteristic of modern corporations, that is, the conflicting interests between managers and shareholders due to the separation of ownership and control (Kim et al. 2011). Jensen et al. (1976) define the agency relationship as a contract under which the principals (i.e., the shareholders) engage the agents (i.e., the managers) to act on their behalf through delegating some decision-making authority to the agents. Within the agency framework, agency problems could arise if the interests of the agents are not aligned with those of the principals, which may take the form of the managements’ attempts to pursue non-value-maximising behaviours, such as “*on-the-job perks*”, “*shirking*”, “*perquisite consumption*”, “*rent extraction*” or “*making self-interested and entrenched decisions that reduce shareholder wealth*” (Badertscher et al., 2013, pp. 230; Ang et al. 2000, pp. 83).

In order to mitigate the agency problems, it is essential for shareholders to take some initiatives to ensure the alignment of the managements’ and shareholders’ interests. Jensen et al. (1976) define the costs incurred by shareholders to take initiatives to mitigate the agency problems as

¹⁰¹ See section 3.2.3.3. for detailed discussions about the direct and indirect costs arising from corporate tax management activities.

the agency costs. According to Jensen et al. (1976), agency costs include monitoring expenditures incurred by the principal (i.e., costs incurred to evaluate and control agents' behaviors such as managerial incentive compensation, operating rules and budget restrictions); bonding costs incurred by the agents (i.e., pecuniary or non-pecuniary costs to ensure that the principals are compensated by the agents if the agents take actions that harm the principal); and the residual losses (i.e., costs incurred due to divergences between the decisions of agents and the decisions that would optimise principals' wealth, given the optimal monitoring costs and bonding costs are incurred) (pp. 308).

Through emphasising the interaction of corporate tax management and the agency tension between managers and shareholders in publicly-traded companies, Slemrod (2004), Chen and Chu (2005) and Crocker and Slemrod (2005) provide the theoretical foundation for examining corporate tax management from a principal-agent perspective. Chen and Chu (2005) argue that tax management behaviours conducted by a corporation can be more complicated than that of individuals, since the implementation of corporate tax strategies often involves multiple parties, including shareholders, stakeholders, managers, tax authorities and the general public. To the extent that risk-neutral shareholders delegate the authority of tax-related decision-making to a risk-averse manager, corporate tax management decisions will not only increase the risk of being challenged and penalised by tax authorities, but also alter the optimal compensation scheme offered to managers, leading to efficiency losses in controlling managers' efforts¹⁰².

Slemrod (2004) suggests that in publicly-traded companies, tax decisions are not made by shareholders directly but rather by their agents. Risk-neutral shareholders expect managers to make tax decisions on behalf of their benefits to reduce tax liabilities effectively and thereby maximising firms' after-tax wealth, while the incentives of managers to engage in tax management depend on "*the nature of the contractual relationship between the shareholders of a firm and the manager of the company's tax affairs*" (pp 12). Thus, shareholders need to use appropriate compensation and penalty contract to align managers' incentives regarding corporate tax management with the interests of shareholders. Similarly, Crocker and Slemrod

¹⁰² In particular, the efficiency losses in controlling firm managers is due to the illegal nature of many tax management strategies which entail future risks of being detected by tax authorities. The compensation contract of firm managers who conduct aggressive tax management activities should be contingent on the outcome of the tax management behaviours, i.e., managers should be compensated not only for their efforts in conducting tax management, but also for additional risks of being detected and penalised by tax authorities. Such compensation contract can lead to incomplete contract of management incentives since managers will be compensated no matter whether the tax management is successful or not.

(2005) study corporate tax management under the context of the contractual relationship between shareholders and firms' tax executives who possess tax-related discretion in making decisions about whether to reduce corporate tax liability by legal approaches or through illegal tax evasion. They highlight the importance of the managerial incentive compensation contract in effective corporate tax management; and argue that the optimal incentive compensation contracts should tie tax managers' salary to the achieved effective tax rate and impose non-compliance penalties on tax managers, to encourage the reduction of firm' effective tax burden and restrict illegal tax evasions (pp. 1594-1595).

The agency perspective of corporate tax management in the above studies does not assume that corporate tax management is "*in itself a reflection of the agency problems*" (Hanlon et al. 2010, pp 138). Instead, these studies assume that the agency tension between managers and shareholders due to the separation of ownership and control could lead managers to implement corporate tax management in a way that is not desired by shareholders. For this reason, it is important for shareholders and boards of directors to provide effective compensation contract to align the incentives of managers with shareholders' interests, in order to mitigate the agency tension between shareholders and managers and motivate managers to conduct tax management for the benefits of shareholders (Hanlon et al. 2010). Consistent with this notion, Armstrong et al. (2015) perceive corporate tax management as one of many investment opportunities available to managers, which entails varying degrees of uncertainty and risk regarding challenges and penalties by tax authorities. The unresolved agency problem due to information asymmetry between managers and shareholders could lead managers to adopt a tax strategy with the level of associated risk differing from what shareholders would expect. They find that corporate governance mechanism, which is measured by board independence, financial expertise on board and incentive-based managerial compensation, plays an important role in mitigating tax-induced agency problems by attenuating the extreme levels of tax management (i.e., both the over-investment and the under-investment in tax management which are not desired by shareholders).

An alternative principal-agent perspective of the corporate tax management was proposed by Desai et al. (2006), which emphasises that corporate tax management activities and managerial rent diversion can be complementary. Specifically, corporate tax management activities can create tools, shields and opportunities to facilitate managerial opportunism and resource diversion, since corporate tax management often increases organisational and financial

reporting complexity to avoid providing a roadmap to tax authorities. To the extent that the organisational and financial complexity arising from tax management activities cannot be adequately communicated with shareholders and investors, information about firms' tax management strategies will be asymmetrically distributed between the management and firm owners, leading to a less transparent corporate information environment which expands the scope for managers to divert corporate resources for their personal benefits¹⁰³ (Desai et al. 2006; Balakrishnan et al. 2018).

Desai et al.'s (2006) principal-agent perspective of corporate tax management underlies a number of empirical tax studies. For example, using a sample of 862 U.S. firms over the period 1993-2001, Desai et al. (2009) find a positive association between corporate tax management (as measured by book-tax gap) and firm value (as measured by Tobin's q), given there is a strong level of corporate governance mechanism (as measured by a high level of institutional ownership). However, for firm-years with weak corporate governance, the beneficial effects of tax management on firm value are not pronounced. Their results indicate that corporate governance acts as an important determinant in explaining the valuation of corporate tax management activities. Shareholders tend to perceive corporate tax management as conducted in a beneficial manner only when firms' corporate governance mechanism is strong enough to restrict managerial opportunism in tax management, while poor corporate governance can cause shareholders to suspect the motivation of tax executives and discount the value of tax management. Wahab and Holland (2012) provide evidence that corporate tax management is negatively valued by shareholders. Their findings are consistent with the agency cost perspective of corporate tax management that tax management transactions could increase the tax-related information asymmetry between shareholders and managers and facilitate managerial rent diversion at the expense of shareholders, leading to shareholders' concern of moral hazard risk. However, inconsistent with Desai et al. (2009), the authors find that corporate governance mechanism does not play a significant role in affecting relationship between tax management and shareholders' valuation.

¹⁰³ According to Scholes et al. (2016), the use of the complicated organisation structure to achieve tax management goals, such as joint venture or special-purpose entities, could create "serious conflicts of interests between parties, leading to forced trade-offs by tax planners" (pp 142). In addition, survey evidence in Henderson et al. (2005) shows that managers are reluctant to disclose tax-related risk management information to outside parties to avoid being detected by external scrutiny.

In summary, the principal-agent perspective of corporate tax management incorporates agency cost into the total costs of corporate tax management. The agency costs¹⁰⁴ related to corporate tax management refer to the incremental costs incurred by shareholders to align the incentives of managers with shareholders' interests and ensure that tax management activities are conducted in an effective manner to maximise the after-tax wealth of firm owners.

3.2.3. Determinants of corporate tax management

Understanding the determinants of corporate tax management is vital for understanding the wide variations in tax management behaviours across firms. As highlighted by Dyreng et al. (2008), there are significant variations in the extent to which firms are able to pay lower taxes relative to their pre-tax income, even among firms in the same industry. According to Weisbach (2002), it is puzzling that some firms engage in corporate tax management activities enthusiastically whereas others do not avail themselves of available tax management opportunities and forgo the potential benefits of corporate tax management. This section reviews relevant literature to provide insights into the determinative factors that cause variations in firms' tax management behaviours.

3.2.3.1. Objectives of corporate tax management

Some studies define corporate tax management broadly as the ability of firms to reduce their tax liabilities. For example, Dyreng et al. (2008) define tax management as anything that reduces firms' cash effective tax rate. Consistently, Hanlon et al. (2010) define tax management as the reduction of explicit taxes. Such definitions of corporate tax management implicitly assume that firms engage in tax management with the aim of reducing their tax burden to the lowest level. Firms engaging in tax minimisation activities might benefit from the reduced explicit tax burdens that would be paid to tax authorities. However, not all tax minimisation activities are effective in reducing a firm's tax burden to a desirable minimum level (Phillips 2003; Robinson et al. 2010). This is because "*in a world of costly contracting, implementation of tax minimising strategies may introduce significant costs along non-tax dimensions*"

¹⁰⁴ Basically, the costs incurred by shareholders in reducing agency problems include costs of incentive compensations to motivate managers to engage in tax management for the benefits shareholders, if shareholders view corporate tax management as a worthwhile (value-enhancing) activity; or costs associated with monitoring or regulation to moderate managers' incentives to engage in tax management, if shareholders view tax management activities as associated with information asymmetry and managerial rent extraction (Desai et al. 2006; Hanlon et al. 2010).

(Scholes et al. 1992, pp 3). Therefore, the ultimate goal of effective tax management should be the optimisation of firms' tax liabilities and the maximisation of firms' after-tax net wealth, through considering not only the explicit taxes but also the implicit taxes and non-tax costs (Scholes et al. 2016).

3.2.3.2. Benefits and motivation of corporate tax management

The benefits of engaging in tax management activities can be straightforward, i.e., they reduce present and future taxes that would be levied, collected or withheld by tax authorities. Therefore, corporate tax management may benefit firm owners in the form of reduced tax liability, the increased after-tax net income and after-tax cash flows (Rego et al. 2012). For this reason, shareholders and boards of directors might be motivated to undertake a pattern of tax management actions that effectively balance the benefits of corporate tax management against its associated costs, with the primary aim of achieving the maximisation of firms' after-tax net wealth (Scholes et al. 1992).

3.2.3.2.1. Increased after-tax return

In light of the Scholes-Wolfson framework of effective tax management, the ultimate objective of corporate tax management is the maximisation of firms' after-tax returns through implementing tax strategies that are expected to generate incremental net benefits. Consistent with this notion, Koester (2011) documents that investors may view corporate tax management activities as 'good stewards of firm resources' that managers are capable of seeking opportunities to prevent the transfer of firm resources to the governments. They find that investors place a premium on firms that engage in tax management activities. Desai and Hines (2002) find that on average stock prices react positively to firms' announcements of plans to expatriate, and the positive reaction of the stock price is more pronounced for highly levered firms who have sizable interest expenses assigned to foreign income source which reduce their ability to claim foreign tax credits¹⁰⁵. Results in Desai and Hine (2002) suggest that shareholders perceive the changing of corporate residence from the U.S. to foreign tax jurisdictions as a tax-favoured activity which is designed to reduce firms' overall tax liabilities

¹⁰⁵ According to Desai et al. (2002), U.S. tax laws require the allocation of general expense items between domestic income source and foreign income sources based on fractions of assets located inside and outside the U.S. Thereby, interest expenses allocated to foreign income sources will reduce the foreign tax credit that can be claimed due to the lowered magnitude of foreign income.

and enhance shareholder wealth, and positively value the increased ability of highly-levered firms to utilise interest tax shields as a result of their expatriation decisions.

In examining the market valuation of the components of tax management, Amir et al. (1999) find that share prices respond positively to information contained in deferred taxes arising from losses carryforwards, suggesting that equity investors reward tax savings from deferral tax activities. In addition to deferral tax activities, investors may also positively value the permanent tax management activities, due to their ability to permanently reduce firms' taxable income relative to pre-tax book income. Frank et al. (2009) argue that as there are areas of nonconformity between financial reporting standards and tax rules, firms are provided with opportunities to undertake aggressive financial and tax reporting activities during the same accounting period. They find a strong and positive association between aggressive tax reporting (measured as high-level of discretionary permanent book-tax difference) and aggressive financial reporting (measured as high-level of discretionary accrual), and that future abnormal stock return is positively associated with current tax-reporting aggressiveness in firms with high level of aggressive financial reporting. Their results indicate that the market overprices the permanent tax management activities undertaken by firms that are aggressive in financial reporting. Inconsistent with Scholes-Wolfson theoretical framework which demonstrates that the explicit tax benefits obtained from operating in low-tax jurisdictions may be offset by the non-tax costs and the implicit taxes in the form of lower pre-tax rate of return¹⁰⁶, Bryant-Kutcher et al. (2012) find that firms operating in foreign countries with lower foreign effective tax rates exhibit higher after-tax return and higher firm value as measured by Tobin's q. Their results imply that the implicit tax or non-tax costs do not completely offset the explicit tax benefits obtained from operating in low-tax jurisdictions, since the market frictions and heavy transaction costs associated with foreign business operations may restrict the market competition of operating in low-tax countries.

3.2.3.2.2. Increased cash flows

Compared to benefits associated with after-tax returns due to reduced tax expense, the cash flow benefits of corporate tax management could arise in the form of the reduced cash tax

¹⁰⁶ According to Bryant-Kutcher et al. (2012), the implicit tax could arise from competitions among firms who operate in low tax countries to obtain explicit tax benefits, which drive up assets price and drive down pre-tax return. The non-tax costs refer to high transactional, transportation and communicational costs of operating business in low tax countries due to the lack of well-structured infrastructure.

payments. The increased cash flow benefits can be achieved by engaging in either the permanent-based or the deferral-based tax management strategies. To the extent that a firm engages in tax management through permanent-based tax management transactions, the after-tax cash flow benefits may arise in the form of permanently reduced tax payments, if the tax management transactions are not challenged and overturned by tax authorities in the future. By comparison, to the extent that a firm engages in tax management through delaying the remittance of tax revenue to tax authority, the after-tax cash flow benefits may arise in the form of the deferment of tax payments, which can be perceived as being provided with an interest-free loan from the tax authority over the deferral period (Davies et al. 1997).

Graham et al. (2006) provide evidence that tax management departments in tax shelter firms use both permanent- and deferral-based tax sheltering transactions as tools to reduce firms' tax burden in a given reporting year. They find that firms that are accused as tax shelters use less debt, since the cash flow benefits (i.e., annual deductions in cash tax payments) generated by tax shelters in their sample account for 9% of asset value on average, which are much higher than the interests tax deductions from issuing debt. Using a large sample of U.S. firms from 1993-2010, Goh et al. (2016) find a negative association between corporate avoidance (as measured by higher level of book-tax difference, permanent book-tax difference and lower level of long-run cash ETR) and the cost of equity which is derived from firms' current stock prices and analysts' forecast of future earnings¹⁰⁷. Specifically, they find that a one-standard-deviation increase in their tax management measures averagely leads to a 13 to 26 basis points reduction in the cost of equity, suggesting that the cash flow benefits associated with corporate tax management generally reduce the expected rate of return required by equity investors. This is consistent with Lim (2011) who uses a large sample of Korean firms and finds that the cost of debt is negatively associated with the level of corporate tax management, indicating that corporate tax management serves as a substitute for the use of debt because it increases financial slacks, reduces expected probability of bankruptcy and lowers firms' default risks. Consistently, Edward et al. (2015) investigate the interrelationship between financial constraints and firm-specific tax management behaviours, and find that firms who experience financial constraints tend to rely more on internally generated cash savings via tax management activities, since it can be more costly and difficult for firms in financial distress to get access

¹⁰⁷ Goh et al.'s (2016) measure of cost of equity is based on the "discount rate that the market applies to a firm's future cash flow to determine the current stock price" and the analysts' expectations of future earnings are employed as a proxy for the market's expectations of firms' future cash flow (pp. 1653)

to external funds via the traditional debt and equity financing source. In addition, they find that cash tax savings from tax management activities in financial-distressed firms are primarily obtained through deferral-based tax strategies by accelerating tax deductions or delaying the remittance of tax revenue.

3.2.3.2.3. Sustainable tax savings

In addition to the increased after-tax return and cash flow benefits, firm owners may also prefer an effective tax management structure which can sustain tax savings generated from tax management activities for a long period of time, to enhance the after-tax firm value in the long run. Maintaining tax outcomes stable and sustainable can be a fundamental goal for tax departments. For instance, a survey of tax departments conducted by Tax Executive Institute suggests that the ability to avoid tax-related surprises is an important criterion to evaluate the performance and capability of tax executives (TEI 2005). KPMG LLP (2007) indicates that sustainable tax management is a long-term goal for many companies because financial analysts and investors perceive unexpected variations in a firm's effective tax rate as a signal of poor tax management. Lev et al. (2004) suggest that firms are incentivised to manage their taxes through smoothing both current and future taxable income, to avoid variations in taxable income and thereby reducing the present value of income taxes¹⁰⁸. Drake et al. (2017) provide empirical evidence that investors' valuation of corporate tax management depends on the sustainability of the tax benefits associated with firms' tax strategies. Using a large sample of U.S firms from 1992 to 2014, the authors find that firm value as measured by Tobin's q is positively associated with corporate tax management which is measured by low-level of cash ETRs, but is negatively associated with tax uncertainty as measured by high-level of the standard deviation of annual cash ETRs. Their results suggest that investors prefer persistent corporate tax management strategies but discount tax benefits generated from the available tax management transactions which are less likely to be sustained in the future. Similarly, Edgeley and Holland (2018) provide interview evidence that tax managers view stable effective tax rate as competent and reflecting high-quality management, because they firmly believe that their shareholders are "*looking for stable and sustainable after-tax earnings per share*" (pp 18).

¹⁰⁸ According to Lev et al. (2004), "*holding the average level over time of taxable income constant, the lower the volatility of taxable income, the lower the present value of income taxes*" (pp 1069).

According to Hoffman (1961), it is important for tax planners to be aware that outcomes of corporate tax management strategies cannot be sustained in the long run unless the employed tax strategies are flexible, consistent and do not rely on ambiguities in tax law. Using a large sample of 2,077 U.S. firms, Dyreng et al. (2008) provide empirical evidence that a large subset of firms, i.e., approximately one-fourth of their sample firms, is able to sustain a relatively low level of tax payments over a ten-year period. Guenther et al. (2017) find that high effective tax rates are less persistent than low effective tax rates. Consistent with the argument stated in Hoffman (1961), Guenther et al. (2017) suggest that the persistence of low tax payments is more likely to be achieved through taking advantage of benign tax-favoured transactions in a consistent way, rather than engaging in temporary tax incentives that will reverse shortly or undertaking risky tax management activities that rely on ambiguities in tax law.

3.2.3.3. Costs and constraints of corporate tax management

Although corporate tax management may lead to increased after-tax return; increased after-tax cash flow; and sustainable tax savings for a long period of time, there can be various direct and indirect costs associated with corporate tax management which constrain firms from maximising their after-tax wealth through engaging in tax management activities. This is consistent with Scholes-Wolfson framework which highlights the importance of considering the implications of corporate tax management from perspectives of ‘all taxes’; ‘all costs’ and ‘all parties’. As the process of corporate tax management may incur both direct and indirect costs, it is important for tax planners to weigh the expected benefits of tax management against its expected total costs, in order to achieve the fundamental goal of maximising firms’ after-tax wealth. Various costs arising from corporate tax management activities may provide an explanation of the “under-sheltering puzzle” pointed out by Weisbach (2002) that not all firms are incentivised to minimise their tax liabilities through fully taking advantage of their available tax management opportunities (Wahab and Holland 2012).

3.2.3.3.1. Direct tax-related costs

Corporate tax management activities can impose significant direct costs on both firm owners and managers. Direct costs associated with corporate tax management refer to cash outflows that are inevitably incurred by firms to take advantage of their tax management opportunities. These costs include both the administrative costs and the compliance costs. The administrative

costs of corporate tax management are costs incurred to set up and maintain firms' tax management activities, including the initial setup and implementing costs of tax management channels¹⁰⁹ (Mills et al. 1998; Scholes et al. 2016); tax managers' efforts and time spent on structuring and monitoring tax management activities¹¹⁰ (Kim et al. 2011; Armstrong et al. 2012); salaries paid to employees of in-house tax departments for keeping tax-management-related records (Mills et al. 1998; Slemrod and Yitzhaki 2002); and costs of collecting, documenting and communicating tax-management-related information across dispersed operational segments located in multiple tax jurisdictions (Gallemore et al. 2015). Besides administrative costs, firms may also bear compliance costs as part of the corporate tax management costs. A firm will subject to hefty penalties, back taxes and potentially heightened tax scrutiny by tax authorities in the future, once its tax management strategies are challenged and overturned by tax authorities or by the court using judicial doctrine (Slemrod et al. 2002; Guenther et al. 2017). Compliance costs also refer to tax-related fees paid for obtaining external assistance that facilitate the developments of tax management investment opportunities or the elimination of risk and uncertainty associated with tax management, such as fees paid to lawyers, tax expertise, accountant and other relevant parties (Slemrod 2004, pp 17).

3.2.3.3.2. Indirect and nontax costs

a. Agency cost (managerial incentive compensation)

To the extent that corporate tax management is effective in increasing firm's after-tax return/cash flows and sustaining the tax benefits for a long period of time, shareholders may be motivated to encourage their managers to engage in tax management activities and maximise firms' after-tax wealth. However, under the agency context where the ownership and control are separate and the management is delegated to act on behalf of shareholders, it is essential for shareholders and the boards of directors to take some initiatives to align the management's incentives with shareholders' interests, thereby ensuring that managers are willing to bear increased efforts and risks in undertaking tax management activities with the aim of maximising shareholders' after-tax wealth (Slemrod 2006). Previous studies provide empirical

¹⁰⁹Examples of initial setup and implementing costs of tax management channels are costs arising from the constructions of complicated organizational structures such as joint ventures and special-purpose entities (Scholes et al. 2016).

¹¹⁰ For example, Armstrong et al. (2012) identify the role of tax managers as responsible for compliance; providing expertise to advise firms' senior executives; and actively pursuing and generating tax management investment opportunities.

evidence that various types of managerial incentive compensation, such as the after-tax performance-based measure or the equity-based compensation for top executives and tax directors, are used to pursue the alignment of managers' incentives and shareholders' interests in undertaking corporate tax management, based on the view that tax savings generated from managers' tax management efforts are expected to increase with the level of incentive compensation.

Newman (1989), Carnes and Guffey (2000) and Atwood et al. (1998) were among the first to examine firms' choice of using after-tax accounting-based performance measure (e.g., after-tax earnings) to determine CEO bonus plans. These studies provide evidence that CEO after-tax compensation is positively associated with firms' multinational status, size, capital intensity, and numbers of business units, indicating that firms with more tax management opportunities are more likely to reward their CEOs against the after-tax accounting-based performance measures. However, these studies provide no evidence on whether the use of after-tax performance measures leads to managements' actions in effectively reducing corporate tax liabilities.

Phillips (2003) investigates the usefulness of including after-tax accounting-based measures into managers' compensation contracts in motivating the efforts of CEOs and business-unit managers to reduce explicit tax liabilities. Using the proprietary survey data to indicate whether a firm uses after-tax performance measures to compensate its CEOs and business-unit managers, the author finds that compensating business-unit managers against after-tax accounting-based performance measures leads to reduced tax liabilities and economically significant tax benefits, whereas compensating CEO using after-tax accounting-based performance measures has no significant impact on firms' effective tax rates. The author interprets their results as highlighting the practical implications of the after-tax accounting-based incentives on improving business-unit managers' tax management efficiency. However, the after-tax accounting-based compensation only provides incremental motivation for business-units managers rather than for CEOs, suggesting that CEOs might be sufficiently motivated by other incentives such as job retention rather than by the annual after-tax accounting-based compensation. Armstrong et al. (2012) investigate the link between the incentive compensations of tax directors who are directly involved in firms' tax decisions and the extent of firms' tax management activities. They find that tax directors' compensation is negatively associated with firms' GAAP ETR while there is no evidence supporting that tax

directors' compensation has an impact on firms' Cash ETR or the level of firms' tax aggressiveness¹¹¹. Their results indicate that tax directors are provided with strong incentives to obtain the after-tax financial reporting benefits through reducing the level of tax expense reported in financial statements, but have little incentives to take effective actions in lowering firms' cash tax burden¹¹². However, it is still unclear about the individual effects of top executives, i.e., CEO or CFO, on the process of corporate tax management.

Based on the conjecture that CEOs and CFOs can exert pressure on firms' tax departments thereby influencing the level of firms' tax management activities, Rego et al. (2012) investigate the relationship between top executives' equity risk incentives and the level of corporate tax management. They argue that corporate tax management is an activity which can induce tax-saving benefits in the form of reduced tax liabilities while at the same time can also incur significant uncertainty and costs to both firms and top managers. Therefore, CEOs' or CFOs' equity risk incentives are expected to play a role in mitigating the "*risk-related incentive problem between managers and shareholders*", by motivating top executives to undertake tax management activities that involve uncertainty but are expected to generate significant net benefits for firms' shareholders (pp 782). Using four measures to proxy firms' risky tax positions¹¹³, Rego et al. (2012) find that equity risk incentives of top executives¹¹⁴, which motivate top executives to make more risky financing and investing decisions, positively determine the level of corporate tax management. Similarly, Gaertner (2014) provides evidence that compensating CEO against the after-tax accounting-based performance measure results in lower ETRs¹¹⁵. In addition, the author finds that there is a positive association between CEOs' cash compensation and the use of after-tax CEO incentives, indicating that CEOs are compensated for taking additional compensation risks because corporate income taxes can be affected by exogenous factors that are beyond managements' control, and thereby the after-tax

¹¹¹ The level of firms' tax aggressiveness in this study is measured using Frank et al.'s (2009) permanent book-tax difference and Wilson's (2009) tax-sheltering prediction score.

¹¹² Traditional agency theory indicates that compensation of the agents should be determined by performance measures that are controllable by the agent. In terms of the compensation contract for the tax director, Armstrong et al. (2012) interpret that "*the GAAP ETR is relatively controllable by the tax director and can be measured with sufficient precision so as to make it valuable for contracting. In contrast, the firm's other tax attributes are either not sufficiently controllable by the tax director and/or are too noisy to be valuable for contracting*" (pp 393-408).

¹¹³ The four measures include Frank et al.'s (2009) discretionary permanent book-tax differences; Wilson's (2009) tax shelter prediction score; the five-year Cash ETR and the level of unrecognised tax benefits (UTBs),

¹¹⁴ Rego et al. (2013) define equity risk incentives as "reflecting how changes in stock return volatility affect managers' wealth". Managers' equity risk incentives are measured as "changes in value of a manager's stock option portfolio for a given change in stock volatility" (pp. 783).

¹¹⁵ ETR in this study is measured by a firm's annual total income tax expense divided by its pre-tax income.

incentive compensation of managers can be more uncertain and entail more risks than the pre-tax compensation (pp. 1077-1078). Results in Rego et al. (2013) and Gaertner (2014) are in line with Dyreng et al. (2010) who find that individual top executives could influence the level of a firm's tax planning by setting the 'tone at the top' with respect to the firm's tax management strategies.

Acknowledging that effective tax management can serve as a long-term investment which maintains tax benefits for a long period of time, some studies examine the impact of managerial incentive on the sustainability of firms' tax strategies. Using a large sample of U.S. firms for the period 1996 to 2005, Minnick et al. (2010) provide evidence that the pay-performance sensitivity¹¹⁶ motivates CEOs and directors to reduce taxes in the long run. Specifically, they find that a one-unit increase in CEO (director) pay-performance-sensitivity leads to a 0.541% (0.337%) decrease in the five-year GAAP ETR and a 0.571% decrease in five-year cash ETR¹¹⁷, indicating that managerial incentive compensation motivates firm executives to engage in long-run tax management. Brown et al. (2016) investigate whether and how managers' bonus payments vary with their tax management efforts and find that board of directors tend to encourage their managers to engage in tax management activities (i.e., measured as low cash ETRs) by providing them with higher bonuses. However, the bonuses associated with managers' tax management efforts are adjusted downwards if firms' tax positions entail high uncertainty as proxied by high UTBs¹¹⁸. These results imply that boards tend to encourage their managers to engage in tax management activities but penalise those who avoid tax in an uncertain manner. This is in line with DeWaeenaere et al. (2015) who provide theoretical evidence that a proper compensation system should reward tax managers for reducing firms' cash tax payment but penalise tax managers for increasing UTB. In this way, the effort-averse managers will be motivated to undertake effective tax-saving activities to increase firms' net wealth, while at the same time managers will be disincentivised to undertake risky tax activities which may lead to high uncertainty regarding future detections and penalties by tax authorities.

¹¹⁶ Minnick et al. (2010) measure pay-performance sensitivity based on stock holdings and option holdings of CEO and directors. The pay-performance sensitivity is defined as "the change of an executive's wealth (in thousand dollars) from his/her stock and option holdings given a 1% change in stock price" (pp.712).

¹¹⁷ In this study, the director pay-performance-sensitivity is found to only affect GAAP ETRs.

¹¹⁸ According to Brown et al. (2014), FIN No. 48 in U.S. requires managers to recognise a contingent liability (UTB) for uncertain tax positions regarding whether tax authorities will challenge and disallow the current tax benefits. Higher (lower) value of UTB reflects higher (lower) expected future tax-related cash outflows upon future audits by tax authorities. Therefore, UTBs provide boards and managers an explicit measure of *ex ante* uncertainty and risk related to current tax performance to contract upon.

In summary, risk-neutral shareholders can be motivated to pursue tax management opportunities as long as the expected incremental benefits of tax management exceed the associated incremental costs. However, as tax management activities can impose significant costs and risks to firms and managers, risk-averse managers may be disincentivised to engage in tax management (Hanlon et al. 2010). As a result, it is essential for shareholders to take some initiatives to ensure that managers are motivated to undertake value-enhancing tax management activities on behalf of shareholders' benefits. According to previous literature, the initiatives could incur various types of agency costs, such as the increased bonus and the increased after-tax-performance-based or equity-based compensation for top executives and tax directors.

b. Agency costs (managerial opportunism)

The agency relationship is defined as “*a contract under which one or more persons (the principal(s)) engage another person (the agent) to perform some services on their behalf which involves delegating some decision-making authority to the agent*” (Jensen et al. 1976, pp 308). Within the agency framework where the ownership and control are separate, agency problems could occur if managers, who are delegated to act on behalf of firm owners, opportunistically pursue their personal benefit instead of maximising the benefits of firm owners. According to Jensen et al.'s (1976) model of managerial rent extraction under the principal-agent perspective, managers tend to receive ‘declining marginal utility’ from extracting firm resources for their own interests until the marginal benefits of rent extraction equal to the marginal costs arising from risks of losing job or equity compensation. By comparison, shareholders set up monitoring mechanisms to control managers' consumption of firm resource until the incremental monitoring costs exceed the benefits of reducing managerial rent extraction (Blaylock 2016).

As discussed above in section 3.2.3.2., corporate tax management may benefit firms and shareholders in the form of increased after-tax return, increased cash flows and sustainable tax savings. However, Desai et al.'s (2006) principal-agent framework of corporate tax management implies that tax management activities conducted with the intention of avoiding detections by tax authorities could provide tools and shields for managers to extract firm resources at the expense of shareholders. This is because that the complexity, opacity and obfuscation associated with tax management transactions, which make firms' tax management information less likely to be detected and challenged by tax authorities, could in turn increase

the information asymmetry between managers and shareholders and thereby increasing the latitudes for managerial opportunistic behaviours (Desai et al. 2006; Desai et al. 2009; Frank et al. 2009; Kim et al. 2011; Wahab and Holland 2012; Goh et al. 2016). In addition, the concealment or neutralisation of material tax issues and any accompanied obfuscation in firms' reported financial information¹¹⁹ could prevent boards and shareholders from understanding firms' underlying economic performance, which makes it more difficult to monitor and control managers' opportunistic behaviours (Blaylock 2016; Edgley and Holland 2018).

In this situation, corporate tax management and managerial rent diversion can be complementary, because of the complementary relationship between the obfuscation required by managers to ensure that the tax management information is kept secret from the tax authority and the obfuscation needed for managers to extract firm resources for their own benefits (Desai et al. 2006; Blaylock 2016). As discussed in the above section, to the extent that corporate tax management increases firms' after-tax wealth, greater managerial incentive compensation designed to ensure that managers act on behalf of shareholders' interests is expected to encourage managers to engage in a higher level of tax management. However, under Desai et al.'s (2006) framework, if corporate tax management and managerial rent diversion are complementary, high-powered incentive compensation that reduces managerial rent diversion through aligning managers' interests with those of shareholders will constrain managers from engaging in tax management activities, since the reduced rent diversion is accompanied by the reduced tax management. In addition, the impact of high-powered incentive compensation on corporate tax management can be conditional upon the strength of corporate governance mechanism, since well-governed firms tend to exist less scope for reductions in managerial rent diversion and, accordingly, less offsetting reductions in corporate tax management as compared to their poorly-governed counterparts (Desai et al. 2006, pp 147).

Consistent with the notion that corporate tax management and managerial rent diversion are complementary, previous studies provide evidence that corporate tax management facilitates

¹¹⁹ For example, Desai et al. (2009) document that the complex tax shelter activities, such as Enron's Project Steel, facilitate managers to opportunistically manufacture financial reporting income while prevent shareholders and other users of financial statements from understanding and detecting managers' opportunistic behaviours. Desai (2005) argues that the complexity associated with Tyco's tax planning activities centralise power at hands of top executives and provide top executives with tools and shields for managerial rent diversion by way of abusing compensation, inside trading and opportunistically exploiting corporate funds.

opportunistic managerial behaviours such as rent extraction; bad news hoarding¹²⁰; and opaque financial reporting, thereby exacerbating the information asymmetry between managers and various stakeholders and diminishing the incremental benefits associated with tax management. For example, based on the notion that the organisational complexity and information opacity accompanies with corporate tax management could provide self-interested managers with covers and shields for extracting firm resources and concealing negative firm-specific information for extended periods, Kim et al. (2011) find that firms engaging in aggressive tax management (as measured by higher sheltering probabilities, lower long-run cash ETRs and large book-tax differences) are more likely to experience future stock price crash risk. Frank et al. (2009) find that aggressive tax management to manage taxable income downward is positively associated with aggressive financial reporting to manage book income upward for a particular accounting period, suggesting that financial reporting opacity facilitates expropriation in which case managers can disguise tax management as a value-enhancing activity. Similarly, Balakrishnan et al. (2018) find that firms engaging in aggressive tax management exhibit larger analysts' forecast errors, greater analysts' forecast dispersion and lower accruals quality, indicating that sophisticated tax management transactions could impair the quality of the reported financial information and increase the information asymmetry between managers and financial statements users.

Although corporate tax management may lower firms' default risk by way of increasing after-tax cash flows; reducing leverage; and increasing financial slack, corporate tax management could engender uncertainty about the volatility and the magnitude of firms' future cash flows, as it can increase the probability of detection and penalisation by tax authorities and exacerbate the information asymmetry between managers and stakeholders (Mills 1998; Graham et al. 2006; Desai et al. 2006; Frank et al. 2009; Shevlin et al. 2013; Kim et al. 2011; Balakrishnan et al. 2018). Consistent with this argument, previous studies investigate how corporate tax management activities are perceived and evaluated by lenders/debtholders. Hasan et al. (2014) find that banks charge higher loan spreads to firms engaging in greater tax management. They find that the positive relationship between tax management and bank loan spread is primarily due to banks' perception of corporate tax management as inducing higher agency costs (as

¹²⁰ The bad news hoarding activities refer to the managerial incentives to maintain a bad project for extended periods in order to earn the convex payoffs (Black and Liu 2007; Kim et al. 2011). Managers may keep the bad projects alive for extended periods if they withhold the project's negative performance and make it difficult for shareholders to discriminate good from bad projects. Corporate tax management can facilitate the bad news hoarding activities because of the complexity and opacity involved with the tax management transactions.

measured by poor quality of corporate governance); higher information risk (as measured by higher discretionary accruals); and higher probability of being audited by tax authorities (as measured by high IRS audit probabilities). However, they find no evidence that the reduced leverage and improved financial slack arising from tax management exert impacts on the bank loan spread. This is consistent with Shevlin et al. (2013) who find that firms engaging in greater tax management exhibit higher offering yields of public bonds, suggesting that bondholders tend to value corporate tax management negatively.

In light of the above discussion, the agency cost perspective of corporate tax management in terms of the complementary relationship between corporate tax management and managerial rent diversion could offer some explanations of the under-sheltering puzzle that not all firms engage in tax management activity enthusiastically (Desai et al. 2009). Managers can be reluctant to provide detailed disclosures about their firms' tax management strategies, in order to avoid providing a roadmap to tax authorities and outside auditors. As a result, the sophisticated and complex tax management activities may lead to severe opacity and obfuscation in financial reporting, which can provide self-interested managers with tools, masks and opportunities to extract firm resources at the expense of shareholders, debtholders and other stakeholders. Shareholders and other stakeholders therefore may become suspicious about the motivation and the consequence of corporate tax management, which in turn, moderate managers' incentives to undertake tax management activities (Desai et al. 2006).

c. Reputational costs

Reputational costs are often conjectured as an important restrictive factor that constrains firms from engaging in tax management activities, especially the most aggressive form of tax management activities (Gallemore et al. 2014; Graham et al. 2013). Bankman (2004) suggests that firms who engage in aggressive tax management activities may be labelled a "poor corporate citizen" and, thus, bearing significant reputational damage and political costs. As demonstrated by Financial Secretary to the Treasury David Gauke, "*entering into a tax planning scheme can be complex, expensive and cause extensive reputational damage for the companies involved*"¹²¹. Reputational costs are perceived as relating to public visibility and political costs (Gallemore et al. 2014; Dyreng et al. 2016). This is consistent with Zimmerman

¹²¹ See <https://www.gov.uk/government/news/hmrc-defeats-three-more-corporate-avoidance-schemes>

(1983) who employs firm size as a proxy for public visibility and political cost. They find that firms' effective tax rates are positively associated with firm size, which suggests that corporate tax strategies can be partially dependent on public visibility, because it might be less likely for firms which are highly sensitive to political costs and reputational damage to engage in tax reduction activities.

In order to examine whether firms bear reputational damage if their involvements in aggressive tax management are revealed to the public, Hanlon et al. (2009) use event study tests to investigate the stock price reaction to news about firms' involvements in aggressive tax management. They find that there is a decline in firms' stock price following the public revelation of firms' involvements in tax shelter activities, suggesting that the market participants react negatively to aggressive tax management. The authors carefully note that reputational damage can only be one of many possible determinants of the negative market reactions towards aggressive tax management. By contrast, Gallemore et al. (2014) perceive reputation as a multifaceted construct resulting from impressions of multiple interested parties. Therefore, instead of only focusing on the reputational effects exerted by equity investors towards aggressive tax management, Gallemore et al. (2014) examine whether tax shelter firms and their managers bear negative reputational effects from equity investors, customers and tax authorities. Consistent with Hanlon et al. (2009), they find that there is a decline in stock price following the public revelation of firms' engagement in aggressive tax management. However, the negative market reaction towards aggressive tax management is temporary which reverses back within 30 days. In addition, they find no significant changes in firms' sales; advertising expense; level of effective tax rates; and turnover of CFOs, CEOs or auditors following the public revelation of aggressive tax management, which suggests that tax shelter firms and their executives do not face significant negative reputational concerns from equity investors, customers and tax authorities.

One limitation in Hanlon et al. (2009) and Gallemore et al. (2014) is that the use of a sample of tax shelter firms to investigate the reputational effects from tax management cannot provide evidence about whether the ex-ante reputational concerns constrain firms from engaging in tax management. In other words, it is unclear whether managers' reputational concern is a determinative factor to explain the "under-sheltering puzzle", if investigating the reputational effects on corporate tax behaviours using a sample of firms that have been accused as tax shelters (Graham et al. 2014). In order to solve the limitations of using archival data in

examining the reputational influences on managers' motivation for tax management, Graham et al. (2014) survey nearly 600 tax executives and find that 69% of them agree that the potential reputational damage is an important restrictive factor when deciding whether or not to engage in tax management activities. In addition, they find that firms which are publicly listed; large in size; more profitable; and in the retail industry are significantly more concerned about the negative reputation effects from engaging in tax management. However, although survey-based approach has the advantage of gaining direct insights into the impacts of reputational concerns on managers' incentives for tax management, it naturally subjects to the limitation that managers may be reluctant to reply to the survey questions truthfully (Lietz 2013).

In summary, as reputation is a multifaceted construct which is difficult to be observed and measured with accuracy, the impacts of reputational concerns on corporate tax management decisions are empirically inconclusive. The extent to which reputational concerns restrain a firm from engaging in tax management activities can vary considerably depending on firm-specific characteristics, the nature of firms' business and the attitudes of tax executives.

d. Financial reporting cost

Shackelford and Shevlin (2001) define financial reporting costs as "*those costs related to reporting lower income or shareholders' equity*" (pp. 326). Under UK tax legislation, corporate taxable profit relies heavily on the reported accounting profit which is calculated in accordance with the Generally Accepted Accounting Principles (GAAP). That is, the starting point of computing taxable income is the accounting profit reported in individual legal entity's financial statements, and then certain adjustments will be needed in accordance to requirements in tax laws (e.g., adding back depreciation or deducting capital allowance) (HMRC 2017).

In areas where tax laws do not explicitly require adjustments (i.e., book-tax conformity), incomes are recognised in the same manner for both book and tax purposes, thereby the amount of taxable income would be dependent on the adopted accounting methods. In this situation, it can be difficult for a firm to reduce or defer tax payments (increase or accelerate book income) without reducing or deferring book income (increasing or accelerating tax payments) (Guenther et al. 1997). Therefore, in areas of book-tax conformity, the tax management incentives to minimise the reported taxable income could lead to financial reporting costs in terms of the reduced financial reporting income, which can adversely affect financial contracts with various

stakeholders (e.g., creditors, lenders, customers, suppliers and managers), because many financial contracts use book income numbers to outline the term of trade (Shackelford and Shevlin 2001, pp. 326). More important, publicly-held firms which rely heavily on the capital market to raise investment funds can face great financial reporting pressure of signalling high financial income and competent managerial performance to the capital market. Therefore, the engagements in book-tax-conforming tax management strategies which reduce both book income and tax liability can make public firms bear additional costs of being undervalued by equity investors (Klassen 1997).

By contrast, in areas where the tax legislation requires adjustments in calculating taxable income (i.e., book-tax nonconformity)¹²², transactions are accounted for differently for tax and accounting purposes and, hence, the accounting methods adopted for financial reporting purposes become irrelevant for the computation of taxable profit. Therefore, in areas of book-tax nonconformity, managers are provided with opportunities to report higher book income and lower taxable income for the same reporting period (Frank et al. 2009). However, reporting large positive book-tax differences can be a “red flag” which attracts heightened scrutiny from tax authorities, external auditors, financial analysts and investors (Mills and Newberry 2001; Phillips et al. 2003; Erickson et al. 2004). For example, Hanlon (2005) provides evidence that large positive book-tax differences are negatively associated with the market’s expectation of firms’ future earnings persistence, suggesting that equity investors tend to perceive large positive book-tax difference as a signal of poor earnings quality thereby reducing their expectations about firms’ future earnings persistence.

Thus, financial reporting considerations might restrict firms from undertaking tax management activities, since managerial incentives to minimise taxable income could lead to financial reporting costs in the form of reduced book income reported in financial statements or heightened scrutiny and reputational damage as a result of large positive book-tax differences. Effective tax management therefore requires tax planners to balance the conflicts between the objective of financial reporting to report a higher book income and the objective of tax management to report a lower taxable income (Scholes et al. 1992; Shackelford and Shevlin 2001).

¹²² See page 19-21 for detailed discussion about book-tax nonconformity.

e. Earnings management

Previous studies provide evidence that managers have strong incentives to meet particular 'target' earnings figures, such as avoiding the reports of decreased or negative earnings or avoiding failing to meet or beat analysts' earnings forecasts. For instance, Hayn (1995) and Burgstahler and Dichev (1997) provide evidence about earnings management by showing an unusually high frequency of zero or small-increased earnings and an unusually low frequency of slightly-decreased earnings. Barth et al. (1999) find that firms sustaining earnings increases for a continual period tend to have greater price-earnings multiples than other firms that are unable to maintain steady earnings increases, indicating that market rewards firms that exhibit continual positive changes in earnings. Brown and Caylor (2005) document that managers tend to shift their emphases from avoiding the reports of negative or decreased earnings to meeting or beating analysts' earnings forecasts, because firms that successfully meet or beat analysts' expectations of earnings are found to be valued more by equity investors as compared to firms that avoid reporting losses or earnings decreases. In addition, a number of studies provide evidence that firms close to their covenants (e.g., dividend covenants and debt covenants) make income-increasing accounting changes (Healy and Palepu 1990; Sweeney 1994).

Since income tax expense is substantial for a broad set of firms, managers may be incentivised to opportunistically manage the income tax provision for the purposes of improving firms' after-tax earnings and achieving a particular earnings benchmark, when firms' pre-tax earnings fail to achieve the benchmark. The complexity of computing income tax expense and the managerial judgements allowed in estimating tax implications of firms' operations likely exacerbate the information asymmetry between managers and financial statement users, which provides necessary conditions for managers to achieve earnings targets through deliberately manipulating the income tax provision. For example, Dhaliwal et al. (2004) argue that managing income tax provision provides a final chance for achieving the expected earnings target, since the income tax account is one of the last accounts finalised before earnings are released¹²³. They find that firms decrease their annual effective tax rate from the third to the fourth quarter, when their earnings would have missed analysts' consensus forecasts in the absence of tax expense management. Cook et al. (2008) extend Dhaliwal et al. (2004) by investigating the extent to which changes in effective tax rates from the third to the fourth

¹²³ Dhaliwal et al. (2004) suggest that income tax account is one of the last accounts closed after the agreements of any pre-tax adjustments, since changes in pre-tax accounts will affect the tax accounts.

quarter is associated with investments in tax management (as proxied by the level of tax fees paid to auditors). They find that for firms which have achieved analysts' earnings forecasts, there is no significant association between third-to-fourth-quarter changes in ETRs and tax fees paid to auditors. However, for firms that would have fallen short of consensus earnings forecasts in the absence of tax expense management, greater amount of tax fees paid to auditors results in larger reductions in ETR from the third to the fourth quarter. Results in Dhaliwal et al. (2004) and Cook et al. (2008) provide evidence that income tax accounts are regularly used by managers to alter the after-tax earnings.

Gordon and Joos (2004) and Holland and Jackson (2004) provide U.K. evidence to show that managers use discretions and flexibility allowed in computing deferred taxes for the purpose of altering reported information in financial statements and meeting 'target' earnings figures. During the sample period under review in the two studies, U.K firms were required to provide deferred taxes under the partial provision method, i.e., deferred tax liabilities or assets should only be recognised in the financial accounts if they are expected to reverse in the foreseeable future (3-5 years ahead) without being replaced. Under the partial provision method for deferred taxes, managers are provided with discretions and flexibility in determining the required amount of recognised or unrecognised deferred taxes, since they must use their private information to forecast firms' future tax events. In particular, Gordon and Joos (2004) argue that given a total amount of deferred taxes, firms can reduce their total liability and increase their after-tax earnings and shareholders' equity by increasing (decreasing) the amount of unrecognised deferred tax liabilities (assets). They find that the amount of unrecognised deferred tax liability is significantly and positively associated with leverage ratio after controlling for firm-specific operational factors, indicating that deferred tax balances are used by managers to opportunistically influence indicators of leverage to relax firms' debt covenant constraints. Holland and Jackson (2004) find that the under- (over-) provision of deferred taxes is positively (negatively) associated with firms' leverage and the upward adjustments of the prior-year tax charge, but is negatively (positively) associated with firms' profit status, indicating that deferred tax accounts are deliberately used by managers to influence the level of firms' leverage; to absorb tax shocks in the form of prior year adjustments and to smooth profits.

Besides the aggregated income tax accounts and deferred taxes, several studies focus on investigating whether firms manage earnings through exploiting discretion inherent in specific

tax accounts, including the permanently reinvested foreign earnings; the tax losses; and the value allowances for deferred tax assets. Specifically, Krull (2004) documents that the computation of the permanently reinvested foreign earnings requires managers to exercise discretion and judgements in determining the timing and amount of the repatriations of foreign earnings. Thus, managers are provided with opportunities for earnings management via deferring (accelerating) the recognition of income tax expense in financial statements by increasing (reducing) the amount of foreign earnings designated as permanently reinvested abroad. Krull (2004) finds that firms designate more foreign earnings as permanently reinvested abroad when their earnings in the absence of tax-induced earnings management would fall short of analysts' expectations, suggesting that managers exploit discretion in reporting permanently reinvested foreign earnings to beat analysts' earnings expectations¹²⁴. However, she finds no evidence that firms designate less foreign earnings as permanently reinvested abroad when their earnings in the absence of earnings management exceed analysts' forecasts, implying that the permanently reinvested earnings designation is not used to smooth earnings.

Maydew (1997) provides evidence on earnings management through intertemporally shifting income to magnify the net operating loss (NOL) carrybacks. He finds that after the reduction of tax rates as a result of U.S. Tax Reform Act of 1986, firms with tax losses carrybacks defer the recognition of year-end operating income and recognise more nonrecurring losses during the NOL year to maximise their tax refunds from pre-1986 high-tax-rate years. However, since magnifying current tax losses would reduce the available investment tax credits and increase the probability of violating debt covenants¹²⁵, firms with large amount of investment tax credits and high leverage ratio are found to be less incentivised to increase tax refunds through intertemporally shifting income. This is consistent with tax and nontax costs (i.e., the reduced available investment tax credits and the increased probability of debt violation) as being the restrictive determinants of the tax-related earnings management to increase NOL carrybacks.

¹²⁴ According to Krull (2004), managing earnings through exploiting discretion in designating foreign earnings as permanently reinvested abroad is concentrated in firms whose foreign tax rates are below the domestic tax rate. This is because that under U.S. tax law, firms with foreign tax rates that exceed the domestic tax rate face no additional tax burden on repatriation, thereby changing the amount of permanently reinvested earnings has no income tax consequences and cannot affect firms' after-tax earnings. However, for firms whose foreign tax rates are below the domestic tax, additional taxed are owned on repatriation at a rate approximately equal to the U.S. tax rate minus foreign tax rate.

¹²⁵ This is because that magnifying tax losses carrybacks would reduce the taxable income thereby reducing the allowed investment tax credits in the carryback year. In addition, magnifying current tax losses through accelerating the recognition of losses and deferring the recognition of operating income can heighten risks of debt covenants violation of highly levered firms.

In addition, a number of U.S. studies that focus on the link between earnings management and value allowances for deferred tax assets provide evidence that the value allowances are used to meet prior-year earnings (Schrand and Wong 2002); to meet analysts' earnings forecasts (Bauman et al. 2001; Schrand and Wong 2002; Frank and Rego 2006); and to increase the magnitude of a big bath (Bauman et al. 2001).

In summary, managing the income tax provision provides a source of earnings management, since changes in income tax expenses could accordingly alter firms' reported after-tax earnings. Previous literature provides evidence that the aggregated income tax accounts, the deferred tax balances and specific tax accounts can be used by managers to improve firms' net-earning performance and to meet particular 'target' earnings figures, which may result in opacity and obfuscation of the reported financial information and thereby increasing the information asymmetry between managers and financial statement users.

f. Risks in tax outcomes

According to Blouin (2014) and Armstrong et al. (2015), corporate tax management can be perceived as a form of investment opportunity available to management. Similar to any investment projects, managers must evaluate the expected cash flows associated with the tax management project and its inherent risk, in order to estimate its net present value. Tax management risk is defined by HMRC as *“an identified tax issue, where HMRC and the customer may not agree about a particular tax analysis set out in a return or declaration. Or it may be a less specific uncertainty about whether tax returns and declarations are correct which may lead to an issue being identified”*¹²⁶. OECD defines the inherent risk of tax management as *“taking a tax position that is favourable to the taxpayer without openly disclosing that there is uncertainty whether significant matters in the tax return accord with the law”*¹²⁷.

In light of the above definitions, risks of tax management practices mainly arise because of the ambiguities in complying with tax regulations and difficulties in understanding what constitutes appropriate tax practices, resulting in conflicting views between taxpayers and tax authorities about whether a tax management behaviour is 'acceptable' or 'unacceptable'. In the

¹²⁶ HMRC *Approach to Compliance Risk Management for Large Business* (HMRC 2007) para.3.2

¹²⁷ OECD *Study into the Role of Tax Intermediaries* (OECD,2008)

UK, HMRC has developed a risk-based approach with a number of risk rating criterion¹²⁸ to determine the intensity of their administrative intervention in a firm's tax affairs. Firms who are characterised by HMRC as low risk may benefit from a light-touch approach with fewer HMRC-initiated interventions, while firms who are characterised as high risk will subject to more intensive HMRC-initiated interventions and scrutiny, bearing incremental tax repayment and hefty penalties pursuant to a future tax audit if their tax reduction strategies are challenged and overturned by tax authorities¹²⁹ (HMRC 2007; Freedman et al. 2014).

Firms' attitude towards tax management can be an important risk rating criterion for large and complex companies. This is because it can be difficult for large and complex companies to bring down their overall tax-risk rating through managing risks associated with the inherent factors such as 'changes, complexity and boundary issues'. Therefore, large and complex companies may emphasise on improving their overall tax-risk rating by lowering risks associated with behavioural factors, such as improving their corporate tax governance or altering their attitudes towards aggressive tax management¹³⁰ (Freedman et al. 2014). Thus, fears of being characterised by HMRC as high tax risk may constrain firms from engaging in aggressive tax management activities.

However, managers' attitudes towards whether a tax management strategy constitutes 'aggressive' or 'unacceptable' tax management can vary considerably depending on their appetite for risk. Freedman et al's. (2014) interview evidence documents that some managers are unwilling to alter their tax management strategies although they understand that doing so can improve their HMRC risk rating, particularly "*when HMRC's view that a piece of tax planning is 'unacceptable' is based on an interpretation of the law which they feel they are entitled to disagree with, pending determination by the courts*" (Freedman et al. 2014, pp 83). This is consistent with Blouin's (2014) argument that risk-taking (risk-averse) firms can be more (less) willing to engage in aggressive tax management activities, when there is ambiguity in tax laws or a lack of clarified guidance with respect to the appropriate tax practices.

¹²⁸ The risk rating criteria include inherent factors such as "changes, complexity, boundary issues" and behavioural factors such as "corporate governance, delivery, and company's attitude to tax planning and avoidance" (HMRC 2007).

¹²⁹ See: <https://www.gov.uk/hmrc-internal-manuals/tax-compliance-risk-management/tcrm2430>

¹³⁰ HMRC approve that a good management of tax risk should have "strong governance, with a clear tax strategy and principles set by its board, and well-defined accountabilities, roles and responsibilities that are understood throughout the business". *HMRC Approach to Compliance Risk Management for Large Business* (HMRC March 2007)

In summary, corporate tax management can be perceived as one of many investment opportunities available to managers with expected benefits and inherent risks. The inherent risks of deteriorating firms' overall tax-risk rating and intensifying the HMRC-initiated interventions might disincentivise firm managers to engage in aggressive tax management activities. However, the extent to which the risk-rating considerations restrict managers from pursuing tax management opportunities can vary across firms, depending on their appetites for risks. Firms with greater risk tolerance might be more likely to engage in tax management that entails higher tax risk but higher returns, while risk-averse firms might be less willing to take advantage of aggressive tax opportunities, although they may lead to increases in firms' after-tax wealth.

3.2.3.4. Corporate tax management and firm characteristics

This section reviews relevant literature to discuss how firms' fundamental characteristics, including differences in firm size, leverage, capital intensity, internal information environment, in-house tax department, growth opportunities and foreign operations, determine the level of corporate tax management. Since different firm characteristics may lead to variations in firms' incentives and opportunities for tax management, differences in firms' fundamental characteristic are expected to provide an explanation on the cross-sectional variations in the level of corporate tax management.

3.2.3.4.1. Firm size

The political power hypothesis and the political cost hypothesis can be used to explain the association between firm size and corporate tax management (Belz et al., 2016). In particular, the political power hypothesis implies that firm size can be positively associated with tax management, since large (small) firms tend to have greater (less) bargaining power with the governments to impact the political process to their advantage. In addition, large (small) firms may have greater (less) resources available to obtain professional expertise on tax management and arrange their operational transactions in an 'optimal tax-saving' manner (Siegfried 1972; Stickney et al. 1982, pp. 127). On the contrary, the political costs hypothesis indicates that large (small) firms may be subject to heightened (reduced) public visibility and regulatory scrutiny, thereby can be more (less) reluctant to engage in tax management activities (Zimmerman 1983; Kern et al. 1992).

Zimmerman (1983), Omer et al. (1993), Rego (2003) and Minnick et al. (2010) find a negative association between firm size and corporate tax management, which is consistent with the political cost hypothesis that large (small) firms are exposed to greater (less) public visibility and scrutiny, thus are more (less) reluctant to engage in tax planning activities. By contrast, Siegfried (1972), Siegfried (1974), Porcano (1986), Richardson and Lanis (2007), Hanlon et al. (2005), Dyreng et al. (2008) and Wilson (2009) find a positive association between firm size and corporate tax management, which is consistent with the political power hypothesis that large (small) firms tend to have more (less) resources and opportunities to influence tax policy; acquire tax-planning expertise; and arrange their transactions in a tax-saving manner.

As a result, the empirical evidence on the association between firm size and corporate tax management is inconclusive. The conflicting results on the association between firm size and corporate tax management can be partially attributed to the employment of different measurements of effective tax rates; different proxies for firm size; and different sample selection procedures in the process of empirical analyses. For example, Porcano (1986) measures effective tax rate as current U.S. federal income taxes scaled by adjusted net income before tax. Zimmerman (1983) measures the effective tax rate as the difference between income tax expense and change in deferred tax scaled by the difference between sales and cost of goods sold. Wilkie and Limberg (1990) argue that the conflicting results in Zimmerman (1983) and Porcano (1986) are mainly due to their employment of different deferred tax portion¹³¹ when estimating tax payables. In addition, Kern et al. (1992) find that Porcano's (1986) results are sensitive to the chosen database (i.e., the Valueline or Compustat database) while Zimmerman's (1983) results are robust in terms of the choices of databases. Instead of using year-to-year annual effective tax rate, Dyreng et al. (2008) measure corporate tax management using a firm's long-run cash ETR, i.e., cash taxes paid scaled by pre-tax financial accounting income calculated over a ten-year period, and find a positive relationship between long-run tax planning and firm size. Holland (1998) employs both total assets and sales as proxies for firm size to investigate the association between firm size and corporate tax management for a period of 26 years from 1968 to 1993. The author finds a significant negative

¹³¹ According to Wilkie and Limberg (1990), both Zimmerman (1983) and Porcano (1986) exclude deferred taxes when calculate the effective tax rate. However, Zimmerman (1983) exclude changes in deferred tax liability (from balance sheet) while Porcano (1986) exclude deferred tax expenses (from income statement), which can create systematic differences since “*changes in the liability account would approximate long-term deferrals only and may be affected by foreign currency translations, but the deferred tax expense account contains both current and long-term deferrals*” (Kern et al. 1992; pp. 2).

association between ETR and firm size for the year 1978-1981 when firm size is measured by sales, but this significant negative association is only found for the year 1978 and 1982 when firm size is measured by total assets, suggesting that “*sales and assets are not equivalent proxies for political visibility*” (Holland 1998, pp 273).

3.2.3.4.2. Leverage

The tax influence on corporate debt policy can be substantial because tax laws normally offer tax reliefs to firms' financing choices in different ways (Gupta and Newberry 1997; Richardson and Lanis 2007). Firms that rely heavily on debt financing are expected to have lower ETRs compared to firms that rely more on equity financing, since interest expenses from debt financing are normally deductible for tax purpose while dividends from equity financing are not. For this reason, Gupta and Newberry (1997), Derashid and Zhang (2003) and Richardson and Lanis (2007) find that a firm's leverage is negatively associated with ETRs. Using confidential firm-level tax-return data in the UK, Devereux et al. (2018) find a positive and long-run effect of corporate tax on firm leverage. In particular, they provide evidence that a 10 percentage points increase in the marginal tax rate¹³² results in a 7.6 percentage points increase in the leverage ratio, indicating that firms adjust their capital structures gradually according to changes in the marginal tax rate (pp 17). This is consistent with Gupta et al.'s (1997) research finding that it is more likely for firms with high marginal tax rates to use debt financing (Gupta et al. 1997, pp 7). Empirical evidence in those studies shows that debt financing can be used as a tax shield.

Consistent with the notion that debt financing acts as a tax shield, previous studies provide evidence that the greater the use of debt tax shields, the lower the needs for firms to undertake non-debt tax-saving activities (Makie-Mason 1990; Mills et al. 1998; Armstrong et al. 2012). For example, Mills (1998) investigates the determinates of the level of firms' expenditures invested in tax management and finds that highly levered firms do not invest more in tax management (pp 13). An alternative perspective of the substitute relationship between leverage and corporate tax management has been proposed by DeAngelo et al. (1980) and Graham et al.

¹³² Specifically, Devereux et al. (2015) adopt the ‘before-financing’ marginal tax rate which is calculated on the basis of firms' taxable profits before deducting interest expenses, since the ‘after-financing’ marginal tax rate which is calculated using taxable profit after deducting interest expenses can involve endogeneity problems, as firms that are highly levered can mechanically have higher interest payments and lower ‘after-financing’ marginal rate.

(2006) who demonstrate that corporate tax management (i.e., non-debt tax shields) could in turn affect firm's debt financing policy. In particular, Graham et al. (2006) employ a sample of 43 U.S. firms that are accused as tax shelter and find that tax-sheltering firms use less debt than their non-sheltering counterparts (i.e., the debt-to-asset ratio of tax-sheltering firms are 5 percent points lower than that of non-sheltering firms). Their results suggest that the reduction of explicit taxable income resulting from non-debt tax shields is a substitute for the use of interest tax deductions from debt financing.

3.2.3.4.3. Capital intensity

Capital-intensive firms, which are subject to high level of utilisation of property, plant and equipment in corporate operation, may have tax management opportunities that are not available to their noncapital-intensive counterparts, including the management of the timing of acquiring and disposing assets; the choice of accounting depreciation method; and the choice of buying or leasing equipment (Mills et al. 1998). In addition, capital investments of tangible fixed assets normally provide taxpayers with cash tax benefits associated with accelerated depreciation, since tax law typically allow the capital assets to be written off for tax purpose over periods shorter than their economic lives (Gupta et al. 1997).

Gupta et al. (1997) measure capital intensity as the ratio of net property, plant and equipment to total assets. They find that there is a negative relationship between capital intensity and ETRs. Mills et al. (1998) find that firms' investment in tax management as measured by salaries paid to in-house tax departments and tax-related fees paid to obtain tax expertise increases with the level of firms' capital intensity. Newman (1989) finds that capital-intensive firms are more likely to reward their managers using after-tax bonus plan, which implies that capital-intensive firms have more tax management opportunities from the utilisation of fixed assets. The conclusive evidence provided by previous studies suggests that capital-intensive firms, i.e., firms with a large amount of tangible assets, can take advantage of various tax-saving opportunities resulting from the utilisation of capital allowances or incentive provisions associated with qualified fixed assets to reduce their tax liability.

3.2.3.4.4. Internal information environment

Decision theory indicates that “*the quality of the information on which decisions are based affects the quality of those decisions and their outcomes*” (Gallemore et al. 2015, pp 149). Based on the conjecture that the achievement of effective tax management requires comprehensive considerations of firms’ economic environment, business strategies and taxable performance across different operating segments¹³³, Gallemore et al. (2015) posit that the good quality of firms’ internal information environment helps to improve the ability and efficiency in managerial decision-making and implementations of tax management, by providing managers with ‘accessible, useful, reliable and accurate’ information across dispersed business segments.

Gallemore et al. (2015) measure firms’ information environment quality using four proxies, including the speed of releasing earnings announcements; management earnings forecast accuracy; the absence of material weakness in internal control; and the absence of restatements due to errors. They find a negative association between internal information quality and effective tax rates, indicating that firms with better information environment quality are more capable of undertaking effective actions to reduce their tax liabilities. Moreover, they find that better information environment quality plays a role in mitigating the negative impacts of geographic dispersion and environmental uncertainty on corporate tax management. Better information environment quality also facilitates firms to achieve more favourable tax outcomes (as measured by lower ETRs) without incurring additional tax risks (as measured by the ETR volatility). In summary, internal information environment quality is important in determining firms’ ability to reduce tax liabilities and tax risks associated with firms’ tax management strategies.

3.2.3.4.5. In-house tax department

Firms’ choices of the performance evaluation system for their tax departments, i.e., either to evaluate their tax departments as a profit centre or a cost centre, are found to play a significant

¹³³ For example, as argued in Robinson et al. (2010), corporate tax management often requires the communication and integration of specific tax and performance information among different operating segments. However, information problems due to decentralisation and lack of coordination and communication among operating segments can cause difficulties in assessing and estimating whether firms’ all tax-planning opportunities have been identified and utilised.

role in determining firms' tax management behaviours (Robinson et al. 2010). Specifically, a cost centre is a performance measurement system which evaluates a department against its ability to "*minimise costs for a given output, maximise output for a given cost, or minimise average cost*". A cost centre would be an optimal performance measurement system if the quantity and quality of the department output can be easily evaluated. By contrast, a profit centre is a system which evaluates a department against "*the difference between its costs and revenue*". A profit centre performance measure would be more effective if "*the knowledge required to make the product mix, quantity and quality decisions is specific to the division and therefore costly or impossible for managers at higher levels to obtain*" (Jensen and Meckling 1998; pp 352; Robinson et al. 2010, pp 1038).

In their first-step test, Robinson et al. (2010) find that the availability of corporate tax management opportunities, as measured by the level of R&D expenses; capital intensity; inventory intensity; intangible intensity; leverage; and the extent of foreign operations, drives the corporate decision to evaluate a tax department's performance as a profit centre¹³⁴. This means that when efforts on tax management become the emphasis of a tax department, it is more efficient to measure this tax department's performance using a profit-centre performance measure system, because the quantity and quality of the tax-planning efforts can be difficult to assess with accuracy. In their second-step test, Robinson et al. (2010) find that firms who opt for measuring their tax department as a profit centre have lower GAAP ETRs. However, a firm's choice to measure its tax department as a profit centre is found to have no significant effect on the cash tax consequences as measured by cash ETR. These results imply that the adoption of profit-centre performance measure provides tax department more of an incentive to obtain financial reporting benefits through lowering GAAP ETRs, rather than to create cash tax savings through engaging in real tax management activities. The authors carefully note that their results can be affected by potential endogeneity problems. That is, firms with lower ETRs may be more likely to measure their tax department as a profit centre. Although they try to address the endogeneity between the choice of performance measurement and ETRs using the two-stage approach, a two-stage approach may be inadequate to eliminate endogeneity problems (Larcker 2003).

¹³⁴ Robinson et al. (2013) determine firms' choice of performance evaluation system for their tax department based on survey data collected by Ernst & Young about how managers in Fortune 1000 companies view and measure their tax departments. They also find that factors such as decentralization, firm growth, departmental interdependencies and coordination are important factors that drive the decision to evaluate a tax department's performance as a profit center.

3.2.3.4.6. Growth

A firm's growth opportunity could be interrelated with tax management activities in the sense that various tax management opportunities can be available to firms with different levels of growth (Higgins et al. 2015). Miles et al.'s (1978) topology suggest that growing firms concern less about costs minimisation. Instead, they emphasise more on innovation, searching for new markets and generating new products. This implies that firms in high-growth rate may tend to place less emphasis on reducing firms' tax burden through engaging in tax management activities.

However, Higgins et al. (2015) suggest that due to their aggressive pursuit of innovations and entering into new geographic or productive markets, growing firms are likely to have more tax-planning opportunities that are not available to their less-growing counterparts. This is because less-growing firms can be more inclined to maintain operational and organisational stability with fewer adaptability to organisational changes and risks, therefore having fewer opportunities for tax planning. As compared to less-growing firms, high-growing firms tend to have greater propensity for risk and uncertainty. The aggressive culture in growing firms might encourage them to engage in corporate tax management in an aggressive manner. Using six measures to capture a firm's growth opportunity, including the ratio of research and development to sales; the ratio of employees to sales; one-year percentage change in total sales; the ratio of marketing to sales; the employee fluctuations and capital intensity, Higgins et al. (2015) provide empirical evidence that growing firms have lower GAAP ETR; lower Cash ETR; higher permanent book-tax difference; and less sustainable tax positions as compared to firms with less growth opportunities. This is consistent with the conjecture that growing firms possess more tax-planning opportunities and have greater risk tolerance in utilising tax management opportunities.

3.2.3.4.7. Foreign operations

Multinational companies may have tax-planning opportunities that are not available to domestic-only companies, such as strategically arranging their business in low-tax jurisdictions; taking advantage of international tax rate differentials by transferring income from high-tax jurisdictions to low-tax jurisdictions; and exploiting tax-law differences among different tax jurisdictions (Rego 2003, pp. 808). Consistent with this conjecture, Rego (2003)

finds that the worldwide ETRs as measured by the ratio of current income tax payable to pre-tax accounting income across all firms' tax jurisdictions are significantly lower for multinational companies who have intensive foreign operations.

Wilson (2009) infers tax-sheltering activities from firms' financial statements by employing a sample consisting of 59 U.S. firms that are accused of actively engaging in tax-sheltering activities. He finds that those tax-sheltering firms display higher levels of foreign income. However, the author highlights that his research finding is based on 'a unique subset of tax shelter participants' whose tax reduction methods are successfully detected and challenged by tax authorities¹³⁵, which may not be able to provide a generalised guidance to a broader set of tax-sheltering participants or to tax-sheltering firms that engage in alternative types of tax reduction methods. Lisowsky (2010) uses confidential tax return data and finds that the probability of firms to engage in tax-sheltering activities is positively associated with the intensity of their foreign operations and the presence of subsidiaries located in tax havens. This is consistent with Hanlon et al. (2005) who use confidential tax return data to examine the association between firm characteristics and the extent of corporate tax noncompliance (as measured as the level of tax deficiencies proposed upon Internal Revenue Service (IRS) audits and examination). They find that multinational firms have greater tax deficiencies as compared to their domestic-only counterparts.

The above studies show that multinational firms tend to have more corporate tax management opportunities arising from their operations in foreign countries than domestic-only firms. As a result, the OECD has introduced countermeasure to tax noncompliance stemming from multinational operations, i.e., the global action plan, to promote information exchange among different tax jurisdictions with the aim of curtailing base erosion and profit shifting (BEPS) and improving the tax compliance at an international level (OECD 2017)¹³⁶. Action 11 to 13¹³⁷ in the OECD action plan particularly require firms to provide governmental authorities with their key business and tax information across all involved tax jurisdictions, such as profits before taxes and taxes paid or accrued for each tax jurisdiction, in order to facilitate the

¹³⁵ The tax reduction methods used by his sample firm include: 'lease-in, lease out'; 'corporate-owned life insurance'; 'contested liability acceleration strategy'; 'contingent-payment instalment sales'; 'cross-border dividend capture'; 'transfer pricing'; 'offshore intellectual property havens' and 'deduction acceleration strategy'.

¹³⁶ See <http://www.oecd.org/tax/beps/country-by-country-reporting.htm>

¹³⁷ Action 11: *Measuring and monitoring BEPS*; Action 12: *Mandatory disclosure rules*; Action 13: *Transfer pricing documentation and Country-by-Country reporting*.

identification of aggressive tax activities conducted via profit sharing and income shifting.

In conclusion, the section 3.2 reviews previous literature regarding the definition, theories and determinants of corporate tax management. Based on the literature, corporate tax management can be largely interpreted as managing to reduce a firm's tax liabilities. Tax avoidance and tax evasion constitute important components of the corporate tax management continuum. Due to the difficulty in discriminating between 'acceptable' and 'unacceptable' tax avoidance, this study will not attempt to differentiate between tax avoidance and tax evasion when examining corporate tax management behaviours.

According to the Scholes-Wolfson effective tax management paradigm, managers have the incentives to manage the tax liability through taking advantage of tax-planning opportunities based on their firms' characteristic, in order to increase firms' after-tax return and after-tax cash flow and sustain the tax benefits over a long time. However, the process of corporate tax management may incur both direct and indirect costs. The traditional cost-benefit perspective perceives corporate tax management as a mere tax-saving device, but this perspective overlooks an important characteristic of modern corporations, i.e., the conflicting interests between managers and shareholders. By comparison, the principal-agent perspective of corporate tax management indicates that the conflicting interests between managers and shareholders might lead managers to implement corporate tax management in a way that is not desired by shareholders. Therefore, the corporate governance mechanism, which represents how the agency tension between managers and owners is mitigated, can be important in explaining corporate tax management behaviours. The next section will review literature on how corporate governance might affect managers' engagement in tax management activities.

3.3. Corporate Tax Management and Corporate Governance Mechanism

Corporate governance mechanism can be vital in explaining corporate tax management behaviours, since it represents how the decisions and actions made by managers are monitored and how the conflicting interests between managers and firm owners are mitigated. As far as the agency tension between managers and owners is concerned, corporate governance is expected to play a role in determining the level of corporate tax management. Therefore, this section aims to review previous evidence that explains how corporate governance mechanisms

might affect managers' incentives to engage in tax management activities. This section begins with the discussion of the agency theory.

3.3.1. Agency theory

Agency theory is a theory that identifies the agency relationship in modern corporations where “one or more persons (the principal(s)) engage another person (the agent) to perform some service on their behalf which involves delegating some decision-making authority to the agent” (Jensen and Meckling 1976, pp. 308). Under the agency theory, a public corporation is perceived as a legal fiction that acts as “a nexus for a set of contracting relationships”, in which the conflicting objectives of individual participators are brought into accounts and the conditions of individual behaviours are specified *ex ante* in contracts (Jensen and Meckling 1976, pp. 308-311). Under the agency relationship where the management and control are separate, agency problems could arise because of the conflicting interests between the agents and the principals in the sense that the agent who is delegated to act on behalf of the principals does not act to maximise the principals' welfare; and because of the impossibility of perfectly specifying in advance every possible decision and action of the agent in contracts (Brennan 1995; Shleifer and Vishny 1997).

Therefore, the agency theory rests on the premise that agency problems might arise in an organisation when two conditions are displayed. First, the separation of ownership and control leads to conflicting interests between the agent and the principals. Second, it is impossible to address the conflicting interests between the agent and the principals through a complete contract (Hart 1995). Specifically, in the public corporations with dispersed ownership, it may not be rational to expect those individual owners who possess only a small stake to have strong incentives to devote resources to monitoring the management and ensuring that the management acts in their best interests¹³⁸ (Grossman and Hart 1980). The separation of ownership and control and the lack of monitoring may allow self-interested managers of a public company to extract firm resources and pursue their own goals at the expense of those of shareholders¹³⁹. In addition, under the agency theory, a public corporation represents a nexus

¹³⁸ This creates the ‘free-ride problem’ which is explained in Grossman et al. (1980) and Hart (1995) that each fragmented shareholder will forego the involvement in monitoring the management and free-ride in the expectation that other shareholders will devote resources to monitoring the management.

¹³⁹ For example, managers may overpay themselves; pursue non-value-adding but power-enhancing projects; be risk-averse or effort-averse; or be reluctant to lay off workers that are no longer productive (Hart 1995, pp. 681).

of contracts which specify *ex ante* all parties' rights and obligations, such as conditions under which the agents should be nominated and replaced; conditions under which corporate assets should be bought or disposed of ; costs and rewards of each agent; criteria against which the performances of the agents are evaluated; the allocation of the raised funds and profits; and the allocation of steps of the decision-making process among agents (Jensen and Meckling 1976; Fama and Jensen 1983, pp. 302; Hart 1995, pp. 679; Shleifer and Vishny 1997, pp. 741). However, due to the fact that completely and comprehensively contracting for every conceivable eventuality that may occur in the contractual relationship can involve significant transaction costs¹⁴⁰ and are technically impractical since most future contingencies are difficult to foresee and control, there exists 'residual control rights', i.e., the rights to make decisions under unforeseen conditions which are not specified *ex ante* in the contracts (Shleifer and Vishny 1997).

Theoretically, owners of organisations should retain all the residual control rights. However, due to the information asymmetry, firm owners, especially those of organisations with dispersed ownership, may not be qualified or informed enough in exerting the control rights as compared to managers who have full access to firms' internal information and possess abilities and experience to generate returns on the raised funds (Hart 1995; Shleifer and Vishny 1997). As a result, managers end up with extensive residual control rights to allocate and use investors' funds and assets, given the allocation and usage are not specified in the initial contracts. This may trigger the problem of managerial opportunism in the sense that managers use their discretions to expropriate firm resources or pursue their own benefit at the expense of shareholders (Williamson 1985; Grossman and Hart 1986).

The presence of conflicting interests between agents and principals and the incomplete contract of the principal-agency relationship provides a rationale for corporate governance to act as a mechanism for restricting managerial expropriation, through monitoring managers' exercise of residual control rights in making decisions that have not been specified in advance in the contracts¹⁴¹ (Hart 1995; Shleifer and Vishny 1997). Essentially, the objective of the corporate

¹⁴⁰ According to Hart (1995), the incompleteness of the contracts between the agents and the principals can due to the significant transaction costs incurred during the process of contracting, including "*the cost of thinking about all the different eventualities that can occur during the course of the contractual relationship, and planning how to deal with them*"; "*the cost of negotiating with others about these plans*"; and "*the cost of writing down the plans in such a way that they can be enforced by a third party - such as a judge - in the event of a dispute*" (pp. 680).

¹⁴¹ According to Hart (1995), if the principal-agent contracts are complete, there can be no room for corporate governance structure to play a significant role, since "*governance structure matters when some actions have to be*

governance mechanism is to limit managerial discretion and enhance managerial accountability, in order to mitigate agency problems and ensure the alignment of the managements' interests with those of the shareholders. In this way, it is expected that effective corporate governance mechanism plays a role in optimising the managerial investment decisions about allocations of investors' funds; improving the corporate performance efficiency; and enhancing firms' overall transparency and credibility.

In summary, agency theory is a corporate governance theory which deals with agency problems under the agent-principal contractual relationship. Agency theory rests on the premise that agency problems would occur when two conditions are met, i.e., there is a conflict of interests between the agents and the principals; and the principal-agent contract is not complete in addressing the conflicting interests. Under this context, corporate governance mechanism is expected to play a role in mitigating the agency problems through limiting managerial discretion and improving managerial accountability.

3.3.2. Corporate governance mechanism and corporate tax management

3.3.2.1. Ownership structure and corporate tax management

According to the agency theory, agency problems could arise because "*the separation of ownership from control produces a condition where the interests of owner and of ultimate managers may, and often do, diverge*" (Demsetz 1983, pp. 375). Due to the information asymmetry between managers and shareholders as a result of managers' full-time status and private knowledge about firms' price-sensitive information, and due to the imperfectability of shareholders to monitor the managerial behaviours, managers who control the corporate assets may potentially exercise their discretions to extract firm resources for their personal use; or allocate funds to unprofitable projects for the purpose of producing private benefits (Lemmon and Lins 2003). As claimed by Demsetz (1983), management can "*exercise more freedom in the use of firm's resources than would exist if the firm were managed by its owner(s), or at least, if ownership interest were more concentrated*" (pp. 375). This implies that different characteristics of firms' ownership structure may lead to varying nature of firms' agency

decided in the future that have not been specified in an initial contract: governance structure provides a way for deciding these actions". However, if the principal-agent contract is complete, it is hard to find a role for corporate governance structure since all conditions and obligations have been specified in advance with no residual decisions (pp. 676).

problems, as different ownership structure may result in different abilities of firm owners to restrict managerial expropriation. More specifically, firm owners, depending on the concentration and the identities of their ownership (e.g., diffused ownership, institutional shareholding or family firms), may differ in terms of preferences, goals, resources, incentives and voting rights in monitoring managerial behaviors, leading to different nature and extents of firms' agency problems (Pedersen and Thomsen 2003).

For example, for firms with dispersed and diffused ownership, as typical for firms in the U.S. and the U.K., agency problems often arise as a result of the conflicting interests between shareholders who own the firm and managers who are delegated to act on behalf of shareholders (Jensen and Meckling 1976; Roe 1994; Fan and Wong 2002, pp. 405). Therefore, the primary objective of corporate governance under this context is to mitigate managerial incentives for outright expropriation and to reinforce the alignment of shareholders' and managers' interests, thereby enhancing the managerial accountability. Jensen and Meckling's (1976) convergence-of-interests hypothesis advocates that increases in managerial share-ownership may help align the interests of managers with those of shareholders, which in turn reduces the managerial incentives to expropriate firm resources at the expense of shareholders or engage in sub-optimal projects that provide private benefits. This is because that any increase in managements' private wealth from extracting firm resources or undertaking nonprofitable projects will be counteracted by an ultimate decline in the value of managements' managerial ownership as a result of the decline in firm value (Singh et al. 2003; Lafond et al. 2008; Margaritis et al. 2010). However, it is possible that the excessive managerial equity ownership may trigger the exacerbation of the managerial entrenchment problem, since it can be more difficult for the boards of directors and the external market¹⁴² to discipline, control or remove self-interested managers who have large ownership stake and sufficient voting rights (Demsetz 1983; Fama and Jensen 1983; Morck et al. 1988; Danis et al. 1997; Short et al. 1999).

When corporate ownership is concentrated at the hands of certain shareholders, the nature of the agency problems will shift from the conflicting interests between managers and shareholders to the conflicting interests between controlling shareholders and non-controlling minority shareholders (Fan and Wong 2002; Roe 2004). While the small atomistic shareholders

¹⁴² Morck et al. (1988) denote that the external market discipline is mainly from the managerial labor market (Fama 1980); the product market (Hart 1983); and the market for corporate control, to force managers towards the engagements in value enhancing activities (Jensen and Ruback 1983) (pp. 294).

are reluctant to devote resources to closely monitoring managerial actions, the presence of large shareholders, i.e., individuals or institutions who possess large stakes in a firm, may play an active role in improving corporate governance through mitigating the conflicting interests between managers and shareholders and enhancing the managerial accountability. As compared to small shareholders, large shareholders, by virtue of their nontrivial amounts of shareholdings in a firm, are expected to have greater incentives and resources¹⁴³ to incur costs of disciplining managerial behaviours and monitoring firms' long-term performances, in order to restrict managerial expropriation and ensure that managers act to maximise shareholders' wealth in the long run. This is because that the returns of large shareholders from monitoring managerial behaviours and firm performance are likely to be large enough to cover their incurred monitoring costs (Hart 1995; Shleifer and Vishny 1997; Danis et al. 1997; Gillan and Starks 2000). The closer monitoring of managerial behaviours and firm performance provided by large shareholders can be beneficial to all other shareholders, even if they do not bear any costs incurred from the monitoring processes (Huddart 1993; Gillan and Starks 2000).

However, the beneficial role played by large shareholders in addressing agency problems can be debated, since large shareholders may use their voting power to pursue their own benefits at the expense of minority shareholders (Shleifer and Vishny 1997; La Porta et al. 2000; Holderness 2001; Pedersen et al. 2003). For example, large shareholders may have access to management and board members (Carleton et al. 1998; Chen et al. 2007, pp. 283), therefore might be able to access and utilise firms' inside information for pursuing their own interests or persuade management to arrange self-dealing transactions for the purpose of transferring firm resources to companies owned by themselves (Hart 1995, pp. 683; Fan and Wong 2002, pp. 406). In this case, the increased ownership concentration at the hands of a small number of shareholders may therefore induce entrenchment problems in a similar way that high managerial ownership triggers the exacerbation of managerial entrenchment (Jensen and Meckling 1976; Morck et al. 1988; Pedersen and Thomsen 2003).

¹⁴³ According to Faccio et al. (2011), if a risk-averse shareholder's wealth is largely concentrated in a single firm, he/she will face higher systematic risk since his/her wealth is significantly affected by firm-specific risks. By contrast, a well-diversified shareholder is less affected by firm-specific risk because it has been diversified away. Therefore, large shareholders with concentrated ownership in one firm can be more motivated to monitor manager's behaviours to reduce firm-specific risks. This is consistent with Shleifer and Vishny (1997) which documents that large shareholders are motivated to address the agency problems since they have incentives to maximise firm wealth and have enough control over firm assets to protect their interests. Specifically, large shareholders "*have enough voting control to put pressure on the management in some cases, or perhaps even to oust the management through a proxy fight or a takeover. In the more extreme cases, large shareholders have outright control of the firms and their management with 51 or more percent ownership*" (pp. 754).

Further, the incentives of large shareholders to exercise their resources and ability to monitor, discipline and influence managerial behaviours can be dependent on the size of their shareholding stake and the length of time they invest in the firm. Shareholders with large and less marketable shareholding may focus more on firms' long-run performance, and thereby will have greater incentives to oversee management performance and correct managerial failures to ensure that the management acts in the best interests of shareholders and firm survival. However, shareholders with relatively small shareholdings can easily liquidate their investment stakes, rather than involving into the costly processes of monitoring and intervening managerial behaviours if they find that firm managers have been performing poorly (Maug 1998; Chung et al. 2002; Cornett et al. 2007).

As discussed above, it is likely that shareholders with concentrated ownership have stronger incentives to devote resources to monitoring managerial behaviours and addressing agency problems. Different from other large shareholders, family owners tend to “*maintain their ownership stakes for several generations; have a majority of their wealth invested in a single firm; and often serve as senior executives in the firm*” (Anderson et al. 2004, pp. 212). Family firms, by virtue of their concentrated founding-family ownership and their intra-familial altruistic element, are expected to subject to less severe agency problems arising from the separation of ownership and control as compared to nonfamily firms (Chrisman et al. 2004). This is because family owners typically hold substantial and less well-diversified shareholdings in their family firm, thereby tend to have strong incentives to monitor managerial actions closely and create a long-term commitment to their firms' survival. This may help mitigate the managerial opportunistic incentives for private rent-seeking and alleviate the free-rider problems as existed in firms with diffused and atomistic shareholdings (Schulze et al. 2001; Ali et al. 2007; Andres 2008). In addition to their strong incentives, family owners also have the ability, power and advanced firm-specific knowledge to monitor and discipline managers, owing to their long-term presence in the firm (Anderson and Reeb 2003a; Andres 2008). Furthermore, the undiversified nature of founding-family ownership and the long-run relationship with suppliers and other external stakeholders can make family firms more concerned about their reputation, since adverse reputation effects can create longer-lasting and substantial detrimental consequences on family owners' wealth (Villalonga and Amit 2006; Anderson and Reeb 2003b).

However, agency issues can arise in firms with concentrated founding-family ownership in a form that is not presented in nonfamily firms. For example, the self-imposed personnel selection criterion in family firms would likely make family owners hand over executive authorities to certain family members and create impediments for recruiting more qualified personnel from the outside labour market, which may likely lead to biased evaluations of the performance of the selected family agents and create aggravated managerial entrenchment problems. The concentrated founding-family ownership and the entrenchment of family executives can provide opportunities for controlling shareholders in a family firm to expropriate firm resources at the expense of non-controlling minority shareholders, which may occur in the form of the excessive compensation; the disproportionate shares of corporate profit using special dividends; or engaging in self-dealing or related-party transactions (Fama and Jensen 1983; La Porta et al. 1998; DeAngelo et al. 2000; Faccio et al. 2001; Anderson and Reeb 2003a; Anderson and Reeb 2004).

Previous empirical studies have widely investigated the impacts of various corporate ownership structure on corporate tax practices. In addition to the association between corporate tax management and managerial stock ownership as discussed in section 3.2.3.3.2, the association between corporate tax management and ownership structure has also been examined from aspects of managerial dual-class stock ownership, concentrated (private firms) versus diffused ownership (public firms), institutional ownership, hedge fund ownership and family ownership.

In particular, McGuire et al. (2014) argue that managerial dual-class ownership, in which managers entitle to a majority voting rights but a minority cash flow rights, provides a powerful and unique context to examine the impact of agency cost on corporate tax management. This is because the separation of the managements' cash flow rights and voting rights can exacerbate the managerial entrenchment problems, as it alleviates the takeover threats from outside shareholders and simultaneously insulates managers from bearing the 'pro rata shareholder wealth consequences' resulting from their performance. Using a sample of 1800 dual-class firms for period 1995-2002, McGuire et al. (2014) find that dual-class firms appear to engage in less tax management (as measured by higher GAAP ETRs and cash ETRs) relative to their single-class counterparts, suggesting that dual-class managers are less incentivised to engage in costly tax management. The authors interpret their results as that the entrenchment restricts the ability of outside shareholders to compel the dual-class managers to engage in value-enhancing tax management activities, or that the dual-class managers are reluctant to engage

in tax management activities to avoid the price discount imposed by shareholders who may concern about the managerial rent extraction associated with corporate tax management.

In explaining the impact of differences between private and public firms on corporate tax management, Cloyd et al. (1996) argue that public firms rely heavily on the external capital market for equity financing and require managerial performance-based compensation to alleviate agency tension between managers and shareholders. Therefore, managers in public firms tend to have greater pressure to report high financial accounting income to capital market and, thus, are less likely to engage in tax planning activities which may reduce both taxable and book income. This is because that the reduced financial reporting income in publicly-traded firms can *“increase the probability of debt covenant violations; reduce manager compensation tied to reported income; lead to lower performance evaluation; and it may even be perceived as lowering the market value of the firm”* (Cloyd et al. 1996, pp. 28). By comparison, privately-held firms, which have more concentrated shareholder ownership and can communicate information about firm performance and tax strategies with their shareholders more efficiently through channels other than publicly-reported financial statements, tend to experience less capital market pressure of reporting high financial income and rely less on reported financial information for contracting with managers, lenders and other stakeholders (Ball and Shivakuma 2005). As a result, it can be less costly for privately-held firms to sacrifice reporting high earnings in favour of aggressive and beneficial tax positions through transactions that reduce both reported book and taxable income (Klassen 1997; Slemrod 2004).

Consistent with the ‘financial reporting cost’ and ‘capital market pressure’ explanations, Penno et al. (1986) provide questionnaire evidence to show that compared with private companies, publicly-traded firms tend to be more likely to adopt income-increasing accounting methods and, thus, are less likely to engage in book-tax conforming tax strategies that reduce both book income and tax liabilities for the same accounting period (e.g., using First-In-First-Out inventory accounting under the condition that inventory price is increasing). Using a sample of major assets divestiture, Klassen (1997) investigates whether firms’ inside ownership concentration affects their trade-offs between tax incentives to capture tax savings and financial reporting incentives to signal profitable firm value to the capital market. The author shows that for high tax-rate firms, managers of firms with more diffuse stock ownership emphasise more on financial reporting to meet market expectations via recognition of higher gains or smaller losses, while managers of firms with concentrated ownership are more likely to engage in

transactions that produce tax benefits but reduce financial reporting income. His results suggest that the financial reporting costs associated with book-tax conforming tax strategies are higher (lower) for firms with diffused (concentrated) ownership. Using a size-matched sample of 297 private and 553 public banks, Beatty et al. (1999) provide some evidence that private banks are more aggressive in managing taxes than public banks, while public banks concern more about earnings management with less sensitivity to tax rates. Results in these studies are consistent with Hanlon et al. (2005) who use confidential tax return data and find that private firms have greater level of tax deficiencies proposed upon Internal Revenue Service (IRS) audits. Their results suggest that private firms are more inclined to engage in aggressive tax activities than public firms, as they are less constrained by capital market pressures and financial reporting costs.

However, these studies only focus on examining the impact of differences between public and private ownership on conforming tax management, without reflecting firms' incentives to engage in book-tax nonconforming activities that may generate higher book income relative to taxable income for a particular accounting year. Extending studies that focus on conforming book-tax reporting of public and private firms, Mills et al. (2001) shed light on the influence of public VS private ownership on book-tax income differences. Using confidential tax return data for U.S. public and private manufacturing firms, Mills et al. (2001) find that public firms generally report greater book-tax income differences than their private counterparts, consistent with the argument that public firms subject to greater capital market pressure to report higher financial income and, therefore, are more likely to engage in nonconformity tax strategies that generate higher book income relative to taxable income. Taken together, previous studies indicate that due to differences in capital market pressure and financial reporting costs, private firms tend to have more incentives to engage in conforming tax-reduction strategies than public firms, while public firms are more likely than private firms to engage in nonconforming transactions that produce positive book-tax differences.

Khurana et al. (2013) investigate whether institutional shareholders with a long-term investment horizon have an impact on the level of corporate tax management. Using data from 1995 to 2008 and ordinary least squares (OLS) regression, they find that the level of corporate tax management (i.e., measured by total and permanent book-tax differences, annual cash effective tax rates and probability of involving in tax shelter) are negatively associated with the level of long-term institutional ownership (i.e., measured by low average portfolio turnover of

institutional shareholders). However, the full sample results are only statistically significant in firms with weak corporate governance as measured by a high level of the anti-takeover protection index. Their results indicate that institutional shareholders with long-term investment horizon play an active role in monitoring managerial tax behaviours and restricting managers from undertaking aggressive tax management activities, with the aim of eliminating the scope for self-interested managers to take advantage of the complexity and opacity associated with tax management transactions. In order to overcome concerns about endogeneity that may arise from examining the association between institutional ownership and corporate tax management, Khan et al. (2017) and Bird et al. (2017) employ the regression discontinuity design to investigate the impact of institutional ownership on corporate tax management under the context of exogenous shocks to institutional ownership from Russell index reconstitutions¹⁴⁴. Inconsistent with Khurana et al. (2013), Khan et al. (2017) and Bird et al. (2017) both find that increases in institutional ownership lead to greater tax management, especially the tax management through international tax-planning strategies such as the use of tax havens. Their results suggest that institutional shareholders tend to view the benefit of corporate tax management as outweighing its associated costs and encourage managers to engage in international tax-planning activities.

Cheng et al. (2012) examine the impact of hedge fund ownership on corporate tax management. They argue that hedge funds activists, who possess high share ownership and voting rights, are likely to exercise their influence to monitor management behaviours and encourage managers to improve tax-planning efficiency for the purpose of increasing firm value. Using a sample of 435 U.S. activist hedge funds drawing from SEC 13D filings for period 1994-2008, they find that the target firms experience lower tax management as compared to a sample of matched control firms before the hedge fund intervention, but the level of tax management in those target firms is increasing subsequent to hedge fund intervention. After explicitly controlling for other possible indirect influences resulting from hedge fund intervention which may also

¹⁴⁴ The Russell index membership is closely followed by institutional shareholders. By market capitalisation, Russell assigns firms into Russell 1000 (the top 1000 firms) and Russell 2000 (the following 2000 firms) at May 31 of each year. Therefore, the index assignment around the index threshold (i.e., between top Russell 2000 and bottom Russell 1000) is “quasi-random with respect to corporate behaviour”. However, a stock’s index assignment can significantly affect this stock’s portfolio weight, since the Russell 1000 and Russell 2000 are value weighted in which firms at the top of their index receive the highest weight. Therefore, the largest stock in Russell 2000 can receive significant higher weight than the smallest stock in Russell 1000. As a result, firms that around the index threshold can subject to a large and discontinuous jump in institutional ownership, which provides a unique context to study exogenous shocks to the level of institutional ownership (Bird et al. 2017, pp. 30; Khan et al. 2017, pp. 103).

affect corporate taxes (e.g., changes in level of leverage, property, plant and equipment and intangible assets), the authors further confirm that hedge fund intervention has a direct impact on the increased level of corporate tax management in the target firms. Moreover, the increase in corporate tax management subsequent to hedge fund intervention is a positive function of hedge-fund activists' past success in inducing tax changes¹⁴⁵ and their tax knowledge and interests. However, there is no evidence indicating that hedge funds intervention encourages target firms to engage in high-risk and potentially illegal tax shelter activities.

Chen et al. (2010) investigate whether family firms are more aggressive in tax management relative to their non-family counterparts. They argue that the level of tax management in family firms can be different from that in non-family firms, because owners in family firms and managers in non-family firms may view the benefits and costs associated with corporate tax management differently. Family firms, in which family owners have higher and less diversified ownership, longer investment horizons and greater reputation concerns, tend to exhibit less severe owner-manager agency conflict but greater agency tension between the controlling and minority shareholders relative to their non-family counterparts. Therefore, family owners can capture more benefits from tax saving activities, owing to their substantial shareholdings in the firm. However, the less-diversified equity position of family owners and their stronger incentives to protect the family reputation can constrain family firm from engaging in tax management activities, because the reputational damage and the price discount imposed by minority shareholders are likely to exert substantial and longer-lasting detrimental impacts on family owners' wealth. Using 3865 firm-year observations for the period 1996 to 2000, Chen et al. (2010) find that family firms are less aggressive in tax management (as measured by higher effective tax rates and lower book-tax differences) relative to their nonfamily counterparts.

Based on the above research evidence, it can be concluded that firms' ownership structure, including managerial dual-class stock ownership; concentrated versus diffused ownership; institutional ownership; hedge fund ownership; and family ownership, plays an important role in determining the level of corporate tax management, through influencing managers' preferences and attitudes towards undertaking tax management activities.

¹⁴⁵ As measured by the average changes in tax management in the firms targeted by the activist during the past five years.

3.3.2.2. Board of directors and corporate tax management

According to the agency theory, a modern corporation operates under the separation of management and ownership, with a nexus of contracts specifying in advance all parties' rights and obligations (Jensen and Meckling 1976; Baysinger et al. 1985, pp. 104). Owing to the information asymmetry between managers and shareholders and the impossibility of perfectly contracting for every conceivable decision and action of managers, managers may exercise their discretions and power to opportunistically pursue their own objectives at the expense of shareholders' goals (Masson 1971; Zahra and Pearce 1989). Therefore, it is essential for shareholders to ratify and monitor managerial behaviours, in order to alleviate the agency conflicts and ensure that managers act in their best interests. However, given that monitoring is costly, dispersed shareholders who possess small stakes may lack sufficient incentives to devote resources to closely monitoring managerial actions, which can cause the 'free-rider problems' that individual shareholder attempts to free-ride in the expectation that other shareholders will involve in the process of monitoring the management, and ends up with no effective monitoring taken place within the firm (Grossman and Hart 1980; Fama 1980; Hart 1995; Beasley 1996).

Under this circumstance, the board of directors is elected and delegated by shareholders to act as the 'apex' of the internal decision control within a firm (Fama and Jensen 1983, pp. 323). The board of directors is responsible for setting firms' strategic aims and implementation guidelines; ratifying and monitoring managerial behaviours; recruiting, dismissing and compensating top-level managers for the benefit of shareholders; and alleviating agency problems by aligning the emphasis of managerial efforts with shareholders' goals (Fama and Jensen 1983, pp. 311; Zahra and Pearce 1989, pp. 301; Beasley 1996, pp. 446; Committee Cadbury 1992, para 2.5). The board therefore can be viewed as a "*market-induced institution, the ultimate internal monitor of the set of contracts called a firm, whose most important role is to scrutinise the highest decision makers within the firm*" (Fama 1980, pp. 294).

To the extent that the board of directors is responsible for setting firms' strategic aims and providing guidelines on the implementation of the strategic aims, boards' duty should include monitoring of managers' tax management decisions and their implementation process. This is because corporate tax decisions, as noted by Glaister and Hughes (2008), are closely integrated and articulated with the process of developing and implementing firms' strategic decisions and

cannot be managed independently from other corporate business activities (Landolf 2006; Schön, 2008; Hartnett 2008; Erle 2008; Richardson et al. 2013). Therefore, the board of directors should be responsible for ensuring that a firm's tax positions are managed with careful considerations of related uncertainty and their impacts on firms' other business objectives and the broader society. In fact, UK tax authorities recognise that as an important internal monitoring mechanism, board of directors should play a role in assessing and evaluating risks of firms' tax-related activities; ensuring tax activities are conducted with restricted tax aggressiveness; and bearing the ultimate responsibility for firms' tax strategies and outcomes¹⁴⁶ (HMRC 2006; Lanis and Richardson 2011).

Previous empirical studies have investigated the impacts of the board of directors on corporate tax practices, from perspectives of board independence; board size; and characteristics of the board such as directors' financial sophistication and whether a board establishes risk management and internal control system. According to Fama (1980) and Fama and Jensen (1983), the composition of individuals (i.e., the inside and outside members) serving on the board has a crucial impact on board's efficacy in monitoring managerial behaviours and correcting managerial failures. In particular, inside members, who possess substantial information advantage about the organisational performance due to their full-time status, can assist the board to ratify or rationalise firms' strategic decisions and exercise effective controls over the implementation of such strategic decisions. The outside members, owing to their independent characteristics, play an important role in enhancing the viability and independence of the board in the process of internal decision control, by preventing collusion between top-level executive directors; limiting the discretion of executive directors in making key decisions; and aligning the interests between shareholders and managers (Fama 1980; Fama and Jensen 1983; Williamson 1984; Beasley 1996).

Therefore, the effectiveness and independence of a board acting as an important corporate governance mechanism can be a positive function of the proportion of outside members serving on the board. This is consistent with Baysinger and Butler (1985) who state that "*the board's ability to perform the multiple tasks of dealing with the corporate agency problem, providing expertise or guidance, and maintaining effective inter-organisational strategies depends to a large degree on the affiliations of the individual directors comprising the board and the*

¹⁴⁶ See: Her Majesty's Revenue and Customs (HMRC) (2006). *Tax on the Boardroom Agenda: The Views of Business*, HMRC, London, UK.

proportional representation of those individuals” (pp. 110).

Based on the view that a higher proportion of outside members serving on board increases board independence and enhances the effectiveness of boards in monitoring managerial behaviours, Lanis and Richardson (2011) investigate the impact of the board composition on corporate tax aggressiveness using a sample of Australia firms which are accused of involving in aggressive tax practices. Their logistic regression results indicate that higher percentage of outside directors serving on the board significantly reduces the likelihood of corporate tax aggressiveness, indicating that independent boards are more effective in monitoring managerial performance and restricting corporate tax aggressiveness. Using a sample of U.S. firms for the period 1996-2005, Minnick et al. (2010) include board composition as one of their four facets of corporate governance (i.e., board compensation, entrenchment, executive compensation and board composition) to investigate the impact of corporate governance on firms' long-run tax behaviours. Their empirical results show that 1 percent increase in board independence (as proxied by the number of non-executive directors on board) results in 0.054 percent reduction in foreign taxes and 0.137 percent increase in domestic taxes, which suggests that more independent board have stronger motivation to reduce taxes internationally, but are reluctant to undertake activities that reduce domestic taxes due to concerns about the reputational risk. Results in Lanis and Richardson (2011) and Minnick et al. (2010) both indicate that board independence plays a significant role in monitoring managerial tax behaviours and influencing the level of firms' tax management.

However, the role of board independence in restricting corporate tax aggressiveness is found to be conditional on shareholders' priority in residual claims. Richardson et al. (2015) find that financial-distressed firms show greater incentives to take advantage of cash tax savings from aggressive tax management activities, because the traditional sources of external financing for organisational operations such as borrowing from debtholders, becomes more costly for them due to their greater bankruptcy risk. However, they further find that corporate tax aggressiveness is positively associated with the interaction between board independence and financial distress, indicating that outside directors devote less effort to monitoring managerial behaviours and restricting tax aggressiveness during financial distress, when debtholders have priority over shareholders in residual claims.

In addition to board independence, the impacts of board characteristics and board size on corporate tax practices have also been investigated by prior studies. For example, Armstrong et al. (2011) perceive corporate tax management as one of many investment opportunities that are expected to generate cash flows with varying associated risks, and argue that the unresolved agency problems could lead managers to undertake tax management activity with a level of risk differing from what shareholders would desire. Effective corporate governance mechanism ratifies and monitors firms' strategic decisions, therefore, is expected to play a role in mitigating agency problems associated with tax management decisions by attenuating extreme levels of tax management (i.e., by mitigating the over- or under-investments in corporate tax management). Using quintile analysis to investigate the association between corporate governance and tax management at different levels, the authors show that board's financial expertise and independence are positively related to tax management for firms with low-level tax management, but are negatively related to tax management for firms with high-level tax management. Their results suggest that financially sophisticated and independent board are effective in mediating extreme levels of tax management, by encouraging (discouraging) the engagements in tax management activities when firms underinvest (overinvest) in tax management.

Richardson and Lanis (2013) argue that board of directors in a firm is responsible for implementing tax risk management framework with effective policies and procedures, to minimise uncertainties and risks regarding the interpretation and application of complex tax laws and alleviate the reputational damage from engaging in aggressive tax activities. Based on a sample of 203 Australian public firms for the period 2006-2009, Richardson and Lanis's (2013) logistic regression results¹⁴⁷ suggest that firms in which their board establishes a risk management system and internal controls¹⁴⁸ are less likely to be tax aggressive. In addition, they find that the interaction effect between board independence (as measured by a higher proportion of independent members on board) and the establishment of an effective risk management system and internal control jointly leads to reduced tax aggressiveness in a firm. The authors interpret their results as providing policy and practical implications for policymakers and regulatory bodies about the impacts of boards' oversight characteristics on

¹⁴⁷ The dependent variable of the logistic regression is a dummy variable indicating whether a sample firm is accused of involving in tax dispute under the Australia tax laws.

¹⁴⁸ According to Richardson and Lanis (2013), the Australian Stock Exchange requires publicly-listed firms to disclose information in their financial statements about whether a firm has established of risk management systems and internal controls on board.

restricting corporate tax aggressiveness.

Board size can affect the effectiveness of firms' governance mechanism in either a positive and negative way (Wahab and Holland 2012). On the one hand, boards in large size are likely to have directors with diverse backgrounds, skills and experience. Large boards with members in heterogenous backgrounds and skills therefore are expected to be more active in restricting CEO domination and limiting the scope for managerial discretion, thereby enhancing the effectiveness of the board in ratifying and implementing firms' strategic decisions (Zahra and Pearce 1989, pp. 309). On the other hand, larger boards may negatively affect the effectiveness of boards' monitoring function, since it is likely that larger boards are associated with increased difficulties and complication in the process of coordinating, communicating and decision-making as compared to smaller boards (Florackis 2008). Previous empirical studies do not provide compelling evidence on the impact of board size on corporate tax management. Minnick et al. (2010) argue that smaller boards may be nimbler in decision-making and thereby more adept to convince management to allocate resources to tax management. Their results, however, do not show any significant impacts of board size (as proxied by the total number of board members) on firms' long-run tax management (as measured by five-year GAAP ETR and five-year Cash ETR). Similarly, Lanis and Richardson's (2011) logistic regression results show that the board size does not exert significant impacts on the level of firms' engagement in aggressive tax management activities¹⁴⁹.

To summarise, the board of directors, which serves as a key component of internal governance mechanism, is responsible for ratifying and monitoring firms' strategic decisions; scrutinising managerial behaviours; and alleviating the agency problems to protect the interests of shareholders. Boards' duties, among others, include monitoring and implementing firms' tax management strategies and managing firms' tax-related risks, since there is a close liaison between corporate strategic decisions and taxation decisions, due to the fact that tax decisions cannot be made and managed independently from firms' other business activities. Based on the view that board of directors plays a role in mitigating agency problems and monitoring firms' tax matters, previous empirical studies have investigated the impacts of board of directors on corporate tax management, from perspectives of board independence, board size, and characteristics of the board such as directors' financial sophistication and whether a board

¹⁴⁹ The unconvincing results regarding the relationship between board size and corporate tax management may be due to the nonlinear impact from board size.

establishes a risk management system and internal controls.

3.3.2.3. External monitoring and corporate tax management

In addition to ownership monitoring and board of directors, the external mechanism such as firms' external auditors and financial analysts also play an active role in scrutinising managerial behaviours and reducing the information asymmetry between managers and financial statement users, by regularly tracking firms' financial statements to detect financial reporting irregularities and to verify the reliability and transparency of the reported financial information.

The primary role of external auditors is to offer an independent assessment and express an opinion on the validity and reasonableness about whether the client firms' financial disclosures represent their underlying financial conditions and are in conformity with generally accepted accounting principles (Abdel-Khalik and Solomon 1988; Han et al. 2012, pp. 29). DeAngelo (1981) and Lennox (2005) define audit quality as the 'joint probability' that an existing problem related to financial statement is detected and reported by auditors. They suggest that the audit quality is a function of auditors' competence and independence and the level of complexity and opacity associated with the existing financial reporting problem. Palmrose (1986) defines audit quality as the probability that financial statements are free from material omissions or misstatements. These definitions of audit quality imply that high-quality external auditors might enhance the financial reporting quality, through improving the fairness and reliability and reducing the managerial estimation errors in financial disclosures.

Since income taxes are substantial for a broad set of companies, and the managerial judgements needed to estimate the tax-related provisions are frequently documented as contributing to financial statement misstatements, auditors must be well informed about their client firms' tax performances and provide adequate assurance about the validity and fairness of the tax-related disclosures in their clients' financial statements (Barrett 2004, pp. 490-491; Donohoe and Knechel 2013). The involvements in questionable tax-related activities can cause managers to conceal the material information of the tax disclosures. Therefore, auditors have to devote effort and resources to evaluating the reasonableness and reliability of their clients' tax accounts, in order to ensure that the managements do not bias tax provisions to deliberately influence earnings; or engage in tax planning transactions that may be uncovered and overturned by tax authorities in the future. Auditors, if necessary, should require their clients

to correct the questionable tax disclosures by recording a contingent tax reserve which increases the reported tax expense; or reducing the financial statement benefits arising from involving in abusive tax transactions (Kanagaretnam et al. 2016).

The importance of external auditors on firms' tax positions has been examined by several studies. Donohoe and Knechel (2013) employ a large sample of U.S. firms for the year 2002-2010 to explain the association between corporate tax management and audit fees. They find that corporate tax management (as measured by lower cash or current effective tax rates) and the interaction between tax management and tax uncertainty (as measured by greater unrecognised tax benefits) positively influence audit fees after controlling proxies for earnings quality. Their empirical findings suggest that increases in external audit fees can represent a nontax cost borne by tax-aggressive firms, since the complex and risky techniques associated with aggressive corporate tax activities likely increase the required audit efforts and expose auditors to reputational and regulatory risks, leading to a fee premium for external audit services.

Kanagaretnam et al. (2016) employ an international setting to investigate the impact of auditor quality on corporate tax management. Using a sample of non-U.S. companies from 31 countries for the period 1995-2007, they conclude that as compared to the employment of non-Big N external auditors, the employment of Big N firms as external auditors reduces the likelihood of companies' engagement in tax management activities. The authors interpret their findings as that high-quality external auditors play an effective role in reducing managers' incentives to engage in abusive tax transactions, which enhances the credibility of corporate tax reporting. This is because that the tax-related deficiencies in clients' financial statements and the financial restatements resulting from detections by tax authorities regarding clients' aggressive tax transactions inevitably heighten the litigation and reputational risks of auditors. Therefore, higher-quality audit firms with greater reputational concerns likely impose stricter reporting standards on their clients' tax disclosures.

Consistently, Klassen et al. (2016) employ confidential tax data from IRS (Internal Revenue Service) and provide evidence that firms whose tax returns are prepared and signed by external auditors, especially by Big 4 auditors, have less aggressive tax positions claimed in their tax returns (as measured by lower FIN 48 tax reserves) than firms whose tax returns are prepared and signed by their internal tax departments or by external non-auditors. Their results indicate

that high-quality external auditors are likely to impose stricter tax reporting standards and discourage their clients to engage in aggressive tax management activities.

Financial analysts, who act as important information intermediaries in capital markets, are responsible for collecting, analysing and disseminating information reported in firms' financial statements with the aim of issuing earnings forecasts and recommending stocks for equity investors (Yu 2008). Given the prominent role of financial analysts in processing and distributing firms' financial information, prior studies provide evidence that financial analysts are effective in reducing the information asymmetry between managers and investors (Jensen and Meckling 1976); detecting financial fraud and restricting earnings management (Yu 2008; Dyck et al. 2006); enhancing firms' liquidity (Irvine 2003); and increasing firms' voluntary disclosures (Anantharaman and Zhang 2011; Balakrishnan et al. 2014). Yu (2008) demonstrates that financial analysts can be deemed as external monitors against managerial misbehaviour and financial reporting irregularities, since their ability and resources to understand and analyse information reported in financial statements create an 'external layer of scrutiny' of firms' information distribution process (pp. 247).

Allen et al. (2016) argue that firms with higher analyst coverage might be less incentivised to engage in aggressive tax management activities, since the higher the analyst coverage, the more likely firms' underlying practices such as their aggressive tax activities are revealed to the public through analysts' comments and reports. This can lead to reputational costs and undervaluation by equity investors and, thus, dampening firms' incentives to engage in aggressive tax management. However, higher analyst coverage can also create greater market pressure for managers to avoid missing analysts' earnings expectations through earnings management. In this case, firms with high analyst coverage would likely to reduce tax expenses through manipulating income tax provision for the purpose of manufacturing earnings. This is consistent with Graham et al.'s (2014) survey evidence that the publicly-traded firms with higher analyst coverage emphasise more on the importance of tax management techniques which are designed to increase after-tax earnings. Using a difference-in-difference method, Allen et al. (2016) examine the causal effect of the exogenous decrease in analyst coverage due to brokerage house mergers on corporate tax management. They find that firms experiencing reductions in analyst coverage increase their engagements in tax management activities during the post-merger period, confirming the constraining effects of financial analysts on corporate tax management. Using the similar method, Chen et al. (2018) find that reductions in analyst

coverage due to broker mergers/closures lead to 2.5 percent (2.6 percent) decrease in firms' GAAP (cash) effective tax rates on average, and the constraining effects of financial analysts are more pronounced among financial-distressed firms and firms with weaker corporate governance.

To summarise, prior studies provide evidence that high-quality external auditors and intensive analysts coverage exert significant influence on constraining firms' aggressive tax management activities and improving firms' tax and financial reporting quality. This is primarily because external auditors and financial analysts play an active role in tracking firms' financial statements on a regular basis to detect managerial misbehaviours and financial fraud from the reported financial information, which may facilitate to enhance firms' information transparency and reduce the information asymmetry between managers and financial statement users.

The section 3.3 reviews previous literature that examines the relationship between corporate governance and corporate tax management. This section begins with the discussion of agency theory, and is followed by the review of research evidence on how various governance mechanisms affect managers' engagement in tax management activities. The principal-agent perspective of corporate tax management indicates that agency tension between managers and shareholders might lead managers to implement corporate tax management in a way that is not desired by shareholders. Therefore, it can be important for shareholders to rely on various corporate governance mechanisms to monitor managers' behaviours and make sure that managers engage in tax activities on behalf of shareholders' interest. In conclusion, previous studies find that different ownership structure, board of directors, external auditors and financial analysts play a role in affecting managers' incentives and actions in the engagements of tax management activities.

3.4. Corporate tax Management, Corporate Governance and the Informativeness of Tax Disclosures in Financial Statements

This section reviews previous value-relevance accounting and taxation literature, as they provide a theoretical and methodological foundation for justifying and developing the key topic of this thesis, i.e., the informativeness of income tax provision. This section begins with discussing the theoretical foundation and methodology employed by the existing value-relevance accounting and taxation studies, and further reviews previous studies regarding the joint impact of corporate governance and corporate tax management on the informativeness of income tax provision. The main objective of this section is to show the research gap that exists in the literature and to interpret this study's research framework under the context of the existing literature.

3.4.1. Theoretical foundation of value-relevance research

The main objective of the regulated financial reporting and disclosures prepared by firm managers is to credibly communicate firms' current and expected future financial position with financial statements users, in order to provide high-quality information which is useful in facilitating financial statement users to estimate firm value and make a difference in their investment, pricing or allocation decisions (IASB 2018 *Conceptual Framework*, para 1.3-1.11). The quality and decision-usefulness of accounting information reported in financial statements is based on the pillars of relevance and reliability. Specifically, relevance refers to "*the ability of the item to make a difference to decisions of financial statement users*". Reliability refers to "*the ability of the measure to represent what it purports to represent*", i.e., the accounting information is provided with a significant degree of assurance that the information is complete, neutral and free from error (Barth 2000, pp. 16; IASB 2018 *Conceptual Framework*, para 2.4-.219).

Under the efficient market assumption, firm value equals the present value of the expected future net cash flows discounted at an appropriate risk-adjusted rate of return (Kothari 2001, pp. 108-109). Therefore, whether an accounting amount is significantly related to a firms' contemporary security prices or future cash flows can be of great interests to financial statement users, because a significant association between an accounting amount and a firm's contemporary security prices or future cash flows implies that this accounting amount is

measured with sufficient reliability and provides incremental explanation about firms' underlying performance and profitability, thereby might be useful in making a difference in financial statement users' decisions about providing resources to this firm (Lev 1989; Kothari 2001; Barth et al. 2001). As highlighted by IFRS *Conceptual Framework*, information reported in financial statements should facilitate users of financial statements to assess the 'amount, timing and uncertainty' of future net cash inflows to the entity (IASB 2018 *Conceptual Framework*, para 1.2-1.3).

Based on this notion, the primary focus of value-relevance accounting studies is to determine how well a particular accounting amount provides reliable and relevant information for valuing a firm, by employing various valuation models to investigate the association between this accounting amount and a selected variable which represents the 'normative' benchmark amount of firm value (Barth 1994; Holthausen and Watts 2001; Lee 2001). As Barth (2000) highlighted, "*value-relevant means the accounting amount is associated with some measure of value, e.g., share prices. If the amount significantly increases the power of the estimating equation to explain equity value, then it must be relevant and measured with at least some reliability. If it is not relevant there would be no relation with equity value. If the amount is fraught with 'too much' measurement error, the researcher also would not detect a significant relation*" (pp. 16). Consistently, Holthausen and Watts (2001) document that assuming efficient markets, the presence of managers' misrepresentation of a particular accounting variable for the purpose of misleading financial statement users can bias downward the usefulness¹⁵⁰ of this accounting variable in reflecting firms' underlying performance and facilitating investors' estimation of firm value.

It is important to point out that using the association with share price as a criterion for evaluating the informativeness or value relevance of a particular accounting amount is based on the assumption that the capital market is reasonably efficient. That is, competitions among rational and profit-maximising participants will drive the share prices fully and immediately to

¹⁵⁰ However, Lev (1989) and Holthausen et al. (2001) argue that using the return-earning regression to represent the usefulness of earnings is incomplete, since earnings are deemed to provide useful information for a broad range of users under various context, such as predicting corporate bankruptcy and bond rating or for contracting purposes between shareholders and managers or between the firm and its lenders and creditors, rather than solely providing information for equity investors. However, Barth et al. (2001) argue that the usefulness of earnings as reflected from the return-earnings regression captures the ability of earnings to explain securities returns, which can be useful for updating beliefs of investors and accounting standard setters regarding how well share prices reflect an accounting amount.

reflect the effects of this accounting amount on firms' intrinsic values (Fama 1965, pp. 4; Fama 1970, pp. 8; Kothari 2001, pp. 114). The efficient market hypothesis "*provides justification for selecting the behaviour of security prices as an operational test of usefulness of accounting information*" reported in financial statements (Ball and Brown 1968, pp. 160). Otherwise, if the capital market is inefficient in fully and immediately processing the available public information about firms' underlying performance and future prospects, the market participants' estimates of firm value implicit in stock price would be irrational and, thereby, the stock price would not be a good benchmark to evaluate the reliability and relevance of a particular accounting amount in explaining firm value (Ball and Brown 1968, pp. 160; Holthausen and Watts 2001, pp. 18)¹⁵¹.

Although there exists evidence to support the relevance of efficient market hypothesis in explaining the stock market behaviours (e.g., Fama 1976; Seyhun 1986; Landsman and Maydew 1999; Malkiel 2005), substantial empirical evidence suggests that capital market might be inefficient in processing and interpreting available public information (e.g., Barberis et al. 1998; Daniel et al. 1998; Aboody et al. 2002; Lee 2001; Kothari 2001). As Lee (2001) argues, "*if a particular piece of value-relevant information is not incorporated in price, there will be powerful economic incentives to uncover it, and to trade on it. As a result of these arbitrage forces, the price will adjust until it fully reflects the information*", However, "*price discovery is an on-going process and the current price of a security is best regarded as a noisy (or incomplete) proxy for a security's true fundamental value*" (pp. 237).

Base on the above discussion, it can be concluded that the primary purpose of value relevance accounting research is to empirically test the reliability and relevance of an accounting variable in providing useful information for financial statement users to estimate firm value. An accounting amount is defined as informative or value-relevant if it exhibits a predicted association with a selected benchmark variable (e.g., a firm's future cash flows or contemporary share price/stock return) (Barth 2000). When the association with share price/stock return is used as a criterion to evaluate the informativeness or value relevance of an

¹⁵¹However, Barth et al. (2001) argue that using the amount implicit in share prices as the selected benchmark variable to represent firm value only requires the assumption that share prices reflect investors' consensus beliefs rather than the assumption that capital market is efficient, unless that a value-relevance study is designed to test how well the accounting amounts such as the book value of assets, liabilities and accounting net income reflect their corresponding economic amounts (pp. 94,98).

accounting variable, it is necessary to assume that capital markets are at least reasonably efficient in processing the publicly available information to reflect firm value.

3.4.2. Value-relevance accounting and taxation research

3.4.2.1. Value-relevance or informativeness of accounting disclosures

As discussed above, value-relevance studies generally focus on determining the reliability and relevance of an accounting amount by employing various valuation models to investigate the association between this accounting amount and a normative valuation benchmark (e.g., firms' future cash flows, stock price or stock return), with the aim of assessing how well this accounting amount provides useful information in explaining the selected valuation benchmark. Previous value-relevance accounting literature has typically examined the informativeness or value relevance of financial information¹⁵² by 1) testing the association between the financial information and prices or returns to show the ability of the financial information to “*change the total mix of information in the marketplace*”; 2) testing if the financial information “*contains the variables used in a valuation model or assists in predicting those variables*”, e.g., testing the ability of the financial information to predict future cash flows or future earnings (Francis and Schipper 1999, pp. 325). Therefore, in the following sections, previous literature regarding the value relevance of the accounting disclosures will be reviewed from aspects of the return-earnings association; the ability of accounting disclosures to predict future cash flows; and the long-term trend of the value relevance of accounting disclosures.

3.4.2.1.1. Return-earnings association

The correlation between stock returns and earnings has been commonly analysed by previous studies to evaluate the informativeness or value relevance of earnings, based on the underlying logic that if earnings provide useful information to facilitate investors in firm valuation, earnings should be able to provide incremental explanatory power about the price revisions around the earnings announcement and thereby be significantly related to stock returns (Lev 1989). As argued by Lev (1989), “*if an action (reflected by, say, a change in stock price or volume) can be attributed to specific information, such information is considered useful. This*

¹⁵² Financial information examined by previous value-relevance accounting studies includes the aggregated earnings; the disaggregated earnings components and other non-earning items over short-term and long-term.

is the logic underlying the return/earning association studies” (pp. 156). Inferences regarding the informativeness or value relevance of earnings are generally based on the significance of the slope coefficient (earnings response coefficient) or the explanatory power R^2 generated from regressing stock returns on earnings over time and/or cross-sectionally¹⁵³ (Kormendi and Lipe 1987; Collins and Kothari 1989; Easton and Zmijewski 1989). In particular, the slope coefficient of the return-earning regression represents the “average change in the stock price associated with a unit change in earnings” (Lev and Zarowin 1999, pp. 356) and the R^2 measures “the degree to which observed price revisions can be ascribed to (or explained by) earnings, or, rather, the extent to which earnings are actually used by investors” (Lev 1989, pp. 157)¹⁵⁴.

The time-series returns-earnings regressions are estimated based on the assumption that investors react identically to earnings of the same firm over time, and the cross-sectional return-earning regressions are based on the assumption that investors react identically to earnings released across all firms. While the cross-sectional assumption can be less realistic than the time-series assumption since investors’ reactions to earnings of a firm over time might be more stable than that across different firms within a particular reporting period, the cross-sectional return-earnings regressions can be useful for testing the degree of ‘intertemporal stability’ of the returns-earnings relationship, i.e., the fluctuation of the coefficients or R^2 generated from the returns-earnings regression from period to period (Lev 1989). Running the return-earnings regression cross-sectionally for period 1982-1986, Lev (1989) reveals that the return-earning association is intertemporally instable over time.

Numerous studies show that ERCs vary significantly across firms or industries. For example, in explaining the cross-sectional variations of ERC, Collins and Kothari (1989) and Eason and Zmijewski (1989) find that ERC is negatively related to firm’s systematic risk and positively related to firms’ earnings persistence and growth opportunity. Biddle and Seow (1991) perform the cross-industry comparison of return-earning association and find that both the response coefficients and R^2 vary considerably across industries. As a result, Biddle and Seow (1991)

¹⁵³ A lower (higher) slope coefficient and/or a lower (higher) R^2 suggest that the reported earnings are less (more) informative in explaining stock returns (Lev and Zarowin 1999).

¹⁵⁴ According to Beisland (2009), in regression analysis, R^2 measures “the proportion of variance in the dependent variable explained by the independent variable”. Therefore, in the return-earning regression, R^2 measures “how much variation in stock prices or returns is explained by the accounting variance analyzed” (pp. 11).

claim that the return-earnings association should be estimated by industry, as the cross-industry variations in ERCs can bias the magnitudes and significance of ERCs or R^2 if estimated without controlling for characteristics differing systematically across industries¹⁵⁵. Teets and Wasley (1996) suggest that the firm-specific time-series estimation of ERC should be used instead of pooled cross-sectional estimation, since the pooled return-earning regression estimated on the basis of the assumption that return-earning association is homogenous across firms can bias downwards the magnitude of estimated ERC, leading to incorrect inference about behaviours of ERC between groups of firms under examined.

Previous value-relevance literature that examines the return-earning association finds small magnitudes of the slope coefficients (i.e., ERCs ranging from 1 to 3) and low levels of explanatory power (i.e., R^2 ranging from 2% to 5%). The general weak association between returns and earnings, as argued by Kothari (2001), can be explained in four ways. First, a reasonably efficient market can instantaneously incorporate substantial information about firms' underlying performance and future prospects into contemporaneous stock values, while accounting earnings, due to the revenue realisation and expense matching processes, incorporate information about expectations of firms' future cash flows with a lag. This leads to a richer information set implicit in stock prices relative to that in the contemporaneous accounting earnings and, hence, a weak return-earnings association (Beaver et al. 1980). Second, the small association between price change with earnings change may imply that the capital market is not efficient enough to correctly and timely interpret and process the information reflected in accounting earnings when forming expectations of a firm's prospect. Third, poor earnings quality induced by deficient accounting standards (e.g., the discretionary accounting policy choices or subjective judgements allowed by GAAP) may render accounting information less useful in facilitating investors to predict firms' future prospects, leading to weak return-earnings association (Lev 1989; Amir and Lev 1996; Aboody and Lev 1998). Finally, the transitory earnings that are not expected to persist into the future can be less informative about firms' future performance, which contributes to the weak association between earnings and stock returns (Ou and Penman 1989; Hayn 1995; Basu 1997). The presence of transitory earnings can be attributable to transactions that produce one-time gains

¹⁵⁵Different industrial characteristics include financial and operating leverage, growth, product type and entry barriers. Biddle and Seow (1991) demonstrate that estimating the return-earning association by industry membership can naturally capture industry-specific characteristics and control for omitted variables that differ significantly by industry.

or losses; accounting conservatism that reflects bad news more quickly than good news¹⁵⁶; or the managerial misuse of discretionary accruals for opportunistic purposes such as increasing managers' compensation or job security¹⁵⁷.

To summarise, this section highlights that previous studies focus on examining the informativeness or the value relevance of earnings based on two important indexes, i.e., the magnitudes of the earnings response coefficient and the coefficients of determination (R^2) generated from the return-earning regression. Specifically, running the time-series returns-earnings regression can be used to test the cross-sectional behaviour of the return-earning relationship, while running the cross-sectional returns-earnings regression can be used to test the 'intertemporal stability' of the returns-earnings relationship over periods. In addition, previous studies find small earnings response coefficient and low levels of explanatory power from the return-earning regression, indicating general weak association between returns and earnings.

3.4.2.1.2. The ability of accounting disclosures to predict future cash flows

In addition to examining the value relevance of earnings by evaluating the association between earnings and stock price/return under the efficient market assumption, some value-relevance studies employ earnings' predictive ability regarding future operating cash flows as a criterion to evaluate the value relevance of earnings. Since firm value is the discounted present value of the expected future cash flows, testing the ability of an accounting variable to forecast future cash flows can be the 'crux' of valuation, which is more directly consistent with the financial accounting standards' contention that financial information should facilitate users to assess the 'amount, timing and uncertainty' of firms' future cash flows (Kothari 2001, pp. 172; Kim and Kross 2005; IASB 2018 *Conceptual Framework*, para 1.2-1.3).

¹⁵⁶ Conservatism can affect the informativeness of earnings since losses are more timely but more transitory than gains. This is because that the recognition criteria in GAAP are generally less stringent and require less verifiable information for losses than the recognition of good news (Basu 1997). In addition, Hayn (1995) provides evidence that losses are less informative than profits regarding firms' future prospect, since when investors perceive the current reported losses as a signal for low future cash flows of a firm, investors can exercise their options to liquidate the firm rather than suffering from perpetuate losses. Under this circumstance, "investors do not evaluate firms strictly on the basis of their reported earnings, thus leading to a weak observed return-earnings association" (Hayn 1995, pp. 127).

¹⁵⁷ Discretionary accruals which are used for managerial opportunistic purposes tend to be transitory and can reduce the value relevance of earnings, because they are not designed for providing useful information about firms' future performance or long-term strategies (Marquardt and Wiedman 2004; Kothari 2001; Schmidt 2006).

For example, Greenberg et al. (1986) compare the ability of current-period earnings and cash flows to predict future cash flows ranging from one to five years ahead. Using ordinary least-square regression, they find that the coefficient of determination for the earnings model (i.e., the regression of future cash flow on current-period earnings) is greater than that for the cash flow model (i.e., the regression of future cash flow on current-period cash flow), which suggests that earnings have a greater ability to predict future cash flow than cash flow. This is consistent with Lorek and Willinger (1996) who employ quarterly rather than annual data to test the value relevance of earnings and find that earnings are incrementally more useful than cash flows in forecasting future cash flows.

Finger (1994) examines the value relevance of earnings by investigating the ability of earnings to predict future operating cash flow one through eight years ahead, using both firm-specific in-sample and out-of-sample regression. After correcting for autocorrelation, nonstationary and cointegration, her in-sample results show that earnings are a significant predictor of future cash flows for approximately 90% of the sample firms. When using out-of-sample regression to compare the ability of earnings to predict future cash flows with that of cash flows, she finds that cash flow is a superior short-term predictor about future cash flows, while earnings and cash flows are approximately equivalent in forecasting future cash flows over the long-term horizon.

Furthermore, the theoretical model and the firm-specific coefficients analysis of Dechow et al. (1998) both show that current-period earning is a significant predictor of future cash flows, either by testing alone or in conjunction with cash flows. In addition, they suggest that the superiority of earnings over cash flow to predict future cash flows is increasing as the operating cycle increases. Building on Dechow et al.'s (1998) model, Barth et al. (2001) find that the ability of earnings to predict future operating cash flows up to four years ahead has been significantly improved when disaggregating earnings into cash flow and six accruals components, including change in accounts receivable, change in inventory, change in accounts payable, depreciation, amortization and other accruals. In particular, they find that the predictive ability of cash flow and the six accruals components are greater than that of current and up to six lags of aggregate earnings.

To summarise, previous studies have also evaluated the value relevance of earnings by examining their ability to predict future operating cash flows, because it is consistent with the

financial standards' contention that it is important to predict the 'amount, timing, and uncertainty' of firms' future operating cash flows. These studies use the coefficients of determination (R^2) from the regression of future cash flow on current-period earnings to measure earnings' ability to predict future cash flows. Those studies generally find that earnings is a significant predictor of future cash flows.

3.4.2.1.3. The long-term trend in the value relevance of accounting disclosure

Previous studies have also examined the long-term trend in the value relevance of financial information, motivated by concerns that increased complexity in institutional, technological and macroeconomic factors might render the financial statements less useful in providing relevant information about firms' underlying economic conditions and future prospects. Collins et al. (1997) use cross-sectional regressions and R^2 as the primary metric to examine the value relevance of financial information spanning from 1953 to 1993. Regressing the yearly R^2 s derived from three valuation models (i.e., regressing share price three months after fiscal year-end on the book value per share and the earnings per share, jointly and individually) on a time-trend variable (i.e., a variable representing the period 1953-1993), they find that the incremental value relevance of the bottom-line earnings has decreased over time, while the incremental value relevance of book values has increased over time. They further provide evidence that the shift in value relevance from earnings to book value is attributed to the increase in the magnitude of one-time items, intangible intensity and the frequency of negative earnings; and the decrease in average firm size over time.

Similarly, regressing of the yearly R^2 s over a time-trend variable which represents the period 1952-1994, Francis and Schipper (1999) show that the value relevance of earnings to explain stock return has decreased over time, while the value relevance of balance sheet items to explain stock return has increased over time¹⁵⁸. Lev and Zarowin (1999) use similar time-trend regression but a shorter sample period than Collins et al. (1997) and Francis and Schipper (1999) to examine the long-term trend of value relevance of accounting information. They find that the cross-sectional associations (as measured by yearly R^2 s) between capital market values and the accounting information (i.e., earnings, book value, and the combination of earnings and book value) have decreased over the sample period 1977-1993. The authors further denote that

¹⁵⁸ Collins et al. (1997) and Francis and Schipper (1999) also include a time-square variable in the time trend regression to capture the potential nonlinearities on the long-term trend of value relevance of financial information.

the decline in the value relevance of the reported accounting information is attributed to the increasing rate of business changes which is measured by the higher-level of firms' year-end switches in ranked book value portfolio, and the increasing level of investment on research and development.

However, Brown et al. (1999) argue that the presence of scale factors (i.e., differences in the size of observations) in the levels regressions would render the R^2 a biased and unreliable measure in comparing changes in the value relevance of an accounting amount over time. Specifically, a regression that exhibits an increase in the coefficient of variation of the scale factor would generate higher R^2 s as compared to the same regression without scale effects. After controlling for the scale effects by deflating¹⁵⁹ a proxy for the unobservable scale factor (i.e., deflating the stock price to control for the size of a share), Brown et al. (1999) replicate Collins et al. (1997) and find different results that the value relevance of both the book value and earnings has decreased over time, suggesting that the empirical results of Collins et al. (1997) might be biased due to the potential scale effects.

Instead of employing the statistical associations between an accounting variable and capital market values (e.g., stock price and return) to measure the value relevance of this accounting variable, Kim and Kross (2005) examine the long-term trend of the ability of earnings to explain future one-year-ahead operating cash flows over a 28-year period, based on the conjecture that since the stock price is the present value of the expected future cash flows, the deterioration in the association between earnings and stock prices as revealed by previous studies should imply a decrease in the ability of earnings to predict future operating cash flows.

Through regressing the R^2 s derived from annual cross-sectional regressions (regressing future cash flow on current-period cash flow and earnings) on a time-trend variable that represents the period 1973-2000, Kim and Kross (2005) find that the ability of accounting earnings to explain future one-year-ahead cash flows has increased over the 28-year period, regardless of firm size; firms' dividend payments and profit status¹⁶⁰. It is important to point out that in order to address issues related to the cross-sample comparison of R^2 s that may occur in analysing

¹⁵⁹ Brown et al. (1999) point out that deflating by a proxy for scale effects yields R^2 s that “*better reflect the explanatory power of the underlying variables and not that of scale*” than including the proxy as an explanatory variable (pp. 103).

¹⁶⁰ The authors further provide evidence that increased accounting conservatism, i.e., the prompter recognition of bad news in financial statements, is the primary factor that make the financial statement more relevant for future cash flow projections.

the long-term trend of the value relevance of an accounting amount, Kim and Kross (2005) follow Brown et al. (1999) to deflate all variables by total assets to control for the potential scale effects. Since Gu (2002) argue that the inherent sampling variations across samples would also make the R^2 a biased and unrealistic statistic even in the absence of scale effects, Kim and Kross (2005) further rank the dependent variable and all independent variables into percentiles each year to ensure that the sample variance in all regressions are constant over time, thereby eliminating problems regarding the cross-sample comparisons of R^2 s due to the inherent sampling variations. However, results in Kim and Kross (2005) fail to reveal the long-term trend of the ability of earnings to predict future cash flows beyond the one-year horizon.

Overall, the section 3.4.2.1 reviews previous literature regarding the value relevance of the accounting disclosures from aspects of the return-earnings association; the ability of accounting disclosures to predict future cash flows; and the long-term trend of the value relevance of accounting disclosures. To summarise, previous studies focus on examining the informativeness or the value relevance of earnings based on two important indexes, i.e., the magnitudes of the earnings response coefficient and the coefficients of determination (R^2) generated from the return-earning regression. Consistent with the financial standards' contention that it is important to predict the 'amount, timing, and uncertainty' of firms' future operating cash flows, previous studies have also evaluated the value relevance of earnings by examining their ability to predict future operating cash flows. Moreover, previous studies have examined the long-term trend in the value relevance of financial information by regressing the yearly R^2 s derived from valuation models on a time-trend variable. In the next section, relevant tax studies will be reviewed to show the informative role of tax-related disclosures.

3.4.2.2. Value relevance or informativeness of tax-related disclosures

Book and taxable income reporting are two income systems which serve different objectives and are governed by different rules. For instance, book income is prepared according to the generally accepted accounting principles (GAAP), to provide financial information which is useful for potential and existing investors, lenders and other creditors in making investment decisions. By comparison, the calculation of taxable profits is governed by tax legislation with the primary goal of facilitating governments to efficiently and equitably collect revenue. While GAAP often permits considerable discretion in the process of financial reporting, such as allowing managers to exercise judgments and discretion in recognising reserve allowance or

choosing between different accounting approaches, less discretion is allowed by tax law in the process of calculating taxable income (Hanlon 2005; Ayers et al. 2010; Miller and Oats 2017). Moreover, since book and tax reporting serve different purposes, managers tend to have different incentives when preparing book and taxable income in financial statements. Managers might be incentivised to report higher book income to attract new investors; relax debt covenants; or improve managements' compensation and job security, but might be incentivised to report lower taxable income to avoid the transfer of firm wealth from shareholders to tax authorities.

Given that book and taxable income reporting systems are governed by unique set of rules and are subjected to different managerial incentives, it is likely that book and tax disclosures in financial statements serve as alternative sources of information in facilitating the assessment of firms' current and future performance. This section therefore reviews relevant tax studies to provide an insight into the informative role of tax-related disclosures in reflecting firms' current and future performances, from aspects of the role of tax-related disclosures in indicating earnings characteristics; the market participants' valuation of tax-related disclosures; and the ability of tax-related disclosures to predict future tax cash flows.

3.4.2.2.1. The role of tax-related disclosures in indicating earnings characteristics

Previous studies have examined the information contained in book-tax differences in indicating various earnings characteristics. For example, Revsine et al. (1999) demonstrate that an increase in a deferred tax liability (i.e., where book income is in excess of taxable income) “*might be an indication of deteriorating earnings quality*”, and the deferred tax assets accounts (i.e., where taxable income is in excess of book income) can be manipulated as “*a way to artificially increase earnings*” (pp. 633-634). Consistent with this notion, Hanlon (2005) investigates the role of temporary book-tax difference in reflecting the persistence of earnings, accruals, and cash flows in explaining future one-year-ahead earnings, based on the inference that large book-tax differences, if arising from earnings management, should be informative about the lower persistence of firms' earnings and accruals because the manipulated portion of accruals tend to be transitory in nature. Results in Hanlon (2005) show that as compared to firm-years with small book-tax differences, firms-years with large positive and negative book-tax differences both have less persistent earnings, accruals and cash flows, implying that large

book-tax differences might be an indicator of earnings management which results in lower quality of both cash flow component and accrual component of earnings.

Blaylock et al. (2012) argue that if large temporary book-tax differences employed in Hanlon (2005) solely reflect large book accruals¹⁶¹, Hanlon's (2005) empirical results could be explained just as that larger accruals are less persistent than small accruals, which is highlighted by Sloan (1996) and Dechow and Ge (2006). Blaylock et al. (2012) therefore re-examine the incremental informativeness of temporary book-tax differences about earnings persistence after controlling for the magnitude of book accruals. Their results suggest that large temporary book-tax differences provide incrementally useful information about earnings persistence beyond the magnitude of book accruals. In addition, Blaylock et al. (2012) extend Hanlon (2005) by partitioning firms with large positive temporary book-tax differences into three subsamples based on three different sources of book-tax differences, i.e., book-tax differences predominantly arising from 1) firms' upward earnings management; 2) firms' engagements in tax management activities; or 3) the normal differences between book and tax treatments in the absence of tax management or earnings management. They find that firms with large positive temporary book-tax differences that arise primarily from earnings management (tax management) exhibit the lowest (highest) persistence in earnings and accruals.

Rather than focusing on the temporary book-tax differences, Lev and Nissim (2004) suggest that the tax-to-book ratio (i.e., the ratio of estimated taxable income to book income) is a comprehensive 'tax-based fundamental', which reflects the aggregated tax-disclosure information including the temporary book-tax differences; the permanent book-tax differences and the changes in valuation allowance. They investigate whether tax-to-book ratio provides incremental information about earnings' growth over accruals and cash flows¹⁶², and find that the tax-to-book ratio provides incremental explanatory power about earnings growth for up to

¹⁶¹ Accruals recognised for book purposes but not for tax purposes.

¹⁶² Lev and Nissim (2004) demonstrate that the tax-to-book ratio is a measure of earnings growth for three reasons. First, overstating (understating) of current earnings through discretionary accruals can be informative about earnings growth since the overstatement (understatement) of earnings increases (reduces) the base from which future earnings grow and an overstatement of earnings by shifting future earnings to the present (an understatement of earnings by shifting present earnings to the future) is generally followed by a reduction (increase) in earnings. Therefore, to the extent that the tax-to-book ratio reflects the overstatement or understatements of current earnings, it should be informative about future earnings. Second, since tax management behaviors through smoothing both current and future taxable income can make the current taxable income better reflect future taxable income and thereby better related to future earnings, the tax-to-book ratio should be predictive about future earnings to the extent it reflects tax smoothing behaviors. Third, since revenues (expenses) are often included in taxable income before (after) they are included in book income, a higher tax-to-book ratio may indicate higher future revenue or smaller expense and, hence, high future earnings growth.

five years in the future. Schmidt (2006) examines the implications of the tax change component of earnings (i.e., earnings generated by changes in the effective tax rate) for earnings prediction. He argues that the tax change component of earnings can exert either positive or negative impacts on earnings persistence, since earnings generated by changes in the effective tax rate are affected by both persistent and transitory elements, including long-run tax management strategies (i.e., persistent element); period-specified earnings management (i.e., transitory element); and the tax sheltering activities (relatively transitory element). Empirical results in Schmidt (2006) show that the tax change component of earnings in the first fiscal quarter is less transitory and more informative in predicting future earnings than that in the subsequent quarters. His results suggest that the initial estimated ETR in the first quarter incorporates information about managements' estimations regarding the most material and long-term effects on firm earnings. However, the revisions to the annual ETR estimates can be evidence of earnings management or tax-sheltering activities, which leads the tax change of earnings to become more transitory and less informative in predicting future earnings as the year progresses.

Dhaliwal et al. (2013) posit that the disclosure of valuation allowance for deferred tax assets¹⁶³ requires managers to exercise their private information about firms' current underlying financial performance and future prospects, to determine whether it is unlikely for their firms to generate sufficient taxable income in the future to utilise the benefits arising from deferred tax assets. As a result, the valuation allowance disclosures should provide forward-looking information about the persistence of firms' accounting losses. Using a large sample of U.S. loss firms, they find that managements' decisions regarding the recognition of valuation allowance provide incremental information which is useful for predicting the persistence of firm losses up to three years ahead. Specifically, loss-firms that have materially increased their valuation allowance are found to exhibit losses more persistent than loss-firms that report positive taxable income or recognise net operating losses carryforward without increasing valuation allowance.

¹⁶³ The U.S. accounting standard SFAS 109 requires firms to reduce deferred tax assets by a valuation allowance if it is more likely than not (i.e., the probability is more than 50%) that firms will not generate sufficient future taxable income to utilise benefits arising from deferred tax assets. Therefore, managers should use their private information about firms' current and future financial position, to make judgements about whether to reduce deferred tax assets by the valuation allowance.

To summarise, previous tax studies provide compelling and consistent empirical results that tax-related disclosures in financial statements are useful in indicating earnings quality. Specifically, different components of tax disclosures (e.g., temporary book-tax differences; the components of temporary book-tax differences arising from earnings management or tax management; tax-to-book ratio; the initial and revised tax change component of earnings; and the valuation allowance for deferred tax assets) are found to be able to explain various earnings characteristics, including earnings persistence; earnings growth and the persistence of accounting losses.

3.4.2.2.2. The market participants' valuation of tax-related disclosures

As discussed above, tax information reported in financial statements provides forward-looking information about earnings persistence; growth in future earnings; and persistence of accounting losses. Therefore, reported tax information in financial statements might be useful for capital market participants in evaluating and forming expectations about firm value. Prior literature has identified the value relevance of tax disclosures for capital market participants, through revealing the ability of tax disclosures to explain firms' contemporaneous returns or predict future returns¹⁶⁴.

Hanlon et al. (2005) examine the information content of book income and taxable income to determine whether reducing the differences between the two income measures leads to information loss. Using association tests to regress the contemporaneous security returns on book income and the estimated taxable income, they find that although book income exhibits larger explanatory power about firms' annual stock returns than the estimated taxable income (as reflected by higher R^2 s of the book income regression compared to R^2 s of the taxable income regression), the estimated taxable income provides significant information to the capital market as it is found to be significantly and positively associated with the contemporaneous returns. In addition, their portfolio-return tests show that incorporating foreknowledge of both the sign and the magnitude of the pre-tax income (the estimated taxable income) lead to 27.4% (21.1%) average market-adjusted returns. Hanlon et al. (2005) therefore

¹⁶⁴ According to Graham et al. (2012), the association between tax disclosures and contemporaneous returns generally reflects whether equity investors incorporate information about tax-related disclosures into their firm valuation process, but does not provide evidence about whether investors fully and instantaneously impound the tax-related information when the tax disclosures are released. A significant relation between current tax disclosures and future returns shows that equity investors fail to fully and simultaneously value tax disclosures when the tax disclosures are released.

conclude that conforming book and taxable income measures would result in information losses, because the two income systems are both useful for equity investors in assessing firms' underlying performance. Ayer et al. (2009) extend Hanlon et al. (2005) by investigating how corporate tax planning and earnings management affect the information content of estimated taxable income relative to book income. They find that the estimated taxable income is more (less) useful¹⁶⁵ in explaining the annual stock returns for firms with low earnings quality (high tax planning) than for other firms, suggesting that engaging in tax planning compromises the ability of reported tax disclosures to explain firms' underlying economic performance, and investors perceive taxable income as a more useful summary measure of a firm's performance when its book income is considered as being managed opportunistically.

In addition to measuring the information content of tax-related disclosure through its ability to summarise information that affects firms' contemporaneous stock returns, several studies have examined the association between tax disclosures and future stock returns, to show whether the capital market is efficient in simultaneously impounding tax-related information into security prices¹⁶⁶. For example, Lev and Nissim (2004) find that tax-to-book ratio for the current period is positively and significantly associated with subsequent stock returns, consistent with that the information contained in tax-related disclosures about firms' underlying performance is not fully and immediately reflected in the contemporaneous stock prices. However, they find that the ability of the capital market to impound tax-related information has improved over time, as reflected by a stronger association between tax-to-book ratio and contemporaneous stock price and a weaker association between tax-to-book ratio and future stock returns after the implementation of SFAS No. 109 in the year 1993. Hanlon (2005) finds that equity investors use information contained in book-tax differences to assess the persistence of firms' future

¹⁶⁵ Ayer et al. (2009) define the usefulness of taxable income relative to book income as the ratio of the adjusted R^2 generated from regression of firms' contemporaneous returns on their estimated taxable income to the adjusted R^2 generated from regression of firms' contemporaneous returns on their estimated book income. High tax-planning firms are defined as firms in the lowest quintile of accumulated effective tax rates over a five-year window and low earning-quality firms are defined as firms in the highest quintile of absolute abnormal accruals. However, Raedy (2009); Hanlon et al. (2010) and Graham et al. (2012) posit that categorizing book-tax differences according to their sources, i.e., from tax planning or earnings management can be difficult. One problem of Ayers et al. (2009) is that they fail to control for impacts from earnings management (tax planning) when examining the incremental information content of taxable income for high tax-planning (low earnings-quality) firms.

¹⁶⁶ Weber (2009) argues that the ability of tax-related information to predict future returns may either due to equity investors' misunderstanding of tax-related information, leading to systematic errors in investors' earnings expectation, or due to the possibility that tax-related disclosures (e.g., book-tax differences) reflect risk factors that are not well understood by investors. His results support the argument that the positive association between tax-related information and future stock return is attributable to investors' misunderstanding of tax-related information.

earnings. Investors appear to correctly price the persistence of future earnings for firms with large negative book-tax differences, while tend to perceive the positive book-tax difference as a 'red flag' and lower their expectation of future earnings persistence for firms with large positive book-tax differences. Moreover, they find that they exhibit future abnormal returns for firm-years with book-tax differences, indicating that earnings expectations embedded in contemporaneous stock prices fail to immediately and completely reflect information about book-tax differences.

Similarly, Schmidt (2006) provides evidence that the capital market fails to fully understand the implication of tax change components of earnings (i.e., earnings generated by changes in effective tax rates) on earnings persistence, and the mispricing is mainly attributable to investors' underestimation of the persistence of the revised tax change component of earnings (i.e., the tax change components generated from quarter 2-4) due to their transitory nature. As argued by Schmidt (2006), decreases in effective tax rate arising from tax management strategies, such as tax sheltering activities or taking advantage tax rate differentials across tax jurisdictions, can lead to greater tax savings and the consequent increases in earnings, thereby should be perceived as good news. However, Thomas and Zhang (2010) find that the quarterly tax expense surprises (i.e., increases in quarterly tax expense) are positively related to future stock returns, which indicates that increases in tax expense are incrementally useful in indicating firms' higher underlying profitability and hence can be perceived as good news.

Therefore, results of prior research regarding the value implications of tax expense for equity investors are inconclusive. On the one hand, tax expense is perceived as a fundamental cost which represents value lost to the incurred and potential tax obligations, thereby higher tax expenses represent bad news and should be negatively related to value (e.g., Schmidt 2006). On the other hand, taxable income represents an alternative summary measure of firms' underlying profitability, thereby higher tax expenses should be perceived as good news and positively related to value (e.g., Lev and Nissim 2004; Hanlon et al. 2005; Ayer et al. 2009; Thomas and Zhang 2010). Thomas and Zhang (2014) argue that the contradictory results with respect to the value implication of tax expense can be attributed to different regression specifications employed in the studies. The inclusion of proxies for investors' expectations of future profitability (measured using analysts' forecasts) in the regression restricts the ability of tax expense to indicate firms' future profitability and, hence, emphasises the role of tax expense

in representing value lost. However, omitting proxies for expectations of future profitability allows tax expense's 'proxy-for-profitability role' to emerge.

In examining factors that restrict the efficiency of equity investors to use tax-related disclosures in forming expectations of future earnings, Dhaliwal et al. (2013) argue that investors may not fully understand tax-related information due to the complex nature of accounting for income taxes. Moreover, the ability of investors to understand the tax-related information is dependent on the saliency of the tax disclosures and the quality of firms' information environments. Dhaliwal et al. (2013) find that investors generally understand the implication of changes in value allowance on predicting firms' future losses, while do not appear to fully understand the implication of loss firm-years with positive taxable income, since the material decisions regarding valuation allowance are more frequently disclosed in news release and more prominently discussed by management. Moreover, they find that abnormal returns from the mispricing of tax-related information are only present in firm-years with a lower level of analysts following, suggesting that better information environment mitigates the mispricing of tax-related information. This is consistent with Weber's (2009) empirical finding that higher level of analyst following attenuates the positive association between book-tax-differences and future stock returns, which indicates that equity investors become more sophisticated in incorporating information contained in book-tax differences into their earnings expectation for firms with richer information environments.

Besides equity investors, prior studies provide evidence that information contained in tax-related disclosures can also affect decisions made by other capital market participants, such as financial analysts or credit rating agencies. Amir and Sougiannis (1999) document that analysts' earnings forecasts are less precise and over-optimistic for firms with tax-loss carryforwards. Shane and Stock (2006) provide evidence that financial analysts fail to fully understand the impacts of tax-motivated intertemporal income-shifting from high-tax to low-tax periods. Similarly, Weber (2009) finds that firms with higher book income relative to taxable income display greater optimism¹⁶⁷ in analysts' forecasts of future earnings, suggesting that financial analysts fail to fully understand the value implication of information contained in book-tax-differences on future earnings. In addition, he finds that the enhanced information environment of firms (as measured by higher level of firms' analyst coverage) and the improved forecasting

¹⁶⁷ Firms' actual earnings are lower as compared to analysts' consensus forecast of those earnings.

experience of analysts gained from repeating the forecasting process over time (as measured by the number of years that an analyst has made forecasts for a firm) can mitigate the tax-related forecast errors. These studies are consistent with Plumlee's (2003) arguments that due to the complex nature of accounting for income taxes, financial analysts are less capable of accurately incorporating tax-related information into their forecasts.

By contrast, Bratten et al. (2017) provide evidence that financial analysts pay close attention to income taxes and are able to incorporate tax-related information into their earnings forecasts. Bratten et al. (2017) attempt to explain how financial analysts forecast tax expense and what factors affect the accuracy of the tax expense forecasted by analysts. They find that when a firm's tax environment is complex or when managements' estimates include discrete tax items¹⁶⁸, financial analysts are more likely to make improvements on managements' estimates rather than completely echoing managements' estimates of tax expenses. Further, they find that although the tax environment complexity and the presence of discrete items in managements' estimates significantly impair the accuracy of both analysts' and managements' tax expense forecasts, the analysts' tax forecasts are relatively more accurate than managements' estimates under this context. Their results are consistent with Hutchens (2016) who finds that financial analysts incorporate tax-related information into their earnings forecast, and that the tax footnote readability is positively associated with the accuracy of analysts' tax expense forecasts.

Research evidence suggests that credit rating agencies also use the tax-related information to assess a firm's credit risk. Ayers et al. (2010) argue that information contained in firms' book-tax differences can be informative for credit rating agencies, since higher book income relative to taxable income may signal firms' deteriorated earnings quality and increased reliance on off-balance-sheet financing¹⁶⁹, thus might be associated with less favourable rating changes. Using an ordered logit model, they find that firms that have large positive changes in book-tax

¹⁶⁸ Bratten et al. (2017) measure tax environment complexity as higher level of changes in ETRs; higher level of volatility of ETRs; the presence of equity compensation; higher level of permanent differences between tax and book income; the period when legislation retroactively extending the R&D credit is passed; and the presence of unused tax-loss carryforwards. The discrete items refer to "settlements with tax authorities, one-time charges, and return-to-provision reconciliations" (pp. 2).

¹⁶⁹ According to Mills and Newberry (2005); Maydew (2005) and Wilson (2010), large positive book-tax differences may arise from firms' utilisation of the off-balance-sheet financing to report greater interest expense on their tax returns without correspondingly reporting higher interest expense on their financial statements. Extensive utilisation of off-balance-sheet financing increases the probability of firms' default risk thereby may result in downgrades in firms' credit rating.

differences are more likely to experience a downgrade in credit rating. However, the negative association between book-tax differences and credit rating changes is only manifested among the non-tax-planning firms (i.e., firms in the top four quintiles of current or cash effective tax rates). Results in Ayers et al. (2009) suggest that credit rating agencies are able to incorporate the tax-related information into their credit risks analysis and perceive large positive book-tax difference arising from non-tax-planning sources as an indicator of credit risk.

In light of the above-discussed literature, it can be concluded that tax disclosures in financial statements contain useful information for capital market participants (e.g., equity investors, financial analysts and credit rating agencies) in evaluating firms' current performance and future prospects. However, research evidence regarding whether greater tax expense represents value lost to tax paid or conveys favourable news about a firm's future profitability is mixed and is sensitive to the regression specification employed (Thomas and Zhang 2014). In addition, evidence on the efficiency of the capital market in fully and properly understanding the value implication of the tax-related information is inconclusive. Some studies suggest that equity investors (financial analysts) are able to effectively impounds the tax-related information into their security prices (earnings forecasts), while other studies provide evidence that due to the complexity of tax-related disclosures, equity investors and financial analysts fail to properly understand the value implications of the tax-related financial information.

3.4.2.2.3. The ability of tax-related disclosures to predict future tax cash flows

Previous studies have also examined the usefulness and the informativeness of tax-related disclosures to provide forward-looking information about firms' future tax payments, based on the notion that understanding the association between firms' reported tax information and future cash tax outflows is more consistent with the primary objective of financial accounting standards, i.e., to make projections about the 'amount, timing and uncertainty' regarding firms' future cash flows and help investors to make relevant investment decisions.

In explaining the value relevance of deferred taxes and their components about future tax payments, some studies suggest that it is essential to assess the timing and likelihood of the reversals of deferred taxes. For example, White et al. (2003) argue that "*the component of the deferred tax liability should be analysed to evaluate the likelihood of reversals or continued growth. Only those components that are likely to reverse should be considered a liability*" (pp.

304). Givoly and Hayn (1992) investigate whether investors perceive deferred tax liability as a 'real' liability, by examining how firms' equity value changes around news disclosures about the proposed reduction in the corporate tax rate as a result of the enactment of the Tax Reform Act of 1986 in the US. They find that the decline in deferred tax liability resulting from tax rate deduction leads to equity appreciation. However, the equity appreciation resulting from the decline in the nominal value of deferred tax liability varies cross-sectionally as a function of the expected timing and likelihood of the settlement of the deferred tax liabilities. Specifically, the equity appreciation is lower for firms with a higher growth rate in deferred tax liability balance and for firms exhibiting a higher probability of reporting future losses, suggesting that investors tend to perceive deferred tax liability as a 'real' liability and discount it based on the timing and likelihood of its reversal¹⁷⁰.

Similarly, Amir et al. (1997) investigate the value relevance of deferred taxes, by classifying deferred taxes into disaggregated components based on the timing and likelihood of reversals for each component. Their results show that deferred taxes are incrementally useful in explaining cross-sectional variation in firms' equity value and that deferred tax components which are expected to reverse sooner exhibit greater valuation coefficients, indicating that the deferred tax balance plays an informative role in equity valuation, and the value of deferred taxes is dependent on the length of expected time of their reversals.

However, theoretical evidence provided in Guenther and Sansing (2000; 2004) and Dotan (2003) challenges the conventional wisdom that the valuation of deferred taxes is dependent on the time that the deferred taxes are expected to reverse, by arguing that the value of deferred taxes is only based on their future cash tax consequences rather than their length of expected time until reversal. Specifically, they classify deferred tax assets and liabilities into two main categories, i.e., the deferred tax assets or liabilities whose reversal is triggered by tax events and whose reversal is triggered by the accounting recognition of tax expense or benefits, respectively. They demonstrate that only deferred taxes whose reversal is triggered by tax events are value relevant, since those deferred taxes are expected to have future cash tax consequences and, therefore, changes in the timing of their reversal would alter the present value of the associated future tax cash flows. However, for deferred taxes whose reversals are

¹⁷⁰ Givoly and Hayn (1992) measure the expected timing and likelihood of the settlement of deferred tax liability (DTL) as the expected growth rate of firms' deferred tax liabilities (i.e., the higher the growth rate, the more distant the settlement of DTL) and the likelihood of firms' future losses (i.e., the higher the likelihood of future losses, the lower the probability of the settlement of DTL), respectively.

triggered by accounting recognition, the timing of their reversal has no future cash flow implication and therefore is not value relevant.

In validating the theoretical predictions of Guenther and Sansing (2000; 2004) and Dotan (2003), Laux (2013) provides cross-sectional empirical evidence to show whether deferred taxes provide incremental forward-looking information about future tax payments¹⁷¹. Their multivariate empirical results are in line with the theoretical predictions documented in Guenther and Sansing (2000; 2004) and Dotan (2003), which indicates that only the components of deferred taxes whose reversals are triggered by tax events are associated with future tax payments and, hence, are value relevant. In addition, Laux (2013) finds that the growth in the deferred tax balances has no impact on the association between deferred taxes and future tax payments.

Choudhary et al. (2016) develop a measure of income tax accruals quality¹⁷², which captures the precision of income tax accruals to map into the past, current and future income tax-related cash flows. Low (high) precision of the income tax accruals in mapping into tax-related cash flows indicates bad (good) income tax accruals quality, which primarily arises from greater (less) intentional or unintentional managerial estimation errors in the process of estimating income tax accruals¹⁷³. They find that the quality of income tax accruals is negatively

¹⁷¹ Laux (2013) partitions deferred taxes into two categories: (1) deferred tax assets and liabilities arising from revenue and expenses that are included in GAAP income before the tax-related cash flow is realised, i.e., the reversal of deferred taxes will be triggered by the tax event (e.g., restructuring charges; warranty expenses; and employ post-retirement benefits); and (2) deferred tax assets and liabilities arising from revenue and expenses that are included in GAAP income after tax-related cash flow is realised, i.e., the reversal of deferred taxes will be triggered by the accounting recognition after cash tax implication occurred (e.g., depreciation-related deferred tax liability).

¹⁷² Instead of using balance sheet approach to calculate tax accruals, Choudhary et al. (2016) define income tax accruals as the differences between total income tax expense and cash tax incurred for a respective accounting period. They document that tax accruals obtained from income statement induce less noise than that obtained from balance sheet, since “cash tax paid pertains only to income taxes” while non-income-related cash flow would not map into tax-related cash flows (pp. 94). See section 2.4 in the Background Chapter for detailed information about income tax accruals.

¹⁷³ Specifically, Choudhary et al. (2016) argue that intentional or unintentional managerial estimation errors occurred in the process of estimating income tax expense before filling firms’ tax return could reduce the income tax accruals quality, since both managers’ intentional manipulation and their unintentional inability to have perfect insight of the taxable implication of firms’ operation could cause the ex-ante estimated income tax accruals reported in financial statements to differ from their ex-post realisations, obfuscating the ability of current tax expense to represent firms’ real tax obligations for a respective accounting period. In addition, the financial-accounting-standards induced over- or under-statements of current tax expense relative to cash tax payments, which may occur even if the GAAP is properly applied without managerial estimation errors, can reduce the income tax accruals quality, since they are not intended to reflect firms’ ex-post tax outcomes and, hence, are not expected to map into tax-related cash flows. See section 2.4 of the background chapter for detailed information.

associated with firms' future financial restatement resulting from tax issues, indicating that the measure of income tax accruals quality is informative to predict management estimating errors in tax accounts. In explaining the value implication of income tax accruals quality, they further provide evidence that the good (bad) quality of income tax accruals improves (reduces) the usefulness of taxable income in facilitating investors' estimates of firm value.

In addition, Robinson et al. (2016) investigate the informativeness of income tax provision in explaining future tax-related cash flows under the focused setting of FIN 48 in the US. They argue that FIN 48 might either increase or decrease the value relevance of income tax reporting in predicting future tax cash flows. This is because that although FIN 48 is designed to restrict managers' ability to distort tax reserves for the purpose of earnings management, the uniform criteria in FIN 48 fails to adequately reflect firm-specific 'knowledge, experience and judgment' about their overall tax outcomes, which might cause firms to report tax reserves that have little future cash tax implications¹⁷⁴. Specifically, they find that the proportion of FIN 48 reserves being released via cash tax settlement with tax authorities is relatively small as compared to the proportion of reserves being released through other positions with no cash consequences (e.g., due to statute lapses or concessions by tax authorities). In evaluating how the adoption of FIN 48 changes the ability of income tax expense to predict future tax cash flows, they employ the methodology used in previous accounting studies¹⁷⁵ to regress the yearly R^2 s which indicate the incremental explanatory power of income tax expenses about future tax cash flow on a time-trend variable denoting the pre-FIN 48 or the post-FIN48 period. Their results indicate that the implementation of FIN 48 does not improve the incremental informativeness of income tax expense to explain future tax-related cash flows, but instead results in a significant decline in the predictability of income tax expense about future tax cash flows among certain groups of firms.

¹⁷⁴ According to Robinson et al. (2016), FIN 48 reserves might overstate cash required to settle uncertain tax positions and thereby reducing the value relevance of income tax accounts in predicting future tax cash flows. This is because that FIN 48 does not adequately reflect the inability of firms "to take into account the dynamic process of a tax audit and reflect the firm's judgment about the overall outcome", which may result in generating liabilities that "will never be paid in cash" (pp. 1199).

¹⁷⁵ For example, Collins et al. (1997) and Kim and Kross (2005). See section 4.2.1.3. for detailed discussion.

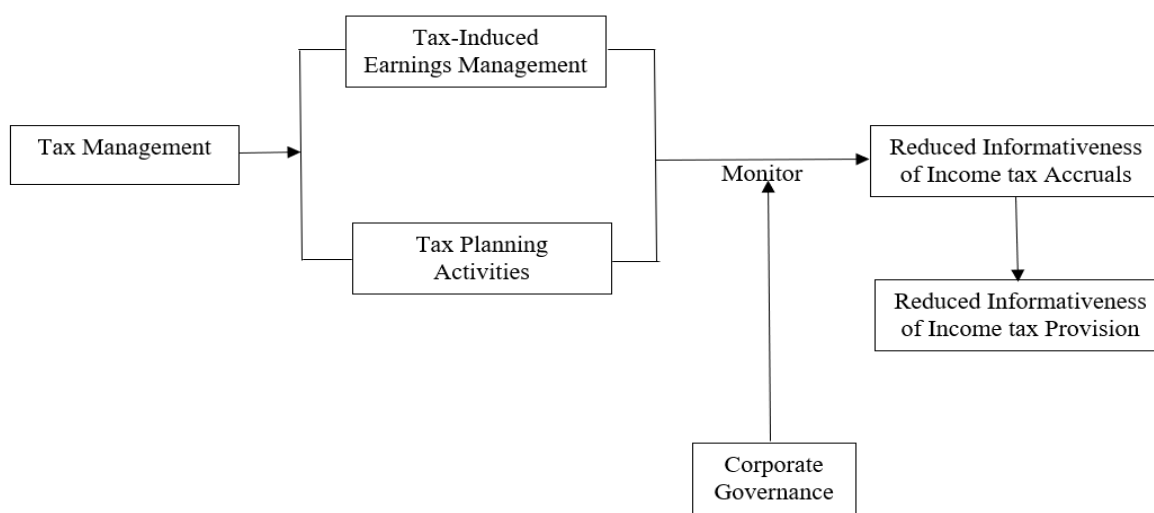
To summarise, previous research evidence indicates that the inter-period income tax allocation plays a significant role in predicting future tax-related cash flows. Conventional wisdom suggests that the value relevance of deferred taxes depends on the timing and likelihood of their reversals. However, recent researches challenge this claim by arguing that the timing and likelihood of the reversals of deferred taxes can only be value relevant if the reversals have future cash tax consequences. Therefore, it is essential to determine the value relevance of reported tax information by examining the extent to which it provides incremental information about future tax-related cash flows. Overall, previous literature reviewed in the section 3.4.1 and 3.4.2 lays the theoretical and methodological foundation for the development of this study's research topic, i.e., the informativeness of income tax provision. The next section 3.4.3 is aimed to show the research gap that exists in the literature and develop this study's research framework under the context of the existing literature.

3.4.3. The impacts of corporate tax management and corporate governance on the informativeness of income tax provision

To the researcher's knowledge, no previous study has directly investigated the association between corporate tax management, corporate governance and the informativeness of firms' income tax provision, particularly in the U.K. setting. Therefore, it is worth investigating the impact of corporate tax management and corporate governance on the informativeness of income tax provision to fill the research gap. This section aims at providing a theoretical framework related to how corporate tax management and corporate governance affect the relevance and reliability of the reported income tax provision.

Figure 3.2

Tax Management, Corporate Governance and the Informativeness of Income Tax Provision



The association between corporate tax management, corporate governance mechanism and the informativeness of income tax provision can be illustrated from the above figure 3.2. Specifically, corporate tax management behaviours, such as tax-induced earnings management and tax planning activities, are expected to reduce the informativeness of income tax provision, while effective corporate governance mechanisms likely play a mediating role in enhancing the informativeness of the reported income tax information through monitoring and restricting the opportunistic tax managements activities.

As shown from section 3.2.2.3, previous literature that examines corporate tax management activities from the agency perspective suggests that corporate tax management and managerial rent diversion can be complementary. This is because the separation of ownership and control could provide self-interested managers with latitude to explore their discretion and flexibility and undertake opportunistic tax management activities, such as deliberately manipulating income tax accruals to meet particular earnings targets¹⁷⁶, or engaging in tax planning activities that entail undesirably high degree of risks of being challenged and penalised by tax authorities. Specifically, managing earnings through distorting income tax accruals could reduce the reliability of income tax provision in faithfully representing firms' real tax obligation, and compromise the informativeness of income tax accruals to explain firms' future tax cash flows. Moreover, the engagements in tax planning strategies may increase the risks of being detected and penalised by tax authorities, which could make it more difficult for managers to predict firms' future cash tax consequences and accurately estimate firms' income tax accruals, thereby compromising the reliability and informativeness of the income tax provisions (Desai et al. 2006; 2009; Choudhary et al. 2016).

The association between corporate tax management and the informativeness of income tax provision can be better explained in conjunction with firms' corporate governance mechanism. This is because shareholders rely on effective corporate governance mechanism to correct managerial misconducts and enhance financial reporting quality. In this context, tax management activities and corporate governance mechanism can be interrelated in the sense that effective corporate governance mechanism plays a role in enhancing the quality and transparency of firms' tax management decisions and restricting self-interested managers from opportunistically pursuing tax management activities at the expense of shareholders. Therefore, effective corporate governance mechanism is expected to play a mediating role in enhancing the informativeness of firms' income tax provision, through monitoring and restricting the opportunistic tax managements behaviours of engaging in: 1) tax-induced earnings management to meet particular earnings target through biasing income tax accruals or; 2) tax planning activities which may cause difficulties for managers to accurately estimate income tax accruals.

¹⁷⁶ Although manipulating the amount of cash tax payments can also contribute to the achievement of meeting particular earnings targets, managers may lack flexibility in altering the amount of cash tax payment through changing the real arrangements of firms' tax activities. By contrast, the provisioning process of income tax accruals requires managers' estimations to be made and subjects to managerial discretion and assumption, which provides managers with more scope and opportunity to gain financial reporting benefits (Armstrong et al. 2014).

The development of this study's research topic is inspired by several previous studies. The most enlightening study is Choudhary et al. (2016) which develops a measure of income tax accruals quality to capture the ability of income tax accruals to map into current, past and future tax-related cash flows. The authors argue that income tax accruals in low quality is partially attributable to managements' intentional or unintentional estimation errors in forecasting the taxable implication of their firms' operation. However, Choudhary et al. (2016) does not employ multivariate regressions to examine how corporate tax planning and tax-induced earnings management affect the income tax accruals quality. More important, it does not provide empirical evidence about whether effective governance mechanism plays a role in restricting managers' opportunistic behaviours and improving the income tax accruals quality. In addition, this study is enlightened by the research findings of Dhaliwal et al. (2004) and Holland and Jackson (2004) that managers have incentives to manipulate the income tax expense accounts through utilising the complexity involved in estimating the income tax information, especially when firms' pre-tax performances have missed certain earnings target. This study also shed light on empirical findings of Desai et al. (2006), Kim et al. (2011) and Balakrishnan et al. (2018). Those studies find that corporate tax management activities, which are designed with the intention to avoid being detected by tax authorities, could create shields and masks for managerial opportunistic behaviours and damage the corporate financial transparency. The negative impacts from tax management activities however appear to be mitigated by effective corporate governance mechanisms (e.g., as captured by higher level of institutional shareholders or financial analysts).

To the researcher's knowledge, no previous study has directly investigated the association between corporate tax management, corporate governance and the informativeness of firms' income tax provision. However, a number of published value-relevant accounting studies have examined the joint impacts of earnings management and corporate governance on earnings informativeness (as summarised in the following table 2.3). As can be seen from table 3.1, previous studies use the slope coefficient and the coefficients of determination (R^2) generated from the return-earning regression to measure the cross-sectional variations in earnings informativeness, and then employ the pooled cross-sectional OLS model to test the impact of earnings management or corporate governance on earnings' informativeness (see Donnelly and Lynch 2002). This study is aimed to fill the research gap in the tax literature with reference to the methodology employed by those value-relevant accounting studies.

Table 3.1
Summary of Value-Relevant Accounting Studies on the Informativeness of Reported Financial Information

Authors	Sample	Dependent Variable	Variable of Interest	Methodology	Research Findings
Warfield, Wild and Wild (1995)	A sample of U.S. firms for period 1988-1990	Firms' contemporaneous stock return	ERC, i.e., the Earnings Response Coefficient, which is measured as the slope coefficient generated from a regression of contemporaneous returns on earnings, is used to measure the informativeness of earnings.	Pooled cross-sectional OLS model is used to test the cross-sectional variations in earnings informativeness conditional upon managerial ownership and regulatory environment.	<p>Earnings informativeness is positively associated with the level of managerial ownership (as reflected by a positive coefficient of the interaction term between earnings and the percentage of managerial ownership).</p> <p>The positive association between earnings informativeness and managerial ownership is attenuated by the monitoring role of regulation (as reflected by a negative coefficient of the interaction term between earnings, the percentage of managerial ownership and an indicator of regulated industry)</p>
Donnelly and Lynch (2002)	A sample of U.K. firms for period 1985-1991	ERC i.e., Earnings Response Coefficient which is measured as the slope coefficient in a regression of return on earnings	The percentage of institutional shareholdings (OB) and the percentage of diffused outside ownership (DOO).	<p>A two-stage method is used as the main test which involves generating the informativeness of earnings as measured by ERC for each firm in the first stage, and then examine the cross-sectional variation in ERC due to ownership structures (as measured by OB and DOO respectively).</p> <p>A one-stage method is used as robustness check which regresses changes in stock price</p>	Earnings informativeness is negatively related to the percentage of institutional shareholding and is negatively related to the percentage of diffused outside ownership, suggesting that the importance of accounting earnings as an information source can be diluted by large shareholders who have the ability to acquire pre-disclosure information, and managers in firms with diffused outside ownership have greater incentive to distort

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				on earnings and the interaction term between earnings and proxies for ownership structure OB and DOO.	reported earnings and thereby reduce earnings informativeness.
Beekes, Pope and Young (2004)	A sample of U.K. firms for period 1993-1995	Earnings per share scaled by prior year-end price	The timeliness of income recognition which is measured as the slope coefficient obtained from a regression of earnings on contemporaneous return	Pooled cross-sectional OLS regression is used to investigate the impact of earnings conservatism (i.e., the bad news is reflected more quickly than good news in earnings) and board composition (i.e., the percentage of outsiders on board) on the timeliness of income recognition	Earnings conservatism is more pronounced in firms with higher level of outside directors on board (as reflected by a positive coefficient on the interaction term between stock return, negative earnings and percentage of outside directors on board)
Bandyopadhyay, Chen, Huang and Jha (2010)	A sample of U.S. firms for period 1972-2006	<p>The incremental ability of earnings in predicting future cash flow (FCFO), which is measured as the differences between the $R_a^2 - R_b^2$, Where R_a^2 is generated from the firm-specific time-series regression of one-year-ahead cash flow on current operating cash flow and current earnings, and R_b^2 is generated from the firm-specific time-series regression of one-year-ahead cash flow on current operating cash flow</p> <p>The incremental ability of earnings in predicting future earnings (FE), which is measured as the differences between the $R_c^2 - R_d^2$, Where</p>	Two measures of accounting conservatism	Pooled cross-sectional OLS regression for the constant sample and Fama-MacBeth yearly cross-sectional GLS regression for the full sample are both used to investigate the impact of accounting conservatism on the ability of earnings to predict future cash flows and future earnings (FCFO and FE).	Accounting conservatism exerts a positive impact on the predictability of future cash flow but exerts a negative impact on the predictability of future earnings.

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		R_c^2 is generated from the firm-specific time-series regression of one-year-ahead earnings on current operating cash flow and current earnings, and R_d^2 is generated from the firm-specific time-series regression of one-year-ahead earnings on current operating cash flow			
Wang (2006)	A sample of U.S. firms over period 1994-2002	Firms' contemporaneous stock return	ERC, i.e., the Earnings Response Coefficient, which is measured as the slope coefficient generated from a regression of contemporaneous returns on earnings, is used to measure the informativeness of earnings.	Pooled cross-sectional OLS regression is used to test the impact of family ownership on the informativeness of earnings	Earnings informativeness of family firms is higher than that of nonfamily firms (as reflected by a positive coefficient of the interaction term between earnings and the indicator of family ownership), suggesting that family ownership improves earnings informativeness through aligning managerial interests with those of outside investors.

3.5. Conclusion

This chapter reviews previous literature on corporate tax management; the impact of corporate governance mechanism on firms' engagement in tax management activities; and the value relevance of accounting and tax-related disclosures. Overall, according to the reviewed literature evidence, tax avoidance and tax evasion constitute important components of the corporate tax management continuum. Since the line of demarcation between 'acceptable' and 'unacceptable' tax avoidance is ambiguous and blurred, this thesis will not attempt to differentiate between tax avoidance and tax evasion and will define corporate tax management as firms' ability to reduce the explicit tax obligation.

Although engaging in corporate tax management activities may benefit firm owners in the form of increased after-tax net income and increased after-tax cash flows, previous literature suggests that there can be various direct and indirect costs associated with tax management activities, which constrains firms from achieving the aim of effective tax management, i.e., the maximisation of firms' after-tax wealth. A growing literature analyses corporate tax management under the agency perspective and suggests that corporate tax management and managerial rent diversion can be complementary. That is, the separation of ownership and control can cause self-interested managers to undertake tax management activities for opportunistic reasons. In this principal-agent context, corporate tax management and corporate governance can be interrelated to the extent that effective corporate governance mechanism plays a role in alleviating the information asymmetry between managers and shareholders and ensuring that tax management activities are conducted in line with shareholders' interest.

Value-relevance studies focus on determining the reliability and relevance of an accounting amount, by investigating the relationship between an accounting amount and a normative valuation benchmark to assess how well this accounting amount provides useful information in explaining the selected valuation benchmark. Previous value-relevance tax studies have examined the informative role of tax-related disclosures from aspects of the ability of reported tax information to indicate firms' earnings characteristics; to help capital market participants in forming expectations about firm value and pricing stocks; and to predict future tax cash flows.

Based on the previous literature evidence, it can be expected that managers' incentives to undertake tax-induced earnings management or engage in tax management activities could compromise the relevance and reliability of income tax accruals in representing firms' underlying tax obligation, resulting in reduced informativeness of income tax provision in explaining future tax cash flows. Moreover, the relationship between corporate tax management and the informativeness of income tax provision can be better explained in conjunction with corporate governance mechanism, to the extent that good corporate governance mechanism plays an active role in monitoring managerial behaviours and restricting self-interested managers from undertaking tax activities at the expense of shareholders. However, to the researcher's knowledge, there is no published research that investigates the association between corporate tax management, corporate governance mechanism and the informativeness of income tax provision. Therefore, this thesis aims to fill this research gap with reference to the methodology employed by previous value-relevance accounting and taxation studies.

Chapter 4

Hypothesis Development and Research Design

4.1. Introduction

The literature review presented in chapter 3 highlights the needs to investigate the informativeness of income tax provision in the UK setting to fill the research gap. This chapter is aimed to detail the process of developing the hypotheses and constructing estimation models for hypothesis tests, based on the institutional knowledge discussed in chapter 2 and the previous research evidence reviewed in chapter 3.

This chapter begins with stating the hypotheses that will be empirically tested in this thesis. Hypotheses in this thesis are designed to seek answers regarding 1) Whether income tax accruals are incrementally informative over cash tax paid in explaining future tax cash flows? 2) How managers' incentives to undertake tax management activities affect the informativeness of income tax accruals? 3) Whether effective corporate governance mechanisms play a significant role in attenuating the negative impacts of managers' tax management incentives on the informativeness of income tax accruals? 4) Whether the incremental informativeness of income tax accruals to explain future tax cash flows has deteriorated or improved over time in the U.K? All of the research questions will be hypothesised in alternative forms. Subsequently, this chapter details the process of developing estimation models for testing the hypotheses, along with the explanation of definitions of the variables employed in the estimation models and the potential econometric issues inherent in the process of multivariate regression analysis.

4.2. Hypothesis Development

The ability of generating cash inflows in excess of disbursement is a decisive factor of firm success (Badertscher et al. 2012). The International Accounting Standard Board (IASB) highlights the importance of financial reporting in cash flow projection by stating that “*existing and potential investors, lenders and other creditors need information to help them assess the prospects for future net cash inflows to an entity*” (IFRS Foundation OB3). The information asymmetries between managers and investors make it necessary for firms to report internally-generated information about their continuous cash-generating ability (Dechow 1994). Realised cash flow information could help users to assess firms' future performance through reflecting how firms have generated, spent and distributed cash during the past periods. However, over finite intervals, the realised cash flow information may not be informative in predicting firms'

future performance due to its inherent timing and matching problems¹⁷⁷. As a result, the accounting standard setters have evolved the generally accepted accounting principles by establishing an accrual system to smooth out the temporary fluctuations in cash flows, thereby providing a less noisy measure of firm performance than the cash-based system (Dechow 1994; Charitou 1997; Bushman et al. 2016).

Through mitigating the timing and matching issues in cash flows¹⁷⁸, the accrual accounting system is aimed at enhancing the informativeness of the reported financial information by providing a better indicator of a firm's present and continuous ability to generate favourable cash flows, rather than providing information solely about cash receipts and payments during that period¹⁷⁹. In addition, the accrual accounting system requires managers to make reliable assumptions, judgements and estimations in the process of financial measurements and reporting, which could provide managers a venue to communicate their private forward-looking information about their firms' future performance and reduce the information asymmetry between management and users of financial reports (Subramanyam 1996; Healy and Wahlen 1999; Arya et al. 2003; Louis and Robinson 2005). However, the usefulness of accrual accounting system in enhancing the informativeness of reported financial information can be counteracted by management's unintentional and intentional estimation errors in the process of accruals provisioning (Dechow et al. 2002; Lev et al. 2010; Badertscher et al. 2012).

Unintentional estimation errors could arise from management difficulties in making accurate forecasts about the economic consequences of firms' business and economic events. According to Lev et al. (2010), the move to fair value accounting results in the prevalence of managerial estimates in the reported accounting data, while today's "competitive and contested" economic environments increase the difficulty of accurately estimating the economic consequences in a future period (pp 781). By contrast, intentional estimation errors could arise from managerial self-interests to influence the reported financial information through biasing accruals. As auditing is imperfect, management's exercise of judgments and estimates could create

¹⁷⁷ For example, cash flow may not be reliable in representing a firm's actual performance when there is unexpected delay in customer payment or temporary increase in inventory. Dechow (1994) and Bushman et al. (2016) state that the timing role of accruals prevents the transitory fluctuations in cash flows and thereby mitigating the timing and matching problems inherent in cash flows.

¹⁷⁸ According to IFRS foundation (OB17), accrual accounting mitigates the timing and matching issues in cash flows by reflecting the economic transactions and other events of a firm in periods when those transactions and events occur, even if the cash flow consequences (i.e., cash receipts or payment) occur in a different period.

¹⁷⁹ See IFRS Foundation OB17.

potentials for managerial manipulation of reported financial information, in which managers “choose reporting methods and estimates” to influence their firms’ reported financial information and make it divergent from firms’ underlying performance (Healy et al. 1999, pp 366; Bergstresser and Phillippon 2006). The intentional and unintentional estimation errors in accruals could compromise the informativeness of accruals and exacerbate the information asymmetry between managers and users of financial statement.

4.2.1. Development of the first hypothesis

Whether income tax accruals are incrementally informative in predicting future tax-related cash flows is an empirical question. According to IFRS conceptual framework, the reported financial information should have predictive value or/and confirmatory value in order to be ‘capable of making a difference’ in the decisions made by financial statement users (IFRS QC6-7). Income tax accruals, which consist of the taxes accrued but not yet paid in respect of taxable profit for the current period; the unsettled tax liabilities in respect of previous periods’ tax outcomes; and deferred taxes in respect of temporary book-tax differences, should be representative about future cash tax consequences when the accrued/unsettled income taxes are realised or when the carrying amount of assets (liabilities) is recovered (settled)¹⁸⁰. Moreover, because of managers’ estimates and projections embedded in the accruals provisioning process, income tax accruals can be a potentially useful device for managers to convey their private information about firms’ tax-related transactions and management strategies which may be useful for predicting firms’ future tax-related cash flows. Consequently, income tax accruals should provide incremental information about future tax-related cash flows.

For example, the creation of deferred tax asset due to employee benefits (i.e., pension or deferred compensation), if estimated properly, informs investors on expected tax reduction in a future period. The revaluation of investment properties under IAS 40 could lead to an increase in the temporary book-tax difference and therefore an increase in the recognition of deferred tax liability, since the revaluation creates book income under IFRS while movements in fair value of investment properties are not taxable under UK tax law¹⁸¹. Assuming the fair value of

¹⁸⁰ See section 2.4 for detailed information about the definition and the components of income tax accruals.

¹⁸¹ According to HMRC (2017), “assuming the property is held, for tax purposes, as an investment, the income arising on the property is brought into tax as it is recognised in the accounts (for example rental income would be brought into tax as recognised in profit or loss). In this case, movements in fair value of investment properties are not taxable. The disposal of the investment properties will typically give rise to a chargeable gain”. See

the investment properties is estimated accurately, the creation of this deferred tax liability from revaluation of investment properties could inform investors on a present obligation to pay taxes in a future period, when the fair value is translated into firms' taxable income either through using (i.e. lease income) or selling the investment properties¹⁸² (Brouwer et al. 2018).

However, there are several reasons why income tax accruals may not be informative about future tax cash flows. First, future obligations to pay income tax is contingent on firms' ability to make profits in the future. A firm's current recognised income tax accruals in respect of taxable temporary differences may not necessarily result in future tax payment if this firm makes a loss in a future period¹⁸³. Second, the provision of income tax accruals can be complex and subjective, as it requires managers' assumptions, estimations and discretion to determine 'whether, where, when and at what rate' transactions are taxable across all taxable jurisdictions (Choudhary et al. 2016, pp 90). For example, managers must estimate the expected manner of recovery (settlement) of assets (liabilities) to determine the corresponding tax base and calculate the deferred taxes in respect of temporary book-tax differences (Brouwer et al. 2018). In addition, due to the stock market listing requirements on timeliness, the income tax information disclosed in financial reports primarily relies on figures estimated by firm managers, as the financial reports are generally prepared before tax returns are filled to tax authorities¹⁸⁴ (Wahab and Holland 2018).

Income tax accruals, which involve managements' estimates of the tax consequence of certain business events, may subject to estimation errors. Unintentional estimation errors are common in tax accruals provisioning¹⁸⁵ (Plumlee et al. 2010; Usvyatsky and Whalen 2014; Choudhary

<https://www.gov.uk/government/publications/accounting-standards-the-uk-tax-implications-of-new-uk-gaap/frs-102-overview-paper-new>

¹⁸² Assuming that both the use and the sale of the investment properties are taxable based on the relevant tax law.

¹⁸³ The verification requirements between deferred liabilities and deferred assets under IAS 12 are asymmetrical. IAS 12 para 24 requires a deferred tax asset to be recognised if it is probable that sufficient taxable profit will be available against the deductible temporary difference. Conversely, under IAS 12 para 15, a deferred tax liability is required to be recognised for all taxable temporary differences except certain exemptions, regardless of whether it will result in future tax cash flows (Brouwer et al. 2018). The asymmetrical verification requirement could make the deferred tax liabilities recognised under IAS 12 divergent from the definition of liability as stated by IFRS conceptual framework that a liability should be recognised "when it is probable that an outflow of resources embodying economic benefits will result from the settlement of a present obligation and the amount at which the settlement will take place can be measured reliably" (IFRS Conceptual Framework, para 4.46).

¹⁸⁴ According to HMRC, the deadline for a firm to fill tax return is 12 months after the end of the accounting period it covers. See <https://www.gov.uk/company-tax-returns>.

¹⁸⁵ For example, the bad/doubtful debt provision should be recognised for financial reporting purpose when there is objective evidence that a firm will not be able to collect the debt, but the bad/doubtful debt is not tax-deductible until the loss from bad/doubtful debt is realised in this firm's profit and loss account. This creates a short-term timing difference (deferred tax asset) between the firm's book income and taxable income, which requires

et al. 2016). This is due to the complex nature of computing income tax accruals, as they require managers to interpret and apply judicial tax law in different tax jurisdictions; to anticipate the tax implications of business operations over all taxable jurisdictions; and to possess specific knowledge on tax accounting to articulate the GAAP-based income and taxable income (Choudhary et al. 2016).

Furthermore, previous studies provide evidence that income tax expense accounts are regularly used by managers to manipulate earnings in order to achieve certain earnings target, leading to intentional estimation errors and making the income tax account a biased construct (Holland and Jackson 2004; Dhaliwal et al. 2004; Phillips et al. 2003; Phillips et al. 2004). Specifically, Holland and Jackson (2004) document that firms have incentives to manage deferred tax provision to avoid the breach of loan covenants; to achieve desirable profit status and desirable effective tax rate; and to avoid “tax shocks” in the form of prior year adjustment. Dhaliwal et al. (2004) provide evidence that managers take advantage of the complexity and discretion in estimating income tax accruals to manage the income tax expense account as the last opportunity to achieve analysts’ earnings target, when the pre-tax accruals fail to achieve the target. Accordingly, the intentional and unintentional errors could introduce noises and biases to income tax accruals, compromising the ability of reported income tax accruals to predict future tax cash flows.

Therefore, whether income tax accruals are informative to explain future tax-related cash flows is an empirical question which is worth investigating. The first hypothesis of this study is designed to examine whether income tax accruals are incrementally informative over cash tax paid in explaining future tax-related cash flows. Hence, it is hypothesised (in alternative form) that:

H1: Income tax accruals are incrementally informative over cash tax paid to explain future tax cash flows.

managers to estimate the amount and timing of the deferred tax asset. Inaccurate estimate of the deferred tax asset could result in future tax deduction that differ from the recognised income tax provision.

4.2.2. Development of the second hypotheses

After examining the extent to which income tax provisions track future tax cash flows on average, this study will further investigate the determinant factors that cause variations in the informativeness of income tax accruals across firms¹⁸⁶. As discussed in chapter 3, under the agency perspective of corporate tax management, the separation of ownership and control could provide managers, who possess the informational advantage and discretion in making and implementing tax-related decisions and activities, with opportunities to pursue their personal interests through engaging in opportunistic tax activities at the expense of firm owners¹⁸⁷. The opportunistic tax management activities could compromise the relevance and reliability of income tax disclosures in representing firms' underlying tax obligation, and reduce the informativeness of income tax accruals in explaining future tax cash flows. The principal-agency perspective of corporate tax management also implies that the relationship between corporate tax management and the informativeness of income tax accruals can be better explained in conjunction with corporate governance mechanism, to the extent that corporate governance mechanism plays a role in alleviating the information asymmetry between managers and shareholders and restricting managers from engaging in opportunistic tax management behaviours.

In summary, it is expected that the informativeness of income tax accruals decreases in managers' incentives to undertake tax management activities which may result in intentional and/or unintentional estimation errors in income tax accruals; and the negative impact of tax management incentives on the informativeness of income tax accruals is expected to be alleviated by an effective governance mechanism to monitor managements' behaviours during the information distribution process. In addition, the informativeness of income tax accruals is also expected to decrease in the complexity of firms' tax environment which may increase the difficulty of managers in estimating income tax accruals accurately. Below is the development

¹⁸⁶ As compared to the cash component of income tax provision, the accruals component of income tax provision requires managers' estimations regarding the taxable implication of firm operation and assumptions about future tax cash flows, therefore involving managerial discretion and might be frequently manipulated and distorted by managers. For this reason, this section focuses on examining the determinant factors that affect the informativeness of income tax accruals, with the primary interests in investigating the impact from managers' tax management incentives.

¹⁸⁷ See page 71-75 in chapter 3 for detailed discussions.

of empirical predictions for the variable factors that are expected to cause variations in the informativeness of income tax accruals across firms¹⁸⁸.

4.2.2.1. Tax management incentives

Corporate tax planning. Tax planning activities designed to reduce firms' tax burden could put firms at risks of being challenged and penalised by tax authorities in the future (Desai et al. 2006; Kim et al. 2011; Hanlon et al. 2014; Guenther et al. 2017). More ex-ante uncertainty of firms' current tax planning behaviours will likely increase difficulties for managers to anticipate firms' future tax consequences and thereby constraining their ability to accurately estimate income tax accruals for the current accounting period¹⁸⁹ (Choudhary et al. 2016). In addition, engaging in tax planning activities may inevitably increase the complexity and opacity of firms' organisational structure and tax-related disclosures, with the intention to avoid providing a roadmap to external auditors and tax authorities. The increased organisational complexity associated with tax planning arrangements will likely make it harder for managers to perfectly understand the taxable implications of their firms' operations over all tax jurisdictions, leading to unintentional estimation errors in income tax accruals¹⁹⁰ (Choudhary et al. 2016). The tax-planning induced opacity and obfuscation in financial statements may in turn increase latitudes for managers to manipulate tax accruals for opportunistic reasons, which

¹⁸⁸ The informativeness of income tax accruals is measured by their ability to predict future one-year ahead tax cash flows. The informativeness measure is limited to the ability of income tax accruals to explain future one-year ahead tax cash flows, based on the assumption that tax estimation errors will be corrected in the subsequent following year. The assumption is reasonable since the UK GAAP and IAS 12 require tax-related estimation errors to be corrected in a timely manner when the estimation errors are identified. See section 4.3.2.1. for detailed discussion.

¹⁸⁹ For example, the expected cost of employees' profit-sharing and bonus payments should be recognised in financial statements when an entity has a present obligation to make such payments, while for tax purposes, costs related to the profit-sharing and bonus payments are not allowed for tax deduction until the amounts are paid. This will give rise to a timing difference and therefore a deferred tax asset (CTA 2009, Part 20). Firms that use the disguised remuneration scheme (e.g., remunerations paid to family member which are not wholly and exclusively for business purposes) to boost deferred tax assets and to reduce income taxes will bear substantial uncertainty regarding challenges and penalties by HMRC, thereby compromising the informativeness of reported tax accruals in explaining future tax-related cash flows.

¹⁹⁰ In order to reduce the probability of being detected, many aggressive tax planning schemes inevitably increase firms' operational and informational complexity. For example, the complex transfer pricing scheme designed to shift income from high-tax jurisdictions to low-tax jurisdictions can make it difficult for shareholders and board members to interpret the tax consequence of firms' underlying performance (Bushman et al. 2004). When estimating income tax accruals, the increased operational and informational complexity requires managers to cope with issues arising from geographic dispersion; differences in legal systems and culture; changes of regulations in foreign subsidiaries; and changes in currency exchange rates, making it difficult for managers to have a perfect insight into firms' tax positions and accurately estimate tax accruals (Hutches et al. 2016; Choudhary et al. 2016).

give rise to intentional estimation errors in the reported tax information and make the income tax disclosures divergent from firms' real tax performance¹⁹¹ (Balakrishnan et al. 2018; Edgley and Holland 2018). As a result, it is expected that corporate tax planning likely increases the intentional and/or unintentional estimation errors inherent in income tax accruals, leading to compromised informativeness of income tax accruals to explain future tax cash flows. Hence, it is hypothesised (in alternative form) that:

H2a: The incremental informativeness of income tax accruals to explain future tax cash flows is negatively related to the level of corporate tax planning.

Tax-induced earnings management. Income tax disclosures provide a source of earnings management, since changes in income taxes could significantly alter firms' net earnings for the current financial reporting period. The discretions and complexity involved in estimating income tax accruals make it difficult for financial statements users to detect managers' opportunistic attempts to manage earnings through manipulating income tax accruals, leading to tax-information asymmetry between managers and financial statements users¹⁹² (Desai et al. 2006; Kim et al. 2011; Balakrishnan et al. 2018). The combination of discretion, complexity and information asymmetry provides opportunities for managers to manage earnings via biasing income tax accruals (Dhaliwal et al. 2004). Firms that attempt to beat earnings target tend to have stronger incentives to engage in earnings management, and thereby can be more likely to manipulate income tax accruals if their non-tax sources of earnings management fail to achieve the target (Dechow et al. 2000; Dhaliwal et al. 2004; Holland and Jackson 2004).

¹⁹¹ Opacity and obfuscation of financial statements refer to the concealments of key information to outside financial reports' users, to prevent them from understanding firms' underlying performance and making proper decisions (Bushman et al. 2004). For instance, the tax-aggressiveness induced opacity in Enron facilitates the manufacturing financial reporting benefits through tax-motivated transactions while preventing outside investors from realising and understanding this opportunistic behaviour: "Enron looked to its tax department to devise transactions that increased financial accounting income. In effect, the tax department was converted into an Enron business unit, complete with annual revenue targets. The tax department, in consultation with outside experts, then designed transactions to meet or approximate the technical requirements of tax provisions with the primary purpose of manufacturing financial statement income" (Desai 2009, pp. 5). Similarly, the complexity arising from Tyco's aggressive tax activities leads to centralised power at the hand of top-level management which facilitates their managerial opportunistic behaviours such as abusing unauthorised compensation (Kim et al. 2011, pp. 640).

¹⁹² Income tax expense reported in financial statements primarily relies on estimated figures, because tax returns are generally filed after financial statements are prepared. Estimating income tax accruals involves substantial discretion and complexity because it requires managers to estimate the tax implication of revenues and expenses across all their firms' operating jurisdictions; estimate the timing and the future realisation amount of the deferred taxes arising from the "timing differences", i.e., items of income or expense which are recognised for the current income statement but are not taxable for this period; and estimate the amount of the permanently reinvested foreign earnings, tax credits, goodwill capitalisation and amortisation, movements in fair value of investment assets (Dhaliwal et al. 2004; Choudhary et al. 2016; Wahab and Holland 2018).

Therefore, it can be expected that firms are more (less) likely to deliberately manage income tax accruals if their pre-tax profit of the current period has missed (beat) the earnings target. The opportunistic management of income tax accruals could induce intentional estimation errors and make the income tax account a biased construct from firms' real tax performance. Hence, it is hypothesised (in alternative form) that:

H2b: The incremental informativeness of income tax accruals to explain future tax cash flows is negatively related to whether and by how much firms' pre-tax performance misses firms' earnings target¹⁹³.

4.2.2.2. Corporate governance

The disclosure of true and fair financial information is central to users of financial reports, as it provides a foundation to understand and analyse a firm's underlying economic performance and such understanding and analysis are fundamental to financial statements users' investment decisions. However, due to the separation of ownership and control, the self-interested executives in the publicly-traded firms may have incentives to distort the reported financial and tax information, in order to "*window dress financial statements prior to public securities offerings, to increase corporate managers' compensation and job security, to avoid violating lending contracts, or to reduce regulatory costs or to increase regulatory benefits*" (Healy et al. 1999). Such distortions can seriously undermine the informativeness of reported financial information and aggravate the information asymmetry between managers and users of financial reports (Krishnan 2003; Ashbaugh-Skaife et al. 2006).

Corporate governance represents "*the set of mechanisms that influence the decisions made by managers when there is a separation of ownership and control*" (Larcker et al. 2007, pp. 964). Through effectively monitoring the managements' behaviours to make sure that financial reporting requirements are complied with; reporting mistakes are detected and corrected in a timely manner; managerial opportunistic behaviours are restricted and firms' economic performances are fairly presented in accordance with GAAP, an effective corporate governance mechanism would restrict the extent of intentional and unintentional estimation errors reported

¹⁹³ Following Dhaliwal et al. (2004) and Holland and Jackson (2004), this study considers three situations where earnings managements to meet target level of earnings are likely present: (1) to avoid reporting a post-tax earnings decline; (2) to avoid failing to meet analysts' forecasts of post-tax earnings; and (3) to avoid reporting a post-tax loss. See section 4.3.2.2 for details.

in financial statements (Klein 2002; Vafeas et al. 2005; Cornett et al. 2007; Yu 2008; Desai et al. 2009; Kent et al. 2010). Corporate governance mechanism employed in this study focuses on functions to monitor management actions, scrutinise financial reporting irregularities and ensure the credibility of the firm's financial statements, including the intensity of analyst coverage, institutional shareholding, audit quality and board independence.

Analysts coverage. Financial analysts, who possess relevant expert knowledge with industry background and are capable of processing and scrutinising information reported in firms' financial statements, are expected to play an external monitoring role in detecting managerial misconducts and influencing managers' financial reporting decisions (Healy et al. 2001). Financial analysts act as external monitors primarily through their ability to collect and disseminate firms' public and private information and convey it to the public, thereby increasing the public awareness of firms' underlying performance and creating public scrutiny of firms' reported financial information (Yu 2008; Mola et al. 2013; Allen et al. 2016). Inside executive management tends to possess substantial informational advantage because of their full-time status and full access to firms' price-sensitive information, which allows the self-interested managers to exploit the informational advantage to engage in financial misreporting or earnings management activities for opportunistic reasons (Ellul and Panayides 2018). The presence of financial analysts, who regularly track and scrutinise firms' financial reporting irregularities and participate in firms' information distribution process¹⁹⁴, will likely constrain managers from exploiting their discretion and flexibility for opportunistic purposes and alleviate the information asymmetry between managers and financial statements users (Yu 2008; Ellul and Panayides 2018). In addition, as the intensity of analyst coverage increases, a firm's stock becomes more publicly visible so does its underlying economic practices, including its tax-related strategies (Allen et al. 2016). As a result, managers' incentives to manipulate income tax provision or/and engage in aggressive tax planning might reduce as the number of analysts following increases due to the heightened public scrutiny. Indeed, Graham et al.'s (2014) survey evidence highlights that firms with significantly higher analyst coverage

¹⁹⁴ According to Yu (2008) and Allen et al. (2016), financial analysts participate in firms' financial reporting process by questioning various aspects of firms' financial reporting, including firms' tax behaviours and strategies, during the earnings release conference calls. Financial analysts can also express their concerns about the financial and tax performance of the covered firms through their research report to their clients; through recommendations and forecasts to public investors and through providing comments to the press. In this way, financial analysts play a role in reducing information asymmetries and enhancing corporate transparency by conveying firms' private information from managers to the public.

are more concerned about the reputational damage and adverse media attention resulting from undertaking aggressive tax activities.

However, the effectiveness of financial analysts in scrutinising financial reporting irregularities and enhancing financial reporting quality can be impaired in several situations. First, higher analyst coverage may create excessive performance pressure on managers, which may in turn create stronger motivation for managers to manipulate financial statements in order to meet analyst' expectations about earnings (Yu 2008; He and Tian 2013). Thus, if income tax provision serves as a tool for inflating earnings (e.g., Dhaliwal et al. 2004), more intensive analyst coverage will likely induce greater managerial incentives to manipulate income tax accruals for the purpose of meeting analysts' earnings expectations. Second, financial analysts who maintain close working relationship with firm managers in order to keep personal contacts with managers and gain access to firms' private information can be less likely to report negative information of the covered firms¹⁹⁵, which compromises the external monitoring function of financial analysts (Francis et al. 1998; Cowan et al. 2003; Chen and Jiang 2006).

Therefore, to the extent that analysts actively participate in firms' information distribution process and subject firms' tax-related behaviours to heightened public scrutiny, intensive analyst coverage will likely dampen managers' incentives to engage in aggressive tax planning or/and manipulate income tax provision for the purpose of inflating earnings, which can enhance the informativeness of income tax accruals (Capstaff et al. 1995; Yu 2008). However, the external monitoring function of analysts to scrutinise managerial misconducts can be compromised if the presence of analysts in turn motives managers to manipulate financial statements or if there is a strong social tie between managers and analysts. Hence, it is hypothesised (in alternative form) that:

H2c_i: The negative relationship between firms' tax management incentives and the incremental informativeness of income tax accruals is attenuated by higher analyst coverage.

¹⁹⁵ For example, Yu (2008) documents that managers can discriminate among analysts by rewarding analysts who report more positive views of firms' underlying performance with more access to managements' private information, such as being able to ask questions during the conference calls. Such private access to firm information can provide a distinct competitive advantage to analysts in respect of gathering data and better understanding and analysing the firm. However, U.K. mirrors the Regulation Fair Disclosure (Reg FD) promulgated in the U.S. 2010 to prohibit the selective disclosure by public companies to analysts and institutional investors. The information which is intentionally released to a limited groups of individuals should be disclosed to the public simultaneously.

Institutional shareholding. Institutional shareholders, i.e., individuals or institutions that hold a sizable investment in a firm, tend to have both incentives and capacity to monitor management behaviours and constrain managers from engaging in self-interested activities. First, as compared to small and diffused shareholdings whose return may not be large enough to cover the associated monitoring cost, institutional shareholders, by virtue of their large shareholding, tend to have stronger incentives to protect their sizable investment through monitoring managerial behaviours and ensuring that managers act in the best interest of shareholders (Grossman et al. 1980; Shleifer and Vishny 1986; Gillan et al. 2000; Cornett et al. 2007). Second, institutional shareholders who have superior resources in acquiring firm information and analysing firm performance can be more sophisticated and better informed than individual shareholders in scrutinising firm behaviours (Shiller and Pound 1989; Lev 1988; Rajgopal et al. 1999). Through transmitting their private information about firms' underlying performance to the capital market and requiring more voluntary disclosures of important information about firms' major activities and future plans¹⁹⁶, institutional investors play a role in improving firms' information environment and reducing information asymmetry between managers and investors (Gillan et al. 1998; Gillan et al. 2003). Third, institutional shareholders can directly discipline and influence management performance through negotiating with management; submitting a shareholder proposal; or liquidating their holdings to create downward pressure on firms' stock price when they detect managers' misconducts, making it more difficult for managers to abuse accounting discretions and manipulate financial statements (Gillan et al. 2000).

However, it is argued that the effectiveness of institutional shareholders in monitoring management behaviours and alleviating information asymmetry between managers and shareholders depends on the size and concentration of their shareholding (Maug 1998). Large and concentrated institutional shareholders whose investment stakes are less marketable and less easily to be liquidated tend to concern more about firms' long-term profitability, and thereby have greater incentives to analyse firm performance; prevent managerial opportunism;

¹⁹⁶ Specifically, to the extent that institutional shareholders make investment decisions based on their private information about firms' underlying performance, large changes in their shareholdings are likely to be driven by their private information and thereby can convey their private information about firms' underlying performance to the capital market (Chakravarty 2001; Piotroski et al. 2004). In addition, prior studies find that firms with large institutional ownership tend to maintain high-level of voluntary disclosures about firms' underlying performance and future plan to cater to institutional investors' strong incentives to collect pre-disclosure information, with the primary purpose of improving their portfolio performance and satisfying their fiduciary responsibility (Utama et al. 1997; El-Gazzar 1998).

and discourage managers from temporarily inflating earnings by distorting accruals (Black et al. 1992; Rajgopal et al. 1999; Chung et al. 2002; Koh 2003). By contrast, small and transient institutional shareholders who are often short-term oriented may be less incentivised to monitor management behaviours and can possibly exert pressure on managers to manipulate earnings in order to avoid reporting earnings decreases (Bushee and Noe 2000; Chuang et al. 2002). The ownership structure in the UK tends to be dispersed rather than concentrated because of the existing takeover code which restricts on building controlling stakes in order to protect the rights of small shareholdings (Goergen and Renneboog, 2001; Faccio and Lang 2002; Florackis 2005).

In summary, to the extent that institutional investors play an informed role in constraining managerial opportunism and alleviating the information asymmetry between managers and shareholders, the presence of institutional investors will likely restrict managers' incentives to engage in opaque and aggressive tax planning activities undesired by shareholders, or to manipulate income tax accruals for the purpose of inflating earnings, which could enhance the informativeness of income tax accruals. However, the effectiveness of the informed monitoring function of institutional investors may vary owing to the different sizes of their shareholding. Hence, it is hypothesised (in alternative form) that:

H2c_ii: The negative relationship between firms' tax management incentives and the incremental informativeness of income tax accruals is attenuated by higher institutional shareholding.

Auditor quality. A primary role of auditors is to obtain reasonable assurance about whether the reported financial information is free from material misstatement and to verify whether the client firms' economic condition is fairly presented in financial statements in accordance with generally accepted accounting principles (DeAngelo 1981; Kanagaretnam et al. 2016). By providing adequate assurance to the financial statements users about the validity and reliability of the reported financial information, auditors serve as an external monitoring mechanism to constrain managerial scope of opportunistically exploiting the latitude available in the financial reporting procedures, which can potentially enhance the informativeness of the reported financial information (Becker et al. 1998; Francis et al. 1999; Gul et al. 2002; Krishnan 2003).

Evidence suggests that auditors face a greater probability of being penalised or sued for failing to detect or prohibit upward earnings management as compared to earnings understatement (Antle and Nalebuff 1991; Becker et al. 1998). Firms' tax management behaviours, such as engaging in tax planning activities or biasing income tax provision for the purpose of inflating earnings, could subject their auditors to heightened litigation risk and reputational damage, due to the greater likelihood of the tax-related misstatements, restatements and being accused as tax-noncompliant by tax authorities (Klassen et al. 2016). As a result, an important part of the audit engagement is to evaluate the validity of clients' tax-related information disclosed in financial statements¹⁹⁷ (Barrett 2004; Donohoe et al. 2014). In order to provide adequate assurance about the reliability and the appropriateness of the reported tax information, auditors should use their specialised skills and knowledge to review their clients' tax accounts and disclosures; request their clients to provide additional information or interpretation about the questionable and opaque tax transactions; and require their clients to adjust the tax-related items if necessary (Kanagaretnam et al. 2016).

Audit quality in terms of detecting and reporting financial statement errors is expected to vary with auditors' independence, expertise and experience (e.g., DeAngelo 1981; Teoh and Wong 1993; Becker et al. 1998; Francis et al. 1999). To the extent that high-quality auditors impose stricter reporting standards on tax-related provision and thereby dampening managers' incentives to undertake opportunistic tax management behaviours, the employment of higher quality auditors will likely enhance the informativeness of income tax accruals. Hence, it is hypothesised (in alternative form) that:

H2c_iii: The negative relationship between firms' tax management incentives and the incremental informativeness of income tax accruals is attenuated by better audit quality.

Board independence. The board of directors is an important internal control mechanism designed to alleviate agency issues arising from the separation of ownership and control in modern corporations (Fama and Jensen 1983). Shareholders, who often hold diffused shareholdings in numerous firms and are less incentivised to devote resources to closely monitoring management, delegate authorities and responsibilities to the board to scrutinise the decision-making and activities of executive directors on their behalf (Grossman and Hart 1980).

¹⁹⁷ As argued by Barrett (2004), an auditor should always consider "the amount for any period's income tax expense as material to the financial statements" since income taxes "can amount to approximately one-half of a public company's net income" (pp. 491).

The board of directors therefore can be perceived as the ‘apex’ of the internal monitoring mechanism within a corporation, because it has the ultimate control over top management to set firms’ strategic aims; to ratify and supervise the making and application of important corporate decisions; to hire, dismiss and reward top-level management for the benefits of shareholders; and to monitor the content and presentation of firms’ financial reporting (Fama and Jensen 1980; Beasley 1996; Peasnell et al. 2000; 2005; Lanis and Richardson 2011). For this reason, firms with stronger and more effective board of directors in monitoring executive actions are expected to be less likely to engage in risky and obscure activities, such as aggressive tax planning activities that are not desired by shareholders or manufacturing accounting figures via manipulating income tax provision at the expense of shareholders (Richardson et al. 2013; Williams 2007; Erle 2008). Indeed, UK tax authorities recognise that an important role played by the board of directors as an internal monitoring mechanism is to limit aggressive tax activities and to bear the ultimate responsibility for firms’ tax strategies and outcomes (HMRC 2006; OECD 2009).

The effectiveness of the board in monitoring management actions can be a function of the composition of the individuals who serve on the board. That is, the extent to which the board is made up of both insiders (i.e., the executive members) and outsiders (i.e., the non-executive members) (Fama 1980; Fama and Jensen 1983). Although it is important to include internal executive managers in the board since their private information about firms’ underlying performance and strategies is crucial in assisting the board to better understand and monitor executive activities and reinforcing the effectiveness of the board, the effectiveness of the board as a monitoring mechanism can be hampered if the board is dominated by internal executive managers who possess huge information advantages and decision-making discretion due to their “*full-time status and insider knowledge*” (Beasley 1996, pp 446; Lanis and Richardson 2011). Therefore, board effectiveness in monitoring executive directors and protecting shareholder benefits can be a positive function of the proportion of independent outside directors (Rosenstein et al., 1990; Brickley et al., 1994; Core et al., 1999). This is because that outside directors, who have neither a management role in the firm nor compensation tied to firm’s performance or/and stock price, tend to be strongly incentivised to enhance the board’s effectiveness through monitoring managerial behaviours and restricting internal executives’ discretions in making key decisions, in order to develop good reputation and signal their competence in decision control to the external market (Beasley 1996; Marra et al. 2011).

To the extent that the board plays a significant role in restricting opportunistic tax management behaviours, it is reasonable to expect that a more independent board (i.e., having a higher proportion of outside directors on the board) will likely enhance the informativeness of income tax accruals. However, survey evidence suggests that only 10% of tax departments consider their work as widely understood outside the tax department within the firm (KPMG 2005). Therefore, the prediction that independent board improves the informativeness of reported income tax accruals is based on the assumption that the outside directors on the board are capable of understanding and identifying firms' tax affairs. Hence, it is hypothesised (in alternative form) that:

H2c_iv: The negative relationship between firms' tax management incentives and the incremental informativeness of income tax accruals is attenuated by more independent board.

4.2.2.3. Innate firm characteristics associated with tax environment complexity

Operational uncertainty. As the disclosures of income tax accruals rely on managers' assumptions, estimations and judgements on "whether, where, when and at what rate" operational transactions are taxable, greater volatility in firms' operational performance may cause more difficulties for managers to accurately forecast and estimate the taxable consequences of their firms' operations (Choudhary et al. 2016, pp 90). As a result, firms' operational uncertainty would likely lead to increased estimation errors in income tax accruals, which reduces their informativeness to explain future tax cash flows. Hence, it is hypothesised (in alternative form) that:

H2d: The incremental informativeness of income tax accruals to explain future tax cash flows is negatively associated with the level of firms' operational uncertainty.

Dispersed operation and firm size. Operating in multiple jurisdictions could increase the complexity of estimating income tax accruals and give rise to greater estimation errors, because it requires tax managers to interpret and comply both tax laws and regulations in every tax jurisdiction and anticipate the taxable implications of firm's transactions across all business segments (Choudhary et al. 2016). In addition, firms with highly dispersed business environments may face information asymmetry due to less-integrated financial information system and barriers of coordination between geographic locations, which may add difficulties

to the process of collecting, estimating and documenting information necessary for financial and tax reporting purpose (Gallemore et al. 2015). As a result, operating in multiple jurisdictions and highly dispersed business segments can increase complexity in estimating income tax accruals, giving rise to estimation errors which make the estimated income tax accruals differ from future realised tax cash flows.

Although larger firms are likely to devote more resources to obtaining sophisticated tax and financial expertise with high ability to understand tax implications of firms' business transactions and estimate and record tax-related information in a proper way, larger firms may face information asymmetry among different business departments and experience complicated coordination and communication in the decision-making process (Mill et al. 1998; Lassila et al. 2010; Choudhary et al. 2016). Hence, it is hypothesised (in alternative form) that:

H2e: The incremental informativeness of income tax accruals to explain future tax cash flows is negatively associated with the number of business segments.

H2f: The incremental informativeness of income tax accruals to explain future tax cash flows is negatively associated with firm size.

Firm profitability. Profitable firms are likely to devote more necessary funds and resources to their tax departments to enable that the tax documentation processes are in an efficient and high-quality manner (Mills et al. 1998). As a result, the level of firms' profitability is expected to be positively associated with the informativeness of income tax accruals. Hence, it is hypothesised (in alternative form) that:

H2g: The incremental informativeness of income tax accruals to explain future tax cash flows is positively associated with firm profitability.

Growth opportunities. Although growth firms would place more emphasis on innovation rather than cost and tax minimisation, they may have greater opportunities for tax planning due to their aggressive pursuit of entering into new products and new geographic market as compared to their less-growth counterparties (Higgins et al. 2015). Moreover, growth firms tend to have greater propensity for risk. The aggressive culture in growth firms would likely encourage them to engage in tax planning activities which entail a higher level of risk and uncertainty (Higgins

et al. 2015). By contrast, less-growth firms are likely to emphasise on costs and tax minimisation due to their limited innovation opportunities. However, their ability to reduce tax through engaging in aggressive tax planning activities can be constrained because of their focus on maintaining organisational and operational stability and because of their aversion to risk (Chen et al. 2010). As a result, growth firms, who possess more risk tolerance and pursue to enter into new product and geographic markets, may have more tax-planning opportunities that are aggressive in nature and entail uncertainty regarding challenges and penalties by tax authorities. The tax outcome uncertainty could increase the difficulty for managers to anticipate firms' future tax consequences and accurately estimate income tax accruals in the current period. Hence, it is hypothesised (in alternative form) that:

H2h: The incremental informativeness of income tax accruals to explain future tax cash flows is negatively associated with firms' growth rate.

Capital intensity. Capital intensive firms, which are subject to high level of utilisation of property, plant and equipment in corporate operation, may have tax planning opportunities that are not available to their noncapital-intensive counterparties, including the choice of buying or leasing equipment; the decisions of the amount and the timing of capital allowances to be claimed¹⁹⁸; or the management of the timing of assets acquisition and disposal for purposes of deferring gains or accelerating losses (Mills et al. 1998; Miller et al. 2017). Exploiting tax planning opportunities with respect to property, plant and equipment could make the process of collecting and recording income tax information more complicated¹⁹⁹, thereby increasing the likelihood of estimation errors in income tax accruals (Gallemore et al. 2015). By contrast, taking advantage of the qualified capital allowances can be perceived as a well-established and benign tax-favoured investment with relatively stable future tax outcomes and less uncertainty regarding challenges by tax authorities. Therefore, the informativeness of income tax accruals

¹⁹⁸ Rather than claiming the full amount of the available capital allowance associated with qualifying fixed assets, a firm can select the amount of capital allowance, i.e., choose to make reduced claim of capital allowance or not claim at all, for purposes of maximising its accounting loss for a specific accounting period, which may "influence both the immediate exposure to tax and the allowances available in subsequent accounting period" (Miller et al. 2017, pp. 111)

¹⁹⁹ Tax planning opportunities associated with plant, property and equipment such as the management of the timing of assets acquisition or disposal and the choice of buying or leasing equipment often require managers to keep track of methods of depreciation and costs for each fixed asset and anticipate the consequence of acquiring or disposing assets, thereby increasing the complexity of the process of information collection and documentation (Mills 1998; Gallemore et al. 2015).

is presumed to be related to firms' capital intensity in unpredictable directions and, hence, it is hypothesised (in alternative form) that:

H2i: There is an association between firms' capital intensity and the incremental informativeness of income tax accruals to explain future tax cash flows.

Leverage. Highly levered firms who are subject to monitoring and scrutiny by lenders may attempt to loosen their debt covenant constraints through engaging in income-increasing accounting procedures, such as temporarily inflating the fair value of investment assets or inventories; lengthen the economic useful lives of tangible assets or capitalised intangible assets to an unreasonable level; or improperly capitalise expense (Dhaliwal et al. 1982; Skinner 1993; Phillips et al. 2003). Such activities have no significant impacts on firms' current tax payments but can cause firms to recognise questionable deferred tax expenses in income statements, which confounds the credibility of firms' income tax provision in reflecting current tax performance and explaining future tax payments, putting firms at risks of being suspected and challenged by tax authorities and external auditors²⁰⁰ (Phillips 2003; Erickson et al. 2004; Blaylock et al. 2012). By contrast, highly leveraged firms may be less inclined to engage in complex tax shelter activities with uncertain tax outcomes, since the tax benefits of debt financing can reduce the value of non-debt tax management activities (Graham et al. 2006; Francis et al. 2014). Therefore, the informativeness of income tax accruals is presumed to be related to firm leverage in unpredictable directions and, hence, it is hypothesised (in alternative form) that:

H2j: There is an association between firm leverage and the incremental informativeness of income tax accruals to explain future tax cash flows.

4.2.3. Development of the third hypothesis

After examining the extent to which income tax provision provides information about the realizability of future tax cash flows and the cross-sectional determinants of the incremental informativeness of income tax accruals, this study will further investigate if there are changes

²⁰⁰ To be sure, managers can manage taxable or book income without creating temporary book-tax difference and deferred taxes by engaging in transactions that generate permanent book-tax differences. Hence, deferred taxes may not be able to capture all aspects of managers' discretionary attempts in managing taxable or book income (Phillips et al. 2003).

in the ability of income tax accruals to predict future tax cash flows over time in the UK. That is, whether the incremental informativeness of income tax accruals about future tax cash flows has improved or deteriorated over time. Over the past three decades, accounting method for deferred taxes has evolved dramatically in the UK²⁰¹. Under SSAP 15, deferred taxes should be recognised on a partial provision basis. UK firms were required to recognise deferred taxes in the financial accounts to the extent that “*it is probable that a liability or asset will crystallise*”, i.e., when the deferred taxes are expected to be reversed in the foreseeable future (three to five years in the future) without being replaced by deferred taxes from new timing differences (SSAP15, para 15). Any amounts not expected to crystallise are only disclosed in the notes rather than in the financial accounts. By contrast, FRS 19 and IAS 12 require deferred taxes to be provided on full provision basis, whereby all amount of timing (or temporary) book-tax difference²⁰² is required to be recognised in the deferred tax accounts, irrespective of whether the deferred taxes would crystallise in the future or not. However, the Financial Reporting Council highlights that FRS 19 adopts a conceptually different approach than IAS 12, since it perceives that the comprehensive nature underpinning the IAS 12 would lead firms to make excessive deferred tax provisions²⁰³.

Specifically, FRS 19 requires deferred taxes to be provided in full using a so-called “incremental timing difference approach”. This approach requires the provision of deferred tax on all timing differences but with a narrower range as compared to IAS 12. For example, under FRS 19, deferred taxes would not be provided on valuation gains or losses if there is no binding commitment to sell the asset (FRS 19, para 44). Deferred taxes would not be provided on

²⁰¹ SSAP 15 was effective since 1980s. On 7 December 2000, FRS 19 ‘Deferred Tax’ was issued and SSAP 15 ‘Accounting for deferred tax’ was superseded. FRS 19 became effective for years ending on or after 23 January 2002 and was withdrawn for accounting periods beginning on or after 1 January 2015, when FRS 102 became effective. All UK listed companies are required to prepare their consolidated financial reports in accordance with IAS 12 ‘Income taxes’ for periods on or after 2004. See <https://www.frc.org.uk/accountants/accounting-and-reporting-policy/uk-accounting-standards/standards-in-issue/uk-accounting-standards-and-statements-for-account>

²⁰² Although both FRS 19 and IAS 12 both require deferred taxes to be provided on full provision basis, there are fundamental differences between FRS 19 and IAS 12 in respect of deferred tax provision. FRS 19 focuses on timing differences that arise because the inclusion of income and expenses in tax assessments in periods different from those in which they are recognised in financial statements (FRS 19, para 2). IAS 12 focuses on temporary differences that arise from differences between the carrying amount of an asset or liability and its tax base (IAS 12, para5). The temporary difference can be broader than, and includes, timing difference. In short, “timing difference is the reversible difference between revenues/expenses for accounting and tax” which focuses on the profit and loss account, while “temporary difference is the difference between the tax and financial reporting base of asset or liabilities” which focuses on the balance sheet (James et al. 2016, pp 284; Telford et al. 2014, pp 127). See page 22-30 for detailed discussions.

²⁰³ See <https://www.frc.org.uk/accountants/accounting-and-reporting-policy/uk-accounting-standards/standards-in-issue/frs-19-deferred-tax>

realised gains or losses on disposal of assets if the assets are rolled over into replacement assets (FRS 19, para 42). In respect of earnings from subsidiaries associates and joint ventures, deferred taxes would not be provided if the earnings are not accrued as receivable or there are no binding agreements to distribute the earnings in the future (FRS 19, para 43). By comparison, IAS 12 is based on the “comprehensive balance-sheet approach” to account for future tax consequences by recognising deferred taxes in respect of all temporary book-tax differences²⁰⁴ (IAS 12, para 5). As a result, deferred taxes recognised under IAS 12 could include items with almost permanent nature of their underlying temporary difference, which are not expected to result in tax cash flows in the near future (Brouwer et al. 2018).

IFRS Conceptual framework requires a liability to be recognised “*when it is probable that an outflow of resource embodying economic benefits will result from the settlement of a present obligation and the amount at which the settlement will take place can be measured reliably*” (IFRS Conceptual Framework, para 4.46). The definition of a liability stated in IFRS conceptual framework is therefore particularly linked to an expected future outflow of economic benefits. As a result, a deferred tax liability provided under SSAP 15 partial allocation approach, which is based on management’s projections of its expected future reversal, can be more qualifying as a liability that represents a present obligation towards tax authorities to pay income taxes in the foreseeable future (Citron 2001; Gordon et al. 2004; Brouwer et al. 2018).

However, partial provision approach is criticised as allowing too much discretion and could be easily manipulated by self-interested managers for opportunistic reasons, which may compromise the informativeness of reported income tax accruals in predicting future tax cash flows (Gordon et al. 2004; Holland and Jackson 2004). By contrast, the full provision approach used under FRS 19 and IAS 12, whereby deferred tax liability is provided on all taxable timing (or temporary) differences²⁰⁵, is likely to reduce the latitudes for opportunistic management behaviours via deferred tax provisioning (Holland and Jackson 2004). However, the full provision approach, which requires firms to recognise deferred tax liabilities on all taxable timing (or temporary) differences with less emphasis on whether they are expected to result in future tax cash flows, may restrict managers’ ability to convey their private information and

²⁰⁴ See page 33 for detailed discussion about the difference between FRS19 and IAS 12.

²⁰⁵ Besides several exemptions as discussed above.

expectation about firms' future cash tax consequences, which could reduce the informativeness of reported income tax accruals about future tax cash flows²⁰⁶.

Based on the above discussions, the third hypothesis of the study is designed to examine the variation in the incremental informativeness of income tax accruals about future tax cash flows over the past three decades from 1992 to 2017, to see whether the informativeness of income tax accruals has improved or deteriorated over time in the UK. Hence, it is hypothesised (in alternative form) that:

H3: There is a time trend in the incremental informativeness of income tax accruals to explain future tax cash flows in the UK over the past three decades.

²⁰⁶ The application of the full provision approach under FRS 19 and IAS 12 may ensure a relatively stable effective income tax rate, which can be useful for investors to derive firms' future after-tax income. However, one may argue that "the most relevant information is that which assists assessment of future cash flow rather than future reported income" (see Discussion Paper by EFRAG, para 2.21; Brouwer et al. 2018, pp 10).

4.3. Research Design

4.3.1. Research design of the first hypothesis

The first hypothesis of this study is to examine whether income tax accruals are incrementally informative over cash tax paid in explaining future tax cash flows. Following Robinson et al. (2016), the predictive ability of income tax accruals for future tax cash flows will be tested based on the pooled cross-sectional models as follows.

$$\text{Cash Tax Paid}_{i,t+\rho} \text{ or } \sum \text{Cash Tax Paid}_{i,t+5} = \alpha + \beta \text{Cash Tax Paid}_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$\text{Cash Tax Paid}_{i,t+\rho} \text{ or } \sum \text{Cash Tax Paid}_{i,t+5} = \phi + \partial \text{Cash Tax Paid}_{i,t} + \delta \text{Tax Accruals}_{i,t} + \varepsilon_{i,t} \quad (2)$$

- $\text{Cash Tax Paid}_{i,t+\rho}$ = Future tax-related cash flows scaled by lagged total assets for future years, where ρ varies from 1 to 5.
- $\sum \text{Cash Tax Paid}_{i,t+5}$ = The sum of future tax-related cash flows scaled by the sum of lagged total assets over future five aggregated years.
- $\text{Cash Tax Paid}_{i,t}$ = Cash tax paid scaled by lagged total assets for company i at time t .
- $\text{Tax Accruals}_{i,t}$ = Income tax accruals scaled by lagged total assets for company i at time t .

All continuous variables are deflated by opening total assets. All continuous variables are winsorised at the 1st and 99th percentile

In model (1) and (2), the dependent variable, $\text{Cash Tax Paid}_{i,t+\rho}$, is the future tax-related cash flows scaled by lagged total assets for year $t + \rho$, where ρ varies from one to five. $\sum \text{Cash Tax Paid}_{i,t+5}$ is the sum of future tax-related cash flows scaled by the sum of lagged total assets over future five aggregated years²⁰⁷. The independent variable in model (1), $\text{Cash Tax Paid}_{i,t}$, refers to the cash tax paid scaled by lagged total assets for year t . A firm's

²⁰⁷ The five-year forecasting window is consistent with Lauz (2013) that some income tax accruals are long-term in nature, which may take several years before their tax effects are finally realized. The five-year forecasting window also captures the normal 4-year limit of HMRC assessment, see <https://www.gov.uk/hmrc-internal-manuals/compliance-handbook/ch51300>. The prediction of aggregated sum of cash tax paid is consistent with Doyle et al. (2003) and Patatoukas et al. (2015) that it is necessary to regress cumulative cash flows on assets or liabilities if there is uncertainty about when the assets or liabilities will affect future cash flows.

future tax-related cash flows can be associated with its current cash tax payments because many cash tax incentives are serially correlated over time (Citron et al. 2013). For example, under UK tax legislation, the systematic annual amortisation of intangible assets such as goodwill, research and development costs or software and website costs are generally allowable for tax deductions over their useful lives. In addition, the tax benefits arising from firms' operation in foreign low-tax jurisdictions can also be serially correlated until such activities are forbidden and terminated by tax authorities²⁰⁸. Hence, a firm's current cash tax payments are expected to provide useful information in explaining its future tax cash flows.

The first independent variable in model (2), *Cash Tax Paid*_{*i,t*}, is the same with that in model (1). The second independent variable in model (2), *Tax Accruals*_{*i,t*}, represents the income tax accruals which are calculated as the difference between total income tax expense and cash tax paid, scaled by lagged total assets for year *t*. If income tax accruals are incrementally informative over cash tax paid in predicting future tax cash flows on average, then the coefficient of *Tax Accruals*_{*i,t*}, i.e., δ , will be significantly different from zero. The significance of coefficients δ in model (2) will be analysed based on Wald tests of coefficient equality. The comparison of the goodness of fit between model (1) and (2) will be based on likelihood-ratio test²⁰⁹ (Fitzmaurice et al. 2004).

²⁰⁸ See Chapter 2 section 2.3.3. for detailed discussions about the tax treatments of key accounting issues under UK tax legislations.

²⁰⁹ The likelihood ratio test can be used to compare the goodness of fit of two nested models, i.e., the reduced model (model 1) and the full model (model 2), by comparing their respective maximised log-likelihoods. Specifically, the maximised log-likelihood of the full model (model 2) should be at least the same with that of the reduced model (model 1), and the larger the difference between the maximised log-likelihoods of the two models, the stronger the evidence that the full model (model 2) performs better than the reduced model (model 1). By comparison, the Wald test works to test how far the estimated parameter of the variable of interest (δ) in the full model (mode 2) is different from zero.

4.3.2. Research design of the second hypotheses

The second hypotheses are to investigate the cross-sectional determinants that cause variations in the informativeness of income tax accruals across firms. The test of the second hypotheses is based on the methodology employed by previous value-relevant accounting studies (e.g., Donnelly and Lynch 2002; Bandyopadhyay et al.)²¹⁰. Relationships between the informativeness of income tax accruals and variables that proxy firms' tax management incentives will be tested individually based on the following models, which will be discussed further in the subsequent section.

$$TAX_INFORM_{it} = \omega_0 + \omega_{1c}AGGRESSIVE_{it}(TA_CASH_{it}) + \sum \omega_{2c}FIRM_CHARA_{it} + \sum \omega_{3c}CONTROL_{it} + \omega_{industry} + \omega_{year} + \varepsilon_{i,t} \quad (3.11)$$

$$TAX_INFORM_{it} = \tau_0 + \tau_{1c}TARGET1_{it} + \tau_{2c}DECLINE_AMOUNT_{it} + \tau_{3c}TARGET1_{it} * DECLINE_AMOUNT_{it} + \sum \tau_{4c}FIRM_CHARA_{it} + \sum \tau_{5c}CONTROL_{it} + \tau_{industry} + \tau_{year} + \varepsilon_{i,t} \quad (3.12)$$

$$TAX_INFORM_{it} = K_0 + K_{1c}TARGET2_{it} + K_{2c}ERROR_AMOUNT_{it} + K_{3c}TARGET1_{it} * ERROR_AMOUNT_{it} + \sum K_{4c}FIRM_CHARA_{it} + \sum K_{5c}CONTROL_{it} + K_{industry} + K_{year} + \varepsilon_{i,t} \quad (3.13)$$

$$TAX_INFORM_{it} = Z_0 + Z_{1c}TARGET3_{it} + \sum Z_{2c}FIRM_CHARA_{it} + \sum Z_{3c}CONTROL_{it} + Z_{industry} + Z_{year} + \varepsilon_{i,t} \quad (3.14)$$

TAX_INFORM_{it}	=	The incremental informativeness of income tax accruals over cash tax paid in predicting future one-year-ahead tax cash flows, which is denoted as $\bar{R}_{Tax\ Accrual}^2$ and $\delta_{Tax\ Accruals}$
$AGGRESSIVE_{it}$	=	A binary variable to proxy the corporate tax planning of company i at time t
TA_CASH_{it}	=	The sum of cash taxes paid scaled by the sum of pre-tax income over a five-year period
$TARGET1_{it}$	=	A binary variable which equals 1 if a firm's current period's pre-tax profit is lower than that of previous period, and 0 otherwise
$DECLINE_AMOUNT_{it}$	=	The difference between a firm's pre-tax profit of a previous period and that of the current period

²¹⁰ In the main tests, this study uses the two-stage estimation method following Donnelly and Lynch (2002), which first estimates the informativeness of income tax accruals for each sample firm, and then examines how the between-firm variations in the informativeness of income tax accruals are explained by firms' tax management incentives and the strength of corporate governance mechanism. In the robustness check, the one-stage estimation approach following Warfield et al. (1995) will be employed to show the robustness of the main results generated using the two-stage estimation. See chapter 3 page 152 for detailed discussion.

$TARGET2_{it}$	=	A binary variable which equals 1 if the actual pre-tax profit reported by I/E/B/S of a firm-year is lower than that of most recent consensus analysts' forecast, and 0 otherwise
$ERROR_AMOUNT_{it}$	=	The difference between the analysts' estimated pre-tax profit and the actual reported pre-tax profit
$TARGET3_{it}$	=	A binary variable which equals 1 if firms' net income scaled by the opening market value of equity is within the range between 0 and 0.02, and 0 otherwise
$FIRM_CHARA_{it}$	=	A vector of variables to capture firms' tax environment complexity
$CONTROLS_{it}$	=	A vector of controls variables that may affect the informativeness of income tax accruals in explaining future tax payments
$\Phi_{industry}$	=	Industry dummies
Φ_{year}	=	Year dummies

All financial accounting variables are deflated by opening total assets. Variable TA_CASH_{it} is winsorised at 0 and 1. All other continuous variables are winsorised at the 1st and 99th percentile. See section 3.2.1 to 3.2.4. for detailed information about variable definition

4.3.2.1. Incremental informativeness of income tax accruals

The dependent variable, TAX_INFORM_{it} , represents the incremental informativeness of income tax accruals over cash tax paid to explain future one-year-ahead tax cash flows²¹¹. TAX_INFORM_{it} is captured by two measures. Following Robinson et al. (2016), we firstly measure the incremental informativeness of income tax accruals using the difference between the coefficients of determination for model (1) and (2). Specifically, the coefficients of determination from model (1) and (2) are denoted as $\bar{R}_{Cash\ Tax}^2$ and $\bar{R}_{Total\ Income\ Tax}^2$, respectively. Then $\bar{R}_{Total\ Income\ Tax}^2 - \bar{R}_{Cash\ Tax}^2 = \bar{R}_{Tax\ Accrual}^2$ represents the incremental informativeness of income tax accruals to explain future tax cash flows. In addition, following previous value-relevant accounting literature (e.g., Francis and Schipper 1999; Kothari 2001), this study employs the slope coefficient of income tax accruals generated from model (2.2), i.e., $\delta_{Tax\ Accruals}$, as an alternative measure of the incremental informativeness of income tax accruals to ensure robustness of this study's research findings.

²¹¹ The informativeness measure is limited to the ability of income tax accruals to explain future one-year ahead tax cash flows, based on the assumption that tax estimation errors will be corrected in the subsequent following year. The assumption is reasonable since the UK GAAP and IAS 12 require tax-related estimation errors to be corrected in a timely manner when the estimation errors are identified. In the robustness check, the estimation window will be extended to show whether firms' tax management incentives exert longer impact on the informativeness of income tax accruals.

4.3.2.2. Tax management incentives

Firms' tax management incentives are captured by a vector of variables that proxy firms' incentives to undertake tax management activities for purposes of 1) reducing tax burdens through permanent or deferral tax planning transactions or; 2) managing earnings via income tax accruals to achieve particular earnings targets.

4.3.2.2.1. Corporate tax planning

The first variable employed to capture firms' tax management incentive is the level of corporate tax planning ($AGGRESSIVE_{it}$), which is captured by the level of firms' long-term cash ETR (TA_CASH_{it}). Following Dyreng et al. (2008) and Guenther et al. (2017), TA_CASH_{it} is calculated as the sum of total taxes paid over the five-year period scaled by the sum of pre-tax income over the same five-year period. A lower (higher) TA_CASH_{it} indicates the greater (poorer) ability of firms to reduce tax burdens through engaging in permanent or deferral tax planning activities. $AGGRESSIVE_{it}$ is defined as a binary variable which equals 1 if a firm's TA_CASH_{it} is in the lowest quintile within the pooled sample of firms (Blaylock et al. 2012). Consistent with the hypothesis H2a that the corporate tax planning would likely increase the intentional and/or unintentional estimation errors in income tax accruals, the coefficient of $AGGRESSIVE_{it}$ (TA_CASH_{it}) in mode 3.1.1. is expected to be negative (positive).

4.3.2.2.2. Tax-induced earnings management

In order to avoid demonstrating deteriorated performance to financial statement users, a firm may set particular earnings targets as the desired minimum level of the current period's earnings performance. Firms' incentives to meet particular 'target' earning figures through manipulating income tax accruals will likely induce intentional estimation errors to income tax accounts and, hence, negatively affect the ability of income tax accruals to explain future tax-related cash flows. Following Phillips et al. (2003) and Holland and Jackson (2004), this study considers three situations where earnings management to meet target level of earnings are likely to present: (1) to avoid reporting a post-tax earnings decline; (2) to avoid failing to meet analysts' forecasts of post-tax earnings; and (3) to avoid reporting a post-tax loss.

Earnings Target 1. In order to show improved earnings performance, firms may set previous period's after-tax profit as the earnings target to avoid reporting declined earnings, and firms' incentive to manage earnings through deliberately biasing income tax accruals might increase (fall) if there is a decline (an increase) in their current-periods' pre-tax profit. Following Holland and Jackson (2004), the first earnings target variable $TARGET1_{it}$ represents a dummy variable which equals 1 if firms' current period's pre-tax profit is lower than that of the previous period, and 0 otherwise. The variable $DECLINE_AMOUNT_{it}$ captures the difference between a firm's previous period's pre-tax profit and that of the current period.

This study predicts that the lower a firm's current pre-tax profit as compared to that of its previous period, the greater its incentive to deliberately manipulate income tax accruals for the purpose of avoiding the report of an apparent post-tax earnings decline. Therefore, the incremental informativeness of income tax accruals is expected to be negatively associated with whether and by how much a firm's current pre-tax profit is lower than that of its previous period. This is expected to be represented in a significant negative coefficient on the interaction term $TARGET1_{it} \times DECLINE_AMOUNT_{it}$ (τ_{3c}) in model 3.1.2. The sum of coefficients on $DECLINE_AMOUNT_{it}$ and on $TARGET1_{it} \times DECLINE_AMOUNT_{it}$ ($\tau_{2c} + \tau_{3c}$) is also expected to be negative²¹².

Alternatively, the entire sample will be partitioned into two subsamples of firm-years (firm-years where $TARGET1_{it}$ equals 1 and firm-years where $TARGET1_{it}$ equals 0). If it is consistent with the hypothesis that firms which have missed previous period's pre-tax profits exhibit strong incentives to distort income tax accruals for earnings management purposes, a negative relationship between TAX_INFORM_{it} and $DECLINE_AMOUNT_{it}$ will be observed in the subsample of firm-years where $TARGET1_{it}$ equals 1.

Earnings Target 2. Besides avoiding the report of an apparent reduction in post-tax earnings, financial analysts' focus consensus with respect to the level of earnings can also be a strong target for firms to achieve, with the aim of showing their competent performance to the capital

²¹² Because a firm's incentive to engage in tax management activities is less clear when its pre-tax profit of current period exceeds that of the previous period (i.e., building a tax cookie jar), this study does not predict the sign of the coefficient of $DECLINE_AMOUNT_{it}$ (τ_{2c}). Tax cookie jar means that managers may have incentives to increase their income tax expense if their pre-tax performance exceeds the earnings target, in order to smooth the post-tax earnings. See Dhaliwal et al. (2004) for discussion about the tax cookie jar.

market and avoiding the negative stock valuation by equity investors. Firms' incentive to manage earnings through biasing income tax accruals might increase (decrease) if their actual pre-tax profits fall below (exceed) the pre-tax profits forecasted by consensus analysts. The second earnings target variable $TARGET2_{it}$ is denoted as a dummy variable which equals 1 if a firm's actual pre-tax profit reported in I/E/B/S is less than that of most recent consensus analysts' forecast, and 0 otherwise. The variable $ERROR_AMOUNT_{it}$ captures the difference between analysts' expected pre-tax profits and firms' actual pre-tax profit.

This study predicts the lower the firm's actual pre-tax profit as compared to that of consensus analysts' forecasts, the greater the incentive of this firm to deliberately influence income tax accruals to narrow the difference between the actual and analysts forecasted post-tax profit. Therefore, the informativeness of income tax accruals is expected to be negatively associated with whether and by how much the firm's actual pre-tax profit is lower than that expected by financial analysts. This is expected to be represented in a significant negative coefficient on the interaction term $TARGET2_{it} \times ERROR_AMOUNT_{it}$ (K_{3c}) in model 3.1.3. The sum of coefficients on $ERROR_AMOUNT_{it}$ and on $TARGET2_{it} \times ERROR_AMOUNT_{it}$ ($K_{2c}+K_{3c}$) is also expected to be negative²¹³.

Alternatively, the entire sample will be partitioned into two subsamples of firm-years (firm-years where $TARGET2_{it}$ equals 1 and firm-years where $TARGET2_{it}$ equals 0). If it is consistent with the hypothesis that firms which have missed analysts' forecasted pre-tax profits exhibit strong incentive to distort income tax accruals for earnings management purposes, a negative relationship between TAX_INFORM_{it} and $ERROR_AMOUNT_{it}$ will be observed in the subsample of firm-years where $TARGET2_{it}$ equals 1.

Earnings Target 3. Firms may also have incentives to avoid reporting a post-tax loss through manipulating income tax accruals. With respect to the setting of manipulating income tax accruals to avoid reporting a post-tax loss, consistent with Phillips et al. (2003) the third tax-management-incentive variable ($TARGET3_{it}$) is denoted as a dummy variable which equals 1 if the net income scaled by the opening market value of equity of a particular firm-year is within

²¹³ This study does not predict the sign of the coefficient of $ERROR_AMOUNT_{it}$ (K_{2c}) because a firm's incentive to engage in tax management activities is less clear when its actual pre-tax profits exceeds the consensus analysts' forecasts (i.e., building a tax cookie jar).

the range between 0 and 0.02, and 0 otherwise²¹⁴. Consistent with the hypothesis H2b, a firm is expected to be more likely to engage in earnings management through manipulating income tax accruals if it attempts to avoid reporting a post-tax loss. As the opportunistic use of income tax accruals for the purpose of beating earnings target could induce intentional estimation errors to the income tax provision and thereby compromising the informativeness of income tax accruals, the coefficient of $TARGET3_{it}$ in model 3.14 is expected to be negative.

4.3.2.3. Innate firm characteristics associated with tax environment complexity

$FIRM_CHARA_{it}$ included in model 3.11-3.14 represents a set of variables to capture firms' tax environment complexity, including firms' operational uncertainty; firms' profitability; firm size; the intensity of firms' multinational operations; opportunities for growth; capital intensity; and leverage. Greater level of firms' tax environment complexity will likely make it harder for managers to understand and anticipate the taxable implications of their firms' operations; to comply with tax laws and tax-related accounting standards; and to estimate income tax accruals accurately, leading to reduced informativeness of income tax accruals about future tax cash flows.

It is important to control for firms' operational uncertainty, since the operational uncertainty can increase difficulties faced by managers in estimating firms' current and future tax position, which may lead to estimation errors in income tax accruals even in the absence of management deliberate bias. Following Guenther et al. (2017), we control for firms' operational uncertainty using the volatility of firms' pre-tax income (VOL_PTBI_{it}) and the volatility of firms' cash flows ($VOL_CASHFLOW_{it}$). VOL_PTBI_{it} is defined as the standard deviation of annual pre-tax income scaled by lagged total assets over a rolling three-year window. $VOL_CASHFLOW_{it}$ is defined as the standard deviation of annual cash flow scaled by lagged total assets over a rolling three-year window. Since firms' operational uncertainty would likely make it difficult for managers to estimate income tax accruals accurately, the coefficients of VOL_PTBI_{it} and $VOL_CASHFLOW_{it}$ are expected to be negative.

Firms' profitability ($PTBI_{it}$) is included to capture the magnitude of firms' available resources to be allocated to tax departments and the economies of scale for tax-related investments, which

²¹⁴ Following Burgstahler and Dichev (1997), this study employs another two scaled net income intervals (0-0.01 and 0-0.03), untabulated results remain statistically identical.

is defined as the pre-tax income scaled by lagged total assets (Choudhary et al. 2016). Since more profitable firms are likely to devote more resources to their tax department to ensure the tax documentation process is in a high-quality manner (Mills et al. 1998), the coefficient of $PTBI_{it}$ is expected to be positive.

Firm size ($SIZE_{it}$) is defined as the natural log of total assets and the level of firms' geographic segment ($SEGMENT_{it}$) is defined as the number of segments in which a firm operates (Iliev 2010). Large firms and firms operating in a highly dispersed business environment may face difficulties in coordinating and communicating among different business departments, which may increase managerial judgement and complexity inherent in the process of estimating income tax accruals (Gallemore and Labro 2015). Therefore, the coefficients of $SIZE_{it}$ and $SEGMENT_{it}$ are expected to be negative.

Firms' growth rate ($GROWTH_{it}$) is captured by the ratio of firms' market value of equity to the book value of equity. A higher (lower) market-to-book ratio indicates a higher (lower) growth rate (Ittner et al. 1997; Balakrishnan et al. 2018). Firms in high growth rate may have more opportunities for tax planning due to their aggressive pursuit of entering into new products and geographic market, which can make their future tax consequence more uncertain to be predicted (Higgins et al. 2015). Therefore, the coefficient of $GROWTH_{it}$ is expected to be negative.

Capital intensity ($CAPINT_{it}$) is defined as the gross cost of property, plant and equipment scaled by the lagged total assets (Laux 2013). The utilisation of tax planning opportunities with respect to property, plant and equipment could make the process of tax information collection and record-keeping complicated and costly. However, taking advantage of the qualified capital allowances can be perceived as a well-established and benign tax-favored investment with relatively stable future cash tax outcomes. Therefore, $CAPINT_{it}$ is expected to be related to the informativeness of income tax accruals in an unpredictable direction.

Leverage ($LEVERAGE_{it}$) is defined as the ratio of long-term debt to total assets (Mills et al. 1998; Holland and Jackson 2004). Highly-levered firms, which may be subject to monitor and scrutiny by lenders, may attempt to loosen their debt covenant constraints through engaging in income-increasing accounting procedures. Such activities may cause firms to manipulate their income tax provision, which makes the income tax account a less trustworthy construct in

reflecting firms' current and future cash tax performance (Dhaliwal et al. 1982; Skinner 1993; Phillips et al. 2003). By contrast, highly levered firms may be less incentivised to reduce their tax burdens by engaging in complex and risky tax shelter activities, since the tax benefits from debt financing can reduce the value of non-debt tax management activities. Therefore, $LEVERAGE_{it}$ is presumed to be associated with the informativeness of income tax accruals in an unpredictable direction.

The control variable $DISCONTINUE_{it}$, calculated as the absolute value of earnings from discontinued operation scaled by the lagged total assets²¹⁵, is included in the regression analysis to control for the impact of non-articulating items such as discontinued operations and extraordinary items on the informativeness of income tax accruals. According to IAS 12 para 81h, the discontinued operations and extraordinary items are reported net of income taxes separately below the continuing activities, but their cash tax consequences are included in cash flow statements²¹⁶. This will induce differences between total income tax expense and cash tax paid (i.e., income tax accruals) for a particular accounting period. Changes in income tax accruals stemming from the accounting treatments of non-articulating items are not designed to mitigate the timing issues and, thus, are not anticipated to be informative about future tax cash flows even if the GAAP is appropriately. $DISCONTINUE_{it}$ is expected to have a negative sign.

By definition, long-term deferred taxes ($DEFER_{it}$) often do not reverse within future one-year period. Therefore, this study controls long-term deferred tax balances because income tax accruals resulting from them would add noise to the measure of informativeness of income tax accrual about future one-year-ahead cash taxes, even if there is no managerial intentional or unintentional estimation errors in the income tax provision. The variable $DEFER_{it}$ is calculated as the deferred tax balances scaled by the lagged total assets²¹⁷ and is expected to have a negative sign.

²¹⁵ The variable $DISCONTINUE_{it}$ is calculated on the basis of absolute value of earnings from discontinued operation, since both positive and negative earnings from discontinued operation are expected to negatively affect the informativeness of income tax accruals in the same manner.

²¹⁶ Results remain statistically identical if omitting companies exhibiting discontinued operations and extraordinary items from the sample.

²¹⁷ According to Kern et al. (1992), deferred taxes in the liability account in balance sheet would “approximate long-term deferrals only”, but deferred tax expense in income statement consist of “both current and long-term deferrals” (pp. 2). Thus, this study control deferred tax balances in the balance sheet to mitigate the impact of long-term deferred taxes that may not reverse within future one-year ahead.

The year fixed effect is included to allow variations in the intercept across the sample period, in order to adjust the cross-sectional correlation in the error term resulting from common shocks across years (Jayaraman 2008). The industry fixed effect is included to control for the systematic difference in the tax treatments in credit; incentives; and allowance across industries (Omer et al. 1993; Holland 1998; Wahab and Holland 2015). The firm-level clustering of standard errors is aimed at correcting for problems of serial correlation arising from the interdependence in the error terms across years for a given firm (Petersen 2009).

4.3.2.4. Corporate governance

To further investigate whether corporate governance mechanism plays a significant role in restricting firms' tax management incentives and thereby improving the informativeness of the reported income tax accruals, model 3.21-3.24 are re-estimated with the inclusion of the interaction terms between corporate governance and the individual tax management incentive²¹⁸.

$$TAX_INFORM_{it} = \omega_0 + \omega_{1c}TA_CASH_{it} + \omega_{2c}GOVERNANCE_{it} + \omega_{3c}TA_CASH_{it} * GOVERNANCE_{it} + \sum \omega_{4c}FIRM_CHARA_{it} + \sum \omega_{5c}CONTROL_{it} + \omega_{industry} + \omega_{year} + \varepsilon_{i,t} \quad (3.21)$$

$$TAX_INFORM_{it} = \tau_0 + \tau_{1c}DECLINE_AMOUNT_{it} + \tau_{2c}GOVERNANCE_{it} + \tau_{3c}DECLINE_AMOUNT_{it} * GOVERNANCE_{it} + \sum \tau_{4c}FIRM_CHARA_{it} + \sum \tau_{5c}CONTROL_{it} + \tau_{industry} + \tau_{year} + \varepsilon_{i,t} \quad (3.22)$$

$$TAX_INFORM_{it} = K_0 + K_{1c}ERROR_AMOUNT_{it} + K_{2c}GOVERNANCE_{it} + K_{3c}ERROR_AMOUNT_{it} * GOVERNANCE_{it} + \sum K_{4c}FIRM_CHARA_{it} + \sum K_{5c}CONTROL_{it} + K_{industry} + K_{year} + \varepsilon_{i,t} \quad (3.23)$$

$$TAX_INFORM_{it} = Z_0 + Z_{1c}TARGET3_{it} + Z_{2c}GOVERNANCE_{it} + Z_{3c}TARGET3_{it} * GOVERNANCE_{it} + \sum Z_{4c}FIRM_CHARA_{it} + \sum Z_{5c}CONTROL_{it} + Z_{industry} + Z_{year} + \varepsilon_{i,t} \quad (3.24)$$

TAX_INFORM_{it} = The incremental informativeness of income tax accruals over cash tax paid in predicting future one-year-ahead tax cash flows, which is denoted as $\bar{R}_{Tax\ Accrual}^2$ and $\delta_{Tax\ Accruals}$

TA_CASH_{it} = The sum of cash taxes paid scaled by the sum of pre-tax income over a five-year period

$DECLINE_AMOUNT_{it}$ = The difference between a firm's pre-tax profit of a previous period and that of the current period.

²¹⁸ This study concentrates on the subsamples of firm-years that exhibit tax management incentives to undertake tax-induced earnings management (e.g., when $TARGET1_{it} = 1$), when examining the mediating role played by corporate governance mechanism.

$ERROR_AMOUNT_{it}$	=	The difference between the analysts' estimated pre-tax profit and the actual reported pre-tax profit.
$TARGET3_{it}$		A binary variable which equals 1 if firms' net income scaled by the opening market value of equity is within the range between 0 and 0.02, and 0 otherwise.
$GOVERNANCE_{it}$	=	A proxy for the effectiveness of firms' governance and monitoring mechanism
$FIRM_CHARA_{it}$	=	A vector of variables to capture firms' tax environment complexity
$CONTROLS_{it}$	=	A vector of controls variables that may affect the informativeness of income tax accruals in explaining future tax payments.
$\Phi_{industry}$	=	Industry dummies.
Φ_{year}	=	Year dummies.

All financial accounting variables are deflated by opening total assets. Variable TA_CASH_{it} is winsorised at 0 and 1. All other continuous variables are winsorised at the 1st and 99th percentile. See section 3.2.1. to 3.2.5. for detailed information about variable definition

$GOVERNANCE_{it}$ included in model 3.21-3.24 refers to a proxy for the effectiveness of firms' governance and monitoring mechanism. This study considers four different channels of monitoring managerial behaviours and scrutinising financial reporting irregularities, including analyst coverage, audit quality, institutional shareholding and board independence.

Analysts coverage ($COVERAGE_{it}$) represents the number of analysts who make forecasts about firms' earnings for an accounting period. It is defined as the number of analysts following from Institutional Brokers Estimate System (I/B/E/S). A higher (lower) level of $COVERAGE_{it}$ indicates more (less) intensive analysts coverage of a firm (Yu 2008; Kim et al. 2011). Audit quality ($AUDIT_{it}$) represents the quality of employed auditing firms which is proxied by the size of the auditing firm. It is defined as a binary variable which equals to 1 if the employed auditor is from one of the 'big four' auditing firms, and 0 otherwise (Holland and Jackson 2004; Chi et al. 2011). Institutional shareholding ($INSTITUTION_{it}$) represents the level of firms' institutional ownership. It is defined as the percentage of shares held by large institutional shareholders (Cornett et al. 2008). Board independence ($BOARD_{it}$) captures the composition of insiders and outsiders serving on the board. It is defined as the percentage of the non-

executive (i.e., outside) directors to total number of directors on the board (Wahab and Holland 2012).

Hypotheses H2c_i to H2c_iv predict that stronger corporate monitoring mechanism (i.e., higher analysts coverage, larger institutional shareholding, better audit quality and more independent board) plays a role in attenuating the hypothesised negative relation between firms' tax management incentives and the incremental informativeness of income tax accruals. Thus, the coefficients of the interaction terms, i.e., $TA_CASH_{it} \times GOVERNANCE_{it}$ in model 3.21 are expected to be positive and significant, and the coefficients of $DECLINE_AMOUNT_{it} \times GOVERNANCE_{it}$, $ERROR_AMOUNT_{it} \times GOVERNANCE_{it}$ and $TARGET3_{it} \times GOVERNANCE_{it}$ in model 3.22-3.24 are expected to be positive and significant.

The year fixed effect is included to allow variations in the intercept across the sample period in order to adjust the cross-sectional correlation in the error term resulting from common shocks across years (Jayaraman 2007). The industry fixed effect is included to control for the systematic difference in the tax treatments in credit, incentives and allowance across industries and to control for the variation in the persistence of corporate tax performance varies by industry group²¹⁹ (Omer et al. 1993; Holland 1998; Wahab and Holland 2015). The firm-level clustering of standard errors is aimed at correcting for problems of serial correlation arising from the inter-dependence in the error terms across years for a given firm (Petersen 2009). Variables employed in the regression estimation models are summarised in the following table 4.1.

4.3.3. Research design of the third hypothesis

The third hypothesis is to investigate whether the incremental informativeness of income tax accruals to predict future tax cash flows has improved or deteriorated over time. Following Kim and Kross (2005), Hail. (2013) and Bushman et al. (2016), this study will re-estimate model (1) and (2) cross-sectionally each year, to generate the annual incremental explanatory power provided by income tax accruals to explain future tax cash flows. Then the annual informativeness of income tax accruals (TAX_INFORM_{it}) will be regressed on two time-trend variables based on the following model (4) and model (5).

²¹⁹ For example, Wahab and Holland (2014) find that within industry groupings, there is wide variations in the level of persistency in corporate book tax difference.

Linear Trend Model: $TAX_INFORM_{it} = \vartheta_0 + \vartheta_1 YEAR + \varepsilon_{i,t}$ (4)

Three-Period Model: $TAX_INFORM_{it} = \Pi_0 + \Pi_1 PERIODS + \varepsilon_{i,t}$ (5)

In model (4) and (5), the dependent variable, TAX_INFORM_{it} , represents the incremental informativeness of income tax accruals over cash tax paid to explain future one-year-ahead tax cash flows, which is captured by $\bar{R}_{Tax\ Accrual}^2$ and $\delta_{Tax\ Accruals}$. In model (4), $YEAR$ is set to one in the initial sample year and increasing by one for every sample year thereafter, i.e., $YEAR$ ranges from 1 to 26. The coefficient on $YEAR$, i.e., ϑ_1 , captures the linear time trend in the incremental informativeness of income tax accruals to predict future tax cash flows over the sample period. A significantly positive (negative) ϑ_1 indicates that the incremental explanatory power of income tax accruals to predict future tax cash flows has been increasing (decreasing) over time. An insignificant ϑ_1 indicates that there is no significant linear time trend in the incremental explanatory power of income tax accruals. In model (5), $PERIOD$ is set to zero for sample period from 1992 to 1999 when deferred taxes are provided under SSAP 15 “*Accounting for Deferred Taxation*”; set to one for sample period from 2000 to 2004 when deferred taxes are provided under FRS 19 “*Deferred Tax*”; and set to two for sample period from 2005 to 2017 when deferred tax are provided under IAS 12 “*Income Taxes*”²²⁰. The inclusion of $PERIOD$ allows to break the entire sample into three periods when different tax accounting standards (i.e., SSAP 15 for period 1992-1999, FRS 19 for period 2000-2004, and IAS 12 for period 2005-2017) have been adopted in UK, to investigate whether the adoption of different tax accounting standards leads to changes in the incremental informativeness of income tax accruals to explain future tax cash flows.

Controlling the effects of changes in firm characteristics over time

The tests of the third hypothesis thus far are based on the assumption that the underlying institutional and microeconomic factors affect the incremental informativeness of income tax accruals in the same manner over time. However, changes in the tax accounting standards adopted in the UK may not be the only reason that causes variations in the incremental

²²⁰ Three indicator variables were generated to split the sample period into three periods. Each of the variables respectively represents one period of the enforcement of a different deferred tax accounting standard (i.e., SSAP 15, FRS 19 and IAS 12) among UK listed entities. During the analyses, the first indicator variable for sample period from 1992 to 1999 is omitted and treated as the baseline group due to multicollinearity. See <https://www.stata.com/manuals13/u25.pdf>

informativeness of income tax accruals over time. Other factors, such as that firms themselves have changed in underlying characteristics and performance over time, may also explain the time trends in the incremental informativeness of income tax accruals to predict future tax cash flows. For example, if a firm's operation becomes more uncertain and less predictable (i.e., less predictable income will result in less predictable future tax payments), a decrease in the ability of its income tax accruals to explain future tax cash flow can be evident over time even holding the tax accounting standard constant. In this section, the time trend of the incremental informativeness of income tax accruals to predict future tax cash flows will be re-examined after controlling for influences from changes in firms' underlying characteristics. Following the methodology employed by Dyreng et al. (2017), variables that proxy for changes in firm characteristics will be included in model (6) and (7).

$$TAX_INFORM_{it} = \vartheta_0 + \vartheta_1 YEAR + \sum \vartheta_{2c} FIRM_CHARA_{it} + \sum \vartheta_{3c} GOVERNANCE_{it} + \vartheta_{industry} + \varepsilon_{i,t} \quad (6)$$

$$TAX_INFORM_{it} = \Pi_0 + \Pi_1 PERIOD + \sum \Pi_{2c} FIRM_CHARA_{it} + \sum \Pi_{3c} GOVERNANCE_{it} + \Pi_{industry} + \varepsilon_{i,t} \quad (7)$$

TAX_INFORM_{it}	=	The incremental informativeness of income tax accruals over cash tax paid at time t.
$FIRM_CHARA_{it}$	=	A vector of variables associated with firms' characteristics to proxy firms' tax environment complexity of company i at time t.
$GOVERNANCE_{it}$	=	A vector of variables that capture the strength of firms' corporate governance mechanism of company i at time t.
$YEAR$	=	Ranges from 1 to 26 to capture the sample period.
$PERIOD$	=	Equals to 0 for the sample period from 1992 to 1999, to 1 for the sample period from 2000 to 2004; and to 2 for the sample period from 2005 to 2017.

All continuous variables are deflated by opening total assets. All continuous variables are winsorised at the 1st and 99th percentile. See section 3.2.1. to 3.2.2. for detailed information about the variable definition

$FIRM_CHARA_{it}$ represents a vector of variables discussed in section 3.2 which capture the innate firm characteristics associated with firms' tax environment complexity, and therefore are expected to be associated the informativeness of income tax accruals in explaining future tax cash flows. As discussed in section 3.2., variables that proxy firms' tax environment complexity include firms' operational uncertainty (VOL_PTBI_{it}), firms' profitability ($PTBI_{it}$), firm size ($SIZE_{it}$), the number of operating segments ($SEGMENT_{it}$), opportunities for growth ($GROWTH_{it}$), capital intensity ($CAPINT_{it}$), level of leverage ($LEVERAGE_{it}$) and discontinued operations ($DISCONTINUE_{it}$). $GOVERNANCE_{it}$ represents a vector of variables that capture the strength of corporate governance mechanism including the intensity of analyst coverage

($COVERAGE_{it}$); audit quality ($AUDIT_{it}$); institutional shareholding ($INSTITUTION_{it}$); and board independence ($BOARD_{it}$). Industry fixed effects are also included in model (6) and (7) to account for the inner-industry changes in the composition of firms across industries and over time (Dyreng et al. 2017).

The following table 4.1 describes all the variables employed in the estimation models.

Table 4.1: Variable Measurements		
Item	Name	Measures
Future tax cash flows	$Cash\ Tax\ Paid_{i,t+\rho}$	Future tax-related cash flows scaled by lagged total assets for future years, where ρ varies from 1 to 5.
The sum of future tax cash flows	$\sum Cash\ Tax\ Paid_{i,t+5}$	The sum of future tax-related cash flows scaled by the sum of lagged total assets over future five aggregated years.
Current tax cash flows	$Cash\ Tax\ Paid_{i,t}$	Cash tax paid scaled by lagged total assets for company i at time t.
Income tax accruals	$Tax\ Accruals_{i,t}$	Income tax accruals scaled by lagged total assets for company i at time t.
Incremental informativeness of income tax accruals	$\bar{R}_{Tax\ Accruals}^2$	The difference between coefficients of determination from model (1) and (2): $\bar{R}_{Total\ Income\ Tax}^2 - \bar{R}_{Cash\ Tax}^2$
Incremental informativeness of income tax accruals	$\delta_{Tax\ Accruals}$	The slope coefficient of income tax accruals generated for each firm from model (2)
Tax management incentives		
Earnings target1	$TARGET_{it}1$	A binary variable which equals 1 if firms' current period's pre-tax profit is lower than that of previous period, and 0 otherwise.
Earnings target1	$DECLINE_AMOUNT_{it}$	Difference between a firm's previous period's pre-tax profit and that of the current period scaled by lagged total assets
Earnings target2	$TARGET_{it}2$	A binary variable which equals 1 if firms' actual pre-tax profit reported in I/E/B/S is lower than that of most recent consensus analysts' forecast, and 0 otherwise
Earnings target2	$ERROR_AMOUNT_{it}$	Difference between analysts' expected pre-tax profits and actual pre-tax profit reported by this firm scaled by the lagged total assets
Earnings target3	$TARGET_{it}3$	A binary variable which equals 1 if firms' current net income scaled by the opening market value of equity is within the range between 0 and 0.02, and 0 otherwise
Tax planning	TA_CASH_{it}	Calculated as the sum of total taxes paid over the five-year period scaled by the sum of pre-tax income over the same five-year period.
Tax planning	$AGGRESSIVE_{it}$	A binary variable which equals 1 if a firms' TA_CASH_{it} is in the lowest quintile
Tax environment complexity		
Operational uncertainty	VOL_PTBI_{it}	The standard deviation of annual pre-tax income scaled by lagged total assets over a rolling three-year window

Operational uncertainty	$VOL_CASHFLOW_{it}$	The standard deviation of annual cash flow scaled by lagged total assets over a rolling three-year window
Firm size	$SIZE_{it}$	The natural log of total assets
Profitability	$PTBI_{it}$	The pre-tax income scaled by lagged total assets
Business segments	$SEGMENT_{it}$	The number of segments in which a firm operates
Growth opportunities	$GROWTH_{it}$	The ratio of firms' market value of equity to book value of equity
Capital intensity	$CAPINT_{it}$	The gross cost of property, plant and equipment scaled by lagged total assets
Leverage	$LEVERAGE_{it}$	Long-term debt to total assets scaled by lagged total assets
Discontinued operation	$DISCONTINUE_{it}$	The absolute value of earnings from discontinued operation scaled by the lagged total assets
Deferred tax balance	$DEFER_{it}$	The deferred tax balances scaled by the lagged total assets
Corporate governance		
Analyst coverage	$COVERAGE_{it}$	The number of analysts following
Audit quality	$AUDIT_{it}$	A binary variable equals to 1 if the employed auditor is from one of the 'big four' auditing firms, and 0 otherwise
Institutional shareholding	$INSTITUTION_{it}$	The percentage of shares held by large institutional shareholders
Board independence	$BOARD_{it}$	The percentage of the non-executive (i.e., outside) directors to total number of directors on the board
Time-trend variables		
Sample period dummy	$YEAR$	Ranges from 1 to 26 to capture the sample period
Three-period dummy	$PERIOD$	Equals to 0 for sample period from 1992 to 1999, to 1 for sample period from 2000 to 2004; and to 2 for sample period from 2005 to 2016

4.3.4. Econometric issues and regression diagnostic procedure

4.3.4.1. Heteroscedasticity and scaling effects

Scale-related heteroscedasticity problem arises because firms of different size tend to have different values of many variables. For instance, the level of income tax accruals and cash tax payment can be naturally higher (lower) for large (small) firms. Failing to control for the scale differences can cause the variability of the dependent variable to be unequally distributed across the range of values of the independent variables and thus compromise the explanatory power of the independent variables, which will in turn lead to scale-related heteroscedasticity

in the distribution of error terms and reduce the regression estimation efficiency²²¹ (Hurd 1979; Barth and Kallapur 1996; Akbar and Stark 2003; Baum 2006). Heteroscedasticity tests based on Breusch and Pagan (1979) will be conducted to detect heteroscedasticity problems.

To mitigate the scaling effect and the heteroscedasticity problems, a common method is to deflate all continuous variables employed in the regression analysis by a proxy for scale (Akbar and Stark 2003; Horton 2008; Barth et al. 2009; Brav 2009). Deflating the continuous variables by a proxy for scale could also yield estimation results that better reflect the explanatory power of the independent variables rather than that of the variations in scale (Brown et al. 1999). A range of deflators has been employed by previous literature to control for the scale-related problems, including opening book value of assets (e.g., Kim et al. 2011; Guenther et al. 2017); net book value of equity (e.g., Akbar and Stark 2003; Wahab and Holland 2012); sales (e.g., Hirschey 1985); market value of equity (e.g., Christie 1987; Horton 2008); and numbers of shares outstanding (e.g., Rees 1997). In the absence of methodological consistency regarding the deflator's choice, this study employs the lagged total assets as a deflator to control for the scale-related heteroscedasticity problems in order to be consistent with many of the current tax studies²²². Further, the Eicker-Huber-White robust standard errors will be used in the regression analysis if the Breusch and Pagan (1979) and White (1980) tests detect any heteroscedasticity problems after deflating all continuous variables by a proxy for scale to control for the scaling effects.

4.3.4.2. Outliers

Outliers are unusual observations “with a unique combination of characteristics identifiable as distinctly different from the other observations” (Hair et al. 2014, pp. 62). Since the “arithmetic mean (a least-squares estimator) is sensitive to extreme values (relative to the sample media)”, including unusual points of data in the OLS regression can cause the coefficient estimates strongly influenced by the extreme values and, thus, poorly fit the regression sample (Baum 2006, pp. 126). In summary, outliers are observations with unusually high or low value, which

²²¹ According to Baum (2006), the disturbance variances of cross-sectional datasets are often related to some measures of scale within groups of observations. For instance, the dispersion of wealthy households' errors around the predicted value will likely be much greater than those of low-income households (Baum 2006, pp 144). In this case, the coefficient estimation conducted under the Ordinary Least Square (OLS) assumption of homoscedasticity is not consistent when in fact the distribution of error terms is heteroscedastic which can cause estimation inefficiency (Hurd 1979).

²²² See Kim et al. (2011); Robinson et al. (2014); Choudhary et al. (2016); and Guenther et al. (2017).

are not representative of characteristics of the entire sample and distort the results and the interpretation of the OLS multivariate coefficient estimates. There are two commonly used approaches in dealing with outliers, i.e., winsorisation (where the extreme values of data are replaced by the value of the closest nonoutliers); and trimming or truncation (where the detected outliers and influential data are dropped from the sample). As winsorisation keeps the estimate of scale constant while trimming or truncation involves the omission of certain percentage of observations which can increase the amount of missing data and affect the results of multivariate analysis, this study follows previous published tax accounting studies (e.g., Kim et al. 2011; Hope et al. 2013; Choudhary et al. 2016; Guenther et al. 2017) to mitigate the influence of outliers through winsorising the continuous variables employed in the regression analysis at the 1st and 99th percentile.

4.3.4.3. Normality of residuals

The Ordinary Least Squares (OLS) regression should be conducted based on the assumption that the residuals from the regression model are normally distributed. Although the estimated coefficients obtained from the OLS regression are still BLUE (best linear unbiased estimators) in the absence of normality in the distribution of the model residuals, the validity of the overall model goodness of fit (F-statistic) and the statistical significance of the coefficients (t-statistics) is based on the normality of the model residuals (Crown 1998, pp. 71). If the normal distribution of the model residuals is violated, the OLS statistical inferences based on the t-statistics and F-statistics will become unreliable, since the generated OLS estimators will be inefficient and the estimated standard errors will be biased (Green 2003; 2008). The Normal-Probability plots will be employed before multivariate regression analysis to show the distribution of model residuals.

4.3.4.4. Autocorrelation

The assumption of OLS estimation that error terms in the regression model are independently distributed can be violated when there is “correlation between members of series of observations ordered in time (as in time series data) or space (as in cross-sectional data)” (Gujarati 2003, pp. 442). With the cross-sectional data, departures from the independence of the distribution of error terms may reflect the ‘neighbourhood effect’ among contiguous observations while in terms of the time-series data, observations that are close in time may

share some correlation in their disturbance (Baum 2006, pp. 154-155). The presence of autocorrelated error terms in the regression model can cause the OLS standard error to under- or overestimate the true standard error, thereby reducing the efficiency of the OLS estimator and violating the OLS test statistics²²³ (Gujarati 2003, pp. 442; Maddala and Lahiri 2009, pp. 253; Petersen 2009, pp. 440). Following, following Hoechle (2007) and Petersen (2009), the year dummies will be included in the regression models to mitigate the potential correlation between observations over the same period (i.e., the cross-sectional dependence among error terms)²²⁴, and the clustered firm-level Eicker-White robust standard errors²²⁵ will be employed in the multivariate regression analysis to mitigate both the normality dispersion and the potential autocorrelation of error terms across years for a given observation (i.e., the serial correlation among error terms) (Hair et al. 2014).

4.3.4.5. Multicollinearity

Multicollinearity refers to an interdependency condition in which two or more explanatory variables of a regression model correlate with each other (Gujarati 2003). Multicollinearity problems can cause threats to the model specification and the parameter estimates of the multivariate regression analysis, since the presence of multicollinearity indicates that the explained variance of an explanatory variable can be allocated arbitrarily between the linearly interdependent explanatory variables, leading to difficulties in distinguishing “*the independent contribution to explained variance of an explanatory variable that exhibits little or no truly independent variation*” and making the coefficient estimation unreliable (Farrar and Glauber 1967, pp. 93). According to O’Brien (2007), multicollinearity problems can “*increase estimates of parameter variance; yield models in which no variable is statistically significant*

²²³ For example, Maddala and Lahiri (2009) indicate that the presence of serial-correlation tends to make the R^2 , T-statistic and F-statistic exaggerated.

²²⁴ According to Petersen (2009), “since many panel data sets have more firms than years, a common approach is to include dummy variables for each time period (to absorb the time effect) and then cluster by firm (Lamont and Polk, 2001; Anderson and Reeb, 2004; Gross and Souleles, 2004; Sapienza, 2004; and Faulkender and Petersen, 2006)” (pp. 458).

²²⁵ It is important to distinguish the difference between the robust standard errors and the clustered standard errors. According to Baum (2006), estimating the robust standard errors only affect the coefficients’ standard errors and interval estimates rather than affecting the magnitude of the coefficient. The robust estimator of standard errors will produce test statistics (i.e., p-value, t-statistics and F-statistics) that are “robust to conditional heteroskedasticity of unknown forms”. By comparison, the cluster estimator of the standard errors “allows the disturbance within each cluster to be correlated with each other but requires that the disturbances from different clusters be uncorrelated”. The cluster estimator will produce test statistics (i.e., p-value, t-statistics and F-statistics) that are “robust to the correlation of disturbances within groups”. As a result, the cluster-robust-standard error estimator produce test statistics that are robust to the correlation of model residuals and to the nonidentically distributed model residuals (pp. 136-138).

even though R^2 is large; produce parameter estimates of the incorrect sign and of implausible magnitude; create situations in which small changes in the data produce wide swings in parameter estimates; and, in truly extreme cases, prevent the numerical solution of a model” (pp. 673). For this reason, it is crucial to detect and correct the problem of multicollinearity before conducting any multivariate regression analysis. Two well-known diagnostic tests, i.e., the analysis of correlation coefficients and the variance inflation factors (VIF), will be employed to detect problems of multicollinearity.

Specifically, in the analysis of correlation coefficients, any Spearman correlations between pairs of variables equal to or higher than 0.8 reveal the existence of multicollinearity problems in the model (Hair et al. 2014). However, analysis of correlation coefficients can only be performed to explain the collinearity condition of two explanatory variables rather than that between the multiple (i.e., three or more) explanatory variables. As a result, the variance inflation factors (VIF) will be further performed to detect problems of multicollinearity among multiple explanatory variables employed in the regression models. VIF is calculated as the inverse of the tolerance value, in which the tolerance value for an independent variable equals 1 minus the property of variance it shares with other independent variables in the model. Consequently, a higher level of VIF (i.e., VIF equal or higher than 10) indicates that the variability of an independent variable can be largely explained by other independent variables and, hence, signifies the presence of multicollinearity problems (O’Brien 2007).

4.4. Conclusion

This chapter details the process of hypotheses development and estimation model construction. As this thesis attempts to examine the cross-sectional determinates and the time-series trend of the informativeness of income tax accruals in the UK setting, the hypotheses and estimation models are designed to first test whether the income tax accruals are incrementally informative over cash tax paid to explain future tax cash flows. This study further examines the cross-sectional determinants of the income tax accruals, with the primary interests in investigating how managers’ incentives to undertake tax management activities affect the informativeness of income tax accruals; and whether corporate governance mechanism plays a significant role in attenuating the impacts of the tax management incentives on the informativeness of income tax accruals. Finally, this study examines the time-series trend in the informativeness of income tax accruals to show whether the incremental informativeness of income tax accruals has

deteriorated or improved over time in the UK. Overall, through testing the hypotheses, this thesis aims to provide a thorough understanding on the ability of income tax provision to explain future tax cash flows in the UK setting.

Chapter 5

Sample Selection and Descriptive Statistics

5.1. Introduction

This chapter concentrates on presenting the process of sample selection and the summary of descriptive statistics. It begins with stating the data source and sample framework which are inclusive of the data type and the screening criteria imposed on the sample selection process. The subsequent section of this chapter presents the summary statistics and univariate variable correlations for the dependent and independent variables employed in the estimation models for hypotheses tests. The last section concludes this chapter.

5.2. Data Source and Sample Selection

This study employs a panel dataset of publicly-traded non-financial U.K. companies listed on the London Stock Exchange (LSE) for the period 1992 to 2017, obtained from the Datastream database. The year 1992 is used as a starting point since data for corporate tax payment is generally not available on Datastream prior to the year 1992. The sample includes both active and inactive stocks to avoid survivorship bias²²⁶, and the sample frame focuses only on non-financial companies, as financial companies (such as financial institutions, insurance companies and unit trusts) tend to have different financial reporting regulations as compared to other non-financial companies (Fama and French 1992; Hanlon 2005)²²⁷.

The data employed in the dataset can be classified into three different types, including the reported financial accounting and taxation data; the corporate governance data; and the industry classification. All of the data included in the dataset are archive in nature and can be obtained from firms' publicly-reported financial statements. First, the reported financial accounting and taxation data, for example, profit before tax, cash tax paid or income tax expenses, were obtained from Worldscope provided by Thomson Reuters. Second, the corporate governance data were collected from several different sources. For instance, data regarding the composition

²²⁶ The original sample is generated using the Datastream constituent list FTSE All-Share+DEADUK which produces 9912 active and inactive (i.e., dead or delisted) firms. In order to avoid the inclusion of foreign companies that list in the UK, companies with exchange/market name (EXMNEM) that is not denoted as "London" and equity record (ISIN and MAJOR) that is denoted as secondary quotation will be excluded from the sample (3948 firms are excluded).

²²⁷ For instance, Fama and French (1992) state that high leverage is normal for financial companies. But the meaning of high leverage is quite different between financial and non-financial companies, as for non-financial companies, high leverage more likely indicates financial distress.

of board directors and names of audit firms were collected from Datastream; the financial analyst data were collected from the Institutional Brokers Estimate System (I/B/E/S) database provided by Thomson Reuter; and the institutional ownership data were collected from Capital IQ. Third, the industry classification is based on the Financial Times Stock Exchange (FTSE)/Dow Jones (DJ)'s industry classification benchmark industry name (ICBIN) obtained from the Thomas Reuters Datastream.

Following previous tax literature, several screening criteria were further imposed on the sample selection process. First, companies that provide financial information in currencies other than U.K. sterling are excluded due to the difficulties in comparing and analysing firm performances if their reported financial information are provided in different currencies. Second, following Hanlon (2005), firms reporting pre-tax financial reporting loss and negative current tax expense are excluded from the sample²²⁸. The inclusion of only profit-making companies in the sample is intended to control tax losses carried forward or transferred among groups, because changes in tax losses can obscure the true informativeness of income tax accruals in explaining future tax payments. The exclusion of loss-making observations with negative pre-tax profit is also intended to eliminate the confounding denominator effect and maintain a reasonable economic interpretation of ETRs, as *“it is not clear how to interpret negative tax rates because firms do not necessarily receive a refund for annual tax losses”* (Guenther et al. 2017, pp. 121). Third, companies with negative book value of equity are excluded from the sample. The exclusion of companies with negative book value of equity is to avoid negative market-book ratios due to their limited economic meaning in indicating companies' expected future growth (Collins et al. 1999). Finally, each company included in the sample is required to have tax data (i.e., income tax expense and cash tax paid) for at least six consecutive years to ensure that there is sufficient data (i.e., data for current year and future five years, i.e., t , $t+1$, $t+2$, $t+3$, $t+4$ and $t+5$) to regress model (1) and model (2). The final sample consists of 323 UK quoted non-financial companies (8398 company-year). The sample data were cross-checked with information reported in firms' annual reports to verify the accuracy of the data employed²²⁹. The following table 5.1 to 5.3

²²⁸ According to Hanlon (2005), net operating losses (NOL) could lead to a lower (or possible zero) deferred tax expense when there is a true temporary book-tax difference in the deferred tax expense account for a respective reporting period and, accordingly, the explanation power of the income tax accruals to predict future cash tax payment could be compromised if the true value of deferred taxes is masked by the NOL. Therefore, this study eliminates loss-making companies to control the effect of the NOL.

²²⁹ 88 companies' financial reports were collected from the Company House, to compare the data reported in firms' financial reports with the data gathered from the secondary database. No questionable data was found during the cross-checking process.

summarises the data source; the sample selection process; and the industry classification of the employed dataset, respectively.

Table 5.1: Data Sources			
Type of Data		Source	Corresponding Regression Variables
Reported financial accounting and taxation data		Worldscope provided by Thomson Reuters	Cash tax paid; total asset; income tax expense; current tax expense; deferred taxes; pre-tax income; operating cash flow; the percentage of foreign sales to total sales; segment sales; market value of equity; book value of equity; gross cost of plant, property and equipment; and long-term debt.
The corporate governance data	The composition of board directors and names of audit firms	Datastream	The percentage of non-executive board members; The name of auditing firms employed by companies
	The financial analyst data	Institutional Brokers Estimate System (I/B/E/S) database	The number of financial analyst covering; the consensus financial analysts' estimates of pre-tax income in t+1; companies' actual reported pre-tax income in t+1.
	The institutional ownership data	Capital IQ	The percentage of shares hold by institutional owners
The industry classification		Financial Times Stock Exchange (FTSE)/ Dow John (DJ)'s industry classification benchmark	The name of the industry under which the equity is classified

Table 5.2: Sample Selection Process	
Details	Number of Companies
Publicly-listed U.K. firms (Listed throughout the sample period 1992-2017)	9912
Less: firms whose primary quotation is not in UK	(3958)
Less: Financial firms	(843)
Less: firms with no industry identifications	(1265)
Less: firms with currencies other than sterling	(1134)
Less: firms that report negative pre-tax income	(1853)
Less: firms that report negative book income	(71)
Less: firms that report negative current tax expense	(66)
Less: firms that do not have income tax expense for 6 consecutive years	(383)
Less: firms that do not have cash tax for 6 consecutive years	(60)
Final companies	323

Table 5.3: Industry Classification	
FTSE/DJ's Industry Classification	Number of Companies
Basic Materials	24
Consumer Goods	60
Consumer Services	99
Health Care	10
Industrials	95
Oil & Gas	3
Technology	18
Telecommunications	3
Utilities	11
Total	323

5.3. Descriptive Statistics

Table 5.4 and table 5.5 panel A to B respectively present the summary statistics and univariate variable correlations for the dependent and independent variables employed in regressions for the hypotheses tests. Following Dyreng et al. (2008) and Guenther et al. (2017), the variable TA_CASH_{it} , which is used to proxy levels of corporate tax planning, is winsorised at zero and one to maintain a reasonable economic interpretation of the effective tax rate. All other financial accounting variables are deflated by the lagged total assets and are winsorised at the 1st and 99th percentiles.

Table 5.4 shows that cash tax payments ($Cash\ Tax\ Paid_{i,t}$) on average account for 3.28 percent of the opening total assets, and range from -0.01 percent to 11.04 percent of the opening total assets. The mean value of income tax accruals ($Tax\ Accruals_{i,t}$) is 0.0028, which indicates that income tax accruals account for 0.28 percent of the opening total assets on average. Income tax accruals averagely explain 28.27 percent of future one-year-ahead cash tax payments (mean of $\bar{R}_{Tax\ Accruals}^2=0.2827$); and one unit change in income tax accruals leads to 0.7436 unit change in the future one-year-ahead cash taxes on average (mean of $\delta_{Tax\ Accruals}=0.7436$). The mean (median) of the five-year cash ETR, i.e., TA_CASH_{it} , is 0.2712 (0.2756), which suggests that sample firms are able to maintain a long-run cash effective tax rate below 30% on average. The mean value of the indicator variable $AGGRESSIVE_{it}$ is 0.1435, suggesting that 14.35 percent of the sample firm-years are defined as engaging in tax-planning activities.

The minimum value of pre-tax profit ($PTBI_{it}$) is above zero (0.0072), because firms that report pre-tax financial reporting losses are excluded from the sample to mitigate the impact of tax losses carryforward on the informativeness of income tax accruals. The mean value of the indicator variable $TARGET1_{it}$ is 0.3691, suggesting that 36.91 percent of firm-years in the sample report pre-tax profit lower than that of the previous period. Variable $DECLINE_AMOUNT_{it}$, which is defined as the difference between pre-tax profits of the previous period and that of the current period scaled by the lagged total assets, has a mean value of -0.0119 and ranges from -0.1770 to 0.1996. This means that firms' pre-tax profit (year t) in the sample averagely rises by 1.19 percent of the opening total assets from their previous period (year $t-1$). The average of the indicator variable $TARGET2_{it}$ (0.7512) indicates that

75.12 percent of firm-years in the sample report pre-tax profits that are lower than what the financial analysts expected. The variable $ERROR_AMOUNT_{it}$, which is defined as the difference between analysts' expected pre-tax profits and the actual pre-tax profit reported by this firm, has a mean value of 0.0482, indicating that firms' reported pre-tax profit is averagely 4.82 percent lower than the pre-tax profits forecasted by financial analysts. The mean value of the indicator variable $TARGET3_{it}$ (0.0403) indicates that 4.03 percent of firm-years report zero or slightly positive post-tax profit (i.e., the net income divided by market value of equity is between 0 and 0.02).

In terms of the corporate governance data, the mean value of $COVERAGE_{it}$ is 8.0130, with values ranging from 1 to 43, indicating an average of 8 financial analysts making forecasts about earnings for a particular firm-year, and the maximum (minimum) number of financial analysts covering a firm is 43 (1). The mean value of the indicator variable $AUDIT_{it}$ shows that on average 76.02 percent of the sample firms employ auditors from one of the "big four" auditing firms. The mean value of $INSTITUTION_{it}$ (0.1632) indicates that institutional shareholders averagely hold 16.32 percent of firms' common outstanding shares in the sample. On average, 65.35 percent of non-executive directors serve the board (mean value of $BOARD_{it}=0.6535$), which is consistent with Wahab and Holland (2012) that the average level of non-executive directors serving the board is proportionately higher than that of executive directors in UK.

Table 5.5 panel A shows that the cash tax payment ($Cash\ Tax\ Paid_{i,t}$) and the income tax accruals ($Tax\ Accruals_{i,t}$) are negatively correlated (-0.2564), and are both positively correlated with tax cash flows over the future one to five years ($Cash\ Tax\ Paid_{i,t+1}$ through $Cash\ Tax\ Paid_{i,t+5}$). Table 5.5 panel B shows that the two measures of firm-specific informativeness of income tax accruals ($\bar{R}_{Tax\ Accruals}^2$ and $\delta_{Tax\ Accruals}$) are highly correlated, with a ratio of 0.5707. Correlations between the informativeness of income tax accruals (measured by $\bar{R}_{Tax\ Accruals}^2$ and $\delta_{Tax\ Accruals}$) and the level of corporate tax planning (measured by TA_CASH_{it} and $AGGRESSIVE_{it}$) are as expected: $\bar{R}_{Tax\ Accruals}^2$ and $\delta_{Tax\ Accruals}$ are positively correlated with TA_CASH_{it} (0.1216 and 0.0708, respectively) and are negatively correlated with $AGGRESSIVE_{it}$ (-0.0675 and -0.0062, respectively). In addition, both measures of firm-specific informativeness of income tax accruals are negatively correlated with $TARGET1_{it}$ (-0.0117 and -0.0138); $DECLINE_AMOUNT_{it}$ (-0.0178 and -0.0363); and

$TARGET3_{it}$ (-0.0076 and -0.0488), which provides initial univariate evidence to support the hypothesis that firms with strong incentives to meet particular earnings targets, i.e., to avoid reporting a decline in the post-tax earnings or to avoid reporting a post-tax loss, are more likely to manipulate income tax accruals which compromises the ability of income tax accruals to explain future tax cash flows. However, the positive correlations between firm-specific informativeness of income tax accruals and $TARGET2_{it}$ (0.0355 and 0.0262) and $ERROR_AMOUNT_{it}$ (0.0967 and 0.0397) are not as expected, which potentially implies that the analysts' consensus forecasts regarding the level of pre-tax profit may not be a strong target that motivates managers to manipulate income tax accruals for the purposes of managing earnings to meet analysts' expectation.

Correlations between firm-specific informativeness of income tax accruals and variables of tax-related firm characteristics are generally consistent with expectations: the informativeness of income tax accruals (measured by $\bar{R}_{Tax\ Accruals}^2$ and $\delta_{Tax\ Accruals}$) is positively correlated with firm profitability ($PTBI_{it}$, 0.0834 and 0.0712) and the level of capital intensity ($CAPINT_{it}$, 0.0300 and 0.0537); and is negatively correlated with firm size ($SIZE_{it}$, -0.2635 and -0.1243), firm growth ($GROWTH_{it}$, -0.0506 and -0.0845), leverage ratio ($LEVERAGE_{it}$, -0.1222 and -0.1652), levels of discontinued operation ($DISCONTINUE_{it}$, -0.0240 and -0.0034), the number of firms' operational segments ($SEGMENT_{it}$, -0.0400 and -0.0250) and firms' long-term deferred tax balances ($DEFER_{it}$, -0.0703 and -0.0362). However, the positive correlations between the informativeness of income tax accruals and the proxies to capture firms' operational uncertainty, i.e., VOL_PTBI_{it} (0.1165 and 0.0524) and $VOL_CASHFLOW_{it}$ (0.2354 and 0.1707), are not consistent with the hypothesis. More important, the correlation matrix shown in table 5.5 panel A to panel B does not initially signify the existence of extreme multicollinearity issues between two variables employed in the regression analysis, as the univariate variable correlations are all below 0.8.

Table 5.4: Descriptive Statistics

Firm N=323	Mean	Median	Max	Min	Standard Deviation
Cash Tax Paid _{it}	0.0328	0.0277	0.1104	-0.0001	0.0232
Tax Accruals _{it}	0.0028	0.0021	0.0510	-0.0382	0.0132
$\bar{R}_{\text{Tax Accruals}}^2$	0.2827	0.2193	1.2295	-0.4519	0.3835
$\delta_{\text{Tax Accruals}}$	0.7436	0.7306	3.5789	-1.5415	0.7186
TA_CASH _{it}	0.2712	0.2756	1.0000	0.0000	0.0886
AGGRESSIVE _{it}	0.1435	0.0000	1.0000	0.0000	0.3506
PTBI _{it}	0.1400	0.1186	0.5143	0.0072	0.0949
VOL_PTBI _{it}	0.0417	0.0300	0.2196	0.0043	0.0388
VOL_CASHFLOW _{it}	0.0472	0.0352	0.2221	0.0058	0.0400
SIZE _{it}	12.2554	11.9790	17.2603	8.3982	2.0201
GROWTH _{it}	3.1014	2.3150	17.3300	0.4800	2.7262
CAPINT _{it}	0.2963	0.2431	1.0828	0.0053	0.2327
LEVERAGE _{it}	0.1345	0.0920	0.6862	0.0000	0.1522
SEGMENT _{it}	3.4063	3.0000	10.0000	1.0000	2.3099
DISCONTINUE _{it}	0.0003	0.0000	0.6814	-0.1508	0.0141
DEFER_BALANCE _{it}	0.0871	0.0000	4.7510	-0.4341	0.5548
TARGET1 _{it}	0.3691	0.0000	1.0000	0.0000	0.4826
DECLINE_AMOUNT _{it}	-0.0119	-0.0111	0.1996	-0.1770	0.0492
TARGET2 _{it}	0.7512	1.0000	1.0000	0.0000	0.4327
ERROR_AMOUNT _{it}	0.0482	0.0205	0.4105	-0.2596	0.0989
TARGET3 _{it}	0.0403	0.0000	1.0000	0.0000	0.1966
COVERAGE _{it}	8.0130	6.0000	43.0000	1.0000	6.6332
AUDIT _{it}	0.7602	1.0000	1.0000	0.0000	0.4269
INSTITUTION _{it}	0.1632	0.0000	1.0000	0.0000	0.3070
BOARD _{it}	0.6535	0.6667	1.0000	0.2222	0.1356
YEAR	13.5000	13.5000	1.0000	26.0000	7.5004
PERIOD	2.1900	2.5000	1.0000	3.0000	0.8780

See table 4.1 for detailed information about the variable definition

Table 5.5: Pairwise Correlation Matrix

Panel A	Cash Tax Paid _{i,t+1}	Cash Tax Paid _{i,t+2}	Cash Tax Paid _{i,t+3}	Cash Tax Paid _{i,t+4}	Cash Tax Paid _{i,t+5}	Cash Tax Paid _{i,t}	Tax Accruals _{i,t}
Cash Tax Paid _{i,t}	0.7561	0.6662	0.6050	0.5515	0.5169	1.0000	
Tax Accruals _{i,t}	0.1978	0.1616	0.1244	0.1268	0.0940	-0.2564	1.0000

Panel B	$\bar{R}_{\text{Tax Accruals}}^2$	$\delta_{\text{Tax Accruals}}$	TA_CASH	AGGRESSIVE	PTBI	VOL_PTBI	VOL_CASHFLOW	SIZE	GROWTH	CAPINT	LEVERAGE	DISCONTINUE	SEGMENT	DEFER	TARGET1	DECLINE_AMOUNT	TARGET2	ERROR_AMOUNT	TARGET3
$\bar{R}_{\text{Tax Accruals}}^2$	1.0000																		
$\delta_{\text{Tax Accruals}}$	0.5717	1.0000																	
TA_CASH	0.1216	0.0708	1.0000																
AGGRESSIVE	-0.0675	-0.0062	-0.5978	1.0000															
PTBI	0.0834	0.0712	-0.0618	-0.0914	1.0000														
VOL_PTBI	0.1165	0.0524	0.0407	0.0490	0.2939	1.0000													
VOL_CASHFLOW	0.2354	0.1707	0.0553	-0.0074	0.3079	0.6108	1.0000												
SIZE	-0.2635	-0.1243	-0.1250	0.0839	-0.2389	-0.2046	-0.3236	1.0000											
GROWTH	-0.0506	-0.0845	-0.0266	-0.0863	0.5240	0.1534	0.0724	0.0269	1.0000										
CAPINT	0.0300	0.0537	0.0345	-0.0688	0.0054	-0.0536	-0.0704	0.0267	-0.0411	1.0000									
LEVERAGE	-0.2222	-0.1652	-0.1844	0.1448	-0.1993	-0.1286	-0.2041	0.3872	0.0318	0.0538	1.0000								
DISCONTINUE	-0.0240	-0.0034	0.0068	0.0061	-0.0240	-0.0271	-0.0435	0.0689	0.0118	0.0036	0.0344	1.0000							
SEGMENT	-0.0400	0.0250	0.0330	0.0535	0.0141	0.1145	-0.0505	0.3716	0.1228	0.1153	0.0734	0.0523	1.0000						
DEFER	-0.0703	-0.0362	-0.0384	0.0376	-0.0361	-0.0370	-0.0901	0.2954	0.0071	-0.0171	0.1191	0.0589	0.1602	1.0000					
TARGET1	-0.0117	-0.0138	0.0838	-0.0064	-0.3257	0.0678	-0.0240	-0.0163	-0.1274	-0.0236	0.0066	0.0416	0.0308	-0.0002	1.0000				
DECLINE_AMOUNT	-0.0178	-0.0363	0.0672	0.0155	-0.5280	0.0053	-0.0534	0.0614	-0.2045	-0.0180	0.0149	0.0508	0.0042	0.0064	0.6497	1.0000			
TARGET2	0.0355	0.0262	0.0358	-0.0273	-0.0550	0.0115	-0.0104	-0.0626	0.0822	-0.0648	-0.0550	-0.0483	0.0837	-0.0545	0.0003	0.0255	1.0000		
ERROR_AMOUNT	0.0967	0.0397	0.1297	-0.0205	-0.1811	0.0035	-0.0020	-0.0637	0.0250	-0.1090	-0.0778	-0.0438	0.0410	-0.0693	0.1282	0.1061	0.4957	1.0000	
TARGET3	-0.0076	-0.0488	0.0820	-0.0122	-0.1135	0.1445	0.0636	-0.0163	0.1354	-0.0376	0.0459	0.0480	0.0256	-0.0203	0.1553	0.1630	0.0711	0.1617	1.0000

5.4. Conclusion

This chapter focuses on describing the data and sample employed in the estimation models for hypotheses tests. In summary, this study employs a panel dataset of publicly-traded non-financial U.K. companies for the period 1992 to 2016. The data employed in the dataset can be classified into three types: the reported financial accounting and taxation data; the corporate governance data; and the industry classification. The financial accounting and taxation data is obtained from the Worldscope; the corporate governance data is obtained from Datastream, Capital IQ and the Institutional Brokers Estimate System (I/B/E/S) database; and the industry classification is based on the Financial Times Stock Exchange (FTSE)/ Dow John (DJ)'s industry classification benchmark industry name (ICBIN).

Chapter 6
Regression Analysis and Results

6.1. Introduction

This chapter focuses on the regression analyses based on the estimation models developed in chapter 4 and the sample discussed in chapter 5. This chapter begins with discussing the multivariate regression results generated from testing the first to the third hypothesis, and proceeds with conducting further analyses to test the robustness of the regression results. The final section concludes this chapter.

In conducting the regression analyses, heteroscedasticity and multicollinearity problems have been tested and reported based on the Breusch and Pagan (1979) test and the variance inflation factors (VIF), respectively. The Quantile-normal plots are employed to check whether the model residuals are normally distributed²³⁰. All continuous variables are winsorised at the 1st and 99th percentile to mitigate the influence of outliers and are scaled by the lagged total assets to control for the scale-related heteroscedasticity problems. Moreover, the year fixed effect is included to adjust the cross-sectional correlation in the error term resulting from common shocks across years (Jayaraman 2007). The industry fixed effect is included to control for the systematic difference across industries which may affect the informativeness of income tax accruals. Standard errors are clustered at firm level to correct for potential problems of serial correlation arising from the inter-dependence in the error terms across years for a given firm (Petersen 2009).

6.2. Multivariate Regression Results for the First Hypothesis

Table 6.1 panel A and panel B present regression results of estimating model (1) and model (2), respectively. The Breusch-Pagan tests indicate that there is a significant level of heteroscedasticity. Therefore, standard robust errors are used to control for the heteroscedasticity problem (Eicker 1963). Results in table 6.1 panel A reveal that the current cash tax payment, $Cash\ Tax\ Paid_{i,t}$, is significant in predicting future one- to five-year ahead cash tax payments, which is consistent with the prediction that firms' future tax cash flows are related to the current cash tax payments²³¹. The R-square statistics in table 6.1 panel A indicate

²³⁰ The normality of model residuals is checked and reported in appendix D. Figures reported in appendix D show that the distribution of residuals of models employed for the hypotheses tests does not severely violate the normality assumption.

²³¹ A firm's future tax-related cash flows can be associated with its current cash tax payments because many tax incentives are serially correlated over time (Citron et al. 2013). For example, under UK tax legislation, the

that the predictability of current tax payments reduces monotonically, from explaining 58.67 percent of variations in future one-year ahead cash tax payments to 32.69 percent of variations in future five-year ahead cash tax payments.

Results in table 6.1 panel B reveal that the income tax accruals, $Tax\ Accruals_{i,t}$, are incrementally informative over cash tax payment in explaining future one- to five-year ahead cash tax payments. Specifically, the Chi-squares from the Wald tests reject the null hypothesis that the coefficients of $Tax\ Accruals_{i,t}$ in model (2) are not significantly different from zero. The likelihood ratio tests reject the null hypothesis that the predictive ability of those two models are the same, indicating that model (2) which exhibits higher R^2 performs significantly better than model (1). Differences between R^2 of model (1) and that of model (2) imply that the income tax accruals of the current period explain approximate 4.58 percent to 15.04 percent of variations in future cash tax payments.

Overall, results reported in table 6.1 panel A and panel B provide evidence that cash tax payments and income tax accruals are both useful predictors of future tax cash flows. Although the provisioning process of income tax accruals relies on managers' estimations and assumptions about the tax implications of firms' business operations, and therefore may involve managerial intentional or unintentional estimation errors, income tax accruals are averagely found to be incrementally informative over cash tax payments in predicting future one- to five-year ahead tax cash flows.

systematic annual amortisation of intangible assets is generally allowable for tax deductions over their useful lives. In addition, the tax benefits arising from firms' operation in foreign low-tax jurisdictions can also be serially correlated until such activities are forbidden and terminated by tax authorities. See section 4.3.1 on page 182 for detailed information.

Table 6.1 Regression Results: Incremental Informativeness of Income Tax Accruals

Panel A: This table presents the results of whether firms' current-period cash tax payment is a significant predictor of firms' future tax payments, based on the following model (1). $Cash\ Tax\ Paid_{i,t+\rho}$ or $\sum Cash\ Tax\ Paid_{i,t+5} = \alpha + \beta Cash\ Tax\ Paid_{i,t} + \varepsilon_{i,t}$ (1)						
	T+1	T+2	T+3	T+4	T+5	T+1~T+5
Cash Tax Paid _{i,t}	0.7274 (34.73)***	0.6255 (23.13)***	0.5555 (18.13)***	0.5078 (15.04)***	0.4751 (12.45)***	2.9423 (19.29)***
Constant	0.0061 (3.66)***	0.0082 (3.96)***	0.0150 (6.74)***	0.0186 (7.09)***	0.0186 (6.48)***	0.0616 (6.06)***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3311	3026	2741	2,457	2178	2058
R-Square	0.5867	0.4733	0.4072	0.3544	0.3269	0.5563
F-statistic	68.10 P=0.000	33.84 P=0.000	22.19 P=0.000	14.65 P=0.000	11.78 P=0.000	22.09 P=0.000
Breusch-Pegan test	591.33 P=0.000	355.34 P=0.000	270.56 P=0.000	168.32 P=0.000	170.67 P=0.000	167.09 P=0.000
Panel B: This table presents the results of whether firms' current-period income tax accrual is a significant predictor of firms' future tax payments, based on the following model (2). $Cash\ Tax\ Paid_{i,t+\rho}$ or $\sum Cash\ Tax\ Paid_{i,t+5} = \phi + \delta Cash\ Tax\ Paid_{i,t} + \delta Tax\ Accruals_{i,t} + \varepsilon_{i,t}$ (2)						
	T+1	T+2	T+3	T+4	T+5	T+1~T+5
Cash Tax Paid _{i,t}	0.8399 (58.45)***	0.7175 (31.23)***	0.6337 (23.12)***	0.5719 (18.20)***	0.5289 (14.57)***	3.3257 (25.48)***
Tax Accruals _{i,t}	0.7085 (24.40)***	0.5847 (17.33)***	0.4893 (13.84)***	0.4396 (13.04)***	0.3721 (9.29)***	2.6560 (17.06)***
Constant	0.0019 (1.72)*	0.0047 (2.68)***	0.0120 (6.20)***	0.0160 (6.80)***	0.0162 (6.01)***	0.0475 (5.50)***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3311	3026	2741	2457	2178	2058
R-Square	0.7371	0.5781	0.4827	0.4169	0.3727	0.6718
Differences between R-Squares of model 1 and model 2	0.1504	0.1048	0.0755	0.0652	0.0458	0.1155
F-statistic	168.31 P=0.000	57.11 P=0.000	31.21 P=0.000	21.89 P=0.000	15.80 P=0.000	35.18 P=0.000
Breusch-Pegan test	645.64 P=0.000	636.74 P=0.000	442.85 P=0.000	313.81 P=0.000	218.18 P=0.000	310.16 P=0.000

Chapter 6 Regression Analysis and Results

VIF	1.80	1.74	1.69	1.63	1.57	1.56
Chi ² for wald test of $\delta=0$	595.51 P=0.000	300.19 P=0.000	191.43 P=0.000	170.11 P=0.000	86.35 P=0,000	291.00 P=0.000
Likelihood ratio test of the equality of goodness-of-fit between model (1) and model (2)	1497.35 P=0.000	671.19 P=0.000	373.29 P=0.000	249.99 P=0.000	153.40 P=0.000	620.16 P=0.000
Regression estimations are conducted with the employment of clustered firm-level Eicker-Huber-White robust standard errors. The figures in parentheses are t-statistics, ***, ** and * denote significance at 1%, 5% and 10% respectively.						

6.3. Multivariate Regression Results for the Second Hypotheses

6.3.1. Tax management incentives and the informativeness of income tax accruals

After confirming that income tax accruals are incrementally informative over cash tax payments in predicting future tax cash flows on average, the second hypotheses of this study are designed to investigate the cross-sectional determinative factors that cause variations in the incremental informativeness of income tax accruals across firms. It is expected that firms with strong incentives to 1) undertake tax planning activities for the purpose of reducing corporate tax burdens or; 2) achieve particular earnings targets through manipulating income tax accruals will likely induce tax-related-financial-reporting transparency issues and intentional and/or unintentional estimation errors to income tax accruals, resulting in reduced incremental informativeness of income tax accruals in explaining future tax cash flows. Table 6.2 to table 6.7 present multivariate regression results of estimating model (3.11) to model (3.14) in testing the impact of tax management incentives on the incremental informativeness of income tax accruals. In order to alleviate concerns about potential heteroscedasticity and autocorrelations in error terms across years for a given firm, t-statistics and p-values are reported based on the Eicker-Huber-White robust standard errors corrected for firm clustering (Petersen 2009).

Corporate Tax Planning. Estimating the model (3.11) to test the impact of corporate tax planning on the incremental informativeness of income tax accruals yields results presented in the following table 6.2. Four sets of results are reported in table 6.2 column I to column IV. Column I and column II present results of estimating model (3.11) where the incremental informativeness of income tax accruals is captured by $\delta_{Tax\ Accruals}$, i.e., the slope coefficient of $Tax\ Accruals_{it}$ generated from model (2). Column III and column IV present the results of estimating model (3.11) where the incremental informativeness of income tax accruals is captured by $\bar{R}_{Tax\ Accruals}^2$, i.e., the difference between the coefficients of determination generated from model (1) and (2). Corporate tax planning is measured by TA_CASH_{it} , firms' five-year cash effective tax rate, and $AGGRESSIVE_{it}$, the indicator variable which equals 1 if a firm's TA_CASH_{it} is in the lowest quintile within the pooled sample of firms, and 0 otherwise.

The coefficient estimates reported in table 6.2 column I to column IV support hypothesis H2a which predicts the negative relationship between the incremental informativeness of income

tax accruals and the level of corporate tax planning. Specifically, as shown in column I to column IV, the coefficients of $AGGRESSIVE_{it}$ are highly significant with expected negative sign (-0.1823 with $t=-2.74$ and -0.0922 with $t=-3.12$, respectively), while the coefficients of TA_CASH_{it} are significant with expected positive sign (0.6528 with $t=1.95$ and 0.3719 with $t=2.17$, respectively). These findings suggest that consistent with the hypothesis H2a, the informativeness of income tax accruals is significantly lower for firms that undertake tax planning activities designed to reduce their cash tax burden, which may either be because tax planning activities inevitably increase the organizational complexity and aggravate the uncertainty regarding future challenges and penalties by tax authorities, thereby adding difficulties for managers to accurately estimate the taxable implications of their firms' operations; or because tax planning activities that are carried out with the intention to avoid providing roadmaps to tax authorities may increase the obfuscation and opacity of firms' tax disclosures and, hence, provide opportunities for self-interested managers to manipulate income tax accruals for opportunistic reason.

In terms of firm-specific variables that proxy the tax environment complexity, results reported in table 6.2 indicate significant negative relationships between the informativeness of income tax accruals and three variables: firm growth ($GROWTH_{it}$) when the informativeness is either captured by $\delta_{Tax\ Accruals}$ or $\bar{R}_{Tax\ Accrual}^2$, firm size ($SIZE_{it}$) and leverage ($LEVERAGE_{it}$) when the informativeness is captured by $\bar{R}_{Tax\ Accrual}^2$. These results provide evidence that the informativeness of income tax accruals in predicting future tax cash flows is significantly lower for large firms that are more likely to face difficulties in coordinating and communicating among different business departments during the decision-making process; for growth firms that are more inclined to engage in aggressive tax-planning activities due to their greater risk tolerance and continuous pursuits of entering into new product and geographic markets; and for highly-levered firms that may attempt to loosen their debt covenant constraints through managing book income upward which may result in the recognition of questionable tax accruals with limited ability to explain future cash taxes. However, the significantly positive coefficient of $VOL_CASHFLOW_{it}$ is inconsistent with the hypothesis and indicates a positive relationship between the informativeness of income tax accruals and the volatility of operating cash flows, which implies that the informativeness of income tax accruals is significantly lower for firms that are subject to income smoothing activities.

Table 6.2 Regression Result: Tax Planning and the Informativeness of Income Tax Accruals

This table presents the results of the impact of corporate tax planning on the incremental informativeness of income tax accruals, based on the following model (3.11).

$$TAX_INFORM_{it} = \omega_0 + \omega_{1c}AGGRESSIVE_{it}(TA_CASH_{it}) + \sum \omega_{2c}FIRM_CHARA_{it} + \sum \omega_{3c}CONTROL_{it} + \omega_{industry} + \omega_{year} + \varepsilon_{i,t} \quad (3.11)$$

The dependent variable TAX_INFORM_{it} represents the incremental informativeness of income tax accruals. It is captured by two measures, i.e., $\delta_{Tax\ Accruals}$ and $\bar{R}_{Tax\ Accrual}^2$. Variables of interest are $AGGRESSIVE_{it}$ and TA_CASH_{it} , which proxy the level of corporate tax planning. The explanatory variables include: $PTBI_{it}$: pre-tax income scaled by lagged total asset; VOL_PTBI_{it} : the standard deviation of annual pre-tax income scaled by lagged total assets over a rolling five-year window; $VOL_CASHFLOW_{it}$: the standard deviation of annual cash flow scaled by lagged total assets over a rolling five-year window; $SIZE_{it}$: the natural log of total assets; $GROWTH_{it}$: the ratio of firms' market value of equity to the book value of equity; $CAPINT_{it}$: gross cost of property, plant and equipment scaled by the lagged total assets; $LEVERAGE_{it}$: the ratio of long-term debt to total assets; $DISCONTINUE_{it}$: the absolute value of earnings from discontinued operation scaled by the lagged total assets; $SEGMENT_{it}$: the number of segments in which a firm operates; $DEFER_{it}$: long-term deferred tax balances scaled by the lagged total assets. Industry and year fixed effects are included in all regressions.

Regression estimations are conducted with the employment of clustered firm-level Eicker-White robust standard errors.

The figures in parentheses are t-statistics, ***, ** and * denote significance at 1%, 5% and 10% respectively.

	Informativeness denoted as $\delta_{Tax\ Accruals}$		Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$	
	I	II	III	IV
AGGRESSIVE_{it}	-0.1823 (-2.74)***		-0.0922 (-3.12)***	
TA_CASH_{it}		0.6528 (1.95)*		0.3719 (2.17)**
PTBI _{it}	0.3419 (1.06)	0.4821 (1.46)	-0.0537 (-0.31)	0.0253 (0.15)
VOL_PTBI _{it}	-0.2319 (-0.28)	-0.4616 (-0.55)	0.0118 (0.03)	-0.1003 (-0.22)
VOL_CASHFLOW _{it}	2.5651 (3.12)***	2.6289 (3.18)***	1.1744 (2.62)**	1.2002 (2.73)***
SIZE _{it}	-0.0117 (-0.53)	-0.0083 (-0.37)	-0.0287 (-2.30)**	-0.0271 (-2.15)**
GROWTH _{it}	-0.0238 (-2.17)**	-0.0260 (-2.36)**	-0.0078 (-1.90)*	-0.0091 (-2.19)**
CAPINT _{it}	0.1796 (1.04)	0.1762 (1.03)	0.1277 (1.42)	0.1245 (1.37)
LEVERAGE _{it}	-0.1375 (-0.90)	-0.1418 (-0.91)	-0.1683 (-2.07)**	-0.1663 (-2.00)**
DISCONTINUE _{it}	4.2622 (0.61)	3.4407 (0.48)	-0.4625 (-0.19)	-0.8100 (-0.33)
SEGMENT _{it}	-0.0041 (-0.26)	-0.0074 (-0.46)	-0.0072 (-0.93)	-0.0089 (-1.16)
DEFER _{it}	-0.0901 (-0.09)	-0.1652 (-0.16)	0.0720 (0.20)	0.0435 (0.12)

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Constant	0.4614 (1.30)	0.1902 (0.55)	0.2454 (1.28)	0.1061 (0.55)
Industry Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	1255	1255	1255	1255
R-Square	0.1604	0.1530	0.2595	0.2550
VIF	1.41	1.42	1.41	1.42
Breusch-Pagan Test	23.58 P=0.000	24.75 P=0.000	111.42 P=0.000	105.64 P=0.000

Earnings Target 1. Hypothesis H2b predicts that the lower a firm's current period's pre-tax profit as compared to that of its previous period, the greater the incentive of this firm to manipulate its income tax accruals for the purpose of avoiding the report of an apparent decline in its post-tax profits, which may result in intentional estimation errors in the income tax accounts and compromised ability of income tax accruals to explain future tax cash flows. That is, the incremental informativeness of income tax accruals is expected to be negatively associated with whether and by how much a firm's current pre-tax profit is lower than that of its previous period.

Table 6.3 reports regression results based on the model (3.12). In this model, the variable $DECLINE_AMOUNT_{it}$ captures the impact of the differences between a firm's previous period's pre-tax profit and that of the current period on the informativeness of income tax accruals, for firm-years where $TARGET1_{it}$ equals 0; while the interaction term $TARGET1_{it} \times DECLINE_AMOUNT_{it}$ captures the marginal impact of $DECLINE_AMOUNT_{it}$ on the informativeness of income tax accruals for firm-years where $TARGET1_{it}$ equals 1 (Beekes et al. 2004).

Results reported in table 6.3 column I and column II are consistent with the hypothesis H2b, in which the coefficients of the interaction term $TARGET1_{it} \times DECLINE_AMOUNT_{it}$ are highly significant with expected negative sign (-2.2630 with $t=-2.75$ and -1.1430 with $t=2.60$, respectively). The sum of the coefficients on $DECLINE_AMOUNT_{it}$ and $TARGET1_{it} \times DECLINE_AMOUNT_{it}$ is also negative ($\tau_{2c} + \tau_{3c} = -1.0240$ and -1.5946, respectively). These results indicate that the informativeness of income tax accruals is negatively associated with how much firms' current pre-tax profit is lower than that of its previous period. Specifically, one unit increase in $DECLINE_AMOUNT_{it}$, i.e., a one unit decline in firms' current period's pre-tax profit compared to that of the previous period, leads to 1.0240 (1.5946) units decrease in the informativeness of income tax accruals as measured by $\delta_{Tax\ Accruals} (\bar{R}_{Tax\ Accruals}^2)^{232}$.

²³² The coefficients of $DECLINE_AMOUNT_{it}$ are positive and significant (1.2390 with $t=2.47$ and 0.4516 with $t=1.88$, respectively), indicating that for firm-years which have not missed previous period's pre-tax profit (i.e., current period's pre-tax profit exceeds that of the previous period, $TARGET1_{it}=0$), the better the current pre-tax performance as compared to that of the previous period, the lower the informativeness of income tax accruals. This potentially indicates that firm-years with pre-tax profit significantly outperforming that of the previous period also have incentives to manipulate income tax accruals for the purpose of earnings management (e.g., smoothing post-tax profit), which results in reduced informativeness of income accruals.

Table 6.4 reports regression results after partitioning the whole sample into two subsamples, i.e., the subsample of firm-years where $TARGET1_{it}$ equals 1 and the subsample of firm-years where $TARGET1_{it}$ equals 0. If it is consistent with the hypothesis H2b, a negative relationship between the informativeness of income tax accruals ($\bar{R}_{Tax\ Accruals}^2$ or $\delta_{Tax\ Accruals}$) and the difference between firms' previous period's pre-tax profit and that of the current period ($DECLINE_AMOUNT_{it}$) should be observed in the subsample of firm-years that have missed previous-period's pre-tax profit (i.e., $TARGET1_{it}$ equals 1). As shown in table 6.4 column I to column IV, the coefficients of $DECLINE_AMOUNT_{it}$ are negative and significant (-1.2023 with $t=-1.77$ and -0.8859 with $t=-2.08$, respectively) for the subsample of firm-years that have missed previous period's pre-tax profit ($TARGET1_{it}=1$). However, the coefficients of $DECLINE_AMOUNT_{it}$ are positive and insignificant (0.8494 with $t=1.50$ and 0.3503 with $t=1.44$, respectively) for the subsample of firm-years that have not missed previous period's pre-tax profit ($TARGET1_{it}=0$).

Overall, results reported in table 6.3 and table 6.4 provide strong empirical evidence that the informativeness of income tax accruals is negatively associated with how much firms' current pre-tax profit is lower than that of the previous period.

In terms of the firm-specific variables that proxy the tax environment complexity, results reported in table 6.3 and table 6.4 are generally consistent with results reported in table 6.2, which indicates negative relationships between the informativeness of income tax accruals and firm size ($SIZE_{it}$); firm leverage ($LEVERAGE_{it}$) and firm growth ($GROWTH_{it}$), and the positive relationship between the informativeness of income tax accruals and the volatility of firms' operating cash flows ($VOL_CASHFLOW_{it}$). In addition, as shown in table 6.4 column III, the level of firms' capital intensity ($CAPINT_{it}$) has a significant positive impact on the informativeness of income tax accruals, suggesting that taking advantage of the capital allowances from qualified fixed assets represents a benign tax investment activity with relatively stable and well-predictable future cash tax outcomes.

Table 6.3 Regression Result:**Earnings Target 1 (Avoid Earnings Decline) and the Informativeness of Income Tax Accruals**

This table presents the results of testing if the incremental informativeness of income tax accruals is negatively related to whether and by how much a firm has missed its previous period's pre-tax profit, based on the following model (3.12)

$$TAX_INFORM_{it} = \tau_0 + \tau_{1c}TARGET1_{it} + \tau_{2c}DECLINE_AMOUNT_{it} + \tau_{3c}TARGET1_{it} * DECLINE_AMOUNT_{it} + \sum \tau_{4c}FIRM_CHARA_{it} + \sum \tau_{5c}CONTROL_{it} + \tau_{industry} + \tau_{year} + \varepsilon_{i,t} \quad (3.12)$$

The dependent variable TAX_INFORM_{it} represents the incremental informativeness of income tax accruals. It is captured by two measures, i.e., $\delta_{Tax\ Accruals}$ and $\bar{R}_{Tax\ Accrual}^2$. The variable of interest is the interaction term $TARGET1_{it} \times DECLINE_AMOUNT_{it}$. $TARGET1_{it}$ equals 1 if a firm's current pre-tax profit is lower than that of previous period, and 0 otherwise. $DECLINE_AMOUNT_{it}$ captures the difference between a firm's previous period's pre-tax profit and that of its current period. The explanatory variables include: $PTBI_{it}$: pre-tax income scaled by lagged total asset; VOL_PTBI_{it} : the standard deviation of annual pre-tax income scaled by lagged total assets over a rolling five-year window; $VOL_CASHFLOW_{it}$: the standard deviation of annual cash flow scaled by lagged total assets over a rolling five-year window; $SIZE_{it}$: the natural log of total assets; $GROWTH_{it}$: the ratio of firms' market value of equity to the book value of equity; $CAPINT_{it}$: gross cost of property, plant and equipment scaled by the lagged total assets; $LEVERAGE_{it}$: the ratio of long-term debt to total assets; $DISCONTINUE_{it}$: the absolute value of earnings from discontinued operation scaled by the lagged total assets; $SEGMENT_{it}$: the number of segments in which a firm operates; $DEFER_{it}$: long-term deferred tax balances scaled by the lagged total assets. Industry and year fixed effects are included in all regressions.

Regression estimations are conducted with the employment of clustered firm-level Eicker-Huber-White robust standard errors. The figures in parentheses are t-statistics, ***, ** and * denote significance at 1%, 5% and 10% respectively.

	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accruals}^2$
	I	II
TARGET1 _{it}	-0.0187 (-0.58)	0.0051 (0.32)
DECLINE_AMOUNT _{it}	1.2390 (2.47)**	0.4516 (1.88)*
TARGET1 _{it} × DECLINE_AMOUNT _{it}	-2.2630 (-2.75)***	-1.1430 (-2.60)**
PTBI _{it}	0.5090 (1.31)	-0.0115 (-0.06)
VOL_PTBI _{it}	-0.0086 (-0.01)	0.0702 (0.15)
VOL_CASHFLOW _{it}	2.9047 (3.56)***	1.3309 (3.07)***
SIZE _{it}	-0.0028 (-0.13)	-0.0247 (-1.92)*
GROWTH _{it}	-0.0239 (-2.11)**	-0.0071 (-1.51)
CAPINT _{it}	0.1968 (1.13)	0.1307 (1.45)
LEVERAGE _{it}	-0.2542 (-1.63)	-0.2295 (-2.71)***
DISCONTINUE _{it}	4.1732 (0.56)	-0.0803 (-0.03)
SEGMENT _{it}	-0.0062 (-0.37)	-0.0080 (-1.02)
DEFER _{it}	-0.2804 (-0.27)	-0.0612 (-0.17)
Constant	0.1431 (0.44)	0.1034 (0.54)
Industry Dummies	Yes	Yes
Year Dummies	Yes	Yes
Observations	1286	1286
R-Square	0.1585	0.2488
VIF	1.92	1.92
Breusch-Pagan Test	24.58 P=0.000	109.80 P=0.000

Table 6.4 Regression Result: Earnings Target 1 (Avoid Earnings Decline) and the Informativeness of Income Tax Accruals

This table presents the results of testing if the incremental informativeness of income tax accruals is negatively related to whether and by how much a firm has missed its previous period's pre-tax profit, by partitioning the entire sample into two subsamples of firm-years, i.e., where $TARGET1_{it}$ equals 1 and where $TARGET1_{it}$ equals 0.

The dependent variable TAX_INFORM_{it} represents the incremental informativeness of income tax accruals. It is captured by two measures, i.e., $\delta_{Tax\ Accruals}$ and $\bar{R}_{Tax\ Accrual}^2$. The variable of interest is $DECLINE_AMOUNT_{it}$, which captures the difference between a firm's previous period's pre-tax profit and that of its current period. The explanatory variables include: $PTBI_{it}$: pre-tax income scaled by lagged total asset; VOL_PTBI_{it} : the standard deviation of annual pre-tax income scaled by lagged total assets over a rolling five-year window; $VOL_CASHFLOW_{it}$: the standard deviation of annual cash flow scaled by lagged total assets over a rolling five-year window; $SIZE_{it}$: the natural log of total assets; $GROWTH_{it}$: the ratio of firms' market value of equity to the book value of equity; $CAPINT_{it}$: gross cost of property, plant and equipment scaled by the lagged total assets; $LEVERAGE_{it}$: the ratio of long-term debt to total assets; $DISCONTINUE_{it}$: the absolute value of earnings from discontinued operation scaled by the lagged total assets; $SEGMENT_{it}$: the number of segments in which a firm operates; $DEFER_{it}$: long-term deferred tax balances scaled by the lagged total assets. Industry and year fixed effects are included in all regressions.

Regression estimations are conducted with the employment of clustered firm-level Eicker-Huber-White robust standard errors. The figures in parentheses are t-statistics, ***, ** and * denote significance at 1%, 5% and 10% respectively.

	Informativeness denoted as $\delta_{Tax\ Accruals}$		Informativeness denoted as $\bar{R}_{Tax\ Accruals}^2$	
	I	II	III	IV
	$TARGET1_{it}=1$	$TARGET1_{it}=0$	$TARGET1_{it}=1$	$TARGET1_{it}=0$
DECLINE_AMOUNT_{it}	-1.2023 (-1.77)*	0.8494 (1.50)	-0.8859 (-2.08)**	0.3505 (1.44)
PTBI _{it}	0.6553 (1.25)	0.4442 (1.07)	-0.1058 (-0.37)	0.0158 (0.07)
VOL_PTBI _{it}	1.4368 (1.26)	-0.9615 (-1.03)	0.5849 (0.98)	-0.2405 (-0.48)
VOL_CASHFLOW _{it}	2.0414 (2.20)**	3.2939 (3.37)***	1.3525 (2.68)***	1.2385 (2.59)**
SIZE _{it}	0.0035 (0.14)	-0.0020 (-0.08)	-0.0202 (-1.48)	-0.0268 (-1.84)*
GROWTH _{it}	-0.0369 (-2.19)**	-0.0181 (-1.51)	-0.0095 (-1.34)	-0.0051 (-0.99)
CAPINT _{it}	0.1818 (0.98)	0.2190 (1.21)	0.1882 (1.95)*	0.1067 (1.13)
LEVERAGE _{it}	-0.3275 (-1.67)*	-0.2491 (-1.43)	-0.2744 (-2.29)**	-0.2152 (-2.52)**
DISCONTINUE _{it}	15.7479 (1.35)	-1.2228 (-0.16)	1.0470 (0.27)	0.5615 (0.14)
SEGMENT _{it}	-0.0093 (-0.48)	-0.0065 (-0.36)	-0.0099 (-1.07)	-0.0077 (-0.91)

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DEFER _{it}	-0.5530 (-0.49)	-0.2323 (-0.21)	0.0117 (0.02)	-0.1067 (-0.28)
Constant	-0.3063 (-0.47)	0.1244 (0.35)	0.2705 (0.99)	0.1597 (0.77)
Industry Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	441	845	441	845
R-Square	0.2037	0.1728	0.2916	0.2535
VIF	1.50	1.50	1.50	1.50
Breusch-Pagan Test	0.23 P=0.6314	42.81 P=0.000	44.45 P=0.000	59.60 P=0.000

Earnings Target 2. Hypothesis H2b predicts that the lower a firm's actual pre-tax profits as compared to the pre-tax profits forecasted by financial analysts, the greater this firm's incentives to distort their income tax accruals for the purpose of meeting analysts' post-tax forecasts, which may result in increased intentional estimation errors in the income tax account and reduced ability of income tax accruals to explain future tax cash flows. That is, the informativeness of income tax accruals is expected to be negatively associated with whether and by how much the firm's actual pre-tax profit is lower than that expected by financial analysts.

Table 6.5 reports regression results based on the model (3.13). In this model, the variable $ERROR_AMOUNT_{it}$ captures the impact of the differences between analysts' forecasted and firms' actually-reported pre-tax profits on the informativeness of income tax accruals, for firm-years where $TARGET2_{it}$ equals 0; while the interaction term $TARGET2_{it} \times ERROR_AMOUNT_{it}$ captures the marginal impact of $ERROR_AMOUNT_{it}$ on the informativeness of income tax accruals for firm-years where $TARGET2_{it}$ equals 1.

Results reported in table 6.5 column I and column II show that the coefficients of the interaction term $TARGET2_{it} \times ERROR_AMOUNT_{it}$ are significant with unexpected positive sign (1.2616 with $t=1.80$ and 0.6694 with $t=1.92$, respectively). The sum of the coefficients on $ERROR_AMOUNT_{it}$ and $TARGET2_{it} \times ERROR_AMOUNT_{it}$ is also positive ($K_{2c} + K_{3c} = 0.7874$ and 0.4153, respectively). These results fail to support the hypothesis H2b which predicts that the informativeness of income tax accruals is negatively associated with how much firms' actual pre-tax profit is lower than the consensus analysts forecast.

Table 6.6 reports regression results after partitioning the whole sample into two subsamples, i.e., the subsample of firm-years where $TARGET2_{it}$ equals 1 and the subsample of firm-years where $TARGET2_{it}$ equals 0. A negative relationship between the informativeness of income tax accruals and $ERROR_AMOUNT_{it}$ should be observed in the subsample of firm-years where $TARGET2_{it}$ equals 1, if it is consistent with the hypothesis H2b that the incentives to distort income tax accruals for earnings management purposes is stronger for firms that have missed analysts' forecasted pre-tax profits. As shown in table 6.6 column I to column IV where the informativeness of income tax accruals is captured by $\delta_{Tax\ Accruals}$ and $\bar{R}_{Tax\ Accruals}^2$, the coefficients of $ERROR_AMOUNT_{it}$ are positive and significant (0.7749 with $t=2.16$ and 0.3519 with $t=2.25$, respectively) for the subsample of firm-years that report pre-tax profits

lower than the amount forecasted by financial analysts ($TARGET2_{it}=1$). There is no significant relationship between the informativeness of income tax accruals and $ERROR_AMOUNT_{it}$ (-0.9475 with $t=-1.47$ and -0.5789 with $t=-1.67$, respectively) for the subsample of firm-years where $TARGET2_{it}$ equals 0.

Overall, results reported in table 6.5 and table 6.6 fail to support the hypothesis H2b and imply that financial analysts' focus consensus regarding the level of earnings may not be a strong target that motivates managers to achieve through distorting their income tax accruals, even when their pre-tax profits fall below the amount forecasted by financial analysts.

In terms of the firm-specific variables that proxy the tax environment complexity, results reported in table 6.5 and table 6.6 are generally consistent with results reported in table 6.2 to table 6.4, which indicates negative relationships between the informativeness of income tax accruals and firm size ($SIZE_{it}$); firm leverage ($LEVERAGE_{it}$) and firm growth ($GROWTH_{it}$), and the positive relationship between the informativeness of income tax accruals and the volatility of firms' operating cash flows ($VOL_CASHFLOW_{it}$) and capital intensity ($CAPINT_{it}$). In addition, as shown in table 6.5 column I and column II, the number of firms' operating segments ($SEGMENT_{it}$) has a significant and negative impact on the informativeness of income tax accruals, which is potentially due to that firms operating in dispersed business environment face heightened information asymmetry; less-integrated financial information system; and barriers of coordination between business and geographic units, which increases the complexity of estimating income tax accruals and aggravates the probability of estimation errors in income tax accruals.

**Table 6.5 Regression Result:
Earnings Target 2 (Avoid Missing Analysts' Expectation)
and the Informativeness of Income Tax Accruals**

This table presents the results of testing if the incremental informativeness of income tax accruals is negatively related to whether and by how much a firm's pre-tax profit has missed analysts' forecasts, based on the following model (3.13)

$$TAX_INFORM_{it} = K_0 + K_{1c}TARGET2_{it} + K_{2c}ERROR_AMOUNT_{it} + K_{3c}TARGET2_{it} * ERROR_AMOUNT_{it} + \sum K_{4c}FIRM_CHARA_{it} + \sum K_{5c}CONTROL_{it} + K_{industry} + K_{year} + \varepsilon_{i,t} \quad (3.13)$$

The dependent variable TAX_INFORM_{it} represents the incremental informativeness of income tax accruals. It is captured by two measures, i.e., $\delta_{Tax\ Accruals}$ and $\bar{R}_{Tax\ Accrual}^2$. The variable of interest is the interaction term $TARGET2_{it} \times ERROR_AMOUNT_{it}$. $TARGET2_{it}$ equals 1 if a firm's actual pre-tax profit reported in I/E/B/S is less than that of most recent analysts' forecast consensus, and 0 otherwise. $ERROR_AMOUNT_{it}$ captures the difference between analysts' expected pre-tax profits and the actual pre-tax profit reported by this firm in I/E/B/S. The explanatory variables include: $PTBI_{it}$: pre-tax income scaled by lagged total asset; VOL_PTBI_{it} : the standard deviation of annual pre-tax income scaled by lagged total assets over a rolling five-year window; $VOL_CASHFLOW_{it}$: the standard deviation of annual cash flow scaled by lagged total assets over a rolling five-year window; $SIZE_{it}$: the natural log of total assets; $GROWTH_{it}$: the ratio of firms' market value of equity to the book value of equity; $CAPINT_{it}$: gross cost of property, plant and equipment scaled by the lagged total assets; $LEVERAGE_{it}$: the ratio of long-term debt to total assets; $DISCONTINUE_{it}$: the absolute value of earnings from discontinued operation scaled by the lagged total assets; $SEGMENT_{it}$: the number of segments in which a firm operates; $DEFER_{it}$: long-term deferred tax balances scaled by the lagged total assets. Industry and year fixed effects are included in all regressions.

Regression estimations are conducted with the employment of clustered firm-level Eicker-White robust standard errors. The figures in parentheses are t-statistics, ***, ** and * denote significance at 1%, 5% and 10% respectively.

	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accruals}^2$
	I	II
TARGET2 _{it}	-0.0038 (-0.08)	-0.0115 (-0.42)
ERROR_AMOUNT_{it}	-0.4775 (-0.73)	-0.2541 (-0.73)
TARGET2_{it} × ERROR_AMOUNT_{it}	1.2616 (1.80)*	0.6694 (1.92)*
PTBI _{it}	0.3953 (1.29)	0.1084 (0.57)
VOL_PTBI _{it}	-1.1882 (-1.17)	-0.6094 (-1.12)
VOL_CASHFLOW _{it}	3.5657 (2.44)**	0.7796 (0.315)
SIZE _{it}	0.0261 (0.84)	-0.0268 (-1.48)
GROWTH _{it}	-0.0116 (-1.18)	-0.0060 (-1.32)
CAPINT _{it}	0.7064 (2.65)**	0.1851 (1.48)
LEVERAGE _{it}	-0.4228 (-1.83)**	-0.1675 (-1.82)*
DISCONTINUE _{it}	-6.7927 (-0.98)	-3.5358 (-1.29)
SEGMENT _{it}	-0.0270 (-1.74)*	-0.0147 (-1.99)**
DEFER _{it}	0.1767 (0.18)	-0.0137 (-0.03)
Constant	0.1184 (0.27)	0.6321 (2.39)**
Industry Dummies	Yes	Yes
Year Dummies	Yes	Yes
Observations	434	434
R-Square	0.3549	0.3667

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VIF	2.81	2.81
Breusch-Pagan Test	0.47 P=0.4935	40.70 P=0.000

**Table 6.6 Regression Result:
Earnings Target 2 (Avoid Missing Analysts' Expectation) and the Informativeness of Income Tax Accruals**

This table presents the results of testing if the incremental informativeness of income tax accruals is negatively related to whether and by how much a firm's pre-tax profit has missed analysts' forecasts, by partitioning the entire sample into two subsamples of firm-years, i.e., where $TARGET2_{it}$ equals 1 and where $TARGET2_{it}$ equals 0.

The dependent variable TAX_INFORM_{it} represents the incremental informativeness of income tax accruals. It is captured by two measures, i.e., $\delta_{Tax\ Accruals}$ and $\bar{R}_{Tax\ Accrual}^2$. The variable of interest is $ERROR_AMOUNT_{it}$, which captures the difference between analysts' expected pre-tax profits and the actual pre-tax profit reported by this firm in I/E/B/S. The explanatory variables include: $PTBI_{it}$: pre-tax income scaled by lagged total asset; VOL_PTBI_{it} : the standard deviation of annual pre-tax income scaled by lagged total assets over a rolling five-year window; $VOL_CASHFLOW_{it}$: the standard deviation of annual cash flow scaled by lagged total assets over a rolling five-year window; $SIZE_{it}$: the natural log of total assets; $GROWTH_{it}$: the ratio of firms' market value of equity to the book value of equity; $CAPINT_{it}$: gross cost of property, plant and equipment scaled by the lagged total assets; $LEVERAGE_{it}$: the ratio of long-term debt to total assets; $DISCONTINUE_{it}$: the absolute value of earnings from discontinued operation scaled by the lagged total assets; $SEGMENT_{it}$: the number of segments in which a firm operates; $DEFER_{it}$: long-term deferred tax balances scaled by the lagged total assets. Industry and year fixed effects are included in all regressions.

Regression estimations are conducted with the employment of clustered firm-level Eicker-White robust standard errors. The figures in parentheses are t-statistics. ***, ** and * denote significance at 1%, 5% and 10% respectively.

	Informativeness denoted as $\delta_{Tax\ Accruals}$		Informativeness denoted as $\bar{R}_{Tax\ Accruals}^2$	
	I	II	III	IV
	$TARGET2_{it}=1$	$TARGET2_{it}=0$	$TARGET2_{it}=1$	$TARGET2_{it}=0$
ERROR_AMOUNT_{it}	0.7749 (2.16)**	-0.9475 (-1.47)	0.3519 (2.25)**	-0.5789 (-1.67)
PTBI _{it}	0.3160 (0.86)	-0.0237 (-0.05)	0.0614 (0.26)	-0.2200 (-0.90)
VOL_PTBI _{it}	-1.5080 (-1.28)	-0.0184 (-0.01)	-0.4855 (-0.84)	0.0932 (0.12)
VOL_CASHFLOW _{it}	4.7303 (3.03)***	0.2816 (0.16)	0.8965 (1.13)	-0.5919 (-0.46)
SIZE _{it}	0.0228 (0.77)	0.0055 (0.12)	0.0244 (-1.39)	-0.0555 (-1.88)*
GROWTH _{it}	-0.0085 (-0.72)	-0.0188 (-0.88)	-0.0073 (-1.26)	0.0005 (0.05)
CAPINT _{it}	0.5763 (1.96)*	1.1160 (3.64)***	0.0696 (0.51)	0.5064 (3.09)***
LEVERAGE _{it}	-0.3770 (-1.78)*	-0.3723 (-1.11)	-0.1800 (-1.90)*	-0.0507 (-0.35)
DISCONTINUE _{it}	-7.0842 (-0.95)	-1.2517 (-0.07)	-2.4241 (-0.98)	-10.0056 (-1.19)
SEGMENT _{it}	-0.0194 (-1.24)	-0.0360 (-1.51)	-0.0101 (-1.36)	-0.0161 (-1.41)
DEFER _{it}	0.1706	-0.1577	-0.4122	0.4514

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	(0.17)	(-0.11)	(-0.88)	(0.60)
Constant	0.0208 (0.05)	0.6150 (1.00)	0.6041 (2.17)	0.9424 (2.29)**
Industry Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
Observations	329	105	329	105
R-Square	0.3314	0.6436	0.3522	0.5990
VIF	1.67	1.67	1.67	1.67
Breusch-Pagan Test	0.02 P=0.8890	1.51 P=0.2194	26.30 P=0.000	5.95 P=0.0147

Earnings Target 3. Estimating the model (3.14) to test the impact of tax management incentives to avoid reporting a post-tax loss on the incremental informativeness of income tax accruals yields results presented in the following table 6.7. Hypothesis H2b predicts that firm-years reporting zero or slightly positive post-tax earnings are likely to manipulate income tax accruals for the purpose of meeting the target of avoiding reporting a post-tax loss, which could give rise to intentional estimation errors in income tax accruals and make the estimated income tax accruals differ from future realised tax cash flows. Therefore, the informativeness of income tax accruals ($\bar{R}_{Tax\ Accruals}^2$ or $\delta_{Tax\ Accruals}$) is expected to be negatively related to $TARGET3_{it}$ (i.e., an indicator variable equals 1 if the net income scaled by the opening market value of equity of a particular firm-year is within the range between 0 and 0.02, and 0 otherwise)²³³.

As shown from table 6.7, there is no significant evidence supporting the hypothesis H2b that the incentives to avoid reporting a post-tax loss strongly motivate managers to distort income tax provision in a way that compromises the ability of income tax accruals to explain future tax cash flows. Specifically, the coefficients of $TARGET3_{it}$ are insignificant (0.0353 with $t=0.051$ and 0.0712 with $t=1.37$, respectively), indicating that there is no significant difference in the informativeness of income tax accruals between firm-years that are classified as successfully avoiding a post-tax loss and firm-years that report negative or highly-positive post-tax earnings.

In terms of the firm-specific variables that proxy tax environment complexity, results reported in table 6.7 confirm that the informativeness of income tax accruals is positively related to the volatility of firms' operating cash flow ($VOL_CASHFLOW_{it}$) and is negatively related to firm size ($SIZE_{it}$); firms' growth opportunities ($GROWTH_{it}$); and the level of firms' leverage ($LEVERAGE_{it}$).

²³³ Following Burgstahler and Dichev (1997) this study employs another two scaled net income intervals (0-0.01 and 0-0.03), untabulated results remain statistically identical.

**Table 6.7 Regression Result:
Earnings Target 3 (Avoid Reporting Post-Tax Loss)
and the Informativeness of Income Tax Accruals**

This table presents the results of testing if the incremental informativeness of income tax accruals is negatively related to firms' incentives to avoid reporting a post-tax loss, based on the following model (3.14)

$$TAX_INFORM_{it} = Z_0 + Z_{1c}TARGET3_{it} + \sum Z_{2c}FIRM_CHARA_{it} + \sum Z_{3c}CONTROL_{it} + Z_{industry} + Z_{year} + \varepsilon_{i,t} \quad (3.14)$$

The dependent variable TAX_INFORM_{it} represents the incremental informativeness of income tax accruals. It is captured by two measures, i.e., $\delta_{Tax\ Accruals}$ and $\bar{R}_{Tax\ Accrual}^2$. The variable of interest is the variable $TARGET3_{it}$. $TARGET3_{it}$ equals 1 if the net income scaled by the opening market value of equity of a particular firm-year is within the range between 0 and 0.02, and 0 otherwise. The explanatory variables include: $PTBI_{it}$: pre-tax income scaled by lagged total asset; VOL_PTBI_{it} : the standard deviation of annual pre-tax income scaled by lagged total assets over a rolling five-year window; $VOL_CASHFLOW_{it}$: the standard deviation of annual cash flow scaled by lagged total assets over a rolling five-year window; $SIZE_{it}$: the natural log of total assets; $GROWTH_{it}$: the ratio of firms' market value of equity to the book value of equity; $CAPINT_{it}$: gross cost of property, plant and equipment scaled by the lagged total assets; $LEVERAGE_{it}$: the ratio of long-term debt to total assets; $DISCONTINUE_{it}$: the absolute value of earnings from discontinued operation scaled by the lagged total assets; $SEGMENT_{it}$: the number of segments in which a firm operates; $DEFER_{it}$: long-term deferred tax balances scaled by the lagged total assets. Industry and year fixed effects are included in all regressions.

Regression estimations are conducted with the employment of clustered firm-level Eicker-Huber-White robust standard errors. The figures in parentheses are t-statistics, ***, ** and * denote significance at 1%, 5% and 10% respectively.

	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accruals}^2$
	I	II
TARGET3_{it}	0.0353 (0.51)	0.0712 (1.37)
PTBI _{it}	0.4794 (1.45)	0.0340 (0.21)
VOL_PTBI _{it}	-0.5397 (-0.65)	-0.2312 (-0.54)
VOL_CASHFLOW _{it}	2.8593 (3.47)***	1.2962 (2.93)***
SIZE _{it}	-0.0031 (-0.14)	-0.0245 (-1.92)*
GROWTH _{it}	-0.0250 (-2.16)**	-0.0086 (-1.85)
CAPINT _{it}	0.1925 (1.10)	0.1277 (1.42)
LEVERAGE _{it}	-0.2265 (-1.47)	-0.2122 (-2.58)**
DISCONTINUE _{it}	3.7355 (0.49)	-0.2113 (-0.07)
SEGMENT _{it}	-0.0074 (-0.45)	-0.0086 (-1.08)
DEFER _{it}	-0.1941 (-0.19)	-0.0237 (-0.06)
Constant	0.1808 (0.55)	0.1183 (0.62)
Industry Dummies	Yes	Yes
Year Dummies	Yes	Yes
Observations	1286	1286
R-Square	0.1538	0.2465
VIF	1.43	1.43
Breusch-Pagan Test	22.93 P=0.000	111.04 P=0.000

6.3.2. Tax management incentives, corporate governance and the informativeness of income tax accruals

Table 6.8 to table 6.9 present multivariate regression results of estimating model (3.21) to model (3.24) in testing the efficacy of firms' governance mechanisms on attenuating the strength of the relation between the informativeness of income tax accruals and firms' tax management incentives²³⁴. The t-statistics and p-values reported in table 6.8 to table 6.9 are based on the Eicker-Huber-White robust standard errors corrected for firm clustering, in order to alleviate concerns about potential heteroscedasticity and autocorrelations in error terms across years for a given firm (Petersen 2009).

Results reported in table 6.8 column I and II show the efficacy of individual corporate governance component in attenuating the strength of the relation between the informativeness of income tax accruals and corporate tax planning. Specifically, the incremental informativeness of income tax accruals is captured by $\delta_{Tax\ Accruals}$ and $\bar{R}_{Tax\ Accruals}^2$, respectively. The variable TA_CASH_{it} captures the main effect of corporate tax planning on the informativeness of income tax accruals. $COVERAGE_{it}$ represents the number of financial analysts following a firm. $TA_CASH_{it} \times COVERAGE_{it}$ captures the interaction effect between tax planning and analysts coverage. $BOARD_{it}$ represents the percentage of non-executive directors serving the board. $TA_CASH_{it} \times BOARD_{it}$ captures the interaction effect between tax planning and board independence. $AUDIT_{i,t}$ represents whether a firm's external auditor is a "big four". $TA_CASH_{it} \times AUDIT_{it}$ captures the interaction effect between tax planning and audit quality. $INSTITUTION_{i,t}$ represents the number of institutional investors of a firm. $TA_CASH_{it} \times INSTITUTION_{i,t}$ captures the interaction effect between tax planning and the number of institutional investors.

²³⁴ In this section, the importance of corporate governance mechanism in restricting the extent of intentional and unintentional estimation errors reported in income tax accruals will only be examined among firms that exhibit strong tax management incentives to 1) engage in tax planning activities and; 2) achieve the earnings target of avoiding the report of apparently declined post-tax earnings. This is because that in section 3.1., only those two tax management incentives are found to exert negative impacts on the informativeness of income tax accruals and, thus, are expected to be mediated by effective corporate governance mechanisms. However, since tax management incentives to meet analysts' earnings forecasts and to avoid the reports of a post-tax loss are not found to induce estimation errors to income tax accruals and reduce their informativeness, it does not make sense to investigate the role of corporate governance in attenuating the negative impacts of those two tax management incentives on the informativeness of income tax accruals.

If corporate tax planning reduces the informativeness of income tax accruals; and each individual component of the corporate governance mechanism plays a significant role in mediating the negative impact of corporate tax planning on the informativeness of income tax accruals, it is expected that the variable TA_CASH_{it} is significantly positive and all the interaction terms ($TA_CASH_{it} \times COVERAGE_{i,t}$, $TA_CASH_{it} \times BOARD_{i,t}$, $TA_CASH_{it} \times AUDIT_{i,t}$ and $TA_CASH_{it} \times INSTITUTION_{i,t}$) are significantly negative.

Results reported in table 6.8 show that when the informativeness of income tax accruals is captured by $\delta_{Tax\ Accruals}$, both the variable TA_CASH_{it} and all the interaction terms between corporate tax planning and individual corporate governance component are insignificant. When the informativeness of income tax accruals is captured by $\bar{R}_{Tax\ Accruals}^2$, only the interaction term $TA_CASH_{it} \times INSTITUTION_{i,t}$ is significant but with an unexpected positive sign. These results indicate that corporate governance mechanisms are not effective in attenuating the negative impact of corporate tax planning on the informativeness of income tax accruals.

Table 6.8: Tax Planning, Corporate Governance and the Informativeness of Income Tax Accruals

This table presents the results of testing whether good corporate monitoring mechanism plays a role in attenuating the negative impact of corporate tax planning on the incremental informativeness of income tax accruals, based on the following model (3.21).

$$TAX_INFORM_{it} = \omega_0 + \omega_{1c}TA_CASH_{it} + \omega_{2c}GOVERNANCE_{it} + \omega_{3c}TA_CASH_{it} * GOVERNANCE_{it} + \sum \omega_{4c}FIRM_CHARA_{it} + \omega_{industry} + \omega_{year} + \varepsilon_{it} \quad (3.21)$$

The dependent variable TAX_INFORM_{it} represents the incremental informativeness of income tax accruals. It is captured by two measures, i.e., $\delta_{Tax\ Accruals}$ and $\bar{R}_{Tax\ Accrual}^2$. The variables of interest is the interaction terms $TA_CASH_{it} \times GOVERNANCE_{it}$. TA_CASH_{it} proxy the level of corporate tax planning. $GOVERNANCE_{it}$ refers to a proxy for the effectiveness of firms' corporate monitoring mechanism, which includes four different monitoring channels, i.e., the number of analyst following ($COVERAGE_{it}$), the audit quality ($AUDIT_{it}$), the percentage of institutional shareholding ($INSTITUTION_{it}$) and board independence ($BOARD_{it}$). The explanatory variables include: $PTBI_{it}$: pre-tax income scaled by lagged total asset; VOL_PTBI_{it} : the standard deviation of annual pre-tax income scaled by lagged total assets over a rolling five-year window; $VOL_CASHFLOW_{it}$: the standard deviation of annual cash flow scaled by lagged total assets over a rolling five-year window; $SIZE_{it}$: the natural log of total assets; $GROWTH_{it}$: the ratio of firms' market value of equity to the book value of equity; $CAPINT_{it}$: gross cost of property, plant and equipment scaled by the lagged total assets; $LEVERAGE_{it}$: the ratio of long-term debt to total assets; $DISCONTINUE_{it}$: the absolute value of earnings from discontinued operation scaled by the lagged total assets; $SEGMENT_{it}$: the number of segments in which a firm operates; $DEFER_{it}$: long-term deferred tax balances scaled by the lagged total assets.

The t values reported in parentheses are based on standard errors clustered at firm-level. Industry and year fixed effects are included in all regressions. Here ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$
	I	II
TA_CASH _{it}	-0.5959 (-0.27)	-0.7671 (-0.74)
COVERAGE _{it}	-0.1915 (-0.66)	-0.0172 (-0.15)
BOARD _{it}	0.0042 (0.42)	0.0012 (0.25)
AUDIT _{it}	-0.1864 (-0.61)	0.0277 (0.24)
INSTITUTION _{it}	-0.0055 (-1.45)	-0.0033 (-2.08)**
TA_CASH_{it} × COVERAGE_{it}	0.5755 (0.59)	0.2977 (0.72)
TA_CASH_{it} × BOARD_{it}	-0.0199 (-0.51)	-0.0055 (-0.29)
TA_CASH_{it} × AUDIT_{it}	0.8328 (0.76)	0.0549 (0.14)
TA_CASH_{it} × INSTITUTION_{it}	0.0157 (1.24)	0.0121 (2.39)**
PTBI _{it}	0.6831 (2.02)**	0.2310 (1.48)
VOL_PTBI _{it}	-0.8542 (-0.85)	-0.2843 (-0.66)
VOL_CASHFLOW _{it}	2.3904 (2.00)**	0.4532 (0.69)
SIZE _{it}	0.0265 (0.48)	-0.0353 (-1.17)
GROWTH _{it}	-0.0278 (-2.16)**	-0.0116 (-2.80)**
CAPINT _{it}	0.5957 (2.28)**	0.2766 (2.20)**
LEVERAGE _{it}	-0.1649 (-0.73)	-0.0554 (-0.55)
DISCONTINUE _{it}	2.5226	1.0771

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	(0.29)	(0.50)
SEGMENT _{it}	-0.0175 (-1.13)	-0.0094 (-1.22)
DEFER _{it}	-0.0289 (-0.03)	0.2254 (0.47)
Constant	0.5811 (0.66)	0.6965 (1.33)
Industry Dummies	Yes	Yes
Year Dummies	Yes	Yes
Observations	464	464
R-Square	0.4158	0.3922

Results reported in table 6.9 column I and II show the efficacy of individual corporate governance component in attenuating the strength of the relation between the informativeness of income tax accruals and firms' tax management incentives to avoid reporting an apparent decline in post-tax profits. Specifically, the incremental informativeness of income tax accruals is captured by $\delta_{Tax\ Accruals}$ and $\bar{R}_{Tax\ Accruals}^2$, respectively. The variable $DECLINE_AMOUNT_{it}$ captures the main effect of firms' tax management incentives to avoid reporting an apparent decline in post-tax profits on the informativeness of income tax accruals. $DECLINE_AMOUNT_{it} \times COVERAGE_{i,t}$ captures the interaction effect between analysts coverage and managerial incentives to avoid reporting declined post-tax profits. $DECLINE_AMOUNT_{it} \times BOARD_{it}$ captures the interaction effect between board independence and managerial incentives to avoid reporting declined post-tax profits. $DECLINE_AMOUNT_{it} \times AUDIT_{it}$ captures the interaction effect between audit quality and managerial incentives to avoid reporting declined post-tax profits. $DECLINE_AMOUNT_{it} \times INSTITUTION_{i,t}$ captures the interaction effect between the number of institutional investors and managerial incentives to avoid reporting declined post-tax profits.

If it is consistent with the prediction that the incremental informativeness of income tax accruals is negatively associated with how much a firm's current pre-tax profit is lower than that of its previous period, it is expected that the variable $DECLINE_AMOUNT_{it}$ is significantly negative. If each individual component of the corporate governance mechanism plays a significant role in mediating the strength of the negative relation between the informativeness of income tax accruals and the tax management incentive, it is expected that all the interaction terms ($DECLINE_AMOUNT_{it} \times COVERAGE_{i,t}$, $DECLINE_AMOUNT_{it} \times$

$BOARD_{i,t}$, $DECLINE_AMOUNT_{it} \times AUDIT_{i,t}$ and $DECLINE_AMOUNT_{it} \times INSTITUTION_{i,t}$) are significantly positive.

Results reported in table 6.9 show that when the informativeness of income tax accruals is captured by $\delta_{Tax\ Accruals}$, the variable $DECLINE_AMOUNT_{it}$ is significantly negative (-12.4989 with $t=-2.78$), and the interaction terms $DECLINE_AMOUNT_{it} \times COVERAGE_{i,t}$ and $DECLINE_AMOUNT_{it} \times INSTITUTION_{i,t}$ are significant with the expected positive sign (3.0500 with $t=1.83$ and 0.0533 with $t=2.48$, respectively). When the informativeness of income tax accruals is captured by $\bar{R}_{Tax\ Accruals}^2$, the variable $DECLINE_AMOUNT_{it}$ is negative but insignificant (-2.0914 with $t=-0.90$), and the interaction terms $DECLINE_AMOUNT_{it} \times COVERAGE_{i,t}$ and $DECLINE_AMOUNT_{it} \times INSTITUTION_{i,t}$ are with the predicted positive sign (0.4006 with $t=0.45$ and 0.0121 with $t=2.39$, respectively). These results indicate that there is a negative relation between the informativeness of income tax accruals and how much a firm's current pre-tax profit is lower than that of its previous period. However, higher analyst coverage and institutional shareholding appear to play a role in attenuating this negative relation.

**Table 6.9: Earnings Target 1 (Avoid Earnings Decline),
Corporate Governance and the Informativeness of Income Tax Accruals**

This table presents the results of testing if good corporate monitoring mechanism plays a role in attenuating the relation between the incremental informativeness of income tax accruals and whether and by how much a firm has missed its previous period's pre-tax profit, based on the following model (3.22). This regression analysis concentrates on the subsamples of firm-years that exhibit tax management incentives to undertake tax-induced earnings management (e.g., when $TARGET1_{it} = 1$), to examine the mediating role played by corporate governance mechanism.

$$TAX_INFORM_{it} = \tau_0 + \tau_{1c}DECLINE_AMOUNT_{it} + \tau_{2c}GOVERNANCE_{it} + \tau_{3c}DECLINE_AMOUNT_{it} * GOVERNANCE_{it} + \sum \tau_{4c}FIRM_CHARA_{it} + \sum \tau_{5c}CONTROL_{it} + \tau_{industry} + \tau_{year} + \varepsilon_{i,t} \quad (3.22)$$

The dependent variable TAX_INFORM_{it} represents the incremental informativeness of income tax accruals. It is captured by two measures, i.e., $\delta_{Tax\ Accruals}$ and $\bar{R}_{Tax\ Accrual}^2$. The variables of interest is the interaction term $DECLINE_AMOUNT_{it} \times GOVERNANCE_{it}$. $DECLINE_AMOUNT_{it}$ captures the difference between a firm's previous period's pre-tax profit and that of its current period. $GOVERNANCE_{it}$ refers to a proxy for the effectiveness of firms' corporate monitoring mechanism, which includes four different monitoring channels, i.e., the number of analyst following ($COVERAGE_{it}$), the audit quality ($AUDIT_{it}$), the percentage of institutional shareholding ($INSTITUTION_{it}$) and board independence ($BOARD_{it}$). The explanatory variables include: $PTBI_{it}$: pre-tax income scaled by lagged total asset; VOL_PTBI_{it} : the standard deviation of annual pre-tax income scaled by lagged total assets over a rolling five-year window; $VOL_CASHFLOW_{it}$: the standard deviation of annual cash flow scaled by lagged total assets over a rolling five-year window; $SIZE_{it}$: the natural log of total assets; $GROWTH_{it}$: the ratio of firms' market value of equity to the book value of equity; $CAPINT_{it}$: gross cost of property, plant and equipment scaled by the lagged total assets; $LEVERAGE_{it}$: the ratio of long-term debt to total assets; $DISCONTINUE_{it}$: the absolute value of earnings from discontinued operation scaled by the lagged total assets; $SEGMENT_{it}$: the number of segments in which a firm operates; $DEFER_{it}$: long-term deferred tax balances scaled by the lagged total assets.

The t values reported in parentheses are based on standard errors clustered at firm-level. Industry and year fixed effects are included in all regressions. Here ***, ** and * denote statistical significance at the 1%, 5% and 10% levels, respectively.

	Informativeness denoted as $\delta_{Tax\ Accruals}$ $TARGET1_{it}=1$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$ $TARGET1_{it}=1$
	I	II
DECLINE_AMOUNT _{it}	-12.4989 (-2.78)***	-2.0914 (-0.90)
COVERAGE _{it}	-0.1011 (-0.84)	0.0250 (0.51)
BOARD _{it}	-0.0026 (-0.75)	0.0002 (0.13)
AUDIT _{it}	0.2447 (0.97)	0.1048 (1.04)
INSTITUTION _{it}	-0.0054 (-2.12)**	-0.0014 (-1.67)*
DECLINE_AMOUNT_{it} × COVERAGE_{it}	3.0500 (1.83)*	0.4006 (0.45)
DECLINE_AMOUNT_{it} × BOARD_{it}	0.0390 (0.94)	-0.0105 (-0.56)
DECLINE_AMOUNT_{it} × AUDIT_{it}	-2.2552 (-0.97)	0.1072 (0.10)
DECLINE_AMOUNT_{it} × INSTITUTION_{it}	0.0533 (2.48)**	0.0182 (1.69)*
PTBI _{it}	0.4129 (0.68)	0.3229 (1.06)
VOL_PTBI _{it}	0.6725 (0.48)	0.3323 (0.44)
VOL_CASHFLOW _{it}	1.8137 (1.21)	0.7009 (0.90)
SIZE _{it}	0.0699 (1.13)	-0.0033 (-0.12)
GROWTH _{it}	-0.0258 (-1.69)*	-0.0141 (-2.48)**
CAPINT _{it}	0.9181 (2.91)***	0.4033 (3.53)***

LEVERAGE _{it}	-0.7216 (-2.71)***	-0.2515 (-1.93)*
DISCONTINUE _{it}	3.9797 (0.28)	2.8047 (0.74)
SEGMENT _{it}	-0.0196 (-1.15)	-0.0148 (-1.77)*
DEFER _{it}	-0.3602 (-0.40)	-0.0655 (-0.14)
Constant	0.2243 (0.28)	0.2521 (0.71)
Industry Dummies	Yes	Yes
Year Dummies	Yes	Yes
Observations	149	149
R-Square	0.5636	0.5488

*Regression estimations are conducted with the employment of clustered firm-level Eicker-White robust standard errors. The figures in parentheses are t-statistics, ***, ** and * denote significance at 1%, 5% and 10% respectively.*

6.4. Multivariate Regression Results for the Third Hypothesis

After examining the cross-sectional determinants of the incremental informativeness of income tax accruals, the third hypothesis of this study is designed to further investigate if the informativeness of income tax accruals in predicting future tax cash flows has improved or deteriorated over time in the UK. Accounting method for deferred taxes has evolved dramatically in the UK over the last three decades. Specifically, the partial provision methods under SSAP 15, which require deferred tax liabilities or assets to be recognised in the financial accounts based on managers' projection of their expected reversal in the foreseeable future, may facilitate managers to convey their private information about firms' future cash tax payments and thereby improving the informativeness of income tax accruals. However, the partial provision method is criticised as allowing too much discretion and could be easily manipulated by self-interested managers for opportunistic reasons. By comparison, the full provision method under FRS 19 and IAS 12, which requires deferred tax liabilities to be recognised based on all amounts of taxable timing (or temporary) book-tax difference, is likely to reduce the latitudes for managements' opportunistic behaviours via deferred tax provisioning. However, the full provision methods, which recognise deferred tax liabilities without considering managers' expectation about their future reversal, may restrict managers' ability to convey their expectation about firms' future tax payments and, thereby, compromising the informativeness of reported income tax accruals in explaining future tax cash flows.

The following figure 6.1 and figure 6.2 show the incremental informativeness of income tax accruals in explaining future one- to five-year ahead tax cash flows over the entire 26-year sample period from the year 1992 to 2017, where the informativeness of income tax accruals is measured by $\delta_{Tax\ Accruals}$ and $\bar{R}_{Tax\ Accruals}^2$, respectively. Panel A in the following table 6.10 and table 6.11 summarises the average annual informativeness of income tax accruals in explaining future one- to five-year ahead tax cash flows, based on the entire sample-period and the three subperiods (i.e., when different tax accounting standards have been adopted in UK²³⁵), respectively. A robustness check is provided in the table 6.10 and 6.11 panel B to show the average annual informativeness of income tax accruals using a sample of firms that survived over at least the 24 of the 26 sample years, in order to mitigate the concern that the observed time-series trend in the informativeness of income tax accruals is due to the selection bias of sample firms²³⁶. In addition, multivariate results reported in the following table 6.12 and table 6.13 show the time-series trend of the informativeness of income tax accruals in predicting future one- to five-year ahead tax cash flows, by regressing $\delta_{Tax\ Accruals}$ and $\bar{R}_{Tax\ Accruals}^2$ on a time-trend variable (*YEAR* or *PERIOD*) after controlling for a set of variables that proxy changes in firms' underlying characteristics and governance mechanisms in a manner similar to Dyreng et al. (2017). Standard robust errors are used to control for the heteroscedasticity problem (Eicker 1963; Petersen 2009).

The following figure 6.1 and figure 6.2 provide visual evidence on the time-series trend in the informativeness of income tax accruals to explain future one- to five-year ahead cash tax payments, through plotting the sample mean of the incremental informativeness of income tax accruals for each year from 1992 to 2017. As shown in figure 6.1 and figure 6.2, there is a clear downward trend in the incremental informativeness of income tax accruals. The highly significant and negative coefficients on the time trend variables, i.e., *YEAR* and *PERIOD* reported in panel A and panel B of table 6.10 and table 6.11, confirm the visual evidence presented in figure 6.1 and figure 6.2, and show that the informativeness of income tax accruals to explain future one- to five-year ahead cash tax payments has been decreasing over the sample period, regardless of whether the full sample of firms or the sample of surviving firms is

²³⁵ That is, SSAP 15 for period 1992-1999, FRS 19 for period 2000-2004, and IAS 12 for period 2005-2017.

²³⁶ Since firms in the full sample are only required to survive for at least six consecutive years, the increase (decrease) in the informativeness of income tax accruals to explain future tax cash flows generated using the full sample of firms may only indicate that as compared to firms existed in the 1990s, firms in existence today have stronger (weaker) relation between current-period income tax accruals and future tax cash flows (Kim and Kross 2005).

employed. Specifically, the highly significant and negative coefficients on the time trend variable *PERIOD* potentially imply that the ability of income tax accruals to explain future cash taxes is greater during the period 1992-1999 when the partial provision method of deferred taxes (i.e., SSAP 15) has been adopted in the UK, as compared to that during the period 2000-2004 and the period 2005-2017 when the full provision methods of deferred taxes (i.e., FRS 19 and IAS 12, respectively) have been adopted in the UK.

Table 6.12 and table 6.13 report coefficient estimate on the time trend variables *YEAR* and *PERIOD*, after controlling for changes in firms' underlying characteristics and governance mechanisms. As shown from table 6.12 and table 6.13, coefficients on *YEAR* are uniformly negative and highly significant, indicating that even after controlling for changes in firms' underlying characteristics and governance mechanisms, there is still an apparent linear decline in the ability of current-period income tax accruals to predict future one- to five-year ahead tax cash flows over the sample period. However, after controlling for changes in firms' underlying characteristics, coefficients on *PERIOD* are significantly negative only in the cases that future two- to four-year ahead cash taxes are explained by current-period income tax accruals, which implies that as compared to the full provision methods of deferred taxes, the partial provision method of deferred taxes provides income tax accruals with significantly greater ability to predict future two- to four-year ahead tax cash flows.

Figure 6.1

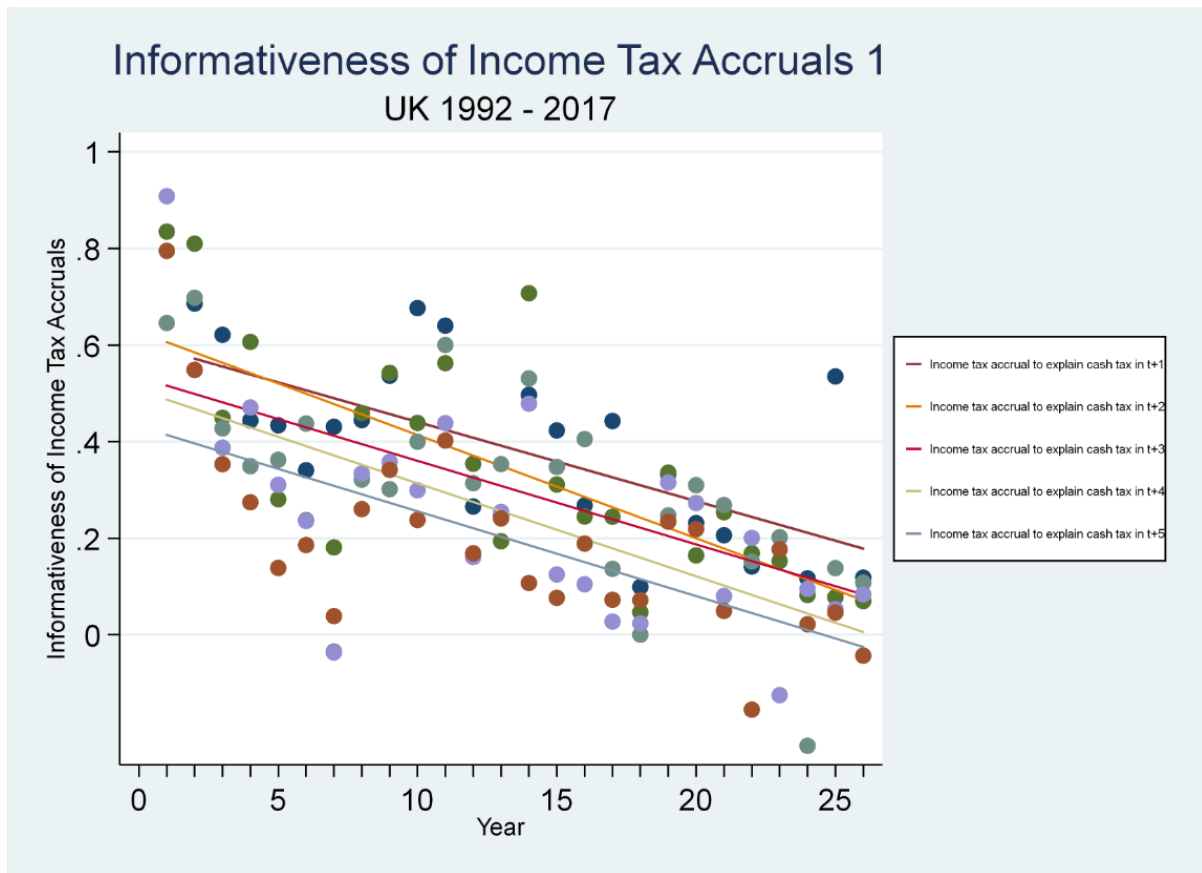
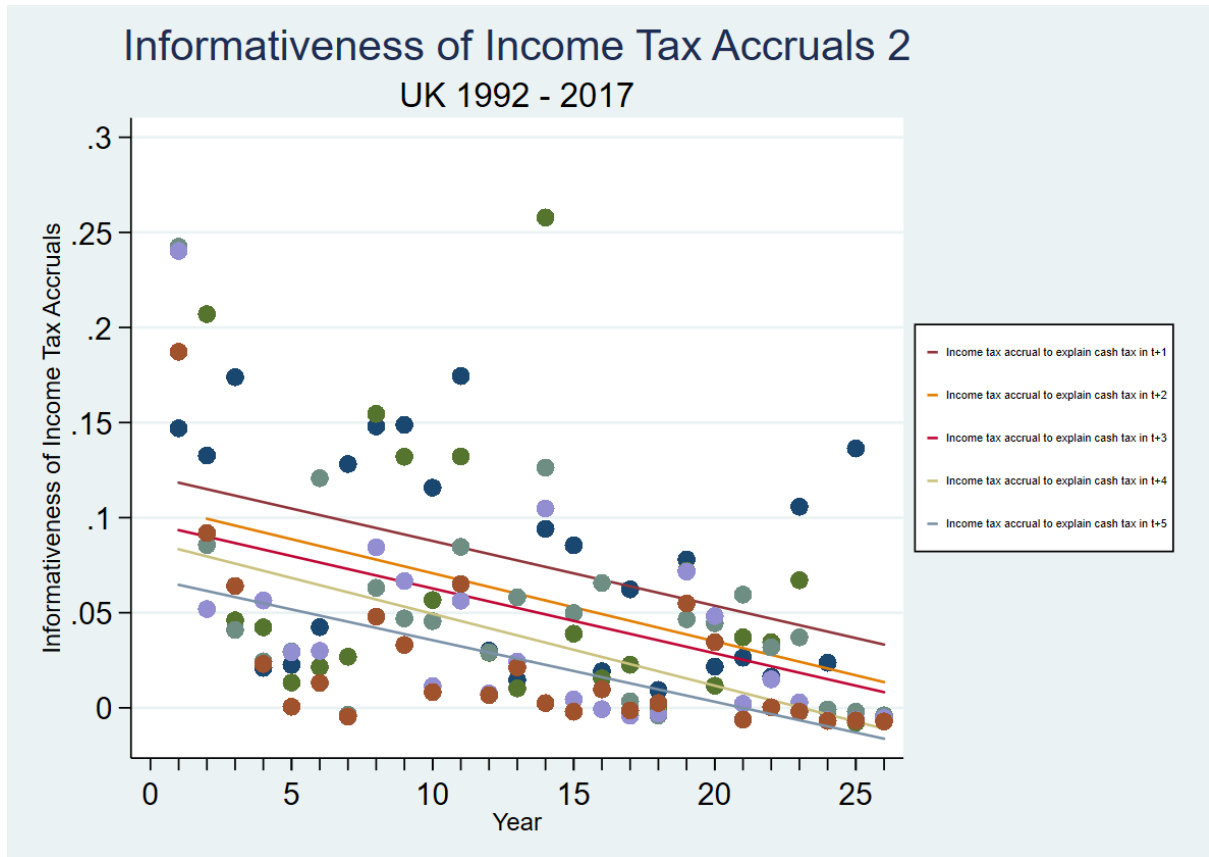


Figure 6.2



Panel A Full Sample of Firms						
YEAR	N	T+1	T+2	T+3	T+4	T+5
1992-1996	1615	0.8558	0.6796	0.5654	0.4713	0.3896
1997-2001	1615	0.6866	0.5790	0.4347	0.3397	0.3215
2002-2006	1615	0.8626	0.5532	0.4278	0.3328	0.3255
2007-2011	1615	0.5699	0.4811	0.4194	0.3434	0.3556
2012-2017	1938	0.6053	0.3607	0.2976	0.1739	0.0619
Coefficient on the Time Trend Variable <i>YEAR</i>		-0.0104 (-33.81)***	-0.0137 (-47.83)***	-0.0135 (-26.85)***	-0.0132 (-28.10)***	-0.0113 (-17.36)***
PERIOD	N	T+1	T+2	T+3	T+4	T+5
1 (1992-1999)	2584	0.7726	0.6445	0.5119	0.4335	0.3781
2 (2000-2004)	1615	0.7419	0.5835	0.5281	0.3989	0.2978
3 (2005-2017)	4199	0.6627	0.4273	0.3297	0.2576	0.2521
Coefficient on the Time Trend Variable <i>PERIOD</i>		-0.0561 (-21.65)***	-0.1109 (-46.98)***	-0.0963 (-27.34)***	-0.0905 (-27.18)***	-0.0621 (-15.51)***
Panel B Constant Sample of Firms						
YEAR	N	T+1	T+2	T+3	T+4	T+5
1992-1996	720	0.6878	0.5963	0.4964	0.5250	0.4219
1997-2001	720	0.4858	0.3716	0.2852	0.2381	0.2129
2002-2006	720	0.4146	0.4258	0.4291	0.2914	0.1992
2007-2011	720	0.2748	0.2073	0.2199	0.1178	0.1419
2012-2017	864	0.2199	0.1343	0.1065	0.0647	0.0161
Coefficient on the Time Trend Variable <i>YEAR</i>		-0.0221 (-42.90)***	-0.0214 (-67.70)***	-0.0173 (-50.83)***	-0.0192 (-49.38)***	-0.0176 (-48.12)***
PERIOD	N	T+1	T+2	T+3	T+4	T+5
1 (1992-1999)	1152	0.5819	0.4823	0.4008	0.3948	0.3243
2 (2000-2004)	720	0.4731	0.4182	0.3938	0.3022	0.2783
3 (2005-2017)	1872	0.2780	0.2201	0.2013	0.1335	0.0821
Coefficient on the Time Trend Variable <i>PERIOD</i>		-0.1540 (-36.07)***	-0.13434 (-34.58)***	-0.1042 (-28.11)***	-0.1324 (-33.19)***	-0.1247 (-36.10)***
<i>The figures in parentheses are t-statistics .***, ** and * denote significance at 1%, 5% and 10% respectively.</i>						

Panel A Full Sample of Firms						
YEAR	N	T+1	T+2	T+3	T+4	T+5
1992-1996	1615	0.2936	0.2174	0.1669	0.1058	0.0781
1997-2001	1615	0.1465	0.1346	0.0964	0.0726	0.0557
2002-2006	1615	0.2361	0.1066	0.0767	0.0799	0.0702
2007-2011	1615	0.0820	0.0580	0.0583	0.0311	0.0388
2012-2017	1938	0.0725	0.0077	0.0226	0.0161	0.0159
Coefficient on the Time Trend Variable <i>YEAR</i>		-0.0095 (-61.16)***	-0.0094 (-65.89)***	-0.0064 (-56.81)***	-0.0042 (-45.41)***	-0.0020 (-21.55)***
PERIOD	N	T+1	T+2	T+3	T+4	T+5
1 (1992-1999)	2584	0.2397	0.1969	0.1477	0.1032	0.0823
2 (2000-2004)	1615	0.2104	0.1137	0.0995	0.0921	0.0610
3 (2005-2017)	4199	0.0966	0.0375	0.0345	0.0304	0.0437
Coefficient on the Time Trend Variable <i>PERIOD</i>		-0.0735 (-53.73)***	-0.0796 (-66.60)***	-0.0570 (-54.37)***	-0.0376 (-44.04)***	-0.0192 (-24.35)***
Panel B Constant Sample of Firms						
YEAR	N	T+1	T+2	T+3	T+4	T+5
1992-1996	720	0.0994	0.1356	0.0846	0.0884	0.0734
1997-2001	720	0.1166	0.0783	0.0546	0.0376	0.0196
2002-2006	720	0.0798	0.0936	0.0696	0.0395	0.0187
2007-2011	720	0.0381	0.0241	0.0312	0.0160	0.0164
2012-2017	864	0.0503	0.0204	0.0203	0.0003	-0.0048
Coefficient on the Time Trend Variable <i>YEAR</i>		-0.0034 (-28.47)***	-0.0059 (-29.31)***	-0.0034 (-27.20)***	-0.0038 (-30.91)***	-0.0032 (-32.29)
PERIOD	N	T+1	T+2	T+3	T+4	T+5
1 (1992-1999)	1152	0.1020	0.1101	0.0754	0.0690	0.0529
2 (2000-2004)	720	0.0968	0.0720	0.0529	0.0333	0.0269
3 (2005-2017)	1872	0.0517	0.0415	0.0349	0.0172	0.0055
Coefficient on the Time Trend Variable <i>PERIOD</i>		-0.0261 (-26.59)***	-0.0341 (-18.44)***	-0.0201 (-18.10)***	-0.0254 (-23.99)***	-0.0236 (-27.35)***

*The figures in parentheses are t-statistics. .***, ** and * denote significance at 1%, 5% and 10% respectively.*

Table 6.12 Regression Results: Time-Series Trend of Income Tax Accruals Measured by $\delta_{Tax\ Accruals}$

	T+1		T+2		T+3		T+4		T+5	
PERIOD	0.2499 (5.30)***		-0.6321 (-39.34)***		-0.5079 (-15.73)**		-0.3830 (-10.49)***		-0.0257 (-0.52)	
YEAR		-0.0118 (-3.95)***		-0.0232 (13.72)***		-0.0319 (-8.86)***		-0.0365 (-10.25)***		-0.0432 (-12.62)***
PTBI _{it}	0.1766 (1.03)	0.1142 (0.75)	0.1130 (1.33)	-0.1056 (-1.10)	-0.2693 (-1.08)	-0.5389 (-2.47)**	0.1220 (0.51)	-0.1695 (-0.84)	0.7058 (2.25)**	0.3969 (1.42)
VOL_PTBI _{it}	0.0279 (0.04)	0.3954 (0.66)	-0.4066 (-1.31)	-0.4000 (-1.34)	0.5610 (0.65)	0.7998 (1.08)	0.8587 (0.92)	1.2580 (1.54)	0.4391 (0.48)	1.1852 (1.48)
VOL_CASHFLOW _{it}	-1.3883 (-1.99)*	-1.4510 (-2.19)**	0.0494 (0.14)	-0.3056 (-0.73)	-0.3293 (-0.35)	-0.7428 (-0.86)	0.4570 (0.49)	0.0247 (0.03)	1.0503 (1.12)	0.6264 (0.72)
SIZE _{it}	0.0176 (1.04)	0.0189 (1.21)	-0.0068 (-1.05)	-0.0108 (-1.21)	-0.0468 (-2.30)**	-0.0503 (-2.49)**	-0.0461 (-1.49)	-0.0490 (-1.92)*	-0.0170 (-0.46)	-0.0179 (-0.64)
GROWTH _{it}	0.0040 (0.82)	0.0068 (1.19)	-0.0028 (-0.89)	0.0068 (1.95)*	-0.0054 (-0.65)	0.0064 (0.84)	-0.0307 (-3.49)***	-0.0180 (-2.49)**	-0.0455 (-4.23)***	-0.0321 (-3.76)***
CAPINT _{it}	0.0151 (0.15)	0.0002 (0.00)	0.0037 (0.10)	0.0014 (0.03)	-0.1878 (-1.74)*	-0.1997 (-1.83)*	-0.1256 (-0.99)	-0.1438 (-1.23)	-0.0267 (-0.20)	-0.0586 (-0.55)
LEVERAGE _{it}	-0.0323 (-0.38)	-0.0505 (-0.66)	-0.0038 (-0.08)	-0.0883 (-1.52)	-0.2054 (-2.17)**	-0.3059 (-3.12)***	-0.0684 (-0.58)	-0.1748 (-1.65)	0.0492 (0.36)	-0.0582 (-0.50)
DISCONTINUE _{it}	4.2969 (0.74)	6.0315 (1.00)	-1.3441 (-0.47)	-4.6339 (-1.57)	0.8783 (0.12)	-1.4914 (-0.23)	0.3680 (0.04)	-1.1621 (-0.13)	6.4379 (0.45)	7.1779 (0.55)
SEGMENT _{it}	0.0017 (0.29)	-0.0029 (-0.64)	0.0045 (1.72)*	0.0039 (1.27)	0.0036 (0.62)	0.0001 (0.01)	-0.0012 (-0.16)	-0.0068 (-0.93)	-0.0034 (-0.44)	-0.0132 (-1.67)*
COVERAGE _{it}	-0.1405 (-3.62)***	-0.1436 (-3.96)***	0.0249 (1.48)	0.0347 (1.68)*	0.2081 (4.06)***	0.2164 (4.46)***	0.2547 (4.76)***	0.2614 (5.71)***	0.1617 (2.42)**	0.1637 (2.74)***
BOARD _{it}	0.0009 (0.74)	0.0022 (2.38)**	-0.0008 (-1.52)	-0.0005 (-0.74)	-0.0028 (-1.83)*	-0.0016 (-1.11)	-0.0036 (-1.94)*	-0.0019 (-1.22)	-0.0035 (-1.67)*	-0.0007 (-0.43)
INSTITUTION _{it}	-0.0035 (-4.70)***	-0.0019 (-3.90)***	-0.0009 (-3.81)***	-0.0017 (-4.55)	0.0002 (0.47)	0.0004 (0.70)	0.0005 (0.83)	0.0014 (2.08)**	-0.0003 (-0.39)	0.0022 (3.63)***
AUDIT _{it}	0.1909 (3.86)***	0.0869 (2.06)**	0.0478 (2.28)	0.0524 (1.83)	-0.0661 (-1.29)	-0.1268 (-2.28)**	-0.0003 (-0.01)	-0.1067 (-1.90)*	0.1460 (2.21)**	-0.0596 (-0.96)
Constant	0.0507 (0.20)	0.9446 (4.32)***	2.4001 (28.94)***	1.1212 (10.16)***	2.3539 (8.87)***	1.5714 (5.62)***	1.6613 (4.89)***	1.3012 (3.99)***	0.1811 (0.46)	0.9114 (2.68)**
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	481	481	481	481	481	481	481	481	481	481
R-Square	0.1406	0.1369	0.4861	0.3246	0.1289	0.1552	0.1356	0.2096	0.0738	0.1642

*Regression estimations are conducted with the employment of clustered firm-level Eicker-White robust standard errors. The figures in parentheses are t-statistics ***, ** and * denote significance at 1%, 5% and 10% respectively.*

Table 6.13 Regression Results: Time-Series Trend of Income Tax Accruals Measured by $\bar{R}_{Tax\ Accruals}$ ²

	T+1		T+2		T+3		T+4		T+5	
PERIOD	-0.0120 (-1.05)		-0.1558 (-24.68)***		-0.2290 (-53.06)***		-0.1765 (-31.78)***		0.0052 (0.91)	
YEAR		-0.0060 (-8.92)***		-0.0092 (-22.86)***		-0.0058 (-8.99)***		-0.0045 (-7.02)***		-0.0022 (-4.04)***
PTBI _{it}	0.0489 (1.30)	0.0055 (0.15)	0.0490 (1.67)*	-0.0293 (-1.18)	0.0089 (0.27)	-0.0516 (-1.37)	0.0570 (1.66)	0.0097 (0.28)	0.1030 (2.23)**	0.0876 (1.87)*
VOL_PTBI _{it}	-0.0649 (-0.45)	0.0325 (0.22)	-0.0903 (-0.87)	-0.0278 (-0.36)	0.0377 (0.32)	-0.0063 (-0.05)	-0.0554 (-0.36)	-0.0879 (-0.69)	-0.1862 (-1.26)	-0.1432 (-0.99)
VOL_CASHFLOW _{it}	-0.1989 (-1.21)	-0.02591 (-1.59)	0.0652 (0.54)	-0.0557 (-0.52)	0.0903 (0.70)	-0.0129 (-0.08)	0.2630 (1.65)	0.1827 (1.19)	0.3525 (1.81)*	0.3318 (1.75)*
SIZE _{it}	0.0051 (1.20)	0.0048 (1.40)	-0.0025 (-0.78)	-0.0036 (-1.76)*	-0.0058 (-2.00)**	-0.0072 (-2.04)**	-0.0071 (-1.92)*	-0.0082 (-2.26)**	-0.0049 (-1.35)	-0.0049 (-1.43)
GROWTH _{it}	0.0004 (0.39)	0.0023 (1.87)*	-0.0026 (-2.23)**	0.0009 (0.97)	-0.0024 (-2.25)**	0.0002 (0.16)	-0.0049 (-4.10)***	-0.0029 (-2.10)**	-0.0049 (-3.72)***	-0.0042 (-3.34)***
CAPINT _{it}	0.0058 (0.23)	0.0016 (0.08)	-0.0013 (-0.09)	-0.0044 (-0.42)	-0.0152 (-1.02)	-0.0140 (-0.80)	0.0095 (0.51)	0.0103 (0.55)	0.0176 (0.96)	0.0158 (0.83)
LEVERAGE _{it}	0.0001 (0.01)	-0.0150 (-0.94)	-0.0002 (-0.02)	-0.0296 (-2.34)**	-0.0181 (-1.42)	-0.0422 (-2.31)**	0.0189 (1.19)	0.0001 (0.00)	0.0186 (1.00)	0.0133 (0.69)
DISCONTINUE _{it}	0.6880 (0.51)	0.7397 (0.50)	-0.3427 (-0.46)	-1.0822 (-1.75)*	0.2242 (0.17)	-1.0218 (-0.84)	-0.9626 (-0.66)	-1.9213 (-1.44)	-0.3169 (-0.21)	-0.2389 (-0.16)
SEGMENT _{it}	0.0008 (0.56)	-0.0005 (-0.44)	0.0012 (1.20)	0.0002 (0.35)	-0.0001 (-0.01)	0.0003 (0.35)	0.0002 (0.15)	0.0004 (0.39)	-0.0001 (-0.07)	-0.0006 (-0.58)
COVERAGE _{it}	-0.0350 (-3.90)***	-0.0346 (-4.32)***	0.0119 (1.88)*	0.0145 (3.19)***	0.0313 (4.91)***	0.0347 (4.93)***	0.0396 (5.05)***	0.0423 (5.79)***	0.0303 (3.83)***	0.0303 (3.95)***
BOARD _{it}	-0.0001 (-0.05)	0.0004 (1.64)	-0.0005 (-2.01)**	-0.0002 (-1.00)	-0.0003 (-1.73)*	-0.0004 (-1.49)	-0.0004 (-1.80)*	-0.0004 (-1.63)	-0.0003 (-1.09)	-0.0001 (-0.37)
INSTITUTION _{it}	-0.0009 (-4.78)***	-0.0006 (-4.65)***	-0.0004 (-4.06)***	-0.0004 (-3.96)***	0.0001 (1.67)*	-0.0003 (-2.35)**	0.0002 (2.06)**	-0.0001 (-1.20)	0.0001 (1.80)*	0.0003 (3.30)***
AUDIT _{it}	0.0550 (4.44)***	0.0282 (2.97)***	0.0268 (3.35)***	0.0112 (1.67)*	-0.0070 (-1.06)	0.0075 (0.71)	-0.0050 (-0.60)	0.0057 (0.57)	-0.0003 (-0.03)	-0.0122 (-1.22)
Constant	0.1579 (2.60)**	0.2358 (4.89)***	0.5343 (14.76)***	0.2830 (10.67)***	0.7488 (22.22)	0.2370 (5.20)***	0.5565 (12.43)***	0.1635 (3.44)***	0.0001 (0.00)	0.0560 (1.36)
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	481	481	481	481	481	481	481	481	481	481
R-Square	0.1855	0.2855	0.4498	0.5252	0.4788	0.2066	0.3147	0.1629	0.0498	0.0587

*Regression estimations are conducted with the employment of clustered firm-level Eicker-White robust standard errors. The figures in parentheses are t-statistics ***, ** and * denote significance at 1%, 5% and 10% respectively.*

6.5 Additional Analyses and Robustness Check

6.5.1. Discretionary accruals to control pre-tax earnings management

Low cash ETR can be attributable to both tax planning activities that reduce tax payments without affecting pre-tax income; and pre-tax accrual management activities that increase pre-tax profits without affecting the tax payment (Kim et al. 2011). In order to show whether results of the main tests are robust to controlling for pre-tax earnings management, this section will further control the absolute discretionary accruals ($ACCRUAL_{it}$) in the tests of the second hypotheses, in an effort to isolate the impact of corporate tax management from pre-tax earnings manipulation. Following Dechow et al. (1995) and Hutton et al. (2009), this study employs the modified Jones model to measure the pre-tax earnings management ($ACCRUAL_{it}$) using the cross-sectional absolute value of discretionary accruals²³⁷.

The re-estimated results shown in table A.1 are consistent with the initial results, which indicates that the informativeness of income tax accruals is significantly lower for companies that engage in tax planning activities or exhibit strong incentives to avoid reporting an apparent decline in the post-tax profits²³⁸. These results imply that the detected negative impacts of tax management incentives (i.e., corporate tax planning and the incentive to avoid reporting an apparently declined post-tax profits) on the informativeness of income tax accruals are mainly due to managers' manipulation of income tax provision rather than due to the pre-tax earnings management.

6.5.2. Alternative measures of corporate tax planning

In the main tests, corporate tax planning is measured by the five-year Cash ETR (TA_CASH_{it}) which is calculated as the sum of total taxes paid over the five-year period scaled by the sum of pre-tax income over the same five-year period. In order to show whether results of the main tests are sensitive to measurements of corporate tax planning, this section will re-estimate the tests of the second hypotheses with the employment of three-year cash ETR, and three-year

²³⁷ See Appendix B for procedures of estimating $ACCRUAL_{it}$.

²³⁸ Results reported in table A.1 show that coefficients of TA_CASH_{it} are significantly positive; coefficients of $TARGET1_{it} \times DECLINE_AMOUNT_{it}$ are significantly negative; and the sum of the coefficients of $DECLINE_AMOUNT_{it}$ and the coefficients of $TARGET1_{it} \times DECLINE_AMOUNT_{it}$ are negative.

and five-year GAAP ETR. Specifically, the three-year cash ETR is calculated as the sum of total taxes paid over the three-year period scaled by the sum of pre-tax income over the same three-year period. The three-year (five-year) GAAP ETR is calculated as the sum of income tax expense paid over the three-year (five-year) period scaled by the sum of pre-tax income over the same three-year (five-year) period.

Results reported in table A.2 show that when the informativeness of income tax accruals is captured by $\delta_{Tax\ Accruals}$, coefficients of the three-year Cash ETR (TA_CASH3_{it}), the three-year GAAP ETR (TA_GAAP3_{it}) and the five-year GAAP ETR (TA_GAAP5_{it}) are all significant with the expected positive sign. However, when the informativeness of income tax accruals is captured by $\bar{R}_{Tax\ Accruals}^2$, only the three-year Cash ETR (TA_CASH3_{it}) is significantly positive while the three-year and the five-year GAAP ETR are both positive but insignificant. These results indicate that corporate tax planning measured by firms' cash tax positions has more robust negative impacts on the informativeness of income tax accruals than that measured by the GAAP ETRs.

6.5.3. Alternative measure of operational uncertainty

In examining the impact of managers' tax management incentives on the informativeness of income tax accruals, it is important to control for uncertainty and difficulties faced by managers in making accurate estimations of income tax accruals. This is because low reliability of the reported income tax accruals to explain future tax cash flows can stem from the uncertainty and difficulties in managers' estimation and forecasts of firms' current and future tax position, even in the absence of management deliberate bias in the income tax accruals. In the main tests, the volatility of firms' pre-tax income (VOL_PTBI_{it}) and the volatility of firms' cash flows ($VOL_CASHFLOW_{it}$) are employed to control for firms' operational uncertainty, as greater uncertainty in firms' operational environment can make it more difficult to estimate tax position. However, Holland and Jackson (2004) point out that in order to reflect difficulties that managers face in making accurate estimation, it can be more efficient to control uncertainty in managers' forecasts instead of uncertainty in firm operation using "a measure of variability in expectation, rather than a measure of variability in outcomes" (pp. 108).

Following Holland and Jackson (2004), this study further employs the coefficient of variation in analysts' forecasted sales and pre-tax profits to control for firms' operational uncertainty

when testing the second hypotheses of this study. Table A.4 shows that results generated with the employment of $UNCERT_PTBI_{it}$ and $UNCERT_SALE_{it}$ (the coefficient of variation in analysts' forecasted pre-tax profits and sales) are generally consistent with the initial results. Specifically, results reported in table A.3 confirm that the informativeness of income tax accruals is negatively associated with the level of corporate tax planning and firms' incentives to avoid reporting an apparent decline in the post-tax profits²³⁹.

6.5.4. Alternative measure of dispersed operation

The main tests of the second hypotheses use the number of segments in which a firm operates ($SEGMENT_{it}$) to measure difficulties and complexity in the estimations of income tax accruals due to firms' operations in multiple jurisdictions. Operating in a highly dispersed business environment, especially with intensive operations in foreign countries, requires tax managers to interpret and comply both local and foreign tax laws and regulations in every tax jurisdiction, which may impart estimation errors in income tax accruals (Choudhary et al. 2016). This section further investigates whether results of the second hypotheses tests are sensitive to alternative measure of firms' dispersed operation. The alternative proxy for the level of firms' dispersed operation ($FOREIGN_{it}$) focuses on the intensity of the foreign operations and is calculated using firms' foreign sales divided by the total sales. Results reported in table A.4 shows that the initial inferences are robust to the alternative measure of dispersed operation.

6.5.5. Longer estimation windows of informativeness of income tax accruals

The main tests of the second hypotheses examines the cross-sectional determinates of the informativeness of income tax accruals, in which the firm-specific informativeness of income tax accruals is measured as the ability of income tax accruals to explain future one-year-ahead cash tax payments. However, results of the first hypothesis test show that income tax accruals are able to predict tax cash flows beyond the future one-year-ahead window. In order to show whether firms' tax management incentives exert longer impact on the informativeness of the reported income tax accruals, this section further increases the estimation window of the informativeness of income tax accruals beyond future one-year ahead to future two years and three years as robustness check. Results reported in table A.5 and A.6 show that extending the

²³⁹ Table A.4 shows that the coefficients of TA_CASH_{it} are positive and the coefficients of $TARGET1_{it} \times DECLINE_AMOUNT_{it}$ are negative.

estimation window weakens the results. Specifically, firms' tax management incentives do not have significant impact on the ability of income tax accruals to explain future tax cash flows beyond the immediate-following year.

This may be due to the fact that UK GAAP and IAS 12 require tax-related estimation errors to be corrected in a timely manner when the estimation errors are identified, and auditors are responsible for comparing the level of tax provision with the subsequent agreed liability and requiring their clients to correct the questionable tax disclosures on an annual basis. Therefore, it is likely that the estimation errors in firms' income tax accruals arising from their earlier tax management behaviours are corrected in the immediate subsequent year, which in turn results in the stronger impact of firms' tax management incentives on the informativeness of income tax accruals to explain future one-year-ahead realised tax cash flows, but weaker relation between firms' tax management incentives and the informativeness measures that predict future two-year- and three-year-ahead tax cash flows.

6.5.6. Firm-fixed effect of the first and third hypothesis tests

Results of the main tests are estimated based on the year and industry fixed effect, to control determinative factors of informativeness of income tax accruals that may be correlated across years and industries. However, it is possible that the regression analyses of the main tests are affected by uncontrolled heterogeneity in firm-specific characteristics which affect the informativeness of income tax accruals. This section will re-estimate tests of the first and the third hypotheses²⁴⁰ using firm-fixed effect estimation models to show whether the main results are sensitive to heterogeneity in firms' specific characteristics. Results estimated using the fixed effect models are presented in table A.7 to table A.9, which remain qualitatively identical to the original results.

Table A.7 shows that when the fixed effect models are employed, the current-period income tax accruals ($Tax\ Accruals_{i,t}$) is still incrementally informative over current-period cash tax payment in explaining future one- to five-year ahead cash tax payments, indicating that the original results are not affected by heterogeneity in firms' specific characteristics. However,

²⁴⁰ When testing the second hypotheses, the informativeness of income tax accruals is estimated for each firm using firm-specific $\bar{R}_{Tax\ Accruals}^2$ and $\delta_{Tax\ Accruals}$. Therefore, the fixed effect estimation models cannot be applied for testing the second hypotheses because of the insufficient observations each year for each firm.

the fixed effect results show that current-period cash tax paid is not useful in predicting future tax cash flows beyond four year ahead. Consistent with the original results, results of fixed effect models presented in table A.8 and table A.9 show that all the coefficients of the time trend variable *YEAR* and *PERIOD* are significantly negative without controlling for changes in firms' underlying characteristics. After controlling for changes in firms' underlying characteristics, it shows that there is significant downward trend in the informativeness of income tax accruals to explain future two- to four-year ahead cash flows.

6.5.7. One-stage estimation of the second hypotheses

In the main tests of the second hypotheses, the two-stage estimation method is employed following Plenborg et al. (1998) and Donnelly and Lynch (2002), which first estimates the informativeness of income tax accruals as measured by $\delta_{Tax\ Accruals}$ and $\bar{R}_{Tax\ Accruals}^2$ for each firm in the sample, and then examines the impact of firms' tax management incentives and corporate governance mechanism on the informativeness of income tax accruals estimated in the first stage. The two-stage estimation method focuses on investigating how the between-firm variations in the informativeness of income tax accruals are explained by firms' tax management incentives and corporate governance strength.

This section will further employ the one-stage estimation approach following Warfield et al. (1995) as a test of the robustness of the main results generated using the two-stage estimation. The one-stage estimation method involves the use of interaction terms between income tax accruals and variables of interests (e.g., firms' tax management incentives and corporate governance strength). Different from the two-stage estimation method which focuses on the cross-sectional determinations of the informativeness of income tax accruals, the one-stage approach focuses on explaining both the cross-sectional and inter-temporal variations in the informativeness of income tax accruals based on the panel data regression (Donnelly and Lynch 2002). It is possible that the original tests estimated based on the year and industry fixed effect may omit to control some firm-specific characteristics which can significantly affect the informativeness of income tax accruals. Thus, the one-stage models will be estimated using firm-fixed effect to mitigate this concern. The one-stage models are presented in Appendix C.

Results reported in table A.10 and A.11 show that results generated using the one-stage estimation with the control of firm-fixed effect are consistent with the initial results.

Specifically, as shown from table A.10, the coefficient H_3 of $Tax\ Accruals_{i,t} * TA_CASH_{i,t}$ in model (8.11) is significant with an expected positive sign (1.7124 with $t=3.37$) and the coefficient M_3 of $Tax\ Accruals_{i,t} * DECLINE_AMOUNT_{i,t}$ in model (8.21) is significant with an expected negative sign (-5.3080 with $t=-1.77$). Consistent with the original results, these results show that firms which engage in tax planning activities or have missed previous-period's pre-tax profit exhibit significantly lower informativeness of income tax accruals. Results reported from table A.11 column I indicate that corporate monitoring mechanisms are not significant in attenuating the negative impacts from corporate tax planning (as shown from the insignificant coefficients of $Tax\ Accruals_{i,t} \times TA_CASH_{i,t} \times COVERAGE_{i,t}$, $Tax\ Accruals_{i,t} \times TA_CASH_{i,t} \times BOARD_{i,t}$ and $Tax\ Accruals_{i,t} \times TA_CASH_{i,t} \times AUDIT_{i,t}$, and the significant positive coefficient of $Tax\ Accruals_{i,t} \times TA_CASH_{i,t} \times INSTITUTION_{i,t}$). Results reported in table A.11 column II indicate that higher level of analysts coverage and institutional shareholding play a significant role in attenuating the negative relation between the informativeness of income tax accruals and firms' incentives to meet previous period's post-tax profit (as shown from the significant positive coefficients of $Tax\ Accruals_{i,t} \times DECLINE_AMOUNT_{i,t} \times COVERAGE_{i,t}$ and $Tax\ Accruals_{i,t} \times DECLINE_AMOUNT_{i,t} \times INSTITUTION_{i,t}$).

6.6. Conclusion

This chapter analyses and discusses the results of the hypotheses tests of this study. This chapter begins with examining whether income tax accruals are incrementally informative over cash tax paid in explaining future tax cash flows. The following section of this chapter tests how tax management incentives, including the engagement in corporate tax planning activities and tax-induced earnings management to meet or beat specific earnings targets, affect the informativeness of income tax accruals. This chapter further tests whether effective corporate governance mechanism plays a significant role in attenuating the negative impact of tax management incentives on the informativeness of income tax accruals. Subsequently, this section investigates the time-series trend in the incremental informativeness of income tax accruals over the past three decade from 1992 to 2017. Finally, several additional analyses are conducted to check the robustness of the estimated results regarding the control of pre-tax earnings management, alternative measures of corporate tax planning, alternative measures of operational uncertainty, alternative measure of dispersed operation, longer estimation window of the informativeness of income tax accruals, firm fixed effect and one-stage estimation.

In summary, this study finds that income tax accruals are incrementally informative over cash tax paid in explaining future tax cash flows in UK. Using the methodology employed in the value-relevance accounting studies, this study provides evidence that the incremental informativeness of income tax accruals to explain future tax cash flow is significantly lower for firms that engage in tax planning or earnings management activities to avoid reporting a decline in the post-tax profits. Higher analysts coverage and institutional shareholding are found to play a significant role in attenuating the negative relationship between the informativeness of income tax accruals and the managements' incentives to avoid reporting an apparent decline in the post-tax profits. However, corporate governance is not significantly important in attenuating the negative impact of corporate tax planning on the informativeness of income tax accruals. In addition, this study finds a significant downward trend in the informativeness of income tax accruals to explain future tax cash flows over the past three decades in UK.

Further analyses and robustness check provide evidence the initial results of this study are robust when 1) the measure of pre-tax earnings management is controlled in the regression estimation; 2) firm fixed effect estimation models are used; 3) alternative measures of operational uncertainty are employed; 4) alternative measure of dispersed operation is employed; and 5) one-stage estimation of the second hypotheses is conducted. However, the initial results can be sensitive to the length of the estimating window in measuring the informativeness of income tax accruals. Results of this thesis can be summarised in the following table 6.14.

Table 6.14: Summary of Main Hypotheses and Results in This Study			
Hypothesis	Aim of Hypotheses	Results of Hypothesis Tests	Table of Results
<i>The incremental informativeness of income tax accruals</i>			
H1	To investigate whether income tax accruals are incrementally informative over cash tax paid in explaining future tax cash flows on average.	Results supported: Income tax accruals are incrementally informative over cash tax paid in explaining future tax cash flows.	Table 6.1
<i>Cross-sectional determinates of informativeness of income tax accruals</i>			
Tax management activities			

H2a	To investigate the impact of corporate tax planning on the informativeness of income tax accruals.	Results supported: There is a negative relationship between the informativeness of income tax accruals and the level of firms' tax planning.	Table 6.2
H2b	To investigate the impact of managers' incentives to avoid reporting a decline in post-tax earnings on the informativeness of income tax accruals.	Results supported: There is a negative relationship between the informativeness of income tax accruals and managers' incentives to avoid reporting a decline in post-tax earnings.	Table 6.3; 6.4
H2b	To investigate the impact of managers' incentives to avoid missing analysts' forecasted earnings on the informativeness of income tax accruals.	Results not supported: There is a positive relationship between the informativeness of income tax accruals and managers' incentives to avoid missing analysts' forecasted earnings.	Table 6.5; 6.6
H2b	To investigate the impact of managers' incentives to avoid reporting a post-tax loss on the informativeness of income tax accruals.	Results not supported: There is no relationship between the informativeness of income tax accruals and managers' incentives to avoid reporting a post-tax loss.	Table 6.7
Corporate Governance Mechanism			
H2c_i~ H2c_iv	To investigate the role of corporate governance mechanisms played in the relation between the informativeness of income tax accruals and corporate tax planning.	Results not supported: Corporate governance mechanisms are insignificant in attenuating the negative impact of corporate tax planning on the informativeness of income tax accruals.	Table 6.8
H2c_i~ H2c_iv	To investigate the role of corporate governance mechanisms played in the relation between the informativeness of income tax accruals and managers' incentives to avoid reporting a decline in post-tax earnings.	Results partially supported: Higher analysts coverage and higher institutional shareholding are significant in attenuating the negative impact of managers' incentives to avoid reporting a decline in post-tax earnings on the informativeness of income tax accruals.	Table 6.9
Time-series trend of informativeness of income tax accruals			
H3	To investigate the time-series trend of the informativeness of income tax accruals to explain future tax cash flows	There is a downward trend of the informativeness of income tax accruals over the period 1992-2017 in the UK.	Figure 6.1 and 6.2; Table 6.10-6.13.

Chapter 7

Conclusion, Implication and Limitation

7.1. Introduction

This study has been carried out to provide the first evidence concerning the informativeness of income tax provision to explain firms' future tax cash flows in the UK setting. Using a panel dataset of publicly-traded UK companies for the period 1992 to 2017, this study provides strong evidence that income tax accruals on average have an incremental ability over cash tax paid to explain future tax cash flows. This study has also examined the cross-sectional determinates and the time-series behaviours of the informativeness of income tax accruals in the UK setting. To summarise this thesis, this chapter begins with overviews of the background, literature review, hypotheses and the research findings while simultaneously discussing the contributions of this thesis. Subsequently, this chapter discusses the theoretical and practical implications that can be drawn from the research findings of this thesis. Limitations and suggestions for future studies are discussed in the following section of this chapter, and the final section concludes this chapter.

7.2. Summary of Background, Literature Review, Hypotheses, Research Findings and Contributions

7.2.1. Summary of background, literature review and hypotheses

The background knowledge provided in chapter 2 and the prior literature evidence reviewed in chapter 3 lay theoretical foundation and guidance for the hypotheses developed in this study.

Chapter 2 of this thesis, which provides the background knowledge regarding the UK accounting and taxation environment, discusses the components of income tax provision and the definition of income tax accruals. Basically, the income tax accruals, i.e., the difference between the income tax expense and the cash tax paid, consist of 1) the deferred taxes; 2) the income taxes accrued but not yet paid; 3) the unsettled tax liabilities; and 4) the financial-accounting-standards induced over- or under-statements of current tax expense relative to cash tax incurred. Therefore, income tax accruals should have predictive ability about future cash tax consequences that would occur when the accrued/unsettled income taxes are realised or when the carrying amount of tax assets (liabilities) is recovered (settled). The ability of income tax accruals to explain future tax cash flows depends on the precision of estimated income tax accruals to reflect firms' underlying tax obligations. Both the intentional and unintentional

managerial estimation errors in income tax accruals can obfuscate the precision of income tax provision in reflecting firms' real tax obligation and compromise the informativeness of income tax accruals to explain future tax-related cash flows.

In addition, chapter 2 highlight that the accounting methods for deferred taxes have evolved dramatically in the UK from the partial to the full provision approach. The partial provision methods allow managers to convey their private information about firms' future tax consequences but is criticised as allowing too much discretion for managers, while the full provision methods which restrict the latitudes for opportunistic management behaviours via deferred tax provisioning could in turn reduce managers' ability to convey their private information about firms' future cash tax consequences.

The literature review in chapter 3 of this thesis provides evidence that managers might be incentivised to engage in tax management activities to increase firms' after-tax net income and after-tax cash flows. However, under the principal-agent framework, corporate tax management activities and managerial rent diversion can be complementary (Desai et al. 2006; 2009; Wahab and Holland 2012). The self-interested managers, who possess private tax information and discretion in making tax-related decisions, may undertake opportunistic tax management activities to pursue their personal interests at the expense of firm owners, such as managing earnings through distorting the income tax accruals or engaging in tax-planning activities which are undesired by shareholders.

Specifically, the manipulation of income tax provision provides a source of earnings management. This is because that changes in the income tax expenses lead to corresponding changes in firms' net earnings; and the discretion, complexity and information asymmetry involved in the process of estimating income tax accruals facilitate managers to manage earnings via deliberately biasing income tax accruals. Earnings management through manipulating income tax accruals could reduce the reliability and relevance of income tax provision to represent firms' real tax obligations (Dhaliwal et al. 2004).

In addition, tax planning activities designed to reduce firms' tax burden could put firms at risks of being challenged and penalised by tax authorities in the future, which can increase the uncertainty of firms' future cash tax outcomes and thereby making it difficult for managers to accurately estimate the current-period income tax accruals. Moreover, the tax-planning

activities carried out with the intention to avoid providing a roadmap to tax authorities could inevitably increase the complexity and opacity related to tax transactions and tax disclosures in financial statements, which could in turn provide self-interested managers with more latitude to manipulate the income tax provision for opportunistic reasons, giving rise to intentional estimation errors in income tax accruals (Desai et al. 2006; 2009; Kim et al. 2011).

The literature review of chapter 3 also highlights the importance of corporate governance mechanism in reducing the agency problems and protecting the benefits of shareholders, through aligning the managements' interests with that of shareholders. The relationship between corporate tax management and the informativeness of income tax accruals therefore can be better explained in conjunction with corporate governance mechanism, to the extent that the effective corporate governance mechanism plays a role in restricting opportunistic managerial performance and enhancing financial transparency, thereby attenuating the negative impact of tax management incentives on the informativeness of income tax accruals.

This study attempts to first test whether the income tax accruals are incrementally informative over cash tax paid to explain future tax cash flows, and then examine the cross-sectional determinates and the time-series trends of the informativeness of income tax accruals in the UK setting. The hypotheses of this study can be summarised in the following table 7.1.

7.2.2. Summary of research findings

As discussed in the section of the summary of hypotheses, it can be concluded that the primary objectives of this study are to investigate: 1) whether income tax accruals are incrementally informative over cash tax paid in explaining future tax cash flows; 2) whether and how different tax management incentives affect the incremental informativeness of income tax accruals; 3) whether more effective corporate governance plays a significant role in attenuating the negative impacts of tax management incentives on the informativeness of income tax accruals and; 4) whether the ability of income tax accruals to explain future tax cash flows has improved or deteriorated over time in the UK. Multivariate regression results of this study are generated using a panel dataset of publicly-traded non-financial UK companies for the period 1992 to 2017, and are summarised as follows.

Firstly, this study provides evidence that income tax accruals are incrementally informative over cash tax paid in explaining future tax cash flows. Current-period income tax accruals explain approximate 6.52 percent to 15.04 percent of variations in future one- to five-year ahead cash tax payments.

Secondly, the incremental informativeness of income tax accruals is found to be significantly lower for firms that 1) engage in tax planning activities or; 2) exhibit strong incentives to avoid reporting an apparent decline in the post-tax profits. On the one hand, these results are consistent with the agency perspective of corporate tax management that tax planning activities carried out with the intention to avoid detections from tax authorities could add opacity and obfuscation to financial statements, which reduces the quality of reported income tax information (Desai and Dharmapala 2009; Kim et al. 2011; Balakrishnan et al. 2018). On the other hand, the result that tax-management incentives to avoid reporting declined post-tax earnings lead to reduced informativeness of income tax accruals is consistent with previous evidence that the income tax accounts provide the last-chance for earnings management, when the pre-tax accruals fail to achieve the earnings target (Dhaliwal et al. 2004; Holland and Jackson 2004).

Thirdly, this study finds that higher level of analysts coverage and institutional shareholding play a significant role in attenuating the negative relationship between the informativeness of income tax accruals and the managements' incentives to avoid reporting an apparent decline in the post-tax profits. However, corporate governance mechanisms are not significantly important in attenuating the negative impact of corporate tax planning on the informativeness of income tax accruals. These results indicate that higher levels of analysts coverage and institutional shareholding might be effective in restricting opportunistic managerial behaviours by using income tax expense as a source of manufacturing earnings. However, corporate governance mechanisms examined in this study are ineffective in scrutinising financial reporting irregularities resulting from the engagements in tax planning activities, which may either due to that there is insufficient information about firms' tax planning strategies available for a potential governance mechanism; or that the governance mechanism is less capable of understanding and identifying firms' tax-planning-related affairs and issues.

Finally, this study finds that the incremental informativeness of income tax accruals about future tax cash flows has deteriorated over time in the UK, implying that as compared to the

partial provision methods of deferred taxes, the full provision method of deferred taxes which focuses on restricting managerial discretions leads to less information content in the income tax provision.

7.2.3. Summary of contributions

This study makes several contributions to the literature by adding understandings of the reported income tax disclosures in the UK setting. Since this study provides the first evidence concerning the informativeness of income tax provision in the UK environment, it contributes to the value relevance literature by employing a value-relevance methodology to examine the reliability and relevance of the reported income tax information in explaining future tax cash flows.

As discussed in the literature review of chapter 3, the Scholes-Wolfson framework and the principal-agent theory provide the theoretical underpinning of studies that examine the corporate tax management behaviours. This study finds that corporate tax planning activities and the tax-induced earnings management to avoid reporting apparent decline in post-tax profits significantly reduce the incremental informativeness of income tax accruals. In this way, this study adds further empirical evidence to support the Scholes-Wolfson framework and the principal-agent perspective of corporate tax management, by showing the importance of considering “all contracting parties, all taxes and all costs” associated with corporate tax management, since the sophisticated and complex tax management activities could induce nontax costs in the form of severe transparency issues to financial statements, which could exacerbate the information asymmetry and the agency issues between managers and investors.

This study also contributes to the agency perspective of corporate tax management by empirically examining the role of corporate governance mechanisms in restricting managers’ incentives to engage in opportunistic tax management activities. Through showing that certain corporate governance mechanisms (i.e., higher analysts coverage and institutional shareholding) play a significant role in attenuating the impact of tax management incentives to avoid reporting an apparently declined post-tax profits, this study extends the literature on understanding how corporate governance affects the managerial performance.

Finally, this study contributes to the literature that compares the information value of the partial provision method with that of the full provision method of deferred taxes. By showing a significant downward trend in the informativeness of income tax accruals to explain future tax cash flows, this study suggests that the full provision methods of deferred taxes adopted in FRS 19 and IAS 12, which focuses on restricting managerial discretions, lead to reduced ability of income tax accruals to explain future tax cash flows as compared to the partial provision methods adopted in SSAP 15. These results imply that the accountings-standard setters' focus on restricting managerial discretion may potentially reduce managers' ability to convey their private information about firms' future cash tax outcomes.

7.3. Policy and Practical Implications

Results of this study provide several policy and practical implications for academics, financial statement users, and regulatory authorities such as the accounting standard setters and corporate governance regulatory bodies. Basically, this study examines the cross-sectional determinates and the time-series behaviours of the informativeness of income tax accruals in the UK setting, and highlights that corporate tax planning and managers' incentives to avoid reporting declined post-tax profits significantly reduce the informativeness of income tax accruals. In this way, this study broads the research scope by providing further empirical evidence on the "incentive structure involved in the corporate tax reporting" (Hanlon and Heitzman 2010, pp. 128). However, the understanding of the quality and the reliability of reported income tax disclosures, particularly in the UK setting, is not well developed and sufficiently investigated. This study therefore advocates that tax researchers consider more about the sufficiency of the tax disclosures in supplying reliable and informative tax information. In addition, this study finds that UK corporate governance is not effective in moderating the negative impact of corporate tax planning on the informativeness of income tax accruals, which suggests that tax researchers should incorporate relevant institutional and policy differences among firms and countries when assessing the transparency problems of income tax disclosures.

In terms of financial statement users such as investors and financial analysts, the results of this study provide practical implications regarding the transparency of the reported income tax disclosures. This study signifies that tax management incentives, including corporate tax planning and earnings management via biasing income tax accruals, lead to reduced ability of income tax accruals to explain future tax cash flows. These results indicate that when

evaluating firms' after-tax performance to make relevant investment decisions, financial statement users should pay attention to firms' reported tax disclosures and analyse firms' tax management incentives, in order to be aware of the potential loss in the information transparency incurred by firms' opportunistic tax management behaviours and hence avoid making biased investment decisions.

In addition to the academics and financial statement users, this study also provides practical implications for regulatory authorities from aspects of enforcing and regulating tax disclosures in financial statements. Firstly, in examining the time-series trend of the informativeness of income tax accruals to explain future tax cash flows, this study shows that there is a significant downward trend in the informativeness of income tax accruals to explain future tax cash flows over the year 1992 to 2017 in the UK. This implies that as compared to the partial provision methods of deferred taxes, the full provision methods which focuses on restricting managerial discretion in deferred tax provision may reduce managers' ability to convey private information about firms' future cash-tax consequences, leading to reduced informativeness of the reported income tax disclosures. These results provide practical and policy implications to accounting standard setters that it might be useful to require a note disclosure in financial statements to clarify the amount of deferred taxes that are likely to have future cash tax consequences and crystallise in the foreseeable future, in order to facilitate managers to convey their private tax information and improve the accuracy of investors' evaluation about firms' future commitments for internal funds.

Secondly, in examining whether the relationship between the informativeness of income tax accruals and firms' tax management activities is conditional upon the strength of corporate governance mechanism, this study shows that higher levels of analysts coverage and institutional shareholding appear to be effective in restricting self-interested managers from using income tax provision as a source of manufacturing earnings. However, the corporate governance mechanisms examined in this study are not effective in scrutinising tax reporting irregularities resulting from the engagements in tax planning activities. This could be due to the insufficiency of the tax disclosures available for a potential governance mechanism to assess a firm's tax planning strategies; or due to the incapability of the governance mechanism in understanding and identifying firms' tax-planning-related issues and affairs. The former highlights the importance of financial reporting and tax regulatory authorities to require increased tax disclosures, in order to ensure the adequacy of the tax planning information

available for firms' control mechanisms when assessing firms' tax planning strategies and tax reporting transparency. The latter suggests that the UK tax authority and corporate governance regulatory bodies should enforce further actions additional to the existing anti-tax-avoidance scheme, to enhance the capability of firms' corporate governance mechanism (such as board of directors) in understanding firms' tax information; monitoring managers' tax management decisions and implementations; and ensuring that firms' tax management activities are conducted with transparency and restricted uncertainty.

7.4. Limitations and Suggestions for Future Studies

This section discusses the limitations of this study and provides suggestions for future studies. Limitations of this study can be summarised as follows:

First, in order to ensure that there is sufficient data to generate the firm-specific informativeness of income tax accruals, each company included in the sample is required to have sufficient data on income tax expense and cash tax payment for at least six consecutive years, which may induce survivorship bias. Second, when conducting the hypothesis tests, loss firms are omitted from the sample to control for tax losses that are carried forward or transferred among groups, which may inhibit generalising the results to other samples. However, the exclusion of loss firms is necessary as tax losses may obscure the true informativeness of income tax accruals in explaining future tax payments.

Moreover, this study investigates the time-series trend of the informativeness of income tax accruals, in order to show whether the adoption of different tax accounting standards leads to changes in the informativeness of income tax accruals. However, changes in the tax accounting standards adopted in the UK may not be the only reason that causes variations in the informativeness of income tax accruals over time. Although several variables that capture the changes in firms' underlying characteristics and performance are included in the regression, other factors which may shape managers' behaviours in the financial reporting process (e.g., financial crises) are neglected, which may add noise to the interpretation of the results.

Despite the limitations, this study provides suggestions for future studies which are interested in examining the reported tax disclosures. To begin with, as stated in chapter 3, this study does not distinguish between the benign tax avoidance and illegal tax evasion when examining the

impact of corporate tax management on the informativeness of income tax accruals. Future research therefore may be interested in differentiating the impacts of tax avoidance and tax evasion on the informativeness of income tax accruals, such as investigating whether the informativeness of income tax accruals is significantly lower in a sample of firms that are accused of engaging in tax-sheltering activities.

In addition, this study uses the ability of income tax accruals to explain future tax cash flows as a criterion to evaluate the informativeness of income tax provision. Future studies may be interested in further analysing whether the capital market participants, such as the stock investors and the sophisticated financial analysis, appreciate the information contained in income tax provision and fully incorporate the informativeness of the income tax accruals into their valuations about firms' future net performance. For example, future research could consider whether low informativeness of the income tax accruals aggravates analysts' earnings forecast errors or leads to mispricing in stock markets.

Furthermore, when examining cross-sectional determinates of the informativeness of income tax accruals, this study expects that managers' tax management incentives to meet particular earnings target through biasing income tax accruals lead to intentional and/or unintentional estimation errors in income tax accruals, which reduces the ability of income tax accruals to explain future tax cash flows. However, this study has not examined how managers manipulate the income tax accruals to avoid failing the earnings target. Therefore, future research might consider examining 1) whether the willingness of managers to manipulate income tax provision downward for the current accounting period (e.g., to meet particular earnings targets) results in future upward adjustment to prior year tax; 2) whether the willingness of managers to manipulate income tax provision upward for the current accounting period (e.g., to build tax cookie jar) results in future downward adjustment to prior year tax.

Moreover, this study does not investigate whether the income tax expense is regularly used by managers to relax firms' debt covenant constraints. Future research might be interested in examining whether and how firms manage income tax expense when they are close to violate their lending contracts. Last but not the least, future research may extend the agency perspective of corporate tax management by investigating how family ownership, managers' compensation incentives or the board properties affects the informativeness of income tax accruals to explain future tax cash flows.

7.5. Conclusion

In summary, this thesis aims to investigate: 1) whether income tax accruals are incrementally informative over cash tax paid in explaining future tax cash flows; 2) whether and how different tax management incentives affect the incremental informativeness of income tax accruals; 3) whether more effective corporate governance plays a significant role in attenuating the negative impacts of tax management incentives on the informativeness of income tax accruals and; 4) whether the ability of income tax accruals to explain future tax cash flows has improved or deteriorated over time in the UK.

Using a panel dataset of publicly-traded non-financial UK companies for the period 1992-2017, this study provides evidence that current-period income tax accruals are incrementally informative over current-period cash tax paid in explaining future tax cash flows. The incremental informativeness of income tax accruals is significantly lower for firms that 1) engage in tax planning activities or; 2) exhibit strong incentives to avoid reporting an apparent decline in the post-tax profits. There is no significant evidence indicating that the incentives to avoid missing analysts' forecasted earnings or to avoid reporting a post-tax loss strongly motivate managers to distort the income tax accruals. Higher levels of analysts coverage and institutional shareholding are found to play a significant role in attenuating the negative impact of the managements' incentives to avoid reporting an apparent decline in the post-tax profits on the informativeness of income tax accruals. However, there is limited evidence that governance mechanisms are important in moderating the negative impact of corporate tax planning on the informativeness of income tax accruals. In addition, this thesis finds that the incremental informativeness of income tax accruals about future tax cash flows has deteriorated over time in the UK, indicating that the adoption of partial provision method of deferred taxes gives rise to income tax information with significantly greater ability to explain future tax cash flows as compared to the full provision methods of deferred taxes.

This study is not free from limitations. The limited sample size and the limited time periods may inhibit the generalisation of the research findings. First, the sample of firms employed in this study is restricted to publicly-traded non-financial UK companies that have relevant tax data (cash tax paid and income tax expenses) for at least six consecutive years, which could induce survivorship bias. Second, when conducting the hypothesis tests, loss firms are omitted from the sample to control for tax losses that are carried forward or transferred among groups,

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which may inhibit generalising the results to other samples. However, the exclusion of loss firms is necessary as tax losses may obscure the true informativeness of income tax accruals in explaining future tax payments. Despite the discussed limitations, this study provides several policy and practical implications for tax researchers, financial statement users, and relevant regulatory authorities. This study also provides suggestions for future studies that are interested in examining the reported tax disclosures.

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Appendix A Additional Tests and Robustness Check

Table A.1 Inclusion of Pre-Tax Earnings Management: Tax Management Incentives (Tax Planning, Earnings Target 1, Earnings Target 2 and Earnings Target 3) and the Informativeness of Income Tax Accruals								
	I Tax Planning		II Target 1 Avoid Declined Earnings		III Target 2 Avoid Failing Analysts' Forecast		IV Target3 Avoid Reporting Post-Tax Loss	
	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$
TA_CASH _{it}	0.6963 (2.13)**	0.3710 (2.17)**						
TARGET1 _{it}			-0.0174 (-0.54)	0.0051 (0.32)				
DECLINE_AMOUNT _{it}			1.2365 (2.44)**	0.4268 (1.78)*				
TARGET1 _{it} × DECLINE_AMOUNT _{it}			-2.2543 (-2.77)***	-1.0771 (-2.43)**				
TARGET2 _{it}					-0.0103 (-0.21)	-0.0136 (-0.49)		
ERROR_AMOUNT _{it}					-0.3855 (-0.61)	-0.2164 (-0.63)		
TARGET2 _{it} × ERROR_AMOUNT _{it}					1.1873 (1.75)*	0.6374 (1.85)*		
TARGET3 _{it}							0.0472 (0.65)	0.0757 (1.45)
ACCRUAL _{it}	-0.1981 (-0.81)	-0.1052 (-1.26)	-0.1162 (-0.52)	-0.0687 (-0.84)	-0.3210 (-1.42)	-0.1209 (-1.31)	-0.1533 (-0.67)	-0.0936 (-1.13)
PTBI _{it}	0.6163 (1.82)*	0.0939 (0.52)	0.6019 (1.52)	0.0432 (0.20)	0.5074 (1.58)	0.1601 (0.81)	0.5992 (1.71)*	0.1037 (0.60)
VOL_PTBI _{it}	-0.4944 (-0.59)	-0.1150 (-0.25)	-0.0927 (-0.11)	0.0236 (0.05)	-1.0556 (-1.08)	-0.5479 (-1.02)	-0.6119 (-0.74)	-0.2585 (-0.60)
VOL_CASHFLOW _{it}	2.6993 (3.27)	1.2263 (2.81)***	2.9813 (3.67)***	1.3552 (3.13)***	3.5932 (2.45)**	0.7711 (1.00)	2.9422 (3.59)***	1.3291 (3.03)***
SIZE _{it}	-0.0096 (-0.44)	-0.0277 (-2.21)**	-0.0036 (-0.17)	-0.0251 (-1.96)*	0.0221 (0.72)	-0.0285 (-1.55)	-0.0040 (-0.18)	-0.0250 (-1.97)**
GROWTH _{it}	-0.0281 (-2.46)**	-0.0103 (-2.51)**	-0.0252 (-2.15)**	-0.0082 (-1.73)*	-0.0150 (-1.47)	-0.0075 (-1.73)	-0.0268 (-2.24)**	-0.0099 (-2.12)**
CAPINT _{it}	0.1538 (0.90)	0.1134 (1.24)	0.1785 (1.03)	0.1210 (1.35)	0.6879 (2.59)**	0.1776 (1.41)	0.1741 (1.00)	0.1179 (1.31)
LEVERAGE _{it}	-0.1371 (-0.90)	-0.1651 (-2.00)**	-0.2577 (-1.70)*	-0.2287 (-2.71)***	-0.3704 (-1.58)	-0.1477 (-1.60)	-0.2270 (-1.51)	-0.2107 (-2.59)***
DISCONTINUE _{it}	4.4389 (0.62)	-0.1701 (-0.07)	4.6783 (0.62)	0.3918 (0.14)	-6.1864 (-0.88)	-3.1491 (-1.12)	4.6696 (0.60)	0.4643 (0.16)
SEGMENT _{it}	-0.0078 (-0.48)	-0.0096 (-1.24)	-0.0067 (-0.40)	-0.0088 (-1.11)	-0.0258 (-1.65)*	-0.0142 (-1.94)*	-0.0079 (-0.47)	-0.0093 (-1.17)

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DEFER _{it}	-0.0986 (-0.10)	0.0563 (0.16)	-0.2271 (-0.22)	-0.0475 (-0.13)	0.2134 (0.21)	0.0033 (0.01)	-0.1392 (-0.14)	-0.0123 (-0.03)
Constant	0.2238 (0.66)	0.1316 (0.70)	0.1761 (0.55)	0.1273 (0.67)	0.1780 (0.41)	0.6575 (2.45)**	0.2134 (0.66)	0.1409 (0.75)
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1236	1236	1267	1267	430	430	1267	1267
R-Square	0.1560	0.2639	0.1601	0.2569	0.3522	0.3686	0.1556	0.2555
<p><i>Regression estimations are conducted with the employment of clustered firm-level Eicker-White robust standard errors. The figures in parentheses are t-statistics, ***, ** and * denote significance at 1%, 5% and 10% respectively.</i></p>								

**Table A.2 Alternative Measure of Corporate Tax Planning:
Corporate Tax Planning and the Informativeness of Income Tax Accruals**

	Informativeness denoted as $\delta_{Tax\ Accruals}$			Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$		
TA_CASH3_{it}	0.4806 (2.07)**			0.2513 (1.89)*		
TA_GAAP5_{it}		0.6837 (1.87)*			0.1736 (0.85)	
TA_GAAP3_{it}			0.5747 (2.04)**			0.0936 (0.56)
PTBI _{it}	0.5684 (1.71)*	0.4905 (1.63)	0.5252 (1.73)*	0.0605 (0.36)	-0.0110 (-0.07)	-0.0007 (-0.00)
VOL_PTBI _{it}	-0.6209 (-0.74)	-0.3390 (-0.41)	-0.5181 (-0.63)	-0.1914 (-0.43)	-0.1401 (-0.31)	-0.1811 (-0.41)
VOL_CASHFLOW _{it}	2.7627 (3.35)***	2.6556 (3.24)***	2.7812 (3.41)***	1.2339 (2.82)***	1.2629 (2.84)***	1.2899 (2.93)***
SIZE _{it}	-0.0055 (-0.25)	-0.0046 (-0.22)	-0.0046 (-0.21)	-0.0255 (-2.01)**	-0.0258 (-2.02)**	-0.0252 (-1.97)**
GROWTH _{it}	-0.0267 (-2.39)**	-0.0274 (-2.49)**	-0.0272 (-2.46)**	-0.0094 (-2.28)**	-0.0082 (-1.83)*	-0.0082 (-1.83)*
CAPINT _{it}	0.1686 (0.98)	0.1748 (1.03)	0.1693 (1.00)	0.1191 (1.30)	0.1251 (1.36)	0.1245 (1.35)
LEVERAGE _{it}	-0.1665 (-1.07)	-0.1860 (-1.23)	-0.1937 (-1.28)	-0.1800 (-2.17)**	-0.2014 (-2.42)**	-0.2075 (-2.48)**
DISCONTINUE _{it}	2.8787 (0.40)	3.9818 (0.56)	4.1343 (0.57)	-1.2291 (-0.49)	-0.0437 (-0.02)	-0.0430 (-0.01)
SEGMENT _{it}	-0.0072 (-0.45)	-0.0064 (-0.40)	-0.0064 (-0.40)	-0.0087 (-1.13)	-0.0081 (-1.04)	-0.0083 (-1.05)
DEFER _{it}	-0.1868 (-0.19)	-0.2316 (-0.23)	-0.2248 (-0.22)	-0.0044 (-0.01)	-0.0311 (-0.08)	-0.0310 (-0.08)
Constant	0.1576 (0.47)	0.0274 (0.08)	0.0435 (0.13)	0.0955 (0.49)	0.0870 (0.44)	0.1001 (0.51)
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1272	1279	1286	1272	1279	1286
R-Square	0.1580	0.1579	0.1615	0.2522	0.2447	0.2451

*Regression estimations are conducted with the employment of clustered firm-level Eicker-Huber-White robust standard errors. The figures in parentheses are t-statistics, ***, ** and * denote significance at 1%, 5% and 10% respectively.*

	I Tax Planning		II Target 1 Avoid Declined Earnings		III Target 2 Avoid Failing Analysts' Forecast		IV Target3 Avoid Reporting Post-Tax Loss	
	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$
TA_CASH _{it}	0.8131 (1.87)*	0.5088 (2.91)***						
TARGET1 _{it}			-0.0278 (-0.90)	-0.0022 (-0.14)				
DECLINE_AMOUNT _{it}			1.2595 (2.40)**	0.4635 (1.81)*				
TARGET1 _{it} × DECLINE_AMOUNT _{it}			-1.6213 (-1.83)*	-0.5583 (-1.60)				
TARGET2 _{it}					-0.0247 (-0.49)	-0.0217 (-0.83)		
ERROR_AMOUNT _{it}					-0.2763 (-0.49)	-0.1798 (-0.55)		
TARGET2 _{it} × ERROR_AMOUNT _{it}					1.1340 (1.79)*	0.6379 (1.99)**		
TARGET3 _{it}							0.0494 (0.65)	0.0269 (0.62)
PTBI _{it}	0.6097 (1.71)*	0.2492 (1.52)	0.6973 (1.76)*	0.2601 (1.31)	0.2994 (1.02)	0.1064 (0.58)	0.5915 (1.69)*	0.2030 (1.27)
UNCERT_PTBI _{it}	0.0003 (0.85)	0.0001 (0.04)	0.0009 (0.33)	0.0003 (0.23)	-0.0066 (-1.67)*	-0.0030 (-2.08)**	0.0003 (0.12)	0.0001 (0.05)
UNCERT_SALE _{it}	-0.0025 (-0.60)	-0.0007 (-0.35)	-0.0032 (-0.83)	-0.0012 (-0.65)	-0.0070 (-1.31)	-0.0033 (-1.78)*	-0.0030 (-0.78)	-0.0011 (-0.62)
SIZE _{it}	0.0011 (0.04)	-0.0298 (-2.02)**	0.0081 (0.32)	-0.0264 (-1.77)*	0.0205 (0.60)	-0.0249 (-1.26)	0.0080 (0.32)	-0.0264 (-1.77)*
GROWTH _{it}	-0.0256 (-2.32)**	-0.0115 (-2.85)***	-0.0237 (-2.10)**	-0.0095 (-2.08)**	-0.0158 (-1.46)	-0.0077 (-1.65)*	-0.0237 (-2.07)**	-0.0095 (-2.11)**
CAPINT _{it}	0.1698 (1.00)	0.0914 (0.83)	0.2045 (1.16)	0.1119 (1.06)	0.6934 (2.54)**	0.2133 (1.86)*	0.2029 (1.14)	0.1122 (1.06)
LEVERAGE _{it}	-0.1892 (-1.07)	-0.1554 (-1.94)*	-0.2785 (-1.58)	-0.2034 (-2.48)**	-0.4303 (-1.93)*	-0.1666 (-1.85)*	-0.2701 (-1.54)	-0.2034 (-2.51)**
DISCONTINUE _{it}	3.6949 (0.48)	0.7472 (0.31)	4.6048 (0.56)	1.7979 (0.58)	-6.4955 (-0.88)	-3.4495 (-1.28)	3.9088 (0.47)	1.5223 (0.49)
SEGMENT _{it}	-0.0168	-0.0106	-0.0162	-0.0102	-0.0219	-0.01337	-0.0170	-0.0104

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	(-1.18)	(-1.33)	(-1.07)	(-1.22)	(-1.37)	(-1.82)*	(-1.13)	(-1.25)
DEFER _{it}	-0.3557 (-0.34)	-0.0447 (-0.11)	-9.5045 (-0.48)	-0.1761 (-0.43)	-0.1804 (-0.18)	-0.1009 (-0.21)	-0.4155 (-0.40)	-0.1400 (-0.34)
Constant	0.6299 (1.63)	0.5382 (2.62)**	0.7729 (2.12)**	0.6322 (3.05)***	0.4407 (0.96)	0.6444 (2.31)**	0.7671 (2.11)**	0.6330 (3.06)***
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1084	1084	1105	1105	421	421	1105	1105
R-Square	0.1246	0.2017	0.1229	0.1818	0.3512	0.3806	0.1195	0.1802
<p><i>Regression estimations are conducted with the employment of clustered firm-level Eicker-White robust standard errors. The figures in parentheses are t-statistics, ***, ** and * denote significance at 1%, 5% and 10% respectively.</i></p>								

	I Tax Planning		II Target 1 Avoid Declined Earnings		III Target 2 Avoid Failing Analysts' Forecast		IV Target3 Avoid Reporting Post-Tax Loss	
	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$
TA_CASH _{it}	0.6236 (1.83)*	0.3251 (1.84)*						
TARGET1 _{it}			-0.0317 (-1.01)	-0.0066 (-0.42)				
DECLINE_AMOUNT _{it}			0.9286 (2.02)**	0.4457 (2.01)**				
TARGET1 _{it} × DECLINE_AMOUNT _{it}			-1.9053 (-2.33)**	-1.0354 (-2.24)**				
TARGET2 _{it}					0.0225 (0.49)	0.0042 (0.16)		
ERROR_AMOUNT _{it}					-0.7865 (-1.25)	-0.3748 (-1.17)		
TARGET2 _{it} × ERROR_AMOUNT _{it}					1.5318 (2.16)**	0.7358 (2.19)**		
TARGET3 _{it}							0.0394 (0.55)	0.1022 (1.79)*
FOREIGN_{it}	-0.0874 (-0.94)	-0.0568 (-1.06)	-0.0799 (-0.83)	-0.0475 (-0.88)	-0.2237 (-2.45)**	-0.0806 (-1.38)	-0.0862 (-0.89)	-0.0539 (-1.01)
PTBI _{it}	0.3570 (1.04)	0.0032 (0.02)	0.3326 (0.83)	-0.0351 (-0.17)	0.2999 (0.95)	0.0335 (0.18)	0.3801 (1.11)	0.0357 (0.22)
VOL_PTBI _{it}	-0.4573 (-0.55)	-0.1567 (-0.35)	-0.0035 (-0.00)	0.0016 (0.00)	-1.2606 (-1.18)	-0.6243 (-1.06)	-0.5121 (-0.61)	-0.3105 (-0.71)
VOL_CASHFLOW _{it}	2.1345 (2.82)***	0.9741 (2.28)**	2.4312 (3.21)***	1.1235 (2.64)***	3.5792 (2.41)**	0.6775 (0.86)	2.3716 (3.09)***	1.0750 (2.46)**
SIZE _{it}	-0.0050 (-0.24)	-0.0281 (-2.16)	0.0007 (0.04)	-0.0262 (-2.03)**	0.0342 (1.16)	-0.0282 (-1.53)	-0.0007 (-0.00)	-0.0261 (-2.05)**
GROWTH _{it}	-0.0233 (-2.10)**	-0.0071 (-1.68)*	-0.0211 (-1.85)*	-0.0053 (-1.11)	-0.0076 (-0.82)	-0.0033 (-0.71)	-0.0227 (-1.94)*	-0.0070 (-1.48)
CAPINT _{it}	0.2006 (1.13)	0.1155 (1.29)	0.2297 (1.27)	0.1236 (1.40)	0.6901 (2.40)**	0.1611 (1.21)	0.2231 (1.23)	0.1180 (1.35)
LEVERAGE _{it}	-0.1540 (-0.92)	-0.1774 (-2.09)**	-0.2684 (-1.60)	-0.2348 (-2.71)***	-0.5558 (-2.32)**	0.2385 (-2.61)**	-0.2364 (-1.44)	-0.2191 (-2.63)***
DISCONTINUE _{it}	1.7010	-1.3885	2.8384	-0.3007	-7.8337	-3.8673	2.2995	-0.6728

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	(0.24)	(-0.59)	(0.38)	(-0.11)	(-1.15)	(-1.42)	(0.30)	(-0.23)
DEFER _{it}	-0.2584 (-0.25)	-0.0894 (-0.25)	-0.2662 (-0.25)	-0.1489 (-0.40)	-0.0597 (-0.06)	-0.0876 (-0.19)	-0.2182 (-0.21)	-0.1166 (-0.31)
Constant	0.2001 (0.59)	0.1294 (0.65)	0.1481 (0.46)	0.1292 (0.65)	0.0222 (0.05)	0.6390 (2.36)**	0.1839 (0.57)	0.1451 (0.73)
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1127	1127	1154	1154	416	416	1154	1154
R-Square	0.1596	0.2539	0.1618	0.2483	0.3700	0.3749	0.1575	0.2489
<p><i>Regression estimations are conducted with the employment of clustered firm-level Eicker-White robust standard errors. The figures in parentheses are t-statistics, ***, ** and * denote significance at 1%, 5% and 10% respectively.</i></p>								

**Table A.5 Longer Estimation Window:
Tax Management Incentives and the Informativeness of Income Tax Accruals to Explain Future Two-Year-Ahead Cash Tax**

	I Tax Planning		II Target 1 Avoid Declined Earnings		III Target 2 Avoid Failing Analysts' Forecast		IV Target3 Avoid Reporting Post-Tax Loss	
	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$
TA_CASH _{it}	-0.1409 (-0.22)	0.0789 (0.37)						
TARGET1 _{it}			0.0076 (0.16)	-0.0218 (-1.43)				
DECLINE_AMOUNT _{it}			1.4628 (2.08)**	0.2174 (0.75)				
TARGET1 _{it} × DECLINE_AMOUNT _{it}			-2.8805 (-2.36)**	-0.2523 (-0.51)				
TARGET2 _{it}					-0.0579 (-0.93)	-0.0213 (-0.97)		
ERROR_AMOUNT _{it}					-0.8371 (-1.35)	-0.1899 (-0.71)		
TARGET2 _{it} × ERROR_AMOUNT _{it}					1.4046 (1.99)*	0.5184 (1.78)*		
TARGET3 _{it}							0.0990 (0.97)	-0.0303 (-0.69)
PTBI _{it}	0.2828 (0.69)	0.1752 (0.96)	0.5329 (1.08)	0.1826 (0.88)	0.3259 (0.81)	0.1978 (1.45)	0.4994 (1.18)	0.1739 (0.93)
VOL_PTBI _{it}	-0.7787 (-0.69)	0.0090 (0.02)	-0.0491 (-0.04)	0.1336 (0.29)	-0.1405 (-0.10)	-0.5663 (-1.15)	-0.7138 (-0.64)	0.0689 (0.16)
VOL_CASHFLOW _{it}	1.4854 (1.01)	0.0665 (0.16)	1.5488 (1.08)	0.1340 (0.33)	-0.3952 (-0.20)	1.1238 (2.01)	1.4870 (1.04)	0.1319 (0.33)
SIZE _{it}	0.0569 (1.96)*	-0.0046 (-0.46)	0.0619 (2.17)**	-0.0028 (-0.28)	0.0873 (2.72)**	0.0206 (1.56)	0.0619 (2.16)**	-0.0030 (-0.30)
GROWTH _{it}	-0.0050 (-0.47)	0.0009 (0.18)	-0.0076 (-0.73)	0.0005 (0.10)	0.0187 (1.45)	0.0023 (0.49)	-0.0096 (-0.94)	0.0008 (0.15)
CAPINT _{it}	0.1042 (0.44)	-0.0099 (-0.12)	0.0738 (0.33)	-0.0126 (-0.16)	0.3527 (1.17)	0.0925 (0.87)	0.0691 (0.30)	-0.0135 (-0.17)
LEVERAGE _{it}	0.1108 (0.49)	0.0757 (0.78)	0.0852 (0.38)	0.0587 (0.60)	-0.3650 (-1.32)	-0.2098 (-2.19)**	0.1159 (0.52)	0.0643 (0.65)
DISCONTINUE _{it}	24.3012 (0.93)	-0.5305 (-0.16)	24.9079 (1.00)	-0.3000 (-0.09)	-2.4737 (-0.26)	-2.0899 (-0.58)	24.5456 (0.97)	-0.4732 (-0.14)
SEGMENT _{it}	-0.0102	0.0023	-0.0064	0.0033	-0.0352	-0.0033	-0.0078	0.0031

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	(-0.47)	(0.28)	(-0.30)	(0.41)	(-1.71)*	(-0.36)	(-0.36)	(0.38)
DEFER _{it}	0.0332 (0.03)	0.3684 (0.90)	0.1053 (0.10)	0.3319 (0.78)	1.3104 (1.31)	0.7276 (1.72)*	0.2195 (0.20)	0.3394 (0.79)
Constant	-0.7175 (-1.56)	0.2247 (1.59)	-0.8346 (-1.83)*	0.1969 (1.45)	-0.7050 (-1.26)	-0.2774 (-1.60)	-0.7897 (-1.75)*	0.2032 (1.50)
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1255	1255	1286	1286	434	434	1286	1286
R-Square	0.1114	0.0810	0.1135	0.0815	0.2536	0.2149	0.1105	0.0805
<p><i>Regression estimations are conducted with the employment of clustered firm-level Eicker-White robust standard errors. The figures in parentheses are t-statistics, ***, ** and * denote significance at 1%, 5% and 10% respectively.</i></p>								

**Table A.6 Longer Estimation Window:
Tax Management Incentives and the Informativeness of Income Tax Accruals to Explain Future Three-Year-Ahead Cash Tax**

	I Tax Planning		II Target 1 Avoid Declined Earnings		III Target 2 Avoid Failing Analysts' Forecast		IV Target3 Avoid Reporting Post-Tax Loss	
	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$	Informativeness denoted as $\delta_{Tax\ Accruals}$	Informativeness denoted as $\bar{R}_{Tax\ Accrual}^2$
TA_CASH _{it}	-0.5582 (-0.72)	0.0582 (0.32)						
TARGET1 _{it}			-0.0743 (-0.91)	-0.0092 (-0.54)				
DECLINE_AMOUNT _{it}			2.3033 (2.89)***	0.0183 (0.07)				
TARGET1 _{it} × DECLINE_AMOUNT _{it}			-4.2550 (-1.98)**	-0.5178 (-1.18)				
TARGET2 _{it}					-0.0757 (-0.94)	-0.0152 (-0.70)		
ERROR_AMOUNT _{it}					1.1496 (1.87)*	0.2881 (1.85)*		
TARGET2 _{it} × ERROR_AMOUNT _{it}					-9.3566 (-0.52)	0.0049 (0.03)		
TARGET3 _{it}							0.0716 (0.54)	-0.0522 (-1.34)
PTBI _{it}	0.5707 (1.02)	-0.3471 (-1.70)*	0.6693 (0.90)	-0.3995 (-1.70)*	0.5172 (1.08)	0.3519 (2.10)	0.7112 (1.30)	-0.3433 (-1.68)*
VOL_PTBI _{it}	-0.1402 (-0.09)	-0.3026 (-0.88)	1.0088 (0.56)	-0.0158 (-0.04)	0.6033 (0.40)	-0.6842 (-1.81)*	-0.0806 (-0.05)	-0.1472 (-0.40)
VOL_CASHFLOW _{it}	0.3806 (0.20)	0.0388 (0.08)	0.4880 (0.26)	0.1311 (0.28)	-1.1729 (-0.42)	0.8211 (1.31)	0.3903 (0.21)	0.1099 (0.23)
SIZE _{it}	0.0604 (1.64)	-0.0052 (-0.51)	0.0608 (1.78)*	-0.0028 (-0.28)	0.0299 (0.81)	0.0272 (1.75)*	0.0604 (1.74)*	-0.0032 (-0.32)
GROWTH _{it}	-0.0095 (-0.67)	0.0068 (1.18)	-0.0093 (-0.67)	0.0069 (1.19)	0.0066 (0.31)	-0.0051 (-0.99)	-0.0120 (-0.90)	0.0066 (1.14)
CAPINT _{it}	0.0770 (0.23)	0.0398 (0.39)	0.0427 (0.14)	0.0458 (0.46)	-0.5740 (-1.86)*	-0.0279 (-0.29)	0.0318 (0.10)	0.0429 (0.43)
LEVERAGE _{it}	-0.2280 (-0.91)	0.0254 (0.29)	-0.2493 (-1.00)	-0.0025 (-0.03)	-0.2332 (-0.79)	-0.0152 (-0.18)	-0.1839 (-0.76)	0.0160 (0.19)
DISCONTINUE _{it}	17.8721 (0.71)	-5.1667 (-1.46)	21.2084 (0.89)	-4.8799 (-1.36)	-2.1982 (-0.19)	-0.7790 (-0.22)	20.0902 (0.84)	-4.7971 (-1.33)

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SEGMENT _{it}	0.0102 (0.37)	0.0051 (0.65)	0.0137 (0.50)	0.0055 (0.69)	-0.0295 (-1.42)	-0.0040 (-0.47)	0.0112 (0.40)	0.0053 (0.67)
DEFER _{it}	0.1937 (0.18)	0.1430 (0.42)	0.1908 (0.19)	0.2055 (0.60)	1.7944 (1.61)	0.4129 (1.42)	0.3375 (0.34)	0.2005 (0.58)
Constant	-1.5118 (-2.38**)	1.2479 (7.44)***	-1.6292 (-2.64)***	1.1985 (7.32)***	0.3647 (0.53)	-0.3742 (-1.64)	-1.5604 (-2.52)**	1.2083 (7.38)
Industry Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1255	1235	1286	1265	434	428	1286	1265
R-Square	0.0512	0.1798	0.0560	0.1808	0.1171	0.2399	0.0517	0.1789
<p><i>Regression estimations are conducted with the employment of clustered firm-level Eicker-White robust standard errors. The figures in parentheses are t-statistics, ***, ** and * denote significance at 1%, 5% and 10% respectively.</i></p>								

Table A.7 Firm-Fixed Effect of First Hypothesis: Incremental Informativeness of Income Tax Accruals

Panel A: Cash Tax Paid_{i,t+ρ} or \sum Cash Tax Paid_{i,t+5} = $\alpha + \beta$ Cash Tax Paid_{i,t} + $\varepsilon_{i,t}$ (1)						
	T+1	T+2	T+3	T+4	T+5	T+1~T+5
Cash Tax Paid _{i,t}	0.3282 (8.96)***	0.1467 (4.53)***	0.0704 (2.16)**	0.0247 (0.68)	0.0284 (0.63)	0.6369 (2.97)***
Constant	0.0227 (10.84)***	0.0284 (12.88)***	0.0357 (17.44)***	0.0393 (16.44)***	0.0393 (12.74)***	0.1643 (13.83)***
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3311	3026	2741	2457	2178	2058
Overall R-Square	0.4976	0.2293	0.0958	0.0387	0.0409	0.2480
F-statistic	11.37 P=0.000	4.98 P=0.000	3.89 P=0.000	4.60 P=0.000	4.20 P=0.000	4.03 P=0.000
Panel B: Cash Tax Paid_{i,t+ρ} or \sum Cash Tax Paid_{i,t+5} = $\phi + \delta$ Cash Tax Paid_{i,t} + δ Tax Accruals_{i,t} + $\varepsilon_{i,t}$ (2)						
	T+1	T+2	T+3	T+4	T+5	T+1~T+5
Cash Tax Paid _{i,t}	0.6032 (19.15)***	0.3036 (8.11)***	0.1523 (3.85)***	0.0798 (1.73)*	0.0708 (1.26)	1.2528 (5.36)***
Tax Accruals _{i,t}	0.6317 (18.81)***	0.3634 (8.85)***	0.1884 (4.58)***	0.1309 (3.15)***	0.1040 (2.15)**	1.4786 (7.62)***
Constant	0.0113 (7.43)***	0.0220 (10.08)***	0.0324 (14.37)***	0.0370 (13.81)***	0.0376 (10.92)***	0.1390 (11.53)***
Firm Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	3311	3026	2741	2457	2178	2058
R-Square	0.7172	0.4736	0.2435	0.1172	0.0968	0.5181
Differences between R-Squares of model 1 and model 2	0.2196	0.2443	0.1477	0.0785	0.0559	0.2701
F-statistic	33.86 P=0.000	9.96 P=0.000	5.25 P=0.000	4.86 P=0.000	4.04 P=0.000	9.27 P=0.000
Chi ² for wald test of $\delta=0$	1184.26 P=0.000	250.74 P=0.000	55.43 P=0.000	22.76 P=0.000	11.97 P=0.000	275.92 P=0.000
Likelihood ratio test of the equality of goodness-of-fit between model (1) and model (2)	1113.95 P=0.000	271.03 P=0.000	62.82 P=0.000	26.40 P=0.000	14.22 P=0.000	308.19 P=0.000

Regression estimations are conducted with the employment of clustered firm-level Eicker-White robust standard errors. The figures in parentheses are t-statistics, ***, ** and * denote significance at 1%, 5% and 10% respectively.

Table A.8: Firm-Fixed Effect of Third Hypothesis						
Average Annual Informativeness of Income Tax Accruals Measured by $\delta_{Tax\ Accruals}$						
Panel A Full Sample of Firms						
YEAR	N	T+1	T+2	T+3	T+4	T+5
1992-1996	1615	0.8558	0.6796	0.5654	0.4713	0.3896
1997-2001	1615	0.6866	0.5790	0.4347	0.3397	0.3215
2002-2006	1615	0.8626	0.5532	0.4278	0.3328	0.3255
2007-2011	1615	0.5699	0.4811	0.4194	0.3434	0.3556
2012-2017	1938	0.6053	0.3607	0.2976	0.1739	0.0619
Coefficient on <i>YEAR</i> without Controlling Firm Characteristic		-0.0104 (-34.37)***	-0.0137 (-44.08)***	-0.0134 (-30.77)***	-0.0132 (-31.27)***	-0.0113 (-22.15)***
Coefficient on <i>YEAR</i> With Controlling Firm Characteristic		-0.0009 (-0.14)	-0.0126 (-2.98)***	-0.0350 (-3.98)***	-0.0591 (-7.00)***	-0.0751 (-9.99)***
PERIOD	N	T+1	T+2	T+3	T+4	T+5
1 (1992-1999)	2584	0.7726	0.6445	0.5119	0.4335	0.3781
2 (2000-2004)	1615	0.7419	0.5835	0.5281	0.3989	0.2978
3 (2005-2017)	4199	0.6627	0.4273	0.3297	0.2576	0.2521
Coefficient on <i>PERIOD</i> without Controlling Firm Characteristics		-0.0561 (-20.86)***	-0.1109 (-41.16)***	-0.0963 (-25.28)***	-0.0905 (-24.54)***	-0.0622 (-14.03)***
Coefficient on <i>PERIOD</i> with Controlling Firm Characteristics		0.5228 (8.10)***	-0.5500 (-21.78)***	-0.4715 (-10.48)***	-0.3156 (-5.61)***	0.1466 (1.96)*
Panel B Constant Sample of Firms						
YEAR	N	T+1	T+2	T+3	T+4	T+5
1992-1996	720	0.6878	0.5963	0.4964	0.5250	0.4219
1997-2001	720	0.4858	0.3716	0.2852	0.2381	0.2129
2002-2006	720	0.4146	0.4258	0.4291	0.2914	0.1992
2007-2011	720	0.2748	0.2073	0.2199	0.1178	0.1419
2012-2017	864	0.2199	0.1343	0.1065	0.0647	0.0161
Coefficient on <i>YEAR</i> without Controlling Firm Characteristics		-0.0078 (-4.00)***	-0.0221 (-16.78)***	-0.0148 (-8.78)***	-0.0211 (17.32)***	-0.0114 (-7.12)***
PERIOD	N	T+1	T+2	T+3	T+4	T+5
1 (1992-1999)	1152	0.5819	0.4823	0.4008	0.3948	0.3243
2 (2000-2004)	720	0.4731	0.4182	0.3938	0.3022	0.2783
3 (2005-2017)	1872	0.2780	0.2201	0.2013	0.1335	0.0821
Coefficient on <i>PERIOD</i> without Controlling Firm Characteristics		-0.1116 (-6.79)***	-0.2244 (-21.60)***	-0.1764 (-12.87)***	-0.1990 (-19.96)***	-0.1031 (-7.59)***
Coefficient on <i>PERIOD</i> with Controlling Firm Characteristics		0.2041 (2.53)**	-0.2490 (-4.77)***	-0.3776 (-6.89)***	-0.2044 (-3.26)***	-0.2272 (-3.96)***
<i>The figures in parentheses are t-statistics, ***, ** and * denote significance at 1%, 5% and 10% respectively.</i>						

Table A.9: Firm-Fixed Effect of Third Hypothesis						
Average Annual Informativeness of Income Tax Accruals Measured by $\bar{R}_{Tax\ Accrual}^2$						
Panel A Full Sample of Firms						
YEAR	N	T+1	T+2	T+3	T+4	T+5
1992-1996	1615	0.2936	0.2174	0.1669	0.1058	0.0781
1997-2001	1615	0.1465	0.1346	0.0964	0.0726	0.0557
2002-2006	1615	0.2361	0.1066	0.0767	0.0799	0.0702
2007-2011	1615	0.0820	0.0580	0.0583	0.0311	0.0388
2012-2017	1938	0.0725	0.0077	0.0226	0.0161	0.0159
Coefficient on <i>YEAR</i> without Controlling Firm Characteristic		-0.0095 (-71.15)***	-0.0094 (-79.27)***	-0.0065 (-56.50)***	-0.0042 (-39.05)***	-0.0020 (-18.02)***
Coefficient on <i>YEAR</i> With Controlling Firm Characteristic		-0.0025 (-1.72)*	-0.0077 (-7.08)***	-0.0048 (-2.64)**	-0.0055 (-3.23)***	-0.0052 (-3.53)**
PERIOD	N	T+1	T+2	T+3	T+4	T+5
1 (1992-1999)	2584	0.2397	0.1969	0.1477	0.1032	0.0823
2 (2000-2004)	1615	0.2104	0.1137	0.0995	0.0921	0.0610
3 (2005-2017)	4199	0.0966	0.0375	0.0345	0.0304	0.0437
Coefficient on <i>PERIOD</i> without Controlling Firm Characteristics		-0.0735 (-60.86)***	-0.0796 (-77.74)***	-0.0570 (-59.24)***	-0.0376 (-41.87)***	-0.0192 (-20.24)***
Coefficient on <i>PERIOD</i> with Controlling Firm Characteristics		0.0607 (4.40)***	-0.1161 (-13.52)***	-0.2287 (-34.06)***	-0.1827 (-23.01)***	-0.0013 (-0.14)
Panel B Constant Sample of Firms						
YEAR	N	T+1	T+2	T+3	T+4	T+5
1992-1996	720	0.0994	0.1356	0.0846	0.0884	0.0734
1997-2001	720	0.1166	0.0783	0.0546	0.0376	0.0196
2002-2006	720	0.0798	0.0936	0.0696	0.0395	0.0187
2007-2011	720	0.0381	0.0241	0.0312	0.0160	0.0164
2012-2017	864	0.0503	0.0204	0.0203	0.0003	-0.0048
Coefficient on <i>YEAR</i> without Controlling Firm Characteristics		-0.0028 (-6.08)***	-0.0051 (-14.11)***	-0.0046 (-16.40)***	-0.0045 (-18.68)***	-0.0014 (-5.16)***
PERIOD	N	T+1	T+2	T+3	T+4	T+5
1 (1992-1999)	1152	0.1020	0.1101	0.0754	0.0690	0.0529
2 (2000-2004)	720	0.0968	0.0720	0.0529	0.0333	0.0269
3 (2005-2017)	1872	0.0517	0.0415	0.0349	0.0172	0.0055
Coefficient on <i>PERIOD</i> without Controlling Firm Characteristics		-0.0283 (-7.17)***	-0.0481 (16.16)***	-0.0455 (-20.04)***	-0.0411 (-20.47)***	-0.0145 (-6.10)***
Coefficient on <i>PERIOD</i> with Controlling Firm Characteristics		0.0959 (9.12)***	-0.0221 (-2.30)**	-0.0701 (-10.56)***	-0.0474 (-5.31)***	-0.0235 (-4.39)***
<i>The figures in parentheses are t-statistics, ***, ** and * denote significance at 1%, 5% and 10% respectively.</i>						

Table A.10: Firm-Fixed Effect of Second Hypotheses
One-Stage Estimation Model : Tax Management Incentives and the Informativeness of Income Tax Accruals

This table presents the results of the impact of tax management incentives (i.e., corporate tax planning, managerial incentives to avoid declined earnings, to avoid failing analysts' forecasts and to avoid reporting post-tax loss) on the incremental informativeness of income tax accruals, based on the following models:

$$\text{Cash Tax Paid}_{i,t+1} = \emptyset + H_1 \text{Cash Tax Paid}_{i,t} + H_2 \text{Tax Accruals}_{i,t} + H_3 \text{Tax Accruals}_{i,t} * \text{TA_CASH}_{i,t} + H_4 \text{Tax Accruals}_{i,t} * \text{Firm Innate Character}_{i,t} + \varepsilon_{i,t} \quad (8.11)$$

$$\text{Cash Tax Paid}_{i,t+1} = \emptyset + M_1 \text{Cash Tax Paid}_{i,t} + M_2 \text{Tax Accruals}_{i,t} + M_3 \text{Tax Accruals}_{i,t} * \text{DECLINE_AMOUNT}_{i,t} + M_4 \text{Tax Accruals}_{i,t} * \text{Firm Innate Character}_{i,t} + \varepsilon_{i,t} \quad (8.21)$$

$$\text{Cash Tax Paid}_{i,t+1} = \emptyset + \Theta_1 \text{Cash Tax Paid}_{i,t} + \Theta_2 \text{Tax Accruals}_{i,t} + \Theta_3 \text{Tax Accruals}_{i,t} * \text{ERROR_AMOUNT}_{i,t} + \Theta_4 \text{Tax Accruals}_{i,t} * \text{Firm Innate Character}_{i,t} + \varepsilon_{i,t} \quad (8.31)$$

$$\text{Cash Tax Paid}_{i,t+1} = \emptyset + A_1 \text{Cash Tax Paid}_{i,t} + A_2 \text{Tax Accruals}_{i,t} + A_3 \text{Tax Accruals}_{i,t} * \text{TARGET3}_{i,t} + A_4 \text{Tax Accruals}_{i,t} * \text{Firm Innate Character}_{i,t} + \varepsilon_{i,t} \quad (8.41)$$

The dependent variable $\text{Cash Tax Paid}_{i,t+1}$ represents future one-year ahead tax-related cash flows scaled by lagged total assets. $\text{Cash Tax Paid}_{i,t}$ represents firms' cash tax paid scaled by lagged total assets at current period. $\text{Tax Accruals}_{i,t}$ represents firms' income tax accruals scaled by lagged total assets at current period. Variables of interest are. $\text{TA_CASH}_{i,t} \times \text{Tax Accruals}_{i,t}$; $\text{DECLINE_AMOUNT}_{i,t} \times \text{Tax Accruals}_{i,t}$; $\text{ERROR_AMOUNT}_{i,t} \times \text{Tax Accruals}_{i,t}$ and $\text{TARGET3}_{i,t} \times \text{Tax Accruals}_{i,t}$. $\text{TA_CASH}_{i,t}$ represents the sum of cash taxes paid scaled by the sum of pre-tax income over a five-year period. It is a proxy of the level of corporate tax planning. $\text{DECLINE_AMOUNT}_{i,t}$ captures the difference between a firm's previous period's pre-tax profit and that of its current period. $\text{ERROR_AMOUNT}_{i,t}$ captures the difference between analysts' expected pre-tax profits and the actual pre-tax profit reported by this firm in I/E/B/S. $\text{TARGET3}_{i,t}$ equals 1 if the net income scaled by the opening market value of equity of a particular firm-year is within the range between 0 and 0.02, and 0 otherwise.

$\text{Firm Innate Character}_{i,t}$ is a proxy of firms' innate characteristic. It includes: $\text{ACCRUAL}_{i,t}$: represents the absolute discretionary accruals scaled by total assets; $\text{PTBI}_{i,t}$: pre-tax income scaled by lagged total asset; $\text{VOL_PTBI}_{i,t}$: the standard deviation of annual pre-tax income scaled by lagged total assets over a rolling five-year window; $\text{VOL_CASHFLOW}_{i,t}$: the standard deviation of annual cash flow scaled by lagged total assets over a rolling five-year window; $\text{SIZE}_{i,t}$: the natural log of total assets; $\text{GROWTH}_{i,t}$: the ratio of firms' market value of equity to the book value of equity; $\text{CAPINT}_{i,t}$: gross cost of property, plant and equipment scaled by the lagged total assets; $\text{LEVERAGE}_{i,t}$: the ratio of long-term debt to total assets; $\text{DISCONTINUE}_{i,t}$: the absolute value of earnings from discontinued operation scaled by the lagged total assets; $\text{FOREIGN}_{i,t}$: firms' foreign sales divided by the total sales; $\text{DEFER}_{i,t}$: long-term deferred tax balances scaled by the lagged total assets.

Firm and year fixed effects are included in all regressions. Regression estimations are conducted with the employment of clustered firm-level Eicker-White robust standard errors. The figures in parentheses are t-statistics, ***, ** and * denote significance at 1%, 5% and 10% respectively.

		I Tax Planning	II Target 1 Avoid Declined Earnings	III Target 2 Avoid Failing Analysts' Forecast	IV Target3 Avoid Reporting Post-Tax Loss
Cash Tax Paid _{it}	0.6131 (16.44)***	0.6942 (17.20)***	0.7071 (15.86)***	0.4948 (6.90)***	0.6914 (17.41)***
Tax Accruals _{it}	0.7000 (13.95)***	-0.2180 (-0.53)	1.2477 (1.83)*	0.3584 (0.70)	0.3844 (0.88)
TA_CASH_{it} × Tax Accruals_{it}		1.7124 (3.37)***			
DECLINE_AMOUNT_{it} × Tax Accruals_{it}			-5.3080 (-1.77)*		
ERROR_AMOUNT_{it} × Tax Accruals_{it}				0.7538 (0.73)	

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TARGET3_{it} × Tax Accruals_{it}					-0.3431 (-1.48)
ACCRUAL _{it} × Tax Accruals _{it}		0.2913 (0.60)	-0.6203 (-0.89)	-1.2055 (-1.68)*	0.3904 (0.99)
PTBI _{it} × Tax Accruals _{it}		0.5823 (0.85)	-0.0239 (-0.02)	1.2927 (1.17)	0.0161 (0.03)
VOL_PTBI _{it} × Tax Accruals _{it}		0.6331 (0.45)	4.9428 (1.27)	1.4758 (0.45)	1.1591 (0.78)
VOL_CASHFLOW _{it} × Tax Accruals _{it}		1.2830 (0.77)	-3.6318 (-1.06)	-3.1910 (-0.97)	2.0147 (1.28)
SIZE _{it} × Tax Accruals _{it}		0.0149 (0.46)	-0.0291 (-0.63)	0.0085 (0.28)	0.0057 (0.17)
GROWTH _{it} × Tax Accruals _{it}		-0.0005 (-0.04)	-0.0362 (-1.38)	-0.0534 (-2.14)*	0.0012 (0.11)
CAPINT _{it} × Tax Accruals _{it}		-0.0448 (-0.29)	-0.3155 (-0.81)	-0.0567 (-0.13)	0.0575 (0.32)
LEVERAGE _{it} × Tax Accruals _{it}		-0.4063 (-1.26)	-0.6577 (-1.23)	-0.6420 (-2.10)**	-0.8290 (-3.00)***
DISCONTINUE _{it} × Tax Accruals _{it}		-27.5834 (-1.83)*	-37.7681 (-1.35)	-12.3573 (-0.42)	-26.7872 (-1.98)**
FOREIGN _{it} × Tax Accruals _{it}		-0.0345 (-0.29)	0.4796 (2.19)**	0.3558 (1.91)*	0.0573 (0.43)
DEFER _{it} × Tax Accruals _{it}		3.1420 (1.86)*	1.9637 (0.82)	1.6198 (1.01)	3.4796 (1.90)*
Constant		0.0076 (1.20)	0.0144 (7.86)***	0.0164 (5.32)***	0.0038 (0.61)
Firm Fix	Yes	Yes	Yes	Yes	Yes
Year Fix	Yes	Yes	Yes	Yes	Yes
Observations	3111	965	331	283	986
R-Square	0.6376	0.7870	0.7361	0.7418	0.7896

**Table A.11: Firm-Fixed Effect of Second Hypotheses
One-Stage Estimation Model : Tax Management Incentives, Corporate Governance
and the Informativeness of Income Tax Accruals**

This table presents results of testing whether good corporate monitoring mechanism plays a role in attenuating the negative impact of tax management incentives on the incremental informativeness of income tax accruals, based on the following models:

$$\text{Cash Tax Paid}_{i,t+1} = \emptyset + H_5 \text{Cash Tax Paid}_{i,t} + H_6 \text{Tax Accruals}_{i,t} + H_7 \text{Tax Accruals}_{i,t} * \text{TA_CASH}_{i,t} + H_8 \text{Tax Accruals}_{i,t} * \text{TA_CASH}_{i,t} * \text{GOVERNANCE}_{i,t} + H_9 \text{Tax Accruals}_{i,t} * \text{Firm Innate Character}_{i,t} + \varepsilon_{i,t} \quad (8.12)$$

$$\text{Cash Tax Paid}_{i,t+1} = \emptyset + M_5 \text{Cash Tax Paid}_{i,t} + M_6 \text{Tax Accruals}_{i,t} + M_7 \text{Tax Accruals}_{i,t} * \text{DECLINE_AMOUNT}_{i,t} + M_8 \text{Tax Accruals}_{i,t} * \text{DECLINE_AMOUNT}_{i,t} * \text{GOVERNANCE}_{i,t} + M_9 \text{Tax Accruals}_{i,t} * \text{Firm Innate Character}_{i,t} + \varepsilon_{i,t} \quad (8.22)$$

The dependent variable $\text{Cash Tax Paid}_{i,t+1}$ represents future one-year ahead tax-related cash flows scaled by lagged total assets. $\text{Cash Tax Paid}_{i,t}$ represents firms' cash tax paid scaled by lagged total assets at current period. $\text{Tax Accruals}_{i,t}$ represents firms' income tax accruals scaled by lagged total assets at current period. Variables of interest are $\text{Tax Accruals}_{i,t} * \text{TA_CASH}_{i,t} * \text{GOVERNANCE}_{i,t}$ in model (8.12) and $\text{Tax Accruals}_{i,t} * \text{DECLINE_AMOUNT}_{i,t} * \text{GOVERNANCE}_{i,t}$ in model (8.22). $\text{GOVERNANCE}_{i,t}$ is a proxy for the effectiveness of firms' governance mechanism, which includes four different monitoring channels, i.e., the number of analyst following ($\text{COVERAGE}_{i,t}$), the audit quality ($\text{AUDIT}_{i,t}$), the percentage of institutional shareholding ($\text{INSTITUTION}_{i,t}$) and board independence ($\text{BOARD}_{i,t}$). $\text{TA_CASH}_{i,t}$ represents the sum of cash taxes paid scaled by the sum of pre-tax income over a five-year period. It is a proxy of the level of corporate tax planning. $\text{DECLINE_AMOUNT}_{i,t}$ captures the difference between a firm's previous period's pre-tax profit and that of its current period.

$\text{Firm Innate Character}_{i,t}$ is a proxy of firms' innate characteristic. It includes: $\text{ACCRUAL}_{i,t}$: represents the absolute discretionary accruals scaled by total assets; $\text{PTBI}_{i,t}$: pre-tax income scaled by lagged total asset; $\text{VOL_PTBI}_{i,t}$: the standard deviation of annual pre-tax income scaled by lagged total assets over a rolling five-year window; $\text{VOL_CASHFLOW}_{i,t}$: the standard deviation of annual cash flow scaled by lagged total assets over a rolling five-year window; $\text{SIZE}_{i,t}$: the natural log of total assets; $\text{GROWTH}_{i,t}$: the ratio of firms' market value of equity to the book value of equity; $\text{CAPINT}_{i,t}$: gross cost of property, plant and equipment scaled by the lagged total assets; $\text{LEVERAGE}_{i,t}$: the ratio of long-term debt to total assets; $\text{DISCONTINUE}_{i,t}$: the absolute value of earnings from discontinued operation scaled by the lagged total assets; $\text{FOREIGN}_{i,t}$: firms' foreign sales divided by the total sales; $\text{DEFER}_{i,t}$: long-term deferred tax balances scaled by the lagged total assets.

Firm and year fixed effects are included in all regressions. Regression estimations are conducted with the employment of clustered firm-level Eicker-Huber-White robust standard errors. The figures in parentheses are t-statistics, ***, ** and * denote significance at 1%, 5% and 10% respectively.

	I Tax Planning	II Target 1 Avoid Declined Earnings
Cash Tax Paid _{it}	0.7633 (5.21)***	0.4533 (4.69)***
Tax Accruals _{it}	2.2562 (-2.38)*	3.6825 (2.29)**
TA_CASH _{it} × Tax Accruals _{it}	4.8950 (1.90)*	
TA_CASH _{it} × Tax Accruals _{it} × COVERAGE _{it}	-0.0562 (-0.56)	
TA_CASH _{it} × Tax Accruals _{it} × AUDIT _{it}	-5.8518 (-1.60)	
TA_CASH _{it} × Tax Accruals _{it} × BOARD _{it}	-0.0110 (-0.61)	
TA_CASH _{it} × Tax Accruals _{it} × INSTITUTION _{it}	0.0682 (4.64)***	
DECLINE_AMOUNT _{it} × Tax Accruals _{it}		-7.8916 (-4.27)***
DECLINE_AMOUNT _{it} × Tax Accruals _{it} × COVERAGE _{it}		1.2083 (2.29)***
DECLINE_AMOUNT _{it} × Tax Accruals _{it} × AUDIT _{it}		-0.0564 (-0.70)
DECLINE_AMOUNT _{it} × Tax Accruals _{it}		0.1270

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$\times \text{BOARD}_{i,t}$		(0.78)
DECLINE_AMOUNT_{it} \times Tax Accruals_{it}		1.0451
$\times \text{INSTITUTION}_{i,t}$		(1.92)*
ACCRUAL _{it} \times Tax Accruals _{it}	-0.3343 (-0.60)	-2.7254 (-0.93)
PTBI _{it} \times Tax Accruals _{it}	0.9481 (1.38)	0.4434 (0.19)
VOL_PTBI _{it} \times Tax Accruals _{it}	-3.0636 (-0.84)	-1.2162 (-0.20)
VOL_CASHFLOW _{it} \times Tax Accruals _{it}	8.0605 (1.21)	-9.8071 (-1.00)
SIZE _{it} \times Tax Accruals _{it}	-0.1430 (-1.94)*	-0.2506 (-2.16)**
GROWTH _{it} \times Tax Accruals _{it}	-0.0013 (-0.03)	-0.0836 (-1.23)
CAPINT _{it} \times Tax Accruals _{it}	0.0863 (0.28)	1.3801 (2.56)**
LEVERAGE _{it} \times Tax Accruals _{it}	-0.2895 (-1.08)	-0.0842 (-0.09)
DISCONTINUE _{it} \times Tax Accruals _{it}	-4.9094 (-0.64)	-6.6543 (-0.30)
FOREIGN _{it} \times Tax Accruals _{it}	-0.2541 (-2.63)**	-1.1393 (-2.09)**
DEFER _{it} \times Tax Accruals _{it}	-1.9748 (-1.27)	-3.6344 (-0.86)
Constant	0.0105 (1.81)	0.0063 (0.59)
Firm Fix	Yes	Yes
Year Fix	Yes	Yes
Observations	405	133
R-Square	0.4099	0.4401

Appendix B Procedure of Estimating the Measure of Pre-tax Earnings Management

($ACCRUAL_{it}$)

Following Dechow et al. (1995), this study measures pre-tax earnings management using the absolute value of discretionary accruals. Firstly, the following regression is estimated cross-sectionally for each industry and each year from 1992 to 2017:

$$\frac{TA_{it}}{ASSET_{it-1}} = \theta_0 \frac{1}{ASSET_{it-1}} + \theta_1 \frac{\Delta SALES_{it} - \Delta RECEIVABLES_{it}}{ASSET_{it-1}} + \theta_2 \frac{PPE_{it}}{ASSET_{it-1}} + \varepsilon_{it}$$

Where the variable TA_{it} refers to the total accruals for firm i during year t . $ASSET_{it-1}$ is the total assets for firm i during year $t-1$. $\Delta SALES_{it}$ denotes changes in sales for firm i during year t . $\Delta RECEIVABLES_{it}$ denotes changes in receivables for firm i during year t . PPE_{it} denotes the property, plant and equipment for firm i during year t . ε_{it} represents the discretionary accrual which equals to:

$$\varepsilon_{it} = \frac{TA_{it}}{ASSET_{it-1}} - \left(\theta_0 \frac{1}{ASSET_{it-1}} + \theta_1 \frac{\Delta SALES_{it} - \Delta RECEIVABLES_{it}}{ASSET_{it-1}} + \theta_2 \frac{PPE_{it}}{ASSET_{it-1}} \right)$$

Specifically, TA_{it} is calculated using the following equation:

$$TA_{it} = (\Delta CA_{it} - \Delta CL_{it} + \Delta CASH_{it} + \Delta CD_{it} - DEP_{it}) / ASSET_{it}$$

Where ΔCA_{it} denotes changes in the current asset for firm i during year t . ΔCL_{it} denotes changes in the current liabilities for firm i during year t . $\Delta CASH_{it}$ denotes changes in cash and cash equivalents for firm i during year t . ΔCD_{it} denotes changes in debt for firm i during year t . DEP_{it} denotes depreciation of property, plant and equipment for firm i during year t .

Appendix C Regression Models Based on the One-Stage Approach

1) Corporate tax planning as captured by TA_CASH_{it}

$$Cash\ Tax\ Paid_{i,t+1} = \emptyset + H_1 Cash\ Tax\ Paid_{i,t} + H_2 Tax\ Accruals_{i,t} + H_3 Tax\ Accruals_{i,t} * TA_CASH_{i,t} + H_4 Tax\ Accruals_{i,t} * Firm\ Innate\ Character_{i,t} + \varepsilon_{i,t} \quad (8.11)$$

$$Cash\ Tax\ Paid_{i,t+1} = \emptyset + H_5 Cash\ Tax\ Paid_{i,t} + H_6 Tax\ Accruals_{i,t} + H_7 Tax\ Accruals_{i,t} * TA_CASH_{i,t} + H_8 Tax\ Accruals_{i,t} * TA_CASH_{i,t} * GOVERNANCE_{i,t} + H_9 Tax\ Accruals_{i,t} * Firm\ Innate\ Character_{i,t} + \varepsilon_{i,t} \quad (8.12)$$

2) The incentive of firms to avoid reporting an apparently declined post-tax earnings, as captured by $DECLINE_AMOUNT_{it}$ when $TARGET1_{it}$ equals 1.

$$Cash\ Tax\ Paid_{i,t+1} = \emptyset + M_1 Cash\ Tax\ Paid_{i,t} + M_2 Tax\ Accruals_{i,t} + M_3 Tax\ Accruals_{i,t} * DECLINE_AMOUNT_{i,t} + M_4 Tax\ Accruals_{i,t} * Firm\ Innate\ Character_{i,t} + \varepsilon_{i,t} \quad (8.21)$$

$$Cash\ Tax\ Paid_{i,t+1} = \emptyset + M_5 Cash\ Tax\ Paid_{i,t} + M_6 Tax\ Accruals_{i,t} + M_7 Tax\ Accruals_{i,t} * DECLINE_AMOUNT_{i,t} + M_8 Tax\ Accruals_{i,t} * DECLINE_AMOUNT_{i,t} * GOVERNANCE_{i,t} + M_9 Tax\ Accruals_{i,t} * Firm\ Innate\ Character_{i,t} + \varepsilon_{i,t} \quad (8.22)$$

3) The incentive of firms to avoid missing analysts' forecasted earnings, as captured by $ERROR_AMOUNT_{it}$ when $TARGET2_{it}$ equals 1.

$$Cash\ Tax\ Paid_{i,t+1} = \emptyset + \Theta_1 Cash\ Tax\ Paid_{i,t} + \Theta_2 Tax\ Accruals_{i,t} + \Theta_3 Tax\ Accruals_{i,t} * ERROR_AMOUNT_{i,t} + \Theta_4 Tax\ Accruals_{i,t} * Firm\ Innate\ Character_{i,t} + \varepsilon_{i,t} \quad (8.31)$$

$$Cash\ Tax\ Paid_{i,t+1} = \emptyset + \Theta_5 Cash\ Tax\ Paid_{i,t} + \Theta_6 Tax\ Accruals_{i,t} + \Theta_7 Tax\ Accruals_{i,t} * ERROR_AMOUNT_{i,t} + \Theta_8 Tax\ Accruals_{i,t} * ERROR_AMOUNT_{i,t} * GOVERNANCE_{i,t} + \Theta_9 Tax\ Accruals_{i,t} * Firm\ Innate\ Character_{i,t} + \varepsilon_{i,t} \quad (8.32)$$

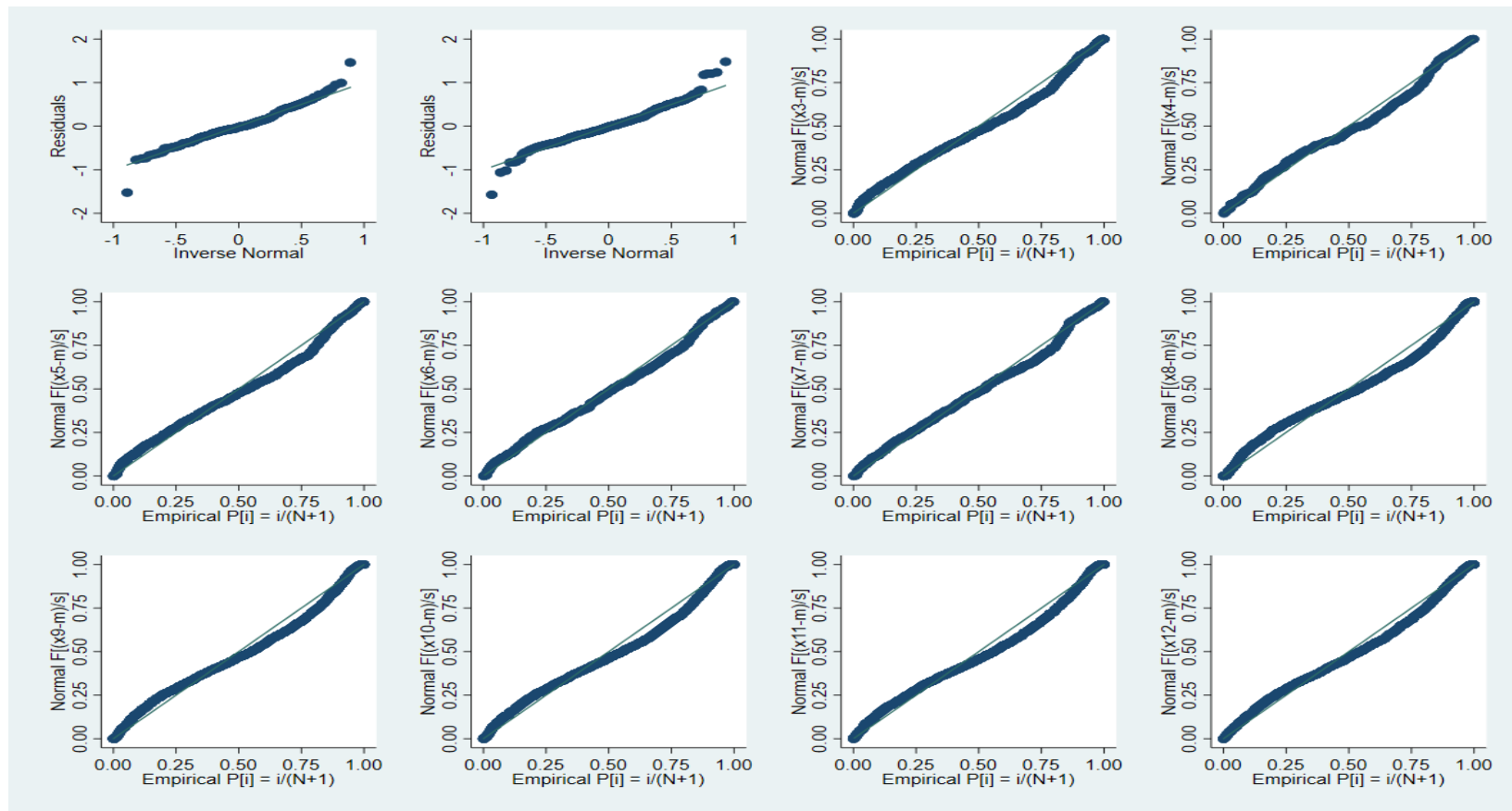
4) The incentive of firms to avoid reporting a post-tax loss as captured by $TARGET3_{it}$.

$$Cash\ Tax\ Paid_{i,t+1} = \emptyset + A_1 Cash\ Tax\ Paid_{i,t} + A_2 Tax\ Accruals_{i,t} + A_3 Tax\ Accruals_{i,t} * TARGET3_{i,t} + A_4 Tax\ Accruals_{i,t} * Firm\ Innate\ Character_{i,t} + \varepsilon_{i,t} \quad (8.41)$$

$$Cash\ Tax\ Paid_{i,t+1} = \emptyset + A_5 Cash\ Tax\ Paid_{i,t} + A_6 Tax\ Accruals_{i,t} + A_7 Tax\ Accruals_{i,t} * TARGET3_{i,t} + A_8 Tax\ Accruals_{i,t} * TARGET3_{i,t} * GOVERNANCE_{i,t} + A_9 Tax\ Accruals_{i,t} * Firm\ Innate\ Character_{i,t} + \varepsilon_{i,t} \quad (8.42)$$

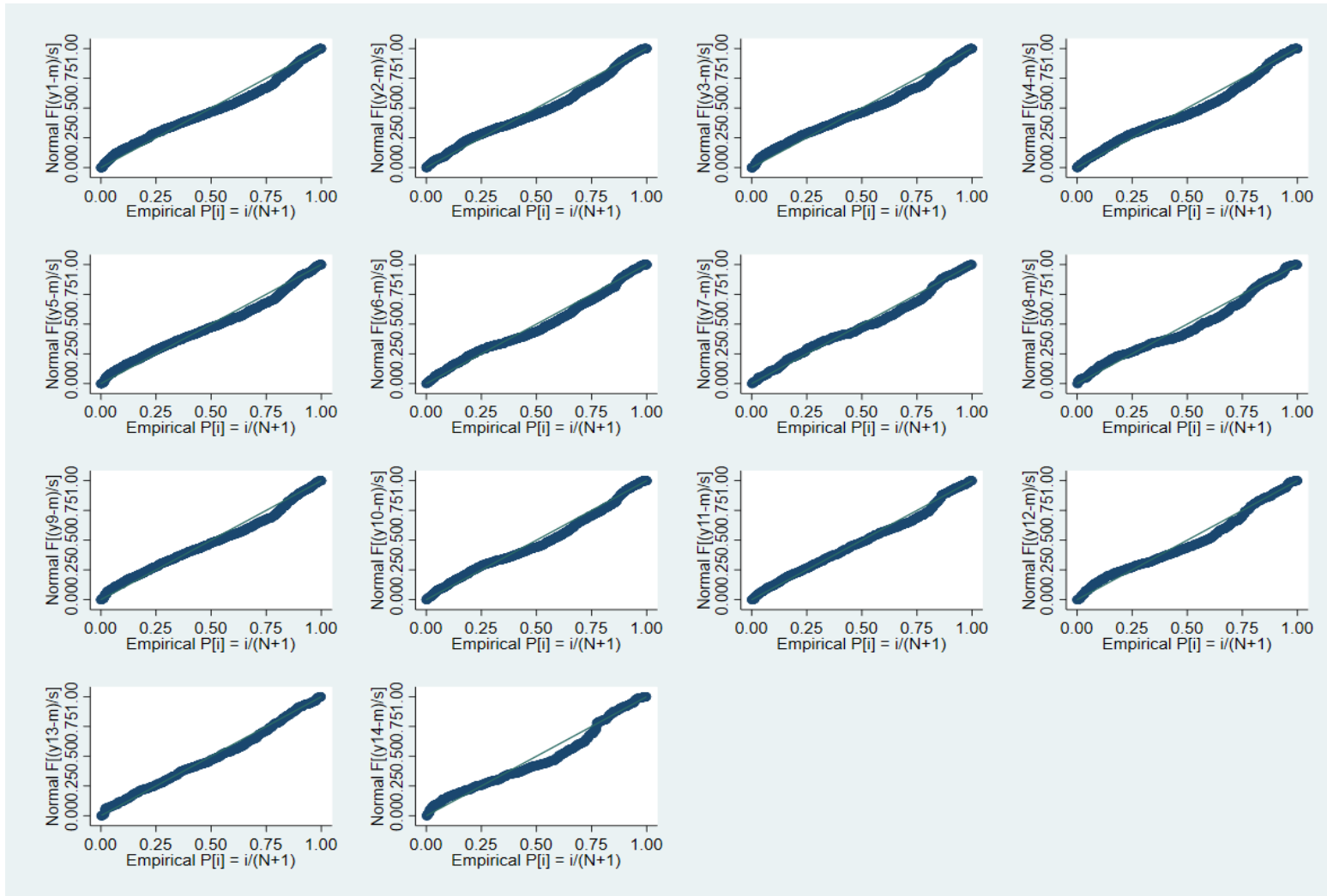
Appendix D Normality of Residuals in Regression Analyses

Normal-Probability plot of residuals for the test of first hypotheses (Using income tax accruals and cash tax paid to explain future one- to five-year ahead tax cash flows model (1) and model (2))



Appendix D

Normal-Probability plot of residuals for the test of second hypotheses (model (3.11)-model (3.14) and model (3.21) to model (3.22))



Appendix D

Normal-Probability plot of residuals for the test of third hypotheses (the time-series trend of income tax accruals model (6) and (7))

