Fewer Courts, Less Justice? Evidence from a Recent Policy of Court Closures in England and Wales

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Summary

England and Wales' justice was threatened when they closed 51% of Magistrates' Courts during 2010/11-2019/20 for budget savings, manifested in 22% delays in case durations, 37% drops in charges, and 23% rise in crimes. However, the link between court closures and justice is widely belittled. This thesis analyses statistical correlations of court numbers with case duration, charges, and crimes by building a unique panel database of administrative statistics in England and Wales.

I use court timeliness statistics from the Ministry of Justice for case duration to investigate if court closures delay cases. The ordinary-least-squares (OLS) estimates show that court closures can delay cases, and the delays can continue to accumulate for about three quarters. One explanation is that the shortage of hearing rooms and court staff lengthens the waiting duration for hearings. Findings suggest that closures could delay justice delivered to victims.

For charges (from the Home Office), I compare charges' responses to court closures and case delays. My OLS results illustrate either court closures or case delays can result in reduced charges after one year, indicating a mechanism that case delays caused by court closure do not allow prosecutors to charge as many as they did before. Additionally, prosecutors' career concerns (seeking convictions) may explain why prosecutors prefer to charge easily convictable crimes. Findings emphasise justice may be selectively delivered to victims after court closures.

For crimes (from the Office for National Statistics), the OLS evidence demonstrates court closures are associated with increased crimes. The rational crime theory could attribute it to lower deterrence caused by case delays and charge reduction. Discoveries stress the effectiveness of justice in addressing crimes could be at risk after court closures.

These findings highlight the adverse complementary effects of court closures on justice, which supplements an assessment of previous closures and the 77 further closures. Quick and efficient supporting services could be critical during future closures.

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Acknowledgements

In the research stage, I encountered many difficulties and received much help. Here, I acknowledge a special appreciation for the tremendous support from my parents, supervisors, sponsors, school, friends, and cat.

Although many things in life are more difficult than completing a PhD, nothing has ever caused me so much self-doubt as doing a PhD. If I describe the past three years in short: confused, more confused, not knowing whether confused or not. In the beginning, there was confusion about not knowing many things. But the more I learned, the more I thought, the more I did, and the more I became confused. Start to question right, question good, question the next direction. After choosing a path that I do not know is right, wrong, good or bad, my way to that direction, I become unknown whether I am still confused. There is a long journey ahead. Still, I want to thank my parents, supervisors, sponsor, university, friends and cat for getting me here.

I must deliver many thanks to my parents' (Zhongyang Luo and Wenmei Liu) quiet support. I am stubborn and wilful, and many of my choices contradict my parents' wishes. Still, they never failed to keep my back. I grew up living with them and everything that made me who I am. I would not have made it this far without their support.

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1 Introduction

1.1 Fewer courts, less justice?

The word justice is defined by the Oxford Dictionary as "the fair treatment of people, the quality of being fair or reasonable, and the legal system used to punish people who have committed crimes." These three aspects of evaluating justice also reflect in scholars' survey questions (e.g., Smith *et al*. 2012; Tyler 1994; Box *et al*. 1988) and governments' concerns (International Consortium for Court Excellence 2018; Ministry of Justice 2019), including whether justice is timely delivered to victims (timeliness of justice), whether justice is fairly delivered to victims (fairness of justice), and whether justice is effective against crimes (effectiveness of justice).

Justice for victims is worthy of attention individually, politically, and socially. From a relatively narrow perspective of individual benefits, justice might be the only compensation for a victim irreversibly damaged. Everyone in society, with a high or low probability, could become such a victim. If individuals feel dissatisfied with justice, from a perspective of politics, they may question the legitimacy of the judicial system and even the political system (Malone 2010). For the entire society, the distrust in justice declines the economy by lessening legitimate economic activities at home and discouraging investments from abroad (Voigt 2016).

England and Wales have closed 51% of Magistrates' Courts. Did these closures pose risks to the timeliness, fairness, and effectiveness of justice? As the basic-level criminal courts, 95% of England and Wales's criminal cases are eventually completed in Magistrates' Courts, and every criminal case would start from or be heard at least once by them (Courts and Tribunals Judiciary 2022). Between 2010/11 and 2019/2020, England and Wales implemented two ongoing projects, i.e., the Court Estate Reform Programme (CERP) and the Estates Reform Project (ERP), of closing 165 out of 321 Magistrates' Courts. Meanwhile, the administrative statistics show that the criminal case duration was delayed by 22%, the number of charges dropped by 37%, and the number of crimes raised by 23% (see table 1.1), implying three risks in justice practice, that is, justice delivered to victims was delayed, justice was selectively delivered, and justice became

ineffective against crimes. However, few attempts have been made to discuss the possible link between court closures and the revealed risks. Research into this issue is becoming more urgent as England and Wales are awaiting complete evaluations for court closures to confirm their proposal of 77 further closures by 2025/26 (National Audit Office 2019).

Table 1. 1 The timeliness, fairness, and effectiveness of justice in England and Wales

Relevant statistics	2010/11	2019/20	Change
The policy of court closures:			
The number of Magistrates' Courts	321[1]	156	-51%
The timeliness of justice:			
The average criminal case duration (days)	139	169	22%
The fairness of justice:			
The number of charges	654,689	415,003	-37%
The effectiveness of justice:			
The number of crimes	4,078,475	5,003,557	23%

* Data source of 1. the number of Magistrates' Courts is House of Commons Library and Ministry of Justice; 2. the average criminal case duration is Ministry of Justice; 3. the number of charges is Home Office; 4. the number of crimes is Office for National Statistics.
* The number of Magistrates' Courts is the total number of Magistrates' Courts remaining open by the end of a financial year; The average criminal case duration refers to the average days taken from crime to completion in the criminal justice system for a financial year; The number of charges is the total number of charged crimes for a financial year; The number of crimes is the total number of police recorded crimes for a financial year.

To the best of my knowledge, even in the background of Europe, there is a limited amount of research discussing any consequences of court closures directly. The court closures are a response to the fiscal deficit of 2008 (European Network of Councils for the Judiciary 2012), and England and Wales are not alone in making this response. Other European countries such as France, Portugal, and Austria also decided to close courts to save the budget but with different measures (see table A1). For example, France closed labour courts and transferred judges to other open courts (Espinosa *et al*. 2017), but England and Wales closed criminal courts and reduced judicial staff. Probably because few countries closed criminal courts, the two articles I did my best to find about court closures only talked about the impacts of closing civil courts on the court system itself (e.g., Chappe and Obidzinski 2013; Espinosa *et al*. 2017), which ignored the difference between

[1] It is the number of courts remaining open at the start of 2010/11.

criminal courts and civil courts and the more serious potential consequences of closing criminal courts.

1.2 Courts and justice

Although the Criminal Court is just one of the primary agencies[2] of the criminal justice system delivering justice to victims, it is the central link between agencies screening criminal cases (e.g., the Police and the Crown Prosecution Service) and agencies punishing crimes (e.g., the Prison and the Probation Service). It links screening agencies to punishing agencies by transferring screened criminal cases into judgements that guide the actions of punishing. Given that around 95% of judgements of criminal cases are made in Magistrates' Courts, closing Magistrates' Courts might negatively impact the performance of the Criminal Court itself. Furthermore, the negative impacts may be transmitted through the central-link agency (the Criminal Court) to other agencies, which carries risks for justice.

This thesis initially develops a hypothesis that closing Magistrates' Courts could have adverse complementary effects on justice's timeliness, fairness, and effectiveness. More specifically, this thesis hypothesises that court closures directly lead to delays in case duration, indirectly lead to drops in charges, and rises in crimes (see figure 1.1). Among the three kinds of statistics evaluating justice, the case duration refers to the average time taken to complete a criminal case in the criminal justice system, indicating how soon justice can be delivered to victims; the drops in charges pose a risk to the fairness of justice for victims whose criminal cases are selectively dropped by prosecutors; the rises in crimes could imply justice system does not prevent crimes effectively.

The hypothesis of the complementary effects is established by reviewing existing theories and empirical evidence in the literature on the justice topic, including literature on court congestion (e.g., Zeisel *et al*. 1959; Voigt 2016; Vita 2012; Landes 1971 etc.), prosecutorial discretion (e.g., Albonetti 1987; Miller 1969; Cotti *et al*. 2022; Lynch *et al*. 2021 etc.) and crime reduction (e.g., Becker 1968; Machin and Meghir 2004; Bell *et al*. 2014; Draca *et al*. 2019 etc.).

[2] The primary agencies of the criminal justice system in England and Wales can include the Police, the Crown Prosecution Service, the Criminal Court, the Prison, and the Probation Service.

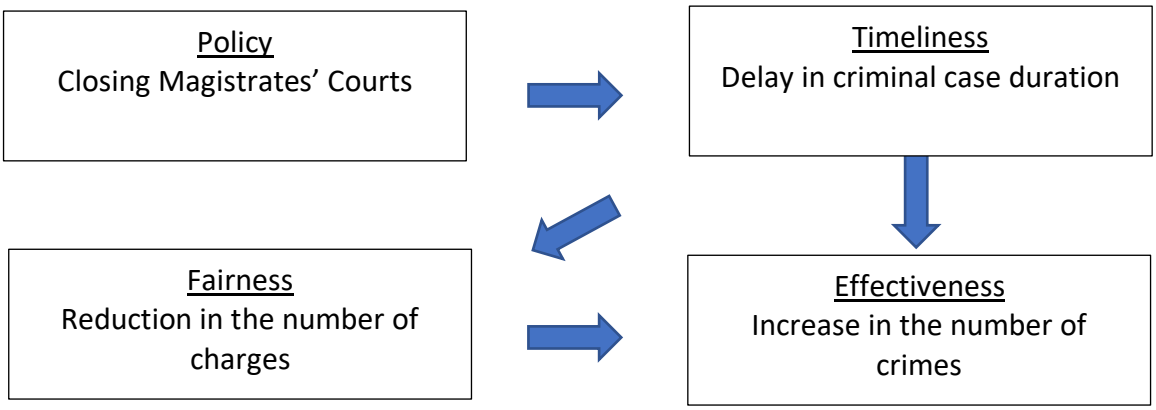


Figure 1. 1 The hypothesis of the complementary effects.

Firstly, based on the literature on court congestion, I hypothesise that court closures can delay case duration by increasing the burden of caseloads on courts that remain open. According to Zeisel *et al.*'s (1959) logjam metaphor, the inputs to courts (e.g., the capacity of courts) could affect the speed of resolving cases. Espinosa *et al.*'s (2017) recent study on French closures of civil courts also established that closing court buildings could increase the burden of caseloads on a nearby court and thus delay the civil case duration. This thesis assumes that closing Magistrates' Courts can delay the criminal case duration through a similar mechanism.

Additionally, the court closures are hypothesised, based on the literature on prosecutorial discretion, to make prosecutors more selective in their charge decisions and thus reduce charges. Prosecutors are inherently selective in charge decisions because the limited resources for courts allow them to charge fewer than they wish. There could be two possible mechanisms making prosecutors more selective after court closures. Firstly, prosecutors' career concerns could drive them to become more selective. To enhance legal reputations (career concern), prosecutors seek high convictions and conviction rates from a limited number of charges (Rasmusen *et al.* 2009). When court closures delay case duration, convictions and conviction rates fall in a certain period. Suppose the dwindling resources for courts (in the form of case delays) do not allow prosecutors to charge as many as before. In that case, prosecutors may drop criminal cases with a low probability of conviction to maintain the desired convictions and conviction rates. Secondly, prosecutors may reduce charges to collaborate with judges. While the courtroom group members, including prosecutors and judges, may have various

career concerns[3], they share the same group value of maintaining organisational efficiency in the criminal justice system (Eisenstein and Jacob 1977). Suppose delays in criminal case duration caused by court closures put organisational efficiency at risk. In that case, prosecutors may maintain cohesion with judges and thus reduce charges to relieve the burdens of caseloads on courts.

Besides, based on the literature on crime reduction, I hypothesise that after court closures, crimes would increase due to case delays and fewer charges. Under Becker's (1968) rational theory, individuals tend to commit crimes when the costs of crimes are lower than the benefits. When evaluating the costs of crimes, the case delays can be viewed as a more considerable time discount (Vereeck and Mühl 2000), and fewer charges could refer to a lower certainty of punishment (Schneider 2019; Abramovaite *et al*. 2018). A more considerable time discount and a lower certainty of punishment could result in lower costs of crimes, which motivates more crimes (Pellgegrina 2008; Dušek 2015; Machin and Meghir 2004; Levitt 1997).

Moreover, the complementary effects could be cyclic. For example, a rise in crimes implies more caseloads are brought to courts if other things remain constant, and then the increase in caseloads will result in case delays again (Vita 2010). If prosecutors charge fewer cases to avoid case delays when crimes increase, the certainty of punishment will drop and thus motivate even more crimes. Then, the cyclic process repeats.

1.3 Design of research

To test the adverse complementary effects on justice, I intend to examine successively if court closures delay case duration, reduce charges, and increase crimes (see table 1.2). By simplifying this thesis into three research questions, we could link the three to the literature on court congestion, prosecutorial discretion, and crime reduction, thus increasing the credibility of the analysis.

To ensure that the three studies have a commonality in discussing the complementary effects of court closures, I intend to build a unique database for all three. My unique panel database consists of quarterly administrative statistics

[3] Prosecutors desire high conviction rates and conviction numbers, while judges desire to avoid overcrowded waiting lists (Eisenstein and Jacob 1977).

available between April 2010 and March 2020 in 42 police force areas (PFAs) in England and Wales. It provides a large enough sample size for the study while covering court closures at different quarters in different judicial territories of the two court projects. Besides, panel data itself is frequently used by literature on the three related topics, which allows us to remove the possible influences of area differences on research (e.g., Espinosa *et al*. 2017; Beenstock and Haitovsky 2004; Cotti *et al*. 2022; Rasmusen *et al*. 2009; Machin and Meghir 2004; Draca *et al*. 2011).

Table 1. 2 Three research questions to test the complementary effects

The complementary effects on justice	Research questions	Literature topics
Timeliness of justice:	Do court closures delay case duration?	Court congestion
Fairness of justice:	Do court closures reduce charges?	Prosecutorial discretion
Effectiveness of justice:	Do court closures increase crimes?	Crime reduction

In the unique database, the data on the number of Magistrates' Courts are repeatedly used in all three studies to capture court closures. It is collected by integrating public data from the House of Commons Library (HOCL) with unique data from the Ministry of Justice (MOJ). Although the HOCL and the MOJ are both official data sources, to achieve quarterly court information on PFAs, we still need to integrate them to overcome the shortcomings of their respective incomplete data. Furthermore, the court closures are measured by per cent changes in the number of Magistrates' Courts. I intend to use the relative change measure because the number of courts varies from PFA to PFA, so the same number of changes can have different effects.

In the first question, I intend to use official timeliness statistics from the MOJ to investigate if court closures can delay average case duration in a PFA. The recently published timeliness statistics provide the case duration at different procedures in the criminal justice system, enabling us to analyse the influences of court closures on various activities in a PFA. Moreover, I intend to collect information from the MOJ about defendants and guilty pleas to control the courts' caseloads and the complexity of cases. Both caseloads and their complexity are frequently addressed in the literature on court congestion (e.g., Bielen *et al*. 2015;

Coviello *et al*. 2018; Beenstock and Haitovsky 2004; Cammnitielo *et al*. 2017). In the study of this question, I plan to employ a two-way fixed-effects (TWFE) ordinary least squares (OLS) approach. It can control the area characteristics (e.g., judges' working patterns) and national policies (e.g., changes in court procedures) while displaying the statistical relationship between court closures and changes in case duration. Variables will be seasonally differenced in regressions to control the possible seasonality of case duration due to seasonal variations in the origins of caseloads (i.e., crimes).

For the second question, I intend to use the number of charges from the Home Office (HO) to analyse the relationship between court closures and changes in prosecutors' charge decisions. The HO, an official data source, breaks down charges by crime groups, making it possible to study prosecutors' preferences for different crimes. Besides, I will collect data from the MOJ on the time taken from charge to conviction (conviction duration) to compare the impacts of conviction delays and court closures on charges. A similar impact would somewhat support my hypothesis that court closures could influence prosecutors' charge decisions by bringing delay problems to courts. Guided by literature on prosecutorial discretion (e.g., Cotti *et al*. 2022; Albonetti 1987; Reinganum 1988), other control variables regarding the crimes prosecutors can charge, such as the number of crimes, crime groups, and average custodial sentence length of crimes (ACSL) would be collected from the MOJ and the Office for National Statistics (ONS). The interested statistical relationship would be examined in a TWFE OLS model, which enables us to control the area characteristics (e.g., public interests) and national policies (e.g., government funding related to the Prosecution Service) simultaneously. In regressions, variables would be seasonally differenced because the seasonality of crimes could be transmitted to charges.

The number of police recorded crimes in the third question would be collected from the ONS to examine if court closures are associated with increased crimes. The crime data by crime groups from the ONS also allows us to check whether different criminals react differently to court closures. Based on the literature on crime reduction (e.g., Levitt 2002; Britt 1997; Evans and Owens 2007), other incentives relating to crimes in an area, such as average custodial sentence length, sentence rates, population, unemployment, gender, age, and ethnicity are

collected from the MOJ and the Annual Population Survey (APS). I intend to employ a fixed-effects (FE) OLS with a time trend variable to test my interested statistical relationship. The FE variable allows us to control the area characteristics (e.g., local crime group), and the time trend variable controls the potential rising trend of crimes caused by the expansion of criminal groups due to increased crime. To offset the strong seasonality in crimes (Draca *et al*. 2011), I would seasonally difference the variables in regressions.

In the first question, I find that court closures could indeed delay case duration. Closing 1% of courts adds 0.1 days to the case duration. The empirical evidence confirms my concerns that court closures may negatively impact the timeliness of justice. I also find that justice delays continue accumulating for about three quarters. The main reason behind this could be that the reduction in hearing rooms and shortage of court staff due to court closures increase the waiting duration for court hearings. Besides, my results show that the second court project (ERP) could have more significant impacts on case duration, perhaps because the ERP's influences are superimposed on the CERP. In other words, court closures could reduce court capacity, thus bringing risks to the timely execution of justice.

In my second question, I find that court closures and conviction delays have similar effects on the fairness of justice. Prosecutors would reduce charges for about one year after court closures or conviction delays. The found similar effects support, to some extent, the hypothesis that court closures affect prosecutors' charge decisions by creating delay problems. I also find that prosecutors are more likely to drop cases with lower conviction rates when they reduce charges, which could be consistent with prosecutors' career concerns of seeking high convictions and conviction rates. These findings suggest that court closures may indirectly make prosecutors selective in delivering justice to victims by creating case delays.

My findings in the third question show a significant association between 1% closures of courts and a 0.06% rise in crimes. The rational crime theory can attribute this finding to the reduced deterrence against crimes caused by case delays and charge reduction due to court closures. The rational crime theory also expects a stronger association when criminals can rationally measure the costs and benefits of crimes. This shows up in my results as a displacement effect

transferring violent crimes into theft crimes. Discoveries here stress that court closures may indirectly put the effectiveness of justice against crimes at risk.

My findings for three research questions highlight the possible risks of court closures to justice's timeliness, fairness, and effectiveness.

1.4 Structure of the thesis

The remaining parts of this thesis are organised as follows: Chapter 2 introduces the background information of Magistrates' Courts; Chapter 3 introduces the building up of the panel database for all examinations; Chapter 4 examines if court closures delay case duration; Chapter 5 examines if court closures reduce charges; Chapter 6 examines if court closures increase crimes; and Chapter 7 concludes the entire thesis.

Chapter 2 will introduce why Magistrates' Courts are essential for the justice system, why the projects of Court closures in England and Wales are riskier than court reforms in other countries, the status of court staff after court closures, whether the court projects achieve the purposes of budget saving and court modernisation, and whether principles of selecting closed courts are applied in practice.

Chapter 3 would justify my selection of quarterly information in police force areas, introduce the integrating process of the unique data of the number of Magistrates' Courts, explain the collection of the data of case duration, charges, and crimes, and introduce the data sources of information on operations of the justice system and demographic characteristics.

Chapter 4 would successively introduce how this chapter contributes to the literature on court congestion, relate this chapter to the literature on court congestion, explain the empirical strategy such as variables for analysing case duration, the employed TWFE OLS methodology, and the model specification with seasonally differenced case duration, present the results about the effects of court closures and case duration, and conclude finding on court closures and case duration.

Chapter 5 would successively introduce how this chapter contributes to the literature on prosecutorial discretion, list existing government explanations for charge reduction, discuss literature related to prosecutorial decisions, present the

empirical strategy such as variables for analysing charges, the employed TWFE OLS approach, and controls in the model specifications with seasonal differenced charges, display the results about the link of charges with court closures and case duration, and conclude findings on the responses of charges to court closures and case duration.

Chapter 6 successively introduces how this chapter contributes to the literature on crime reduction, summarises literature related to the rational crime theory, displays the empirical strategy such as variables for analysing crimes, the employed FE OLS methodology, and controls in the model specification with seasonally differenced crimes, presents results about the impacts of court closures on crimes and concludes findings on court closures and crimes.

Chapter 7 summarises the principal finding on the influences of court closures on case duration, charges, and crimes, highlights the policy implications of the entire thesis, and provides suggestions for future research.

2 Background of Magistrates' Courts

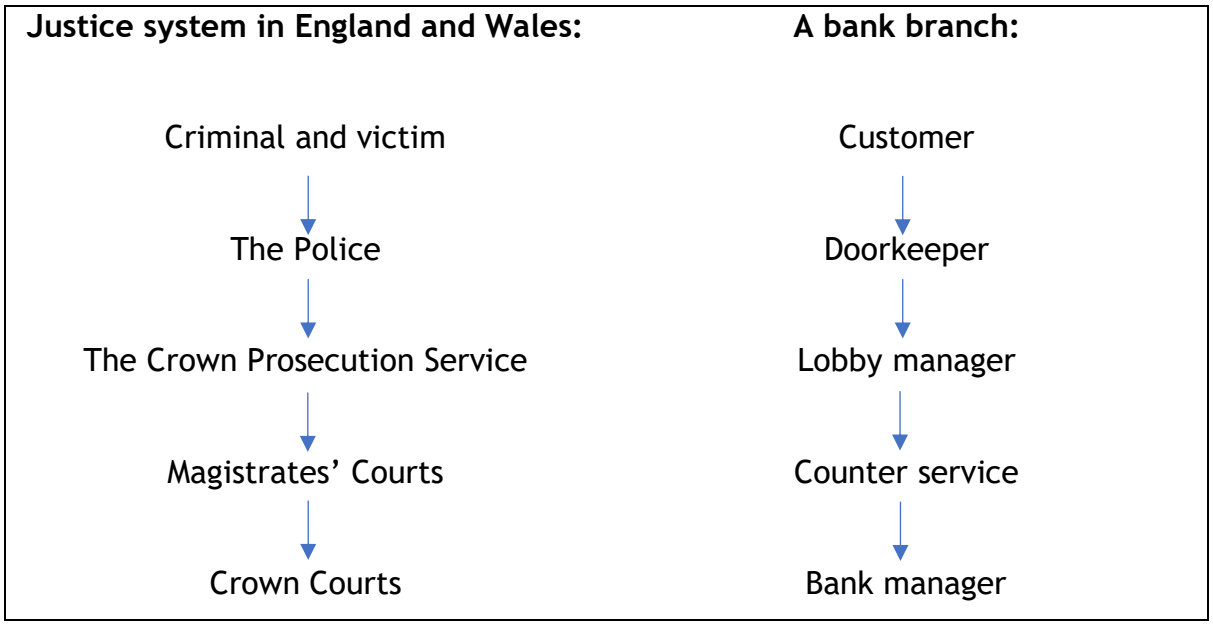
Before further presenting the analysis of this thesis, I want to provide the background information on Magistrates' Courts to one who may not be familiar with the court closures in England and Wales. This chapter is structured as follows: Section 2.1 compares the criminal justice system to a bank branch to introduce the role and importance of Magistrates' Courts in dealing with crimes; Section 2.2 discusses that the court closures in the CERP and the ERP are the most considerable changes in court number for the last twenty years; Section 2.3 shows court closures in England and Wales imply not only a reduction in the number of court buildings but also a reduction in the number of court staff; Section 2.4 lists two reasons for court closures (i.e., budget saving and court modernisation) and existing criticisms of current evaluations of court closures; Section 2.5 firstly lists the principles of court selections and existing complaints of them, then briefly discusses whether the principles were followed in practice; Section 2.6 summarises the background information of Magistrates' Courts in England and Wales.

2.1 The role of Magistrates' Courts

I draw a metaphor of bank branches to introduce the role of Magistrates' Courts (see figure 2.1) because one is more likely to have experience using bank services than have experience accessing the criminal justice system in England and Wales. In dealing with crimes, the Magistrates' Courts act similarly to counter services in a bank branch. In the sequence of a criminal case through the justice system, the Police act as the "doorkeeper" who "welcomes" (i.e., investigates and arrests) "customers" (i.e., suspects). Once the police think the evidence of a crime is sufficient, it will bring the "customer" to the "lobby manager" (i.e., Crown Prosecution Service) to decide whether and in what name the suspects should be charged. All the charged "customers" will be brought to "counter services" (i.e., Magistrates' Courts) first, and they will only be passed to the "branch manager (i.e., Crown Courts) when they need "senior service" (i.e., when the committed crime is serious enough).

Like a bank branch, where counter services provide most services, most criminal cases in the justice system are completed in Magistrates' Courts. For instance,

93%[4] of defendants between January 2009 and December 2019 were sentenced in Magistrates' Courts. Even if a criminal case is already known as serious enough and will eventually be completed in a Crown Court, the first hearing would still happen in a Magistrates' Court to decide if the defendant should be kept in custody until the trial in a Crown Court or released on bail. Since every criminal case needs to be heard at least once in a Magistrates' Court, every criminal case needs to queue for the availability of Magistrates' Courts.



- The details of flows of a criminal case through the justice system can be seen in **figure A1**.

Figure 2. 1 The role of Magistrates' Courts.

While a Magistrates' Court acts in a similar role to the counter service, there is less flexibility for "customers" in using court services than using bank services. When there is a long queue in a bank branch, the customers could use another bank branch if their transactions are urgent. If customers need to queue for a long time every time, they can even open a new account in another bank service. However, different from bank services, it could be impossible for victims to seek help elsewhere if they cannot obtain justice in a timely manner. There is only one criminal justice system in England and Wales, and there are clear principles to guide where a crime should be dealt with. Victims are less likely to have an alternative to secure justice, and their cases cannot be transferred between courts

[4] Data source: Criminal Justice Statistics, published by Ministry of Justice.

as easily as bank accounts. They may have to wait when there is a queue in Magistrates' Courts.

Besides, criminals in the justice system and customers in a bank branch tend to have different preferences for the timeliness of "services". Intuitively, the long queue in a bank branch could discourage customers from coming, but whether the long line in Magistrates' Courts discourages criminal behaviours? Customers in a bank branch look for on-time service, but do criminals look for on-time punishment? Under Becker's (1968) rational theory of crimes, criminals could prefer delayed punishment. If so, the long queue in the Magistrates' Courts may be preferred by criminals.

2.2 Court Estate Reform Programme and Estates Reform Projects

The court closures in England and Wales since 2010/11 have been implemented through two consecutive projects: the Court Estate Reform Programme (CERP) from 2010/11 to 2014/15, and the Estates Reform Projects (ERP) from 2015/16 to 2019/20.

Table 2. 1 Magistrates' Courts in the past twenty years

Financial Year	**02/03**	**03/04**	**04/05**	**05/06**	**06/07**	**07/08**	**08/09**	**09/10**	**10/11**
All courts	334	323	321	323	325	321	322	321	320
Closures	7	13	2	0	2	4	0	1	1
New opens	N/A	2	0	2	4	0	1	0	0
Financial Year	**11/12**	**12/13**	**13/14**	**14/15**	**15/16**	**16/17**	**17/18**	**18/19**	**19/20**
All courts	236	232	227	223	217	175	164	160	156
Closures	84	4	5	4	6	42	11	4	4
New opens	0	0	0	0	0	0	0	0	0

- Source: Integrated data from House of Commons Library and Ministry of Justice.
- "All courts" represents the total number of Magistrates' Courts remained open by the end of the financial year.

The data from the House of Commons Library (HOCL) and Ministry of Justice (MOJ)[5] show that 165 out of 321 Magistrates' Courts have been closed between 2010/11 and 2020/21 in England and Wales. The CERP and the ERP closures are the largest in the last twenty years, and no courts are newly opened (see table

[5] The data of court numbers is discussed in Chapter 3.

2.1). Beyond that, England and Wales have proposed 77 further closures by 2025/26 (National Audit Office 2019), which is currently postponed until more detailed evaluations of previous closures are completed.

There are similarities between the CERP and the ERP in closing courts. The percentage of closures is similar in the two projects. Around 31% of Magistrates' Courts (i.e., 98 out of 321) closed in the CERP, and around 30% (i.e., 67 out of 223) closed in the ERP. Besides, most of the closures in the two projects happened at the beginning of the projects. For example, 84 out of 98 (i.e., 86%) courts in the CERP were closed in 2011/12, and 42 out of 67 (i.e., 63%) courts in the ERP were closed in 2016/17.

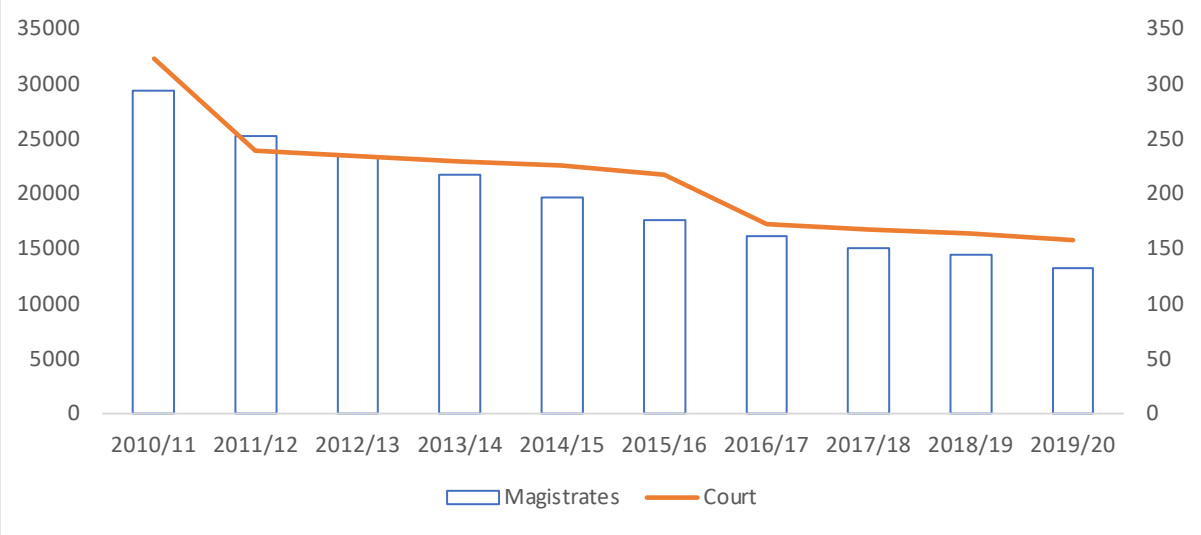
The CERP and the ERP in England and Wales may be riskier than the French 2008 reform as they involve larger closures. Since I only noticed one empirical work of court closures in France, I only specifically compare the closures in England and Wales to France. In the French 2008 reform, only 23% (i.e., 62 out of 271) of labour courts were closed (Espinosa *et al*. 2017). Furthermore, one newly opening labour court during that reform left 210 labour courts open after closures. In contrast, around 51% (i.e., 165 out of 321) of courts closed in England and Wales, and no newly open courts have been recognised so far.

Although there were openings and closures of courts before 2010/11 in England and Wales, these changes might be common variations in courts as few projects or general explanations for these could be noticed. Considering these changes are relatively smaller than closures in the CERP and the ERP, they are not given particular attention in this thesis.

2.3 Staff in closed courts

The CERP and the ERP in England and Wales have not only closed and sold venues, but a reduction in court staff has accompanied this. When a Magistrates' Court was closed, it would go out of service, and the venues of this court, including the hearing rooms, would be put on auction for sale. The workloads in a closed court would be transferred to other Magistrates' Courts that serve within the same judicial territory. In contrast, the court staff, including magistrates who act in a similar role as judges, were likely to be dismissed rather than transferred.

Figure 2.2 shows a similar decreasing trend in the number of courts and magistrates. From the start of court closures in 2010/11 to the last noticed closures in 2020/21, magistrates have decreased from 29,270 to 12,651. Besides, the number of other court staff has also decreased. The House of Commons (2021) reports that the average staff of the Her Majesty's Courts and Tribunal Service (HMCTS) dropped from 20,777 in 2010/11 to 16,713 in 2019/20, accompanied by a decrease in the proportion of permanently employed staff.



Source: HM Courts and Tribunals Service Annual Report and Accounts, various years

Figure 2. 2 Magistrates in Magistrates' Courts

Dismissing court staff, especially judges, is not a common choice among closures in other European countries. For example, judges in French closures were transferred to other open courts rather than dismissed (Espinosa *et al*. 2017). Espinosa *et al*. (2017) found that the completion of cases in nearby courts was delayed, even just closing the venues of courts. If the judges and other court staff were also dismissed, projects of court closures might be riskier than the French 2008 reform.

2.4 Reasons for court closures

2.4.1 To save the budget

The court closures in England and Wales are a response to the 2008 financial deficit (European Network of Councils for the Judiciary 2012). Under the ghastly shock of the worldwide financial crisis in 2008, the Office for National Statistics

(ONS) reports that the British GDP dropped by 25,796 million, accounting for 5.8% of the total in 2008. The disappointing economy caused funding reductions in many fields, while the reduction in funding for the justice system was the most significant. The HM Treasury (2018) reports that government funding for the Ministry of Justice fell by 27% from 2008 to 2018, Crown Prosecution Service by 34%, and Legal Aid by 32%, compared to a smaller reduction in education by 5% and defence by 6%.

The reasons why the justice system sacrificed more for budget savings are given in They Work for You (2019), i.e., some political voices think spending on the justice system (esp. prisons) could be expensive and ineffective. It was stated that imprisonment costs £40,000 per adult per year, which is higher than the average salary of a full-time worker in the UK (i.e., £38,552 in 2020[6]). And some political voices think the high price may not be worth it compared to the poor performance of controlling reoffending[7]. I compare the one-year reoffending rates of England and Wales to other European countries using World Population Review (WPO) statistics. Although the WPO does not report reoffending rates of every country every year, the statistics from it are still more comparable than the Proven Reoffending Statistics, which only report reoffending rates for England and Wales. The WPO shows the one-year reoffending rate was 45% for England and Wales in 2013, 35% for the Netherlands in 2013, 51% for Denmark in 2013, and 25% for France in 2004. In the limited data, England and Wales have poorer performance in controlling reoffending than the Netherlands and France.

Although the government expects to save the budget by reducing court services and selling the venues of courts, the evaluations of monetary savings from closures still need to be completed. I find two reports mentioning savings from the CERP and the ERP, respectively. House of Commons (2016) expects to save £41.5 million and would bring £38.5 million in receipts by closing and selling courts through the first court project CERP. National Audit Office (2019) reports a net savings of £133 million by a combination of cash savings from closing courts and estimates of administrative and judicial savings through the second court project ERP. The

[6] It is the average salary of the full workers in 2020 reported by Office for National Statistics.
[7] The Proven Reoffending Statistics reports that the average reoffending rates of England and Wales were around 31% before 2010.

claimed savings in the House of Commons (2016) and National Audit Office (2019) are only expected savings calculated by models. It was addressed by National Audit Office (2019) that the methodology used to predict savings are not rigorous enough. The claimed savings are not directly from reformed services but theoretical savings arising from process changes through the court closure project, which relies on an analytical model. In the calculations, the theoretical savings will be removed from the budget at the beginning year and considered as the savings have been achieved. However, the Her Majesty's Courts and Tribunals Services (HMCTS) will not check whether these claimed savings materialised as expected.

The National Audit Office (2019) also reported that 42% of respondents who attended a previous court project event believe the process of court closures needs to be more open and transparent. For example, the ONS reports that the GDP kept recovering from April 2009 to March 2016. The GDP in the second season of 2016 after the CERP (£527.401 million) had become higher than the GDP in the first season of 2008 before the 2008 financial crisis (£487,601 million). One may desire more explicit clarifications of why many courts were still closed by the second project (i.e., the ERP) when the GDP had already recovered.

2.4.2 Court modernisation

Modernisation is another claimed reason for the government to close courts. It is also hoped that the increase in the use of technology, such as online forms and video links for witnesses, could mitigate the negative consequences of court closures (House of Commons 2016). However, it is addressed in the National Audit Office (2019) that the progress of supporting services is behind schedule. Only 78% of milestones for delivering these services and 54% of planned outcomes have been completed.

By searching available published information, I noticed three supporting services related to modernisation, including the abolition of committal proceedings and the implementation of the Single Justice Procedure (SJP) and the Automated Track Case Management (ACTM). The committal proceedings were abolished for "either-way offences" in May 2013 to shorten the process in a Magistrates' Court (GOV.UK 2013). The committal proceedings are the court hearing held to decide whether

there is sufficient evidence to pass the criminal case to a Crown Court. The "either-way offences" (e.g., burglary) are crimes more serious than "summary offences" (e.g., motoring offences) but less serious than "indictable offences" (e.g., murder), and they can be either completed entirely in a Magistrates' Court or passed to a Crown Court. The single Justice Procedure (SJP) was applied to simplify the work of a Magistrates' Court for adult defendants who committed non-imprisonable summary offences (GOV.UK 2021). The summary offence usually should only be completed in a Magistrates' Court. The implementation of the SJP allows these cases to be dealt with by a single magistrate based on paperwork alone, without either party having to attend a court for a hearing. Automated Track Case Management (ACTM) was implemented as a supplementary service for the SJP (Judicial Office 2020). The ACTM is a digital support allowing cases subjected to the SJP to be managed by Magistrates' Court without paperwork. All three supporting services likely aim to deal with the possible delay problem in Magistrates' Courts.

2.5 Selecting closed courts

Although England and Wales have listed several principles for selecting closed courts, applying these principles seems flexible in practice.

2.5.1 Listed principles

The general principle at the national level may be that one judicial territory (i.e., a PFA) would have at least one Magistrates' Court remain open after closures. Except for Bedfordshire PFA, which had only one Magistrates' Court before closures, all the other PFAs have experienced court closures.

The detailed principles of selecting closed courts in a PFA were noted by the House of Commons (2016), including improving utilisation rates, ensuring access to courts, delivering value for money, and moving cases towards larger courts. These principles reflect that the government's selections consider the importance of a court, court users' right to access, savings from closures, and substitutes for closed courts:

1. The utilisation rates refer to percentages of available hours used for court hearings in a court hearing venue. The government wishes to improve the average utilisation rates by closing courts to 80%.
2. The right to access a court is one of three rights of accessing justice required by the common law in England and Wales. To ensure this right, the government targets that most court users can access their local court within an hour by public transport after closures.
3. Saving the budget is the main reason for court closures. The government hopes that closing courts could deliver monetary value from sales or save running costs by cutting down services.
4. The government claims the smaller courts in a PFA would be closed first to ensure the remaining courts can deal with the transferred workloads.

However, there are criticisms regarding the government's application of these principles. For example, it was pointed out in the House of Commons (2016) that the government failed to reach the target of improving average utilisation rates to 80%. It was shown that the average utilisation rates dropped from 64% in 2009/10 to 47% after the first project of closures (CERP), and no justifications were given by the government. Moreover, some more specific criticisms are addressed in the report that some courts with high utilisation rates were still closed. For instance, St Helens Magistrates' Court, with utilisation rates of 62%, was closed in 2016/17 when the average utilisation rates of all courts were 47%. In addition, the report also addresses the criticisms of ensuring access to a court. It was criticised that the measurement of travel time to courts is the theoretical time estimated using the distance from "court to court" rather than the distance from "user home to court". The travel time based on "court to court" could be misleading because it does not sufficiently consider local geography or transport infrastructure. Besides, the criticisms of the principle of delivering value for money were just discussed in Section 2.4.1. Additionally, the application of moving cases towards larger courts was criticised because some large courts, like Barry Magistrates' Court, are closed.

2.5.2 Principles in practice

As mentioned above, statistics related to these principles are incomplete, and relevant data has not been fully published. This thesis attempts to analyse the

application of these principles through the government's responses to the proposal of court closures during the ERP provided by the Ministry of Justice (2016).

In practice, the government's considerations shown in the Ministry of Justice (2016) seem complex and irregular. For example, the Shrewsbury Magistrates' Court, with utilisation rates of 28%, was closed to save £290,000 in annual operation costs because its utilisation rates do not worth the costs. However, the Kettering Magistrates' Court, with utilisation rates of 64% and £55,000 annual costs, was also closed. Its utilisation rates may be even higher than other hearing rooms across estates, and its costs are not very high. The given reason for closing it could be confusing to understand the principle of utilisation rates, i.e., there was a nearby court (i.e., Wellingborough Magistrates' Court) with low utilisation rates of 31%, which could absorb caseloads from the Kettering Magistrates' Court. In addition, the Burton-upon-Trent Magistrates' Court, with relatively medium costs (£198,000) and utilisation rates (51%), was decided to be closed because the implemented modernisation services (e.g., video links) were expected to reduce usage in the future. At the same time, the Sandwell Magistrates' Court, with costs of £411,000 and utilisation rates of 52%, was also decided to be closed with a pretty contradicting reason, i.e., it lacks implementation of modernisation services.

Given that decisions to close courts appear complex and irregular, the detailed principles for selecting closed courts may be flexible in practical implementation.

2.6 Summary

Structurally, the role of Magistrates' Courts in the justice system is similar to counter services in a bank branch. Most court services and bank services are solely provided at this level. However, functionally, Magistrates' Courts are less flexible than bank counter services, and criminals in a justice system and customers in a bank branch are likely to have different preferences.

165 out of 321 Magistrates' Courts were closed and sold in the CERP and the ERP, the largest change in courts over the past twenty years. The closures in England and Wales differ from those in other European countries. The closed Magistrates' courts in England and Wales are criminal rather than civil ones, and there was also a decrease in the number of court staff. The decision to close was made mainly to

save the budget. Still, current savings evaluations are incomplete, and the principles of selecting closed courts tend to be irregular and flexible in practice. Even though supporting services have been implemented to bring modernisation and deal with the possible delay problem in courts, modernisation progress is behind schedule.

3 Quarterly Data in Police Force Areas

The unique panel data of my research is discussed in this chapter. Section 3.1 discusses the spatial level and time interval of data; section 3.2 introduces the key independent variable, court numbers; section 3.3 discusses the dependent variable for testing the first research hypothesis; section 3.4 provides an introduction of collecting the dependent variable for testing the second hypothesis; section 3.5 relates to a discussion on collecting data on crime numbers which is the dependent variable for testing the third hypothesis; section 3.6 summarises control variables included in the panel database.

To analyse the consequences of court closures, we need a database containing information across areas and periods because Magistrates' Courts in England and Wales were closed in different places and at different timing. A panel database (see table 3.1) appears to be the proper choice to analyse the impacts of court closures varying across areas and timings.

Table 3. 1 Framework of the panel database

Spatial level	**Time frequency and interval**
42 police force areas in England and Wales	Quarters between April 2010 to March 2022
Information	**Data sources**
Number of Magistrates' Courts	House of Commons and Ministry of Justice
Days of case duration	Ministry of Justice
Number of charged crimes	Home Office
Number of police-recorded crimes	Office for National Statistics
Operations of justice system	Ministry of Justice
Demographic characteristics	Annual Population Survey

3.1 Panel database framework

3.1.1 Police force areas

I would collect information at the police force area (PFA) level for the panel database. The PFA-level data could enable us to control case transfers between courts within a PFA.

The court-level data could ignore case transfers between courts after closures. In the court-level panel data of Espinosa *et al*. (2017), it was found that the case duration in a nearby court could be delayed when it received extra burdens of

caseloads from a closed court. However, it was also found that the delay was insignificant at the national level. The reason for their slight and insignificant findings could be that the caseloads transferring after closures are not controlled. The existing courts in a judicial territory usually work together as a unit. In England and Wales, the courts in a police force area (i.e., judicial territory) deal with cases brought by prosecutors from the same police force area (PFA). The prosecutors may consider the speed of resolving cases when deciding on a Magistrates' Court for hearing cases. Thus, the court receiving the largest extra burdens from closures may receive fewer newly incoming cases, and the delay impacts of closures on the court could be somehow offset.

A judicial-territory level panel database could be preferred to control the cases transferring after closures. According to Crown Prosecution Service (2022), a prosecution should occur in the jurisdiction where the majority part of criminality occurred or where the majority part of the loss was sustained. Although prosecutors can decide which Magistrates' Court to hear, they tend to select from Magistrates' Courts within the same judicial territory. By considering all courts in a judicial territory, we could control the case transfers between courts, e.g., prosecutors bringing more new receipts to less busy courts. Therefore, I build a database containing information on judicial territories, i.e., 42 police force areas in England and Wales[8].

3.1.2 Quarterly data from April 2010 to March 2020

The time interval of the panel database depends on the availability of data on court numbers. Let us recall that I attempt to test the complementary effects of court closures with three research questions. To ensure the impacts of court closures in the three research questions have commonality, I intend to use the same data on court closures in all three questions. Then, the availability of data on court numbers would restrict the time interval of the entire panel database.

In the data sources, i.e., the House of Commons Library (HOCL) and the Ministry of Justice (MOJ), the information on court numbers in PFAs is only available from 2010/11. While I cannot have data on court numbers before 2010/11, my panel

[8] More details of judicial territories and police force areas could be found in Appendix B.

databases can still cover the entire period of the projects of closures. As mentioned in Section 2.2, the changes in court numbers before 2010/11 are likely minor and common variations[9] and unrelated to the projects of court closures. Thus, the unavailability of data before 2010/11 could only be a little loss for the panel database. Except for the unavailability of data before 2010/11, the periods since 2020/21 likely contain complicated influences of the Covid-19 pandemic. Covid-19 was a shock to the entire society of worldwide countries and had been spreading in England and Wales since 2020/21. It may bring bias to the analysis by largely altering the behaviours of entire social parties, such as behaviours of courts, prosecutors, and potential criminals etc. Given that there will be no closures after 2019/20, it may not be cost-effective to suffer the bias from the complex consequences of the Covid-19 pandemic in order to have additional data from 2020/21 to 2021/22. Therefore, I just intend to include information between 2010/11 and 2019/20 in our panel database.

Quarterly data could benefit my PFA-level analysis by giving enough observations. Although only annual data from eight years was collected in Espinosa *et al*.'s (2017) analysis of court closures in France, they still managed to collect 1,817 observations by studying court-level information. Unlike Espinosa *et al*. (2017), studying court-level information, I design to study PFA-level information, i.e., aggregate-level information. To ensure our database can include enough observations and to avoid the time frequency being too short to enable the study to notice the impacts of court closures, I intend to collect quarterly data for the panel database. As a result, my panel database contains available quarterly information on 42 PFAs between April 2010 and March 2020.

3.2 Magistrates' Court numbers

I intend to collect the number of Magistrates' Courts to reflect changes in court services in a PFA. In Espinosa *et al*.'s (2017) analysis of court closures in France, they were interested in the influence of closure on a nearby court. They analysed a court's status (closed or open) and caseloads to understand the relative burden an open court received from a closure. In this thesis, I am interested in the

[9] The difference in the number of open courts between 2002/03 and 2009/11 is 13, as seen in table 2.1.

influence of closures on an aggregate area (i.e., a PFA) and prefer to analyse the changes in courts of an entire PFA to understand the reduction in a PFA's court services. To do so, we intend to collect Magistrates' Courts numbers in PFAs.

The collected number of Magistrates' Courts is integrated information from the House of Commons and the Ministry of Justice. To my best knowledge, this thesis is the first attempt to analyse the number of Magistrates' Courts in England and Wales. The public data of the House of Commons Library (HOCL) was the first source that came into my consideration. This data source summarises the answers of the Ministry of Justice regarding HOCL's written question about court closures. It provides information on courts between 2010/11 and 2019/20, including the name of Magistrates' Courts, locations of courts (e.g., constituency and region), the status of a court (closed or open), the year of closures, the status of sales (sold or not), price of sale, and buyer of the sale. However, the public data of the HOC does not provide the exact date of closures, which does not allow us to analyse the quarterly closures. To achieve the precise date of closures, I uniquely requested information from the Ministry of Justice[10] (MOJ). The unique data from the MOJ provides the names of closed Magistrates' Courts, the exact date of closures, and the region of a court. However, the unique data does not provide details of location[11], nor any information on courts that have remained open. Using this source alone, we cannot understand the changes in courts at the PFA level.

Since the public data of the HOC and the unique data of the MOJ have their limits, I attempt to combine the two data sources to overcome these limits. By doing so, we could have the needed information, including names of all Magistrates' Courts, location details of courts, the status of courts, and exact dates of closures.

While combining the two data sources, I noticed differences in the number of closed courts between them. The public data of the HOC records 164 Magistrates' Court closures, while the unique data from the MOJ records 162 Magistrates' Court closures. In particular, the public data of the HOC misses two closures and adds four additional closures compared to the unique data of the MOJ.

[10] The Ministry of Justice is responsible for court statistics in England and Wales.

[11] The Ministry of Justice only provides location information at the regional level. In England and Wales, this is a larger administrative area than a PFA. Without additional details, we cannot further delineate a region into specific PFAs.

More specifically, for the two missing closures in the public data of the HOC, the public data does not record closures of Balham Youth Court (Magistrates' Court)[12] on 22/22/2011 and Birmingham Magistrates' Youth Court on 31/01/2018. Firstly, the Balham Youth Court (Magistrates' Court) is not regarded as a Magistrates' Court in the data of the HOC. Regarding whether a court is a Magistrates' Court or not, the MOJ is likely to be more reliable because the MOJ is officially responsible for court statistics. Thus, I prefer to regard Balham Youth Court (Magistrates' Court) as a Magistrates' Court. Secondly, while the data of the HOC counts the Birmingham Magistrates' Youth Court as a Magistrates' Court, it does not record this court as closed. I attempted to check the status of Birmingham Magistrates' Youth Court using the Find a Court or Tribunal service of GOV.UK. The Find a Court or Tribunal service is to help court users to find the address, contact details, opening times, building information, and updates of a court or tribunal in England and Wales. If the information for Birmingham Magistrates' Youth Court is still listed in the service, the court is likely to be open. As a result, I found information about the court that was still listed in the service in November 2022, including opening times, and thus I count this court as open.

Table 3. 2 Magistrates' Courts in police force areas (PFAs)

PFA	No.	Ch.	PFA	No.	Ch.	PFA	No.	Ch.
Avon and Somerset	8 (5)	38%	Gwent	6 (2)	67%	Nottinghamshire	5 (2)	60%
Bedfordshire	1 (1)	0%	Hampshire	9 (5)	44%	South Wales	9 (3)	67%
Cambridgeshire	5 (3)	40%	Hertfordshire	5 (3)	40%	South Yorkshire	4 (3)	25%
Cheshire	7 (3)	57%	Humberside	6 (4)	33%	Staffordshire	6 (2)	67%
Cleveland	3 (1)	67%	Kent	10 (6)	40%	Suffolk	4 (1)	75%
Cumbria	6 (3)	50%	Lancashire	10 (5)	50%	Surrey	7 (4)	43%
Derbyshire	4 (2)	50%	Leicestershire	7 (2)	71%	Sussex	9 (5)	44%
Devon and Cornwall	12 (6)	50%	Lincolnshire	5 (2)	60%	Thames Valley	15 (5)	67%
Dorset	5 (2)	60%	Merseyside	7 (4)	43%	Warwickshire	3 (2)	33%
Durham	5 (3)	40%	Norfolk	6 (3)	50%	West Mercia	10 (6)	40%
Dyfed-Powys	10 (6)	40%	North Wales	11 (4)	64%	West Midlands	10 (5)	50%
Essex	7 (4)	43%	North Yorkshire	6 (4)	33%	West Yorkshire	8 (3)	63%
Gloucestershire	5 (1)	80%	Northamptonshire	6 (2)	67%	Wiltshire	3 (2)	33%
Greater Manchester	10 (5)	50%	Northumbria	12 (7)	42%	London	34 (17)	50%

	Obs.	Mean	Std. dev.	Min	Max
Average closure number	42	4	3	0	17
Average closure rates	42	50%	15%	0%	80%

- Data source: House of Commons Library and Ministry of Justice
- No. represents the number of Magistrates' Courts remained open at the start of court closures in April 2010 (outside the bracket "()") and at the end of court closures in March 2020 (inside the bracket "()").

[12] Balham Youth Court (Magistrates' Court)' is the exact name of the court as shown in the unique data provided by the Ministry of Justice (MOJ).

Besides, the public data of the HOC records four extra closures than unique data from the MOJ, including closures of Carmarthen Law (The Guildhall) Courts in 2016/17, Bridgend Law Courts in 2016/17, Brecon Law Courts in 2016/17, and North Liverpool Community Justice Centre in 2013/14. The four courts are comprehensive law courts. The comprehensive law courts in England and Wales are not purely Magistrates' Courts and may provide other court services, such as civil court services. Probably because I specifically requested the information on Magistrates' Courts from the MOJ, the information on comprehensive law courts was excluded in its replies. Nevertheless, as long as a court provides Magistrates' Court service, the closures of it are likely to affect Magistrates' Court services in a PFA. Therefore, the four comprehensive law courts and their closures are counted in my database. I further achieved the exact date of closures for two of the four comprehensive courts from They Work for You (2018), i.e., the closure of Carmarthen Law Courts on 07/05/2016 and Bridgend Law Courts on 29/07/2016. While the closing dates of the other two comprehensive courts are not achieved, they are still included but not recorded as closed in the database. The missing of two closures could be a less loss considering the entire 165 closures.

As a result of combining the public data of the HOC and unique data from the MOJ, my quarterly data records 163 closures out of 321 Magistrates' Courts between April 2010 and March 2020. Then I aggregate the courts' information into the number of courts in PFAs using the location information of the constituency. After combining and aggregating, the quarterly information of Magistrates' Court number in PFAs provides 1,680 observations.

Table 3.2 represents changes in court numbers between April 2010 and March 2020. It can be noticed that the number of courts varies largely across 42 PFAs (ranging from 1 to 34), and there is at least one court that remains open in a PFA after closures. Except for Bedfordshire PFA, which only had one court before closures, every PFA experienced court closures. Among PFAs experiencing closures, the closure number ranges from 1 to 17, and the closure rates range from 25% to 80%. In the average level of all 42 PFAs, the average closure number is four, and average closure rates are 50%.

3.3 Case duration

The case duration would be collected to reflect the changes in court productivity. In the literature on congestion, the case duration (e.g., Espinosa *et al*. 2017; Bielen *et al*. 2015; Bielen *et al*. 2018) and the number of resolved cases per judge (e.g., Beenstock and Haitovsky 2004; Espasa and Esteller- Moré 2015) are usually two indicators for court productivity. The case duration seems to be a more direct measurement of the timeliness of justice, and it is frequently measured by the time taken for a case through the justice system (e.g., Espinosa *et al*. 2017; Bielen *et al*. 2015; Bielen *et al*. 2018). Besides, considering court closures were accompanied by a reduction in judges in England and Wales (discussed in Chapter 2), its impacts on case duration could be easier to detect than on resolved cases per judge. By collecting this estimate, we could detect how court closures influence the procedures of a case through the justice system.

The data on case duration in England and Wales is relatively fresh data published by the MOJ. To my best knowledge, this thesis is the first empirical paper analysing case duration in England and Wales. I collected data on case duration from Timeliness Statistics at Police Force Area, which the MOJ first released in 2019. The estimates of case duration in the data source are created directly from extracts from the underlying Magistrates' Court administrative system. All estimates are based on defendants' counts in completed criminal cases. Although the average case duration based on defendants' counts could be underestimated because a criminal case might involve multiple defendants, it is still the best available data in England and Wales. To ensure the estimates of case duration are accurate, the completed cases in the data have been through a specific validation process, for example, if dates are out of sequence, then cases are removed.

The data source provides us with the average days taken for each defendant from when a crime was committed to when the case was completed in courts between April 2010 and December 2019[13]. While the periods between Jan 2020 and March 2020 are not provided, the given periods only have one court closed in total, and

[13] While there are changes in estimates after January 2018 due to an extra type of defendant being counted, these can be controlled by time Fixed Effects (FE) dummy variables in the Fixed Effects Ordinary Least Squares (FE OLS) model. Specifically, data from January 2018 has been revised due to the identification of defendant attrition through the timeliness process. Consequently, these defendants have been reintroduced into the analysis.

the study still has 1,638 observations of case duration. Besides, the provided data on case duration is broken down into procedures through the criminal justice system (see figure 3.1), including days taken from offence to charge (pre-charge duration), from charge to first hearing (waiting duration), and from first hearing to completion (trial duration). The separated case duration gives this thesis an advantage in analysing different impacts on different procedures. This advantage is unique because much literature on case duration is only able to examine trial duration due to the unavailability of data (Voigt 2016).

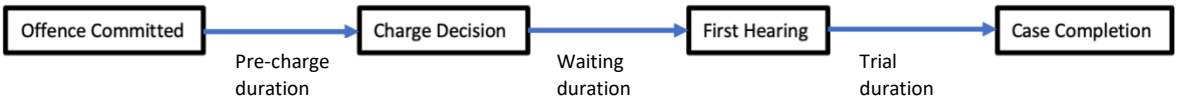


Figure 3. 1 Procedures of case duration

During the pre-charge duration, the police notice the crime through street patrol and reports. After the crime is noticed, police successively investigate the crime, identify the suspects, and question them. Once the police believe the evidence is strong enough for charges, the prosecutors involve and make charge decision with considering advice from polices. The criminal case enters the waiting duration as long as prosecutors make the charge decision. The case needs to wait for the availability of courts for a hearing. As required by the principles of the justice system (Ministry of Justice 2022), a charged criminal case should be brought to a Magistrates' Court for the first hearing as soon as possible. The trial duration starts when the criminal case is first heard. A criminal case might be heard multiple times until completion.

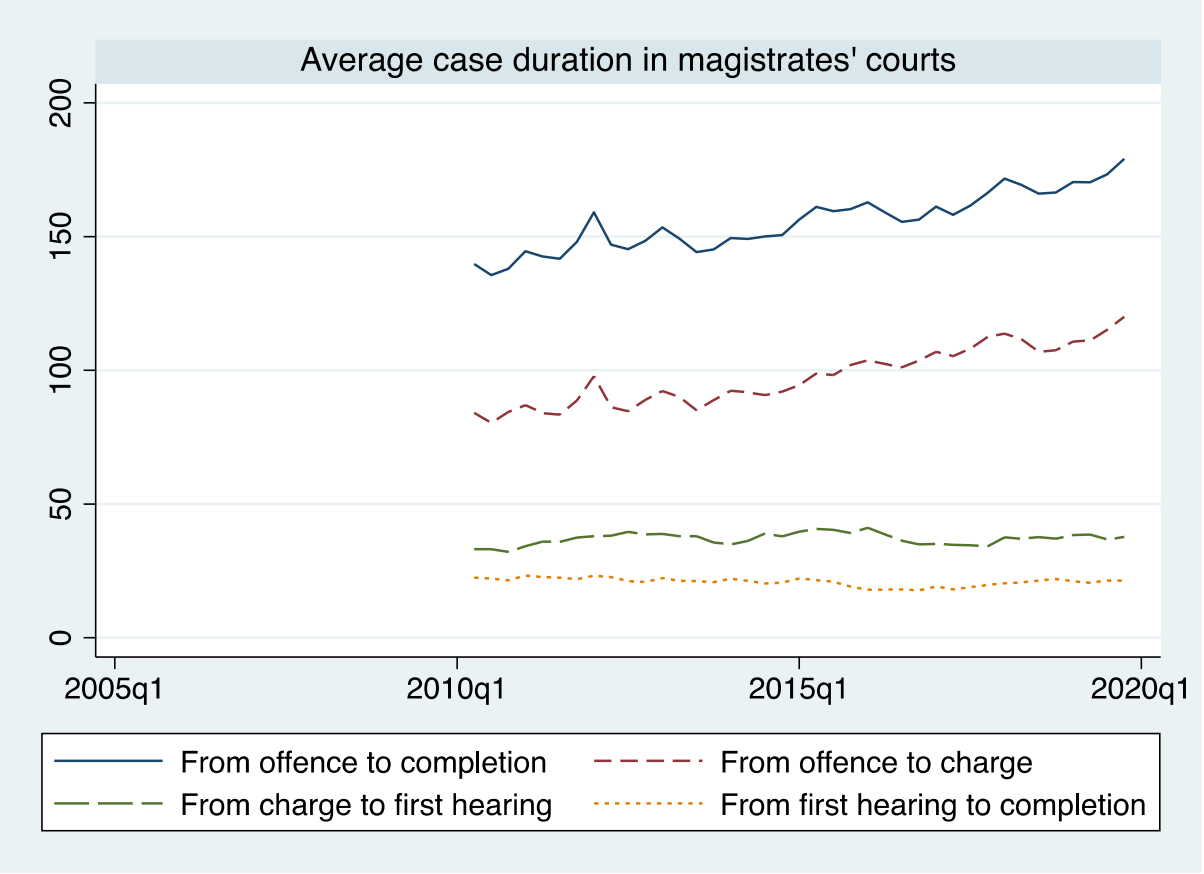


Figure 3. 2 Case duration in Magistrates' Courts

I collected the case duration, which is purely completed in Magistrates' Courts, to address the consequences of closing Magistrates' Courts. The data on case duration is collected at the Local Criminal Justice Boards (LCJBs) level and is aggregated into the PFA level[14].

The collected data on case duration show several stylised facts (see figure 3.2). Among procedures of Magistrates' Court cases through the criminal justice system, the works of judges (trial duration) take the shortest time. In contrast, the works of police and prosecutors (pre-charge duration) take the longest time. The pre-charge duration is more than twice as long as the sum of the waiting duration and trial duration across the previous ten years.

[14] The relationship between Local Criminal Justice Boards and Police Force Areas is detailed in Appendix B.

3.4 Charge numbers

I would collect the number of charges to reflect changes in prosecutors' charge decisions. Although prosecutorial discretion is most frequently indicated by a binary variable (charge or not) in case-level studies (e.g., Albonetti 1987; Lynch *et al*. 2021), the number of charges is the common statistic in aggregate-level studies (e.g., Rasmusen *et al*. 2009; Cotti *et al*. 2022). Compared to a binary variable, the number of charges could reflect the aggregate-level changes in prosecutorial decisions responding to court closures.

In this thesis, the collected charges contain published and uniquely achieved information from the Home Office (HO). To my best knowledge, this empirical analysis is the first attempt to examine the PFA-level number of charges in England and Wales. Among the periods of collected data, the quarterly charges between April 2014 and March 2020 are public information available in Crime Outcome in England and Wales Open Data published by the HO. However, the quarterly charges between Jan 2010 and April 2014 have yet to be published and are uniquely collected from the HO. Although there were changes in divisions of categories of crime outcome (see table D1), the definitions of "charges" are constant across periods. Specifically, the collected charges represent the total number of crimes charged in a quarter, no matter when these crimes were recorded, excluding fraud crimes[15] and crimes recorded by the British Transport Police[16]. The Crime Outcome in England and Wales Open Data is an official statistics output produced to the highest professional standards and free from political interference. It has been produced by statisticians working in the Home Office Science Unit in accordance with the Home Office's Statement of Compliance with the Code of Practice for Official Statistics, which covers their policy on revisions and other matters.

[15] Fraud crimes are now recorded by the National Fraud Intelligence Bureau (NFIB) rather than police forces.

[16] The crimes recorded by British Transport Police are excluded because it is an independent department at the national level, and it is difficult to be investigated at the PFA level.

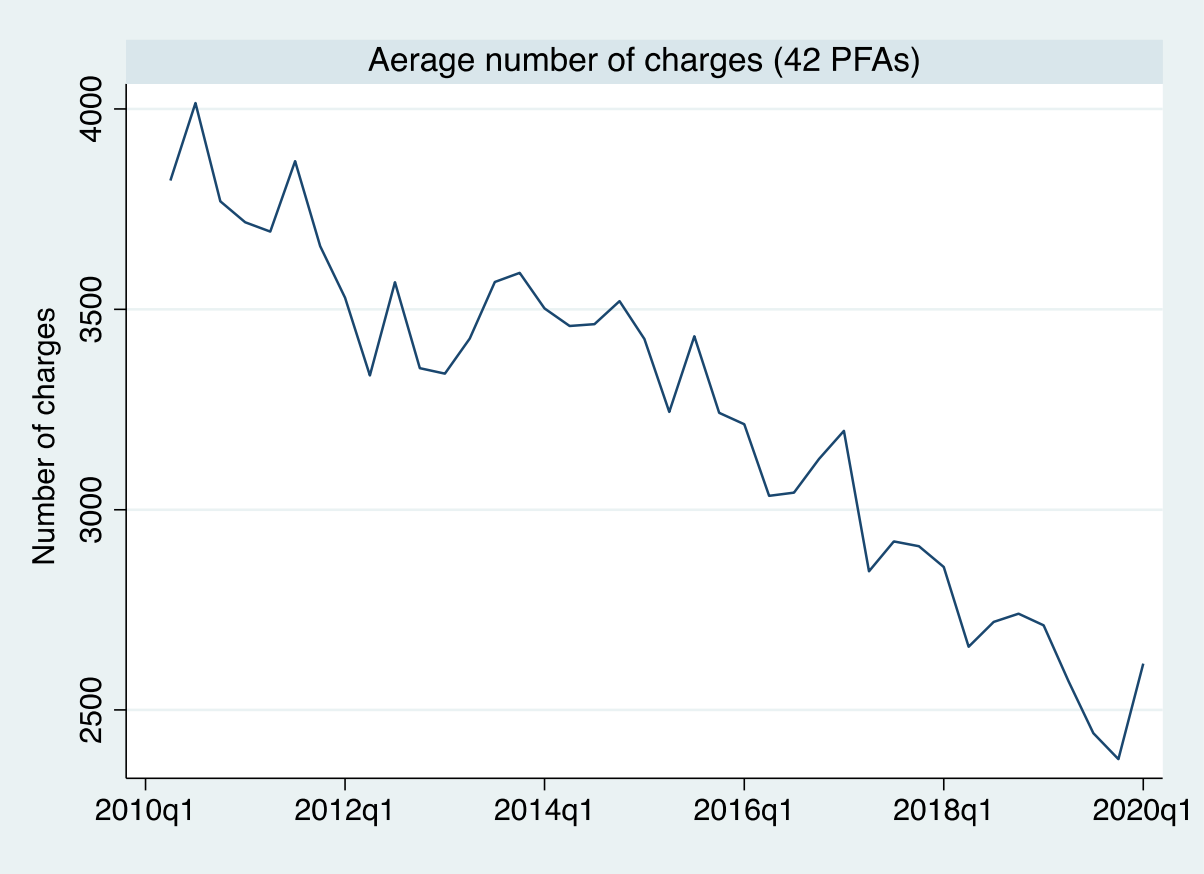


Figure 3. 3 The number of charges

The data source directly provides PFA-level charges and breaks down charges by crime groups, which allows us to analyse prosecutors' preferences for different crimes. The crime groups include violence against the person, sexual crimes, robbery, theft, damage and arson, possession of weapons, drug crimes, miscellaneous crimes against society, and public order crimes.

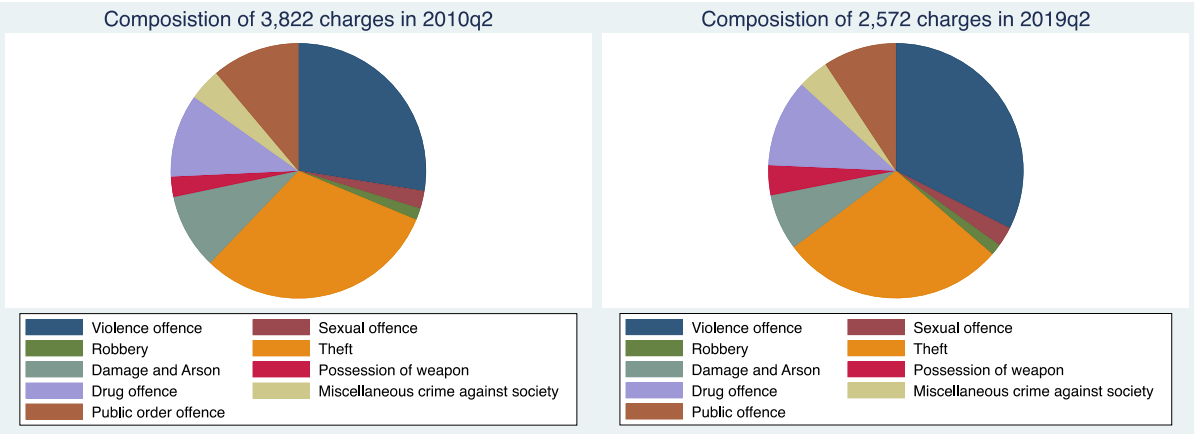


Figure 3. 4 The composition of charges

The collected charges show several stylised facts. Figure 3.3 shows that although there seems to be seasonality[17] in the number of charges, the number of charges generally decreases across time. Figure 3.4 compares the composition of charges between the two same seasons in the early period of closures and the late period of closures. It displays that violent and theft crimes account for more than half the charges. While there are fewer charges in the autumn of 2019 than in the autumn of 2010, the total charges in the autumn of 2019 comprise a higher proportion of more serious crimes, i.e., violent crimes.

3.5 Crime numbers

To examine if court closures increase crimes, I collect the number of crimes as the indicator for criminal behaviours. Although some literature on crime reduction uses crime rates to control population changes, the measurements of crime rates could vary due to different time frequencies of collected data, such as crimes per 100,000 population (e.g., Han *et al*. 2013), crimes per 10,000 population (e.g., Vollaard and Hamed 2012), and crimes per 1,000 population (e.g., Draca *et al*. 2011) etc. In this chapter, I prefer to measure criminal behaviours directly by the number of crimes and control the population separately.

There are two types of crime data in England and Wales, i.e., police-recorded and survey-based data. The police-recorded crime data are available in the Office for National Statistics (ONS) but are supplied by the HO which is responsible for collating recorded crime data supplied by PFAs of England and Wales. These data are supplied by police to the HO monthly and are quality assured by the Home Office Statistics Unit before sending to the ONS. The recorded crime figures can be used for local crime pattern analysis and provide a good measure of trends in well-reported crimes. Unlike survey-based data, recorded crime figures do not include crimes that have not been reported to the police or incidents that the police decide not to record as crimes. The survey-based data is estimates based on the Crime Survey for England and Wales. It covers unreported crimes by interviewing respondents' experiences directly. However, it could have limits to support studies on local-level analysis as it is primarily designed to provide national-level estimates and only includes a minimum of 650 adult interviews in

[17] Further discussion on seasonality can be seen in Appendix D.

each PFA. Thus, the police-recorded data tends to be a more proper choice for my analysis at the PFA level, which is also a frequent choice in other studies on PFA-level crimes (e.g., Abramovaite *et al*. 2018; Machin and Meghir 2004)

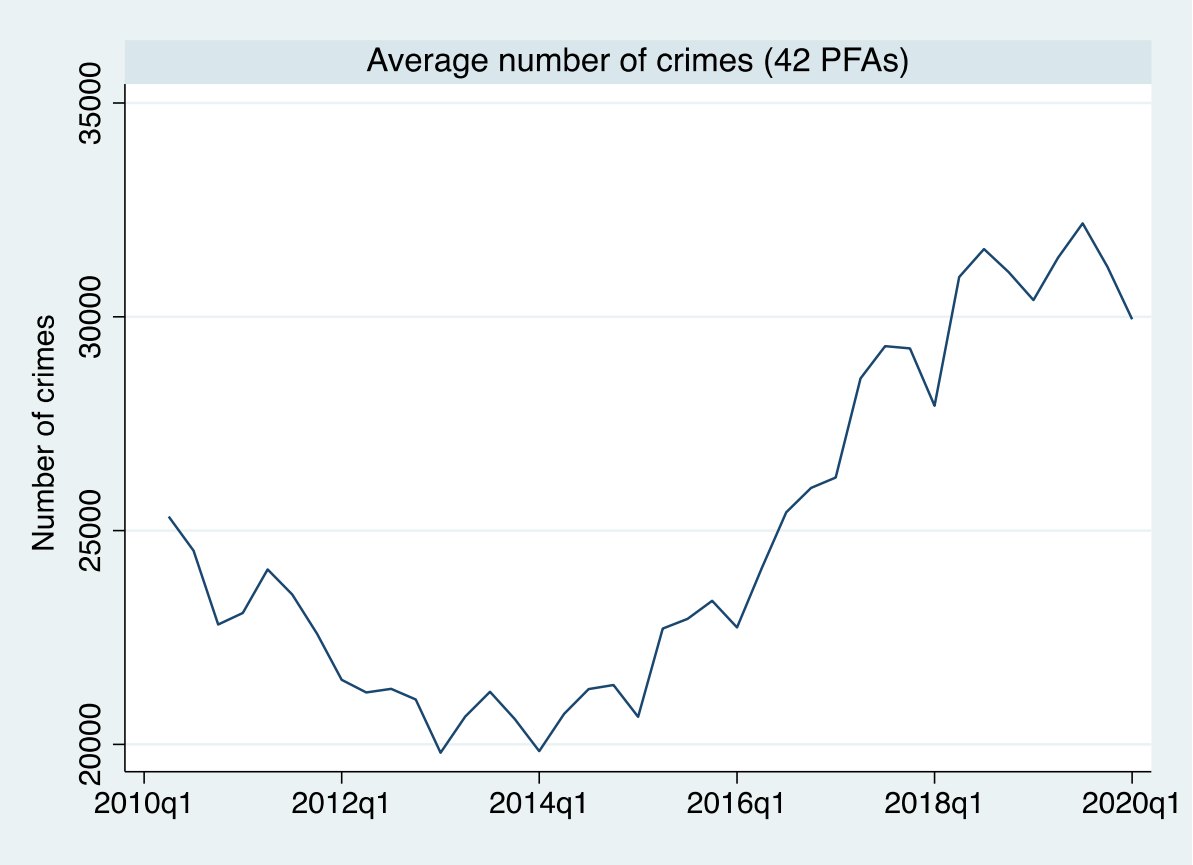


Figure 3. 5 The number of crimes

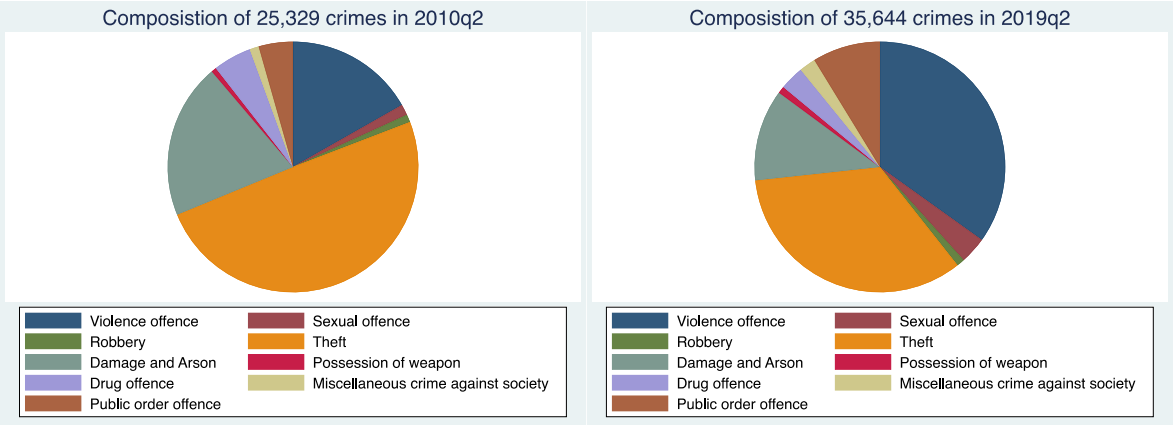


Figure 3. 6 The composition of crimes

The police-recorded data also provides crime information by crime groups, including violence against the person, sexual crime, robbery, theft, damage and

arson, possession of weapons, drug crime, miscellaneous crime against society, and public order crime. It could help this thesis understand the impacts of court closures on criminal behaviours.

I collected the quarterly number of crimes in 42 PFAs between April 2010 and March 2020. The collected data displays several stylised facts. Figure 3.5 demonstrates a U-shape of the trend in crimes. Although there seems to be seasonality in crimes, the crimes generally increase since Jan 2013. Besides, figure 3.6 compares recorded crime composition between two same seasons in early and late periods of closures. It displays that violent, robbery, and theft crimes account for over 75% of recorded crimes. The number of crimes in the autumn of 2019 is greater than that in the autumn of 2010 and reflects an increase in the proportion of more serious crimes, e.g., violent and sexual crimes.

Even though police-recorded data is the proper choice in this thesis, it still comes with limits. For example, the reporting rates and police practice can affect the accuracy of statistics. In a more frequent case, the reporting rates can be lower than in reality. If so, the collected crimes are underestimated, which may result in biased coefficients or lower predictive power.

3.6 Operations of the justice system and demographic characteristics

I also collected operations of the justice system and demographic characteristics for analysis. In this thesis, I aim to analyse the influences of court closures on case duration, charges, and crimes. The literature on court congestion (see Section 4.2), prosecutorial discretion (see Section 5.3), and crime reduction (see Section 6.2) suggest that case duration, charges, and crimes could also be affected by the operations of the justice system and demographic characteristics.

The data source of operations of the justice system is the Ministry of Justice (MOJ) and that of demographic characteristics is the Annual Population Survey (APS). The MOJ publishes various statistics on defendant-level activity in the criminal justice system, such as out-of-court disposals, court proceedings and convictions, remands, sentencing and offending histories. In addition, the APS has a sample size of 320,000 individuals and households in each survey, providing residence-based data on population, age, gender, unemployment, education, and ethnicity.

Moreover, I further collected additional information, including the full-time equivalent police workforce from the HO, the education level of the population from the APS, and the hourly payment level from the Annual Survey of Hours and Earnings (ASHE). However, only annual data of this additional information are available, and thus, I only analyse them in the robustness test of annual data.

4 Do Court Closures Delay Case Duration?

4.1 Introduction

To borrow an old phrase: "Justice delayed is justice denied". In the timeliness statistics published in England and Wales, the timeliness of justice is measured by the duration a criminal case takes through the criminal justice system (case duration). The timeliness of justice is one of the essential criteria to measure the performance of the court system (International Consortium for Court Excellence 2018). The unduly long delay is not only a threat to justice but also a loss of social welfare. For example, victims may not start recovering from hurts until the judgement is made, or innocent defendants cannot return to economic activities when they are detained to wait for trial (Freeman 1996).

The delay in case duration is an incessant problem and has attracted attention since the late 1950s (Priest 1989). Although the reasonable delay may help to ensure the quality of trials (Woude 2012), whether the current delay is reasonable has become a frequent concern for the policy of court closures among European countries since the 2000s (European Network of Councils for the Judiciary 2012). During the closures of 51% of Magistrates' Courts in England and Wales, the average case duration from crime committed to case completion has been delayed by 22% (30 days) between 2010/11 and 2019/20. However, the current consideration of the relationship between case delays and policy changes is still in reporting stage, lacking empirical evidence to support the link between them (Espinosa *et al*. 2017).

4.1.1 Hypothesis

This chapter intends to provide empirical evidence explaining the impacts of court closures on case duration. This chapter's assumption that court closures can delay case duration is based on the literature on court congestion. In Zeisel *et al*.'s (1959) logjam metaphor, the court congestion problem is divided into the incoming caseloads rates and the outcoming caseloads rates to discuss. The court congestion problem could arise when incoming rates exceed outcoming rates. Court closures could be one of the factors affecting the outcoming rates. Studies on the outcoming rates indicate that the capacity of courts and the number of

court staff are two factors affecting court productivity (e.g., Espinosa *et al*. 2017; Gomes *et al*. 2016). Espinosa *et al*.'s (2017) studies on labour court closures in France noted that court closures could cause a slowdown in the outcoming rates by increasing the burden on remaining courts. On that basis alone, court closures in England and Wales may have the same delayed effects on case duration. Moreover, unlike the French closures, the number of court staff in England and Wales has dropped markedly with the closures (see Section 2.3) rather than being transferred to remaining courts as in France. This difference might make case delays in England and Wales more pronounced.

This chapter's analysis of court closures enriches the literature on court congestion. Although the court-level determinants (e.g., number of court staff) of case duration have been discussed at length in the literature (e.g., Zeisel *et al*. 1959; Landes 1971; Beenstock and Haitovsky 2004; Espasa and Esteller- Moré 2015), perhaps due to the lack of actual practices of court closures, the effects of courts' buildings on case duration have only emerged in the last decade. One of the fewer pieces of literature, i.e., Espinosa *et al*. (2017), attempted to investigate the impacts of court closures on the case duration of nearby courts. However, their studies were conducted at the court level and failed to control the cases transferring between courts within the same judicial territory in their analysis of aggregate-level effects. My analysis at the PFA level complements studies on the influences of court closures on judicial territories. Besides, as suggested by Voigt (2016), nation-across studies are helpful in implying the efficient way to deal with court congestion with limited resources as we can learn different findings from the diversified practices across countries. My study can also contribute to solutions for court congestion by discussing the consequences of court closures in England and Wales.

This chapter also addresses the importance of investigating the case duration of different procedures. The different procedures of case duration involve different agents and could be affected by different determinants (Vereeck and Mühl 2000), but much literature seems only to focus on trial duration (e.g., Desrieux and Espinosa 2019; Coviello *et al*. 2018) or does not distinguish procedures of case duration (e.g., Espinosa *et al*. 2007; Vita 2010; Cammnitiello *et al*. 2017). A possible reason is that the literature data source often does not provide case

duration by procedures (Vereeck and Mühl 2000). Another reason might be that most of them only focus on civil courts (e.g., Desrieux and Espinosa 2019; Espinosa *et al*. 2017; Chappe and Obidzinski 2013). Unlike criminal courts, civil courts less frequently involve the performance of other judicial departments, such as police and prosecutors. Thus, the trial duration could become the main concern in their research. Using the Timeliness Statistics at Police Force Area first released by MOJ in 2019 in England and Wales, this chapter addresses that case duration of different procedures in criminal courts can be determined by different factors.

4.1.2 Strategy

To analyse the link between court closures and case delays, I use the Magistrates' Courts number data and court timeliness data mentioned in Chapter 3. By using court timeliness statistics published in 2019 by MOJ, we can overcome the widespread inability (European Network of Councils for the Judiciary 2012) in the literature to break down the case duration by procedures through the justice system. In addition to court closures, my analysis also considers the case-level determinants of case delays, such as caseload pressure and case complexity. The caseload pressure on courts is indicated by the total number of defendants collected from MOJ. The case complexity is also implied using data from the MOJ, including what name the defendant has been charged with, what type of the defendant is (person or company etc.), and how many guilty pleas have taken place. The statistics collected in this chapter are quarterly panel data for 42 PFAs from April 2010 to December 2020. As mentioned in Chapter 3, such panel data can provide us with a large enough sample size while controlling the cases transferring between courts after court closures. By studying the impacts of court closures on the judicial territories (i.e., PFAs) to control case transferring, this chapter may overcome the problem that significant case delays at the national level failed to be noticed in Espinosa *et al*.'s (2017) court-level study.

I intend to employ a TWFE OLS approach to investigate the statistical relationship between court closures and court delays. This approach allows my analysis to examine the statistical correlation between court closures and case delays while controlling the area characteristics (e.g., work patterns of court staff) and policy changes (e.g., SJP and ATCM). In the model specifications, variables are

seasonally differenced because the case duration may have a seasonality. The caseloads for courts fundamentally come from crimes, and crimes themselves are highly seasonal (Draca *et al*. 2011). Different criminal cases in different seasons may make case duration seasonal. Thus, this chapter analyses the correlations between seasonal changes in courts and seasonal changes in case duration.

My TWFE OLS estimates show that there is indeed a significant relationship between Magistrates' Court closures and delays in Magistrates' court cases. If a PFA's courts are closed by 1%, the entire case duration from crime committed to case completion is delayed by 0.1 days. This finding confirms the concerns expressed in government reports that court closures may lead to delays in cases. My research also suggests that delays accumulate for about three quarters after court closures, increasing the risk that delays may persist. Of the found delay of 0.1 days, 0.06 days can be attributed to the time spent waiting for court hearings after being charged. This may be due to court closures increasing burdens on courts by reducing court hearing rooms and staff. In addition, I also find that the second court project (ERP) could have more significant impacts probably because the influences of ERP are superimposed on the influences of the first project (CERP). In other words, the overburden caused by court closures might threaten the entire case duration by affecting specific activities in the criminal justice system.

The following of this chapter is organised as follows: Section 4.2 relates this chapter to the literature on court congestion, introduces the development of studies on case duration, discusses the existing literature on the link between court closures and case delays, and introduces other determinants of case duration; Section 4.3 introduces the applied empirical strategy, lists variables from the built panel database, displays the summary statistics of variables, explains the using of TWFE OLS approach and the exogeneity hypothesis, and presents adjustments and controls in the model specifications; Section 4.4 lists the findings, such as the impacts of court closures on the entire case duration, differences in procedures of case duration, the accumulation of case delays, and the potential superimposed effects of court projects; Section 4.5 is the conclusion section highlighting the main findings and policy implications.

4.2 Literature on court congestion

4.2.1 Development of studies on case duration

The study of delay in case duration is a branch of literature on court congestion (see figure 4.1). It is an ongoing problem and has attracted attention since the late 1950s (Priest 1989). Much research pays attention to reasons for case delays to deal with the congestion of caseloads in courts (e.g., Zeisel *et al*. 1959; Landes 1971; Priest 1989; Posner 1993; Vereeck and Mühl 2000; Torre 2003; Jonski and Mankowski 2014; Vita 2010).

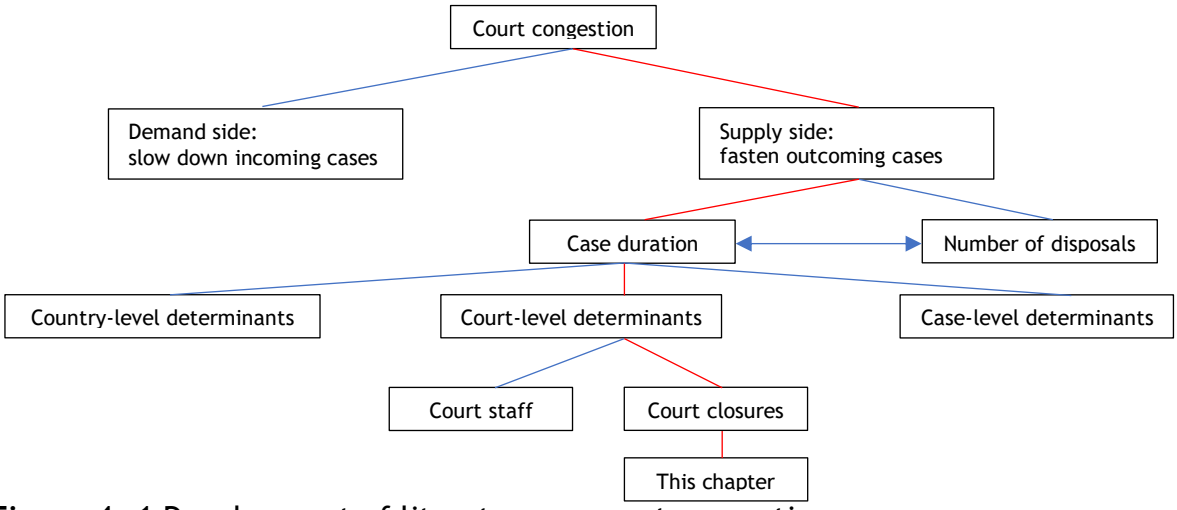


Figure 4. 1 Development of literature on court congestion.

Zeisel *et al*. (1959) is an early theoretical work providing a logjam metaphor to deal with court congestion. In the logjam metaphor, a court is compared to a lake, and the caseloads are compared to logs floating on a lake. The logjam exists in a lake when the rate of logs flowing into a lake exceeds the rate of logs flowing out. In other words, Zeisel *et al*.'s (1959) logjam metaphor suggests that court congestion could exist when the incoming rate of caseloads exceeds the outcoming rate. Literature after Zeisel *et al*. (1959) can be summarised into supply-side and demand-side considerations under the logjam metaphor. The supply-side literature investigates the incoming rate of caseloads (e.g., Vita 2012; Beenstock and Haitovsky 2004; Bielen *et al*. 2015), and demand-side literature investigates the outcoming rate of caseloads (e.g., Landes 1971; Priest 1989; Vereeck and Mühl 2000). Supply-side literature is usually empirical works studying determinants of

court productivity. In contrast, demand-side literature is usually theoretical works that study incentives for court users to bring cases to courts.

The study of case duration sits with supply-side literature studying court productivity. There are two common measurements for court productivity in the literature, including case duration (e.g., Vita 2010; Vita 2012; Bielen *et al*. 2015; Bielen *et al*. 2018; Cammnitiello *et al*. 2017; Gianfreda and Vallanti 2020; Smuda *et al*. 2015; Derieux and Espinosa 2019; Coviello *et al*. 2018; Espinosa *et al*. 2017) and the number of disposals of caseloads (e.g., Landes 1971; Bielen *et al*. 2018; Beenstock and Haitovsky 2004; Espasa and Esteller-Moré 2015; Gomes *et al*. 2016; Voigt 2012). Literature measuring court productivity by case duration usually cares more about the timeliness of courts. For example, Vita (2010) was interested in whether more complicated laws cause a delay in case duration. In contrast, literature measuring court productivity by the number of disposals usually pays more attention to the output of courts. For instance, Beenstock and Haitovsky (2004) were interested in whether more judges increase the number of disposals. However, the case duration and number of disposals could be related, e.g., if other factors are consistent, there are more disposals in a certain time when cases are disposed of sooner.

Among studies on case duration, fewer empirical works investigate the case duration of criminal courts (e.g., Castelliano *et al*. 2020). Many of them pay attention to the case duration of civil courts (e.g., Vita 2010; Bielen *et al*. 2015; Cammnitiello *et al*. 2017; Gianfreda and Vallanti 2020; Espinosa *et al*. 2017). The reason behind this might be the lack of data. Considering even for the civil courts, the complete statistics of case duration are not available everywhere (European Network of Councils for the Judiciary 2012), it might be more difficult to have complete statistics for criminal courts as the case duration here involves more procedures which can be more difficult to monitor. The criminal courts and civil courts may share the same literature on the duration of some procedures, like the trial procedure and the waiting procedure for hearings, because these procedures involve the same agents (e.g., judges and other court staff). For instance, the determinants of trial duration were not distinguished between criminal courts and civil courts in Voigt's (2016) survey of determinants of case duration. However, the civil court data usually includes the waiting duration in the trial duration

(Vereeck and Mühl 2000), which does not allow scholars to investigate the waiting procedure separately. The waiting duration should be considered a genuine court delay because it depends on the courts themselves (ibid.). Thus, more studies distinguishing procedures of case duration seem to be desired.

England and Wales do not seem to have attracted enough attention from scholars studying case duration. Given that the local-level timeliness statistics in England and Wales were not published until recently in 2019, the lack of data could be a reason for the gap. A large number of empirical works have been conducted in other countries such as French (e.g., Desrieux and Espinosa 2019; Espinosa *et al.* 2017), Italy (e.g., Vita 2010; Vita 2012; Cammnitiello *et al.* 2017; Gianfreda and Vallanti 2020; Coviello *et al.* 2018), Belgium (e.g., Bielen *et al.* 2015), Spain (e.g., Espasa and Esterller-More 2015), Israeli (e.g., Beenstock and Haitovsky 2004), and Brazil (e.g., Gomes *et al.* 2016; Castelliano *et al.* 2020). The importance of cross-country studies was emphasised when Voigt (2016) compared literature from different countries. The studies across countries where judiciary inputs and outputs vary widely could inform us of efficient ways to deal with case delays using limited resources.

Although different empirical methodologies are applied to investigate different determinants by literature, the OLS methodology still seems to be the most frequent choice (Voigt 2016). The possible reason is that OLS is simple and efficient in dealing with statistical relationships in panel data, especially when there is less likely to have endogeneity issues. For instance, OLS methodology is applied to investigations of determinants such as complexity of laws (e.g., Vita 2010; Vita 2012), number of judges (e.g., Beenstock and Haitovsky 2004), and number and complexity of cases (e.g., Bielen *et al.* 2015). Even when there might be an endogeneity issue, the OLS methodology is also one of the choices for the robustness test. For example, in a closer work investigating court closures in French, Espinosa *et al.* (2017) applied a 3SLS methodology and an OLS methodology to tackle impacts on case duration. It is found that estimations from 3SLS are close to that from OLS methodology.

4.2.2 Courts and case delays

Although much literature has discussed the court-level determinants of case duration, such as the number of courts (e.g., Espinosa *et al*. 2017), the number of judges (e.g., Beenstock and Haitovsky 2004), the number of judge assistants (Gomes *et al*. 2016), and the number of temporary judges (e.g., Espasa and Esteller-Moré 2015), I could only find two works discussing the impacts of court closures on case duration including one empirical work (i.e., Espinosa *et al*. 2017) and one theoretical work (i.e., Chappe and Obidzinski 2014).

Espinosa *et al*. (2017) from France presented themself as the first attempt to investigate court closures, but closures in France differ from closures in England and Wales. It was found by Espinosa *et al*. (2017) that the case duration in a nearby court increased significantly after the closures. The annual panel data at the court level of four years before and after closures was collected in their analysis, and methodologies including 3SLS and OLS were applied to overcome the potential endogeneity issue. The potential endogeneity issue was addressed in France. The closed courts dealt with a fewer number of cases before closures. So, the number of cases can be correlated with case duration and cause reverse impacts on the decision to a court. While they raised the possibility that this endogeneity may exist, the potential endogeneity did not seem to have an effect on their results. It was established that estimates from the 3SLS methodology provided the same results as the OLS methodology that a closed court could bring delays in case duration to nearby courts receiving the transferred burdens of caseloads.

In Espinosa *et al*. (2017), the estimates from court-level data only found impacts at the court level but failed to notice the aggregate impacts at the national level. Espinosa *et al*. (2017) only introduced the judiciary territory in investigating court-level impacts by measuring court closures by whether a nearby court of remaining courts within one territory was closed or not. At the national level, Espinosa *et al*. (2007) distinguished the after-closure periods by dummy variables and found that case duration in remaining courts did not increase significantly after closures, which did not consider the judicial territory. As I addressed in Section 3.1.1, considering the judicial territory in the analysis is important because courts usually share the burdens of closed courts within the same judicial territory. The impacts

on judicial territories could be different given that a different number of courts are closed at different timings, which may not be visible at the same time at the nation-level analysis if the judicial territory is not considered. It might be the reason why they only found significant court-level impacts but not nation-level impacts. Their results showed that both the 3SLS and OLS estimates suggested a significant increase in the case duration of a court following the closure of a nearby court within the same territory. And the impacts on a remained court in the same territory would be more considerable if the closed courts dealt with more cases before closures.

4.2.3 Other determinants of case duration

Other determinants of case duration addressed in the literature could be summarised as other court-level determinants (e.g., court staff), case-level determinants (e.g., case complexity and caseload pressure), and country-level determinants (e.g., law complexity and court system specialisation).

The court staff could include judges, judge assistants, and temporary judges. The number of judges is considered as an input of court productivity in the logjam metaphor of Zeisel *et al*. (1959). However, existing findings tend to suggest that increasing the number of judges does not necessarily reduce court congestion. In Israel, Beenstock and Haitovsky's (2004) OLS regressions conducted at the court level with annual observations between 1965-1995 showed insignificant links between the number of serving judges and civil/criminal case disposals. Similar empirical evidence was provided by Vita (2012). As a control variable in Vita's (2012) FE OLS regressions, judge number was found to be insignificantly related to case resolving in Italy. In Beenstock and Haitovsky's (2004) theoretical works conforming to the utility theory (e.g., Landes 1971), it was explained that the few caseload pressures as a result of more judges could reduce judges' incentives to work. Increasing judge assistants might be an alternative to reduce case delays because they help with document management and trial preparation but do not share judges' pressure. The empirical evidence was established by Gomes *et al*. (2016). Gomes *et al*. (2016) collected observations from all 27 Brazilian state courts from 2003 to 2012. Their pooler and FE OLS regressions found that more judge assistants could significantly increase resolved cases per judge. In addition,

increasing temporary judges seems to be another alternative. It was implied by Espasa and Esteller-Moré (2015) that temporary judges may have more substantial incentives than permanent judges. Their panel data contained 1,036 observations from Spanish civil courts of the first instance in 2005-2013. It was noticed in FE OLS regressions that the increase in the proportion of temporary judges could significantly increase resolved cases. Landes (1971) might explain that temporary judges usually wish to earn a career reputation in the temporary hiring period to raise the opportunity of future employment and thus tend to be more active in case resolving than permanent judges.

In addition, literature tends to suggest that more complex cases are associated with longer case duration. Although much literature studies civil case duration and thus does not provide measurements of criminal case complexity, measuring criminal case complexity by crime groups[18] might be close to measuring civil case complexity by case categories. Among studies measuring civil case complexity by case categories, Bielen *et al.* (2015) divided tax cases into personal tax (more complicated) and other tax cases (less complicated) and divided construction cases into liability (more complicated) and non-liability (less complicated) cases. Their case-level OLS regressions noticed that the personal tax cases took longer time than other tax cases significantly, while the time taken for liability and none-liability cases had no significant difference. The insignificant findings on construction cases could be due to the limited sample sizes because liability cases only account for 7 out of 89 collected cases. There is also evidence from other measurements. For instance, in Smuda *et al.*'s (2015) study with 263 Cartel dispute cases of breakdown in the European Appellate Court between 2000-2012, the case complexity was measured by the time gap between the breakdown was noticed and the case was actually investigated. It was argued that the longer the time gap was, the more difficult it was to gather respective proof for the case. Their OLS results displayed that the time gap could significantly delay the time taken for the court to review cases. In addition, the complexity of constructive cases was measured by a project size referring to the reserve price of a project in Coviello *et*

[18] In the literature on crime (e.g., Britt 1997; Levitt 2002; Arvanites and Defina 2006; Evans and Owens 2007), the criminal case complexity is usually distinguished by crime groups such as violent and theft crime etc.

al. (2018). By examining 40,521 civil cases collected between 2000-2006 in Italy, their FE OLS results showed that the reserve price of a construction project could significantly delay trial duration.

The findings on the caseload pressure tend to be mixed in the literature. For example, collecting the number of pending cases from the Supreme Court, District Court, and Magistrates' Court in Israel between 1965-1995, Beenstock and Haitovsky's (2004) FE OLS regressions showed that pending cases were unrelated to judges' productivity. However, collecting the number of incoming cases from 4 Italian state courts between 2000-2005, Vita's (2010) FE OLS regressions revealed that pending cases were minorly but positively related to case duration. To learn more about caseload pressure, scholars may need to be aware that the total caseloads of the court are a summary of incoming and pending cases. Judges may have different preferences for them, and thus findings on them could be different. For example, it was found in Cammnitiello *et al.*'s (2017) partial least squares regressions that pending cases were negatively correlated with case duration, but incoming cases had a stronger positive relationship with case duration.

Literature has examined the impacts of law complexity and court system specialisation on case duration. The different findings tend to address the importance of considering which procedure in court is likely to be affected when investigating country-level changes and whether these changes bring additional issues. In Italy, the complexity of laws was found to have different effects on the duration of different procedures (e.g., Vita 2010; Vita 2012). Vita (2010) measured the complexity of laws by the numerical sum of employed laws motivating a judgement, and less employed laws may boost court productivity by simplifying court procedures. Since Vita's (2010) FE OLS regressions were conducted at the state level, only 120 observations were collected between 2000-2005 from 4 Italian states. It was found that an increase in the number of employed laws could significantly produce a rise in the average duration of civil proceedings. However, the small sample might limit Vita's (2010) establishments. In the same nation, with a unique database providing a larger sample size, Vita (2012) randomly collected 800 judgements information between 2000-2007 from 20 Italian regions. Besides, Vita (2012) adapted an ordinary variable to measure law complexity at the case level. It was found that the complexity of laws could delay

the time required to decide the dispute but have no impact on the dispute duration itself. Introducing expert experience in Belgium seems to be helpless to reduce case delays as it added extra procedures in courts (e.g., Voigt 2012; Bielen *et al.* 2015). Voigt (2012) contributed to studies on court system specialisation by first employing the number of administrative courts as a measurement. It was assumed that if more administrative courts could provide a higher degree of court specialisation, judiciary staff might become experts in dealing with specific cases or procedures. At the constitution level, 85 observations were collected from 27 common-law countries. However, the OLS results in Voigt (2012) displayed that the existence of an administrative court reduced court productivity. Instead of using the number of administrative courts to indicate expert experience, the involvement of experts was directly measured by a dummy variable in Bielen *et al.* (2015). In Belgium, the involvement of experts required additional court procedures such as appointing an expert for a case, an inaugural meeting of the expert and waiting for the experts' final report. With a unique dataset of 174 civil court cases, it was found that the overall case duration would rise significantly if an expert was involved in guiding a specific judgment. The introduction of expert experience in Brazil seems can reduce case delays (e.g., Castellino *et al.* 2020). The Brazilian Federal Courts gained expert experience by setting up specific offices for different cases. The office specialisations were measured by dummy variables in Castellino *et al.*'s (2020) least squares dummy variable regressions. Using around 150 thousand cases in 2017, they found that court specialisation could reduce case duration when court offices were either fully or partially specialised in case procedure. While if offices were not specialised in case procedures at all, the case issues must be fully specialised to reduce case duration.

4.3 Empirical strategy

4.3.1 Data description

I intend to use the built panel database (see Chapter 3) to analyse the relationship between court closures and case duration. In addition to the number of Magistrates' courts and case duration, the analysis of this chapter also considers case-level information such as the total number of defendants, defendant ratio by

crime groups, ratio of non-person defendants, and ratio of guilty pleas during a trial (see table 4.1). It is discussed in the literature reviews (Section 4.2) that the case-level information, such as caseload pressure and case complexity, are also determinants of case duration.

Table 4. 1 Variables in the analysis of case duration

Variables	Definitions
Entire case duration:	Average days taken for a defendant from offence to completion.
Pre-charge duration:	Average days taken for a defendant from offence to charge.
Waiting duration:	Average days taken for a defendant from charge to first hearing.
Trial duration:	Average days taken for a defendant from first hearing to completion.
Number of Magistrates' Court:	The number of Magistrates' Court remained open by the end of a period.
Total number of defendants:	The total number of defendants whose cases are completed in a period.
Defendant ratio by crime groups:	The ratio of defendants charged for a specific crime group to total number of defendants.
Ratio of non-person defendant:	The ratio of non-person defendants (e.g., company, public bodies etc.) to total number of defendants.
Ratio of guilty pleas during a trial:	The ratio of guilty pleas made during trial to total number of listed trials.

Several stylised facts can be noticed from the case-level information. Table 4.2 shows that defendants committing summary offences[19], i.e., none-motoring and motoring offences, account for the largest proportion (77%) of total defendants in Magistrates' Courts. During the triable-either-way offences[20], the theft crime is the most frequent (9%) group of crimes heard by Magistrates' Courts. For more serious crimes such as robbery, violent, and sexual crimes, the violent crimes entering into Magistrates' Courts changes more than twice (3%) of the other two (1.3%). Although some of these control variables (e.g., defendant ratio by crime groups) could be endogenous, the potential endogeneity could have fewer impacts on the estimated impacts of court closures if the estimates of court closures remain consistent as the control variables are added stepwise.

[19] The summary offences are less serious crimes, and they usually should be only completed by Magistrates' Courts.

[20] The triable-either-way offences are crimes that can be either purely completed in Magistrates' Courts or passed to crown courts if they serious enough.

Table 4. 2 Summary statistics of the analysis of case duration

Spatial level: 42 PFAs **Time frequency and interval:** quarters between April 2010 to Dec 2019					
Variables	**Obs.**	**Mean**	**Std. Dev.**	**Min**	**Max**
Dependent variable (days):					
Entire case duration	1,638	156	25	98	584
Pre-charge duration	1,638	98	20	41	459
Waiting duration	1,638	37	10	19	107
Trial duration	1,638	21	7	3	47
Explanatory variable:					
Number of Magistrates' Courts	1,638	5	3	1	34
Control variables:					
Total number of defendants	1,638	8,677	9,680	1,412	77,233
Defendant ratio by crime groups:					
Violence against person	1,638	3.0%	0.9%	0.6%	7.1%
Sexual crimes	1,638	0.8%	0.3%	0.1%	2.1%
Robbery	1,638	0.5%	0.3%	0.0%	2.0%
Theft crime	1,638	9%	3%	1%	20%
Possession of weapons	1,638	1.0%	0.4%	0.2%	2.8%
Miscellaneous crimes against society	1,638	3%	1%	0%	9%
Public order crimes	1,638	1.2%	0.4%	0.2%	2.7%
Fraud crimes	1,638	1.0%	0.4%	0.2%	2.7%
Drug crimes	1,638	3.6%	1.3%	0.4%	9.6%
Criminal damage and arson	1,638	0.4%	0.3%	0.0%	2.4%
None-motoring offences	1,638	35%	11%	8%	84%
Motoring offences	1,638	42%	11%	6%	79%
Ratio of none-person defendant	1,638	0.8%	0.5%	0.0%	3.6%
Ratio of guilty pleas during trials	1,638	23%	5%	9%	36%

4.3.2 Methodology

I intend to employ the TWFE OLS approach to investigate if court closures delay case duration. This approach enables this study to examine the statistical relationship between court closures and case delays while controlling area characteristics (e.g., working patterns of court staff) and policy changes (e.g., SJP and ATCM). The area characteristics can include the working patterns of court staff in different PFAs. As addressed in the literature (e.g., Beenstock and Haitovsky 2004; Vita 2012; Gomes *et al.* 2016; Espasa and Esteller-Moré 2015), different court staff could affect case duration differently. In addition, policy changes can affect activities of procedures in the criminal justice system (e.g., Vita 2012; Voigt 2012; Castellino *et al.* 2020), such as the abolition of committal proceedings and the implementation of SJP and ATCM noticed in England and Wales (mentioned in Section 2.4.2), which may influence case duration. Besides, OLS is the most frequent approach employed by literature on court congestion (Voigt 2016), considering it is simple and efficient. A positive relationship

between court closures and changes in case delay could imply that court closures could delay case duration.

Although Espinosa *et al.* (2017) assumed there could be an endogeneity issue between a court's case duration and closure in France due to the closed court dealing with fewer cases, I have addressed in Section 2.5 that selecting closed courts in England and Wales are more likely to be irregular. Even if the utilisation rates of a court are correlated with the decision to close the court in England and Wales, the endogeneity problem is less likely to exist in my PFA-level studies. This reason is that the endogenous correlation may only affect which court is closed at the court level but not how many courts are closed at the PFA level. I have shown summary statistics of court closures in table 3.2 that average, around 50% of courts were closed in each PFA in England and Wales.

To strengthen my argument, I uniquely achieved data on utilisation rates from the Ministry of Justice to compare court closures of PFAs with average utilisation rates of PFAs. The achieved data includes annual available hours and utilisation of hours of 336 hearing venues of Magistrates' Courts from April 2015 to Dec 2020[21]. By comparing the name of hearing venues, 304 hearing venues are matched to my collected data of Magistrates' Court number. The collected available hours and utilisation of hours of the 304 hearing venues are used to calculate the average utilisation rates[22] of 42 PFAs. Although the provided data is incomplete[23], it is still the best available data allowing us to analyse the relationship between the closures of courts and utilisation rates of courts in PFAs.

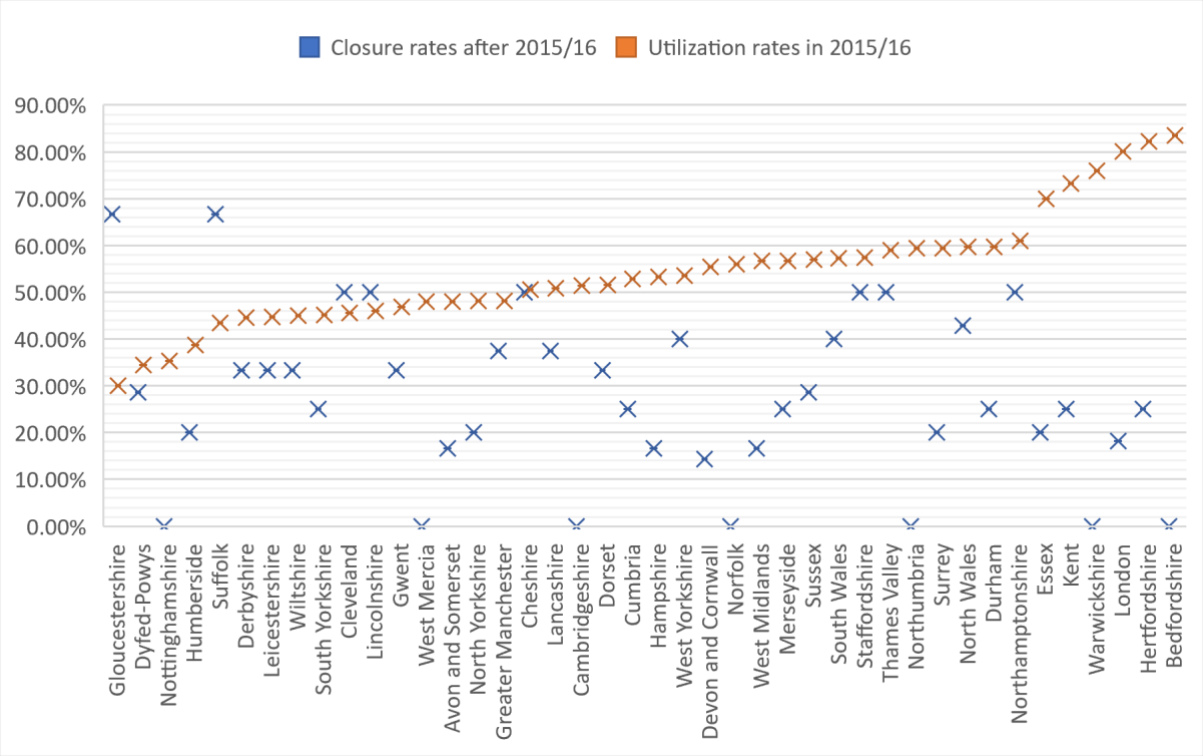
Figure 4.2 supports my argument and shows that court closures and average utilisation rates of courts tend to be unrelated at the PFA level. The average utilisation rates of courts of 2015/16 in 42 PFAs are listed in order of size in figure 4.2. It can be noticed that there is unlikely a certain correlation between the utilisation rates of courts and closure rates of courts at the PFA level. The PFAs

[21] More precisely, the data covers five periods, which include April 2015 to March 2016, April 2016 to March 2017, April 2017 to March 2018, April 2018 to March 2019, and April 2019 to December 2019.

[22] The utilisation rates are calculated by dividing the hours of utilisation by the available hours.

[23] The provided data was sourced from a live management information system, and it has not been subjected to the same level of checks as official statistics. Additionally, the data may contain inaccuracies inherent in any large-scale case management system. Furthermore, estimates for some courts and for financial years before 2015-16 are missing.

having relatively low utilisation rates could experience either large closures (e.g., Gloucestershire PFA and Suffolk PFA) or low closures (e.g., Humberside PFA and Nottinghamshire PFA). Vice versa, PFAs with relatively high utilisation rates could experience either large closures (e.g., Northamptonshire PFA and Thames Valley PFA) or low closures (e.g., London PFA and Warwickshire PFA) as well. Therefore, the addressed endogeneity issue is less likely to exist in my analysis.



- The closure rates represent the per cent changes in court number between 2016/17 and 2019/20.

Figure 4. 2 Court closures and utilisation rates

To further strengthen my argument that case duration is unlikely endogenous with court closures in this analysis, a two-stage least-squares (2SLS) approach is included as a comparative test in this chapter. The design and results of the 2SLS approach can be found in Appendix C.

4.3.3 Model specifications

I employ a TWFE OLS approach to design model specifications to examine court closures and case duration. The model specifications are as follows:

$$\Delta_4 CaseDuration_{it} = \beta_0 \,|\%\Delta_4 lnCourtNumber|_{it} + PFA_i + Quarter_t + \lambda_1 \Delta_4 defendant\_ratio_{it} + \lambda_2 \%\Delta_4 DefendantNumber_{it} + \lambda_3 \Delta_4 none\_person_{it} + \lambda_4 \Delta_4 guilty\_plea_{it} + \varepsilon_{it} \quad (4.1)$$

Where the i represents a specific PFA, the t indicates a specific period of quarters. The Δ_4 means the changes between four periods[24] (or seasonal difference), and the $\%\Delta_4$ means the per cent changes between four periods[25]. The dependent variable, $\Delta_4 CaseDuration$, mainly implies the changes in the entire case duration between four periods, and could also imply the changes in pre-charge duration, waiting duration, and trial duration, respectively. The explanatory variable, $|\%\Delta_4 CourtNumber|$, is the absolute value[26] of per cent changes between four periods in Magistrates' Courts numbers. The PFA is the area-fixed dummy variable of 42 PFAs, and the $Quarter$ is the time-fixed dummy variable of periods (quarters). And other control variables, $\Delta_4 defendant\_ratio$ is the changes between four periods in the ratio of defendant number by crime groups, $\%\Delta_4 DefendantNumber$ is the per cent changes between four periods in total defendant number, $\Delta_4 none\_person$ is the changes between four periods in the ratio of none-person defendants, $\Delta_4 guilty\_plea$ is the changes between four periods in the ratio of guilty pleas during the trial. The ε is a matrix of error terms of the regression. The β_0 is the interested coefficient, and a positively significant β_0 implies court closures can delay case duration.

I measure variables by changes between four periods (or seasonal differences) to control the possible seasonality in case duration. The values of case duration are timeliness statistics for crimes entering the justice system. The literature on court congestion suggests that complexity and number of cases could affect case duration (e.g., Bielen *et al*. 2015; Cammnitiello *et al*. 2017). Thus, the

[24] e.g., $\Delta_4 CaseDuration_{2019q4} = CaseDuration_{2019q4} - CaseDuration_{2018q4}$

[25] e.g., $\%\Delta_4 DefendantNumber_{it} = (DefendantNumber_{2019q4} - DefendantNumber_{2018q4}) / DefendantNumber_{2018q4} \times 100$

[26] Using the absolute value does not alter the estimates of the percentage changes in the number of courts, aside from their sign, because the number of courts in a PFA decreased monotonically between April 2010 and December 2019.

composition and the number of criminal cases entering the justice system can also affect case duration. The literature on crime reduction addresses that committed crimes could have a strong seasonality[27] (e.g., Draca *et al*. 2011), which could bring seasonality to criminal cases entering the justice system. Thus, the case duration of criminal cases might have seasonality as well. There could be several ways to control the seasonality. Firstly, we could control the factors causing seasonality, such as the composition of cases (e.g., Bielen *et al*. 2015) and the number of cases (e.g., Cammnitiello *et al*. 2017) using control variables. However, we may need help to control all the possible factors (e.g., work preference of court staff in different seasons) by controlling variables due to the unavailability of data. Alternatively, we could use time-fixed dummy variables to control the seasonality (e.g., Espinosa *et al*. 2017). While this alternative could be efficient, it will increase the roles of my time-fixed dummy variables. The model specifications have already used the time-fixed dummy variables to control the nation-level changes (e.g., SJP and ATCM)[28]. If we can relieve the time-fixed dummy variables from controlling seasonality in case duration, it would be helpful for us to control the impacts of nation-level changes more specifically. Therefore, finally, I intend to control the seasonality of case duration by seasonally differencing variables.

I measure court closures by per cent changes because PFAs have different court numbers before closures (as noticed in previous Chapter 3). It raises a concern about whether one closure causes the same impact on case duration in different PFAs. Let us discuss this concern through an example of two PFAs, i.e., Wiltshire PFA having three courts and London PFA having 34 courts before closures. The closure of a court is hypothesised to delay case duration by increasing caseloads burdens on courts remaining open in a PFA (e.g., Espinosa *et al*. 2017). Then, closing a court of the same size in the Wiltshire PFA and London PFA, the caseloads burdens of the closed court would be shared by the other two courts in Wiltshire PFA and the rest 33 courts in London PFA. Unless the total size of the two remaining courts in Wiltshire PFA is equal to the total size of the 33 remaining

[27] For example, there might be fewer burglary crimes in winter because the cold weather could reduce outdoor activities, leaving fewer opportunities for potential burglars.

[28] As suggested by the literature on court congestion, such as Vita (2012); Bielen *et al*. (2015), law complexity and justice system specialisation could affect case duration.

courts in London PFA, which is unlikely to be, the extra burdens for remaining courts in Wiltshire PFA would be more prominent than in London PFA. Therefore, measuring court closures by the numeral changes in court numbers could lead to biased influences across PFAs. To avoid such a bias, I use the per cent changes in court numbers to measure court closures. In addition, another group of numeral statistics, i.e., the total number of defendants, could bear a similar bias because different PFAs could have different defendants before closures. Thus, I also measure the changes in total defendant number by per cent.

The area-fixed (PFA_i) and time-fixed ($Quarter_t$) dummy variables control the linearly changing trend in the area (PFA) factors and the difference in nation-level policies between four periods (quarters), respectively. Since the variables are differenced, the specific constant features in a PFA, such as weather, environment, working patterns etc., could already be offset. If these factors have changing trends across periods, the trends would be controlled by the area-fixed dummy variables of 42 PFAs. Besides, the literature on court congestion, such as Vita (2012) and Voigt (2012) implies changes in law complexity and justice system specialisation could affect case duration. I intend to control these nation-level changes (e.g., SJP and ATCM) by the time-fixed dummy variables.

The $\Delta_4 defendant\_ratio_{it}$ is used to control the complexity of cases. Literature on court congestion indicates that case-level factors like case complexity (e.g., Bielen *et al*. 2015; Smuda *et al*. 2015) can also affect case duration. Although less literature studies criminal cases, we could use a category of criminal cases similar to literature on civil cases to measure criminal case complexity (e.g., Bielen *et al*. 2015; Coviello *et al*. 2018). The category of criminal cases, i.e., crime groups, could indicate the complexity of cases to some extent. For example, theft crimes might be less complex than violent crimes for judges to decide the sentence severity considering monetary values can more easily measure the loss caused by theft crimes. As my case duration data are based on defendant counts, I use the ratio of defendant numbers by crime groups to control the complexity of criminal cases.

I use $\Delta\%_4 DefendantNumber_{it}$ to control caseloads pressure in a PFA. The caseload pressure is another case-level determinant suggested by the literature on court congestion (e.g., Vita 2010; Cammnitiello *et al*. 2017). Literature tends to

control it by either the number of pending cases (e.g., Cammnitiello *et al*. 2017) or the number of incoming cases (e.g., Vita 2010). While we should be aware that the pending cases refer to caseloads left by the last period, and the incoming cases refer to new caseloads in the current period. There is less literature addressing which type of caseloads would be given priority to be dealt with. To control the potentially different preferences for pending and incoming cases to some extent, I intend to measure the total caseloads by the number of completed cases in a period. The number of completed cases results from the justice system's selection, and thus the different preferences tend to have been considered. A larger number of completed cases indicate that the justice system has dealt with larger caseloads in a period. As case duration data are based on defendant counts, I measure the caseload pressure by the total number of defendants of the completed caseloads in a PFA.

The $\Delta_4 none\_person_{it}$ and $\Delta_4 guilty\_plea_{it}$ are used to control the different types of defendants. Except for other nation-level and case-level determinants, the types of defendants may also affect case duration. It is suggested by Bielen *et al*. (2015) that cases involving non-person defendants (e.g., companies) may take a shorter duration because these defendants tend to have expert knowledge of laws and know the timing to withdraw cases to save cost, especially in civil cases. I use the ratio of non-person defendants to control the types of defendants. In criminal cases, while the defendants have no right to withdraw a case, they can decide to plead guilty. If a defendant pleads, a case could be completed sooner as it can save time on evidence preparation and trials. I control the defendants' decisions to plead by the ratio of guilty pleas during trials[29].

Despite this chapter's inability to control for the size of closed courts, guilty pleas before trial, and the salaries of magistrates due to data limitations, it considers the most important determinants of case duration, as addressed in the literature.

[29] We cannot control guilty pleas before trial due to the unavailability of data.

4.4 Results

4.4.1 Court closures and case duration

Table 4.3 reports our estimates of the influences of court closures on the entire case duration. I measure the court closures by the per cent changes in courts in a PFA to ease measurement bias due to different court numbers in PFAs. The positively significant estimates imply that closing Magistrates' Courts would delay the average criminal case duration in a PFA. The preciseness of estimates tends to be steady as the standard errors of the estimates of court closures are consistent across controls. In all regressions, differences in constant area factors of PFAs, such as environment, weather, and working patterns etc., were offset by time differencing the variables. In column (1), I include PFA FE dummies to control the linear trend in area factors and quarter FE dummies to control changes in nation-level policies (e.g., SJP and ACTM). In column (2), I additionally control for changes in case-level determinants such as case complexity, caseload pressure, and other potentially influential factors using the defendant ratio by crime groups, the ratio of the none-person defendant, the ratio of guilty pleas during the trial, and the total defendant number. The relatively low R^2 is probably because other controls, such as the salary of court staff, size of closed courts, and guilty pleas before trial, are not included due to the unavailability of data. I focus on the estimates from column (2) as these report a higher goodness-of-fit for the regression.

The estimate of court closures from column (2) indicates 1% closures of Magistrates' Courts is accompanied by 0.1 days delay in average entire case duration from crime committed to case completion in a PFA. On average, PFAs in England and Wales experienced a 50% closure rate of courts since April 2010, which is predicted to cause around five days of delay[30] in the entire case duration for each defendant. Considering there are an average of 8,677 defendants purely dealt with by Magistrates' Courts in a quarter between April 2010 and Dec 2019 across PFAs, the impact of the 43,385 days[31] (199 years) of delay is predicted to be distributed across each PFA per quarter following closures. If the delay also causes

[30] $predicted\ delay\ per\ defendant = 0.1 \times 50 = 5\ (days)$

[31] $43{,}285\ days = predicted\ delay\ per\ defendant \times number\ of\ defendants = 5 \times 8{,}677$

congestion in dealing with newly incoming cases, the delay impacts could be extended through an accumulation of pending cases.

Table 4. 3 Court closures and entire case duration

Dependent variables: Δ_4Entire case duration		
	(1)	(2)
Court closures in four periods (%)	.12*	.10*
	(.06)	(.06)
Linear trend in areas (PFA FE)	Yes	Yes
Difference in periods (Quarter FE)	Yes	Yes
Changes in case-level determinants	No	Yes
P-value of F-test	0.038**	0.000***
Adjusted R^2	0.0161	0.0658
Observations	1,470	1,470

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- Case-level determinants include Δ_4Ratio of defendant by crime groups, $\%\,\Delta_4$Total defendant number, Δ_4Ratio of None-person defendant, and Δ_4Ratio of guilty plea.
- The full estimates can be found in table A7.

I report a comparative test in Appendix C, where I attempt an additional 2SLS approach to compare estimates to the OLS approach. I introduce a measurement of the travelling time of court users to courts as the instrumental variable for court closures in a PFA. Table C3 shows that estimates from 2SLS and OLS regressions are generally similar, and the fitness of the two regressions is close. The results from a Hausman test report that the exogeneity hypothesis between case duration and court closures cannot be rejected.

4.4.2 Delay in waiting duration

To understand the mechanism of the delay impacts of court closures on case duration, I further study the influences of court closures on different procedures through the criminal justice system. Although I find that closing courts can delay the entire case duration, the mechanism by which court closures cause this delay remains unclear. As addressed in Section 3.4, the flow of a case through the criminal justice system could be separated into three procedures, i.e., pre-charge duration, waiting duration, and trial duration. Closing courts could influence the

three procedures differently as they involve different agents (e.g., police, prosecutors, and judges) and activities.

Table 4.4 reports the estimates of the impacts of closing courts on different procedures through the criminal justice system. By the sequence of a case through the criminal justice system, the pre-charge duration (columns 1a and 1b) refers to the procedure from crime committed to being charged, waiting duration (columns 2a and 2b) refers to the procedure from being charged to being firstly heard in a Magistrates' Court, and the trial duration (column 3a and 3b) refers to the procedure from being firstly heard to case completion. I find that only the regression estimates of waiting duration (columns 2a and 2b) are significantly positive, indicating closing courts tend to delay case duration by extending the procedure of waiting for the first hearing. The precision of the estimates remains steady as the standard errors of the estimates of court closures are consistent across controls. All regressions in table 4.4 have the same controls as the earlier regressions of the entire case duration, allowing them to be comparable to the earlier ones. The results show that the fitness of regressions of the three procedures also increases after controlling changes in case-level determinants. Although the R^2 is still not high, the fitness of regressions of waiting duration is relatively higher than that of the entire case duration. I focus on column (2b) as it has a higher fitness of regression than column (2a).

The estimated coefficient of court closures in column (2b) illustrates that if 1% of Magistrates' Courts are closed in a PFA, the average waiting duration of Magistrates' Courts' cases is predicted to be delayed by 0.06 days. The estimated delay impacts on waiting duration are smaller than impacts on the entire case duration. The estimated delay in waiting duration could explain around 60% of the estimated delay in the entire duration. The rest of the 40% of the estimated delay in the case duration may be related to pre-charge and trial duration. However, these impacts on the other two procedures might be too small to be significant.

The court closures delay the entire case duration through delaying waiting duration could be because the waiting duration largely depends on the availability of hearing rooms and magistrates. The waiting duration starts when a criminal case is charged. Once a case is charged, it suggests evidence has been considered enough, and the proposed sentence and the name of the charged case have been

considered proper by prosecutors. Thus, most pre-works before bringing the case to court likely have been completed. As required Ministry of Justice (2022), a case should be brought to a Magistrates' Court for the first hearing as soon as possible. A court would schedule a case in the waiting duration depending on the availability of hearing rooms and magistrates, and the case needs to wait for the hearing. It is discussed in Chapter 2 that the court closures in England and Wales contained a reduction in both hearing rooms and the number of court staff, including magistrates. Therefore, the court closures in England and Wales may directly delay the availability of hearing rooms and magistrates, which a defendant needs to wait. Although a reasonable delay might be necessary to ensure the quality of delivered justice (Woude 2012), given that the waiting duration unlikely involves any specific activities, delays in waiting seem unbeneficial.

Table 4. 4 Court closures and different procedures of case duration

Dependent variables:	Δ_4Pre-charge duration		Δ_4Waiting duration		$\Delta_4 T$rial duration	
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
Court closures in four periods (%)	.06 (.05)	.05 (.05)	.07** (.03)	.06** (.03)	-.01 (.01)	-.01 (.01)
Linear trend in areas (PFA FE)	Yes	Yes	Yes	Yes	Yes	Yes
Difference in periods (Quarter FE)	Yes	Yes	Yes	Yes	Yes	Yes
Changes in case-level determinants	No	Yes	No	Yes	No	Yes
P-value of F-test	0.196	0.007***	0.014**	0.000***	0.000***	0.000***
Adjusted R^2	0.0072	0.0251	0.0205	0.0764	0.0626	0.2366
Observations	1,470	1,470	1,470	1,470	1,470	1,470

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- Case-level determinants include Δ_4Ratio of defendant by crime groups, $\%\,\Delta_4$Total defendant number, Δ_4Ratio of None-person defendant, and Δ_4Ratio of guilty plea.
- Full estimates can be found in table A8.

The insignificant estimates from regressions of pre-charge duration and trial duration imply that the timeliness of the two procedures is less significantly affected by court closures. It is probably because the duration of the two procedures mainly depends on the performance of police, prosecutors, and judges, whose is indirectly affected by closures. However, it does not necessarily mean closing courts do not influence the two procedures. For example, in the pre-

charge procedures, police and prosecutors may investigate and charge fewer crimes[32] to help deal with court congestion problems. In trial procedures, fewer cases are being heard to ease the congestion problem to some extent.

4.4.3 Accumulation of case delays

The lagged court closures are examined to analyse if the case delays would accumulate. In earlier regressions, I find that closing courts can delay the entire case duration because defendants need to wait longer for hearings. Defendants' hearings may be postponed to subsequent quarters, thus accumulating delays. To detect how the impacts of delay might accumulate over time, I examined the lagged impacts of court closures.

Table 4. 5 Accumulation of case delays

Dependent variables: Δ_4Entire case duration					
Lagged impacts:	t	$t-1$	$t-2$	$t-3$	$t-4$
	(1)	(2)	(3)	(4)	(5)
Court closures in four periods (%)	.10*	.14**	.12*	.09	.02
	(.06)	(.06)	(.07)	(.07)	(.06)
Linear trend in areas (PFA FE)	Yes	Yes	Yes	Yes	Yes
Difference in periods (Quarter FE)	Yes	Yes	Yes	Yes	Yes
Changes in case-level determinants	Yes	Yes	Yes	Yes	Yes
P-value of F-test	0.000***	0.000***	0.000***	0.000***	0.000***
Adjusted R^2	0.0658	0.0668	0.0647	0.0596	0.0904
Observations	1,470	1,428	1,386	1,344	1,302

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- Case-level determinants include Δ_4Ratio of defendant by crime groups, $\%\,\Delta_4$Total defendant number, Δ_4Ratio of None-person defendant, and Δ_4Ratio of guilty plea.
- Full estimates can be seen in table A9.

Table 4.5 reports the estimates of court closures at five different timings, including the current quarter of closures and the next four quarters after closures. Control variables are fully included in all regressions. The results show that the delay in the entire case duration could accumulate by three-quarters from when courts were closed. During the three quarters, delay accumulation tends to be a reverse-U shape. If 1% of courts are closed in a PFA, the entire case duration will

[32] In England and Wales, the charge numbers (rates) decrease from 654,689 (16%) in 2010/11 to 415,003 (8%) in 2019/20, statistics from the Home Office.

delay by 0.1 days in the quarter of closures, and then, the delay will accumulate by 0.14 days in the next quarter and by 0.12 days in the second quarter after closures. After three quarters, the accumulation of delay pauses, and the entire case duration tend to reach a new equilibrium.

The changes in the burdens on courts may explain the reverse-U shape of the delay accumulation. In the same quarter of closures, the duration could be directly delayed due to the increased burden of cases transferred from closed courts. In the next quarter of closures, extra caseload pressure from the new incoming cases exacerbates the delay issue. In the second quarter after closures, courts adjust the timeliness of completing cases to the burdens of transferred and newly incoming cases. After three quarters post-closure, courts have developed a new pattern of case completion, and delay accumulation ceases.

Table 4. 6 Case duration in CERP and ERP

Dependent variables:	Δ_4Entire case duration			
Two court projects:	CERP		ERP	
	(1a)	(1b)	(2a)	(2b)
Court closures in four periods (%)	-.002	.03	.20***	.18***
	(.1)	(.1)	(.06)	(.06)
Linear trend in areas (PFA FE)	Yes	Yes	Yes	Yes
Difference in periods (Quarter FE)	Yes	Yes	Yes	Yes
Changes in case-level determinants	No	Yes	No	Yes
P-value of F-test	0.988	0.007***	0.000***	0.000***
Adjusted R^2	-0.0338	0.1236	0.0856	0.1548
Observations	672	672	798	798

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- Case-level determinants include Δ_4Ratio of defendant by crime groups, $\%\,\Delta_4$Total defendant number, Δ_4Ratio of None-person defendant, and Δ_4Ratio of guilty plea.
- Regressions ERP in this table does not include time interval Jan 2020 – Mar 2020 because the data of case duration is not available.
- Full estimates can be found in table A10.

4.4.4 Case duration in CERP and ERP

It is introduced in Chapter 2 that Magistrates' Courts in England and Wales are closed according to two projects, i.e., CERP between April 2010 and March 2015 and ERP between April 2015 and March 2020. If the case delays can accumulate, the closures in ERP might have more significant effects as its impacts could be

superimposed on the impacts of CERP. Therefore, I intend to study the two projects separately to address if ERP can bring superimposed effects on CERP.

Table 4.6 reports the estimates of regressions of the two court projects. Controls are included gradually in the regressions of the two projects. The results show that estimates of court closures from regression of ERP are more significant than that from CERP. The findings may indicate that court closures in the following project (ERP) could bring superimposed effects on the early project (CERP).

4.5 Conclusion

Whether current delays are beneficial for the quality of trials has become a frequent concern for the policy of court closures among European countries since the 2000s (European Network of Councils for the Judiciary 2012). Among them, England and Wales closed 51% of Magistrates' Courts during 2010/11-2019/20, accompanied by 22% delays in case duration. However, concerns about the link between court closures and case delays still stay in reporting stage, lacking empirical evidence. Based on the hypothesis that court closures can increase the court's caseload burden, thereby causing case delays, this chapter investigates the impact of court closures on such delays. My analysis enriches the literature on court congestion by providing evidence from England and Wales, where less attention is paid. Besides, my PFA-level research fixes up the insufficiency of Espinosa *et al.*'s (2017) court-level study, which could not find significant aggregate-level influences. Additionally, my study highlights how court closures can impact various activities within different case duration procedures, contributing to the existing literature.

Based on timeliness statistics recently published in 2019 by MOJ and a unique data source of the number of Magistrates' Courts, this chapter examined the link between seasonal changes in courts and seasonal changes in case duration in PFAs between April 2010 and December 2020. After controlling caseloads pressure, case complexity, area characteristics, and policy changes, my OLS estimates confirmed that there could be a significant correlation between closures of Magistrates' Courts and delays in cases completed in Magistrates' Courts. When court numbers in a PFA are reduced by 1%, the average time between the crime committed and case completion could be delayed by 0.1 days in a quarter. Considering an average

of 51% court closures in PFAs and an average of 8,677 defendants per quarter between 2010/11 and 2019/20, a PFA is predicted to share a person's 43,285 days (199 years) delays each quarter. Rather than disappearing of its own accord, the delay would accumulate for three-quarters after courts were closed. Including the accumulation of delays, 51% of court closures are predicted to delay case duration by around 18 days between April 2010 and March 2020, explaining around six-tenths of the real data. Of the total delays, about 60% occur while the court users wait for a court hearing. Given that the closures of courts' hearing rooms were accompanied by a reduction in magistrates (57%) and other staff, the main reason behind this is likely to be the reduction in hearing rooms and the shortage of court staff. In addition, I found that closures in ERP could have more significant effects than closures in CERP, indicating the following project of court colures might have superimposed effects on the early project.

My analysis provides a visible numerical value for the government's concern about the link between court closures and case delays, thereby more intuitively evaluating the risk of delays. Considering the total delays to a PFA, court users may suffer various harms from case delays. For example, delayed justice may jeopardise victims' recoveries, and innocent defendants may be delayed in getting their lives back to normal. These effects can result in reduced well-being and economic stagnation at the societal level. Among other things, my findings suggest that delays due to court closures occur in the waiting duration rather than in arresting a criminal, searching for evidence, and trials where the quality of work is essential. It indicates that case delays caused by court closures are likely unbeneficial, rendering the damage suffered by the delay unduly and unreasonable. Furthermore, the additional 77 court closures proposed by the government could lead to more severe consequences if they impose compounded effects on prior projects.

Although I have considered case-level and country-level determinants in analysis, other court-level determinants, such as the number of magistrates, other court staff, and their salaries, seem to be unavailable at the local level. Should these data become available, future research could incorporate them to explore potential improvements in the fit of the regression models.

5 Do Court Closures Reduce Charges?

5.1 Introduction

Prosecutors are often the final arbiter of whether to charge in common law jurisdictions (Ligeti 2019; Albonetti 1987; Reinganum 1988; Ulmer *et al*. 2007; Shemer and Jonson 2010; Kingsnorth *et al*. 2022 etc.). In England and Wales, too, the Police refer criminal cases to the Crown Prosecution Service, which then makes the final decision on whether the case should be charged. Prosecutors' important role in the justice system makes it particularly important to understand prosecutors' selection of charges because it will directly affect whether justice is fairly delivered to the victims in practices (Rasmusen *et al*. 2009).

Research into what sharp declines in charges over the past decade has become urgent in England and Wales. The administrative statistics from HO show that total charges in England and Wales fell from 654,689 in 2010/11 to 415,003 in 2019/20. This substantial reduction is unlikely attributable to crime changes, as the charge rates also fell from 16.05% in 2010/11 to 8.29% in 2019/20. Although the HO report offers explanations such as evidence collection becoming more difficult and crime becoming more complex, these explanations could have shortcomings. Few have yet raised the hypothesis that the decline in charges could be related to the 51% closures of Magistrates' Courts over the same period.

5.1.1 Hypothesis

Based on the literature on prosecutorial discretion, I developed a hypothesis that prosecutors can become more selective about charges because court closures delay the duration for cases to get convicted (conviction duration). Prosecutors are inherently selective about charges because they can charge fewer than they wish, considering the limited capacity of courts. They could become more selective after court closures because of their career concerns or courtroom group value. To enhance legal reputations, prosecutors have career concerns about seeking high convictions and conviction rates (Rasmusen *et al*. 2009). Both their desired convictions and conviction rates could fall over a period when court closures delay conviction duration. Suppose prosecutors cannot charge as many as before when court capacity becomes more limited (in the form of conviction delays). In that

case, they may drop criminal cases with a low probability of conviction to maintain their factored convictions or conviction rates. Additionally, although the courtroom group members, including prosecutors and judges, have various career concerns, they share the same group value of maintaining the efficiency of the criminal justice system (Eisenstein and Jacob 1977). When the delay problem caused by court closures puts organizational efficiency at risk, prosecutors may maintain cohesion with judges and thus bring fewer charges to reduce the burdens of caseloads on courts.

My analysis in this chapter provides a fresh perspective for literature to explain the impacts of courts on prosecutorial discretion by bringing prosecutors' career concerns and limited resources for courts together. Although the literature on prosecutorial discretion has discussed the importance of prosecutors' career concerns for their selection of charges for decades (Rasmusen *et al*. 2009; Reinganum 1988; Meares 1995; Albonetti 1987; Shermer and Johnson 2010), few empirical works have attempted to derive the link between changes in charges and court delays. My research adds to the existing literature on the interpretation and empirical evidence of prosecutorial decisions.

This chapter also emphasizes the differences between criminal courts and civil courts for literature. Less literature considers the impacts of court closures on charges. Probably because few countries closed criminal courts, the literature focuses on litigations in civil courts (e.g., Chappe and Obidzinski 2014; Espinosa *et al*. 2017; Desrieux and Espinosa 2019). While charges in criminal courts and litigations in civil courts both are intuitively caseloads of court, they are actually different. Firstly, charges and litigations are decided differently. Prosecutors decide charges, while plaintiffs decide litigations, and the incentives could differ (Shamir and Shamir 2012; Torre 2003). Secondly, the public tends to be more sensitive about charges than litigations. Although the public may accept government efforts to encourage settlements between plaintiffs and defendants to reduce unmeritorious caseloads (Desrieux and Espinosa 2019), it is unclear whether they would accept the same approach for criminals and victims.

5.1.2 Strategy

In order to test my hypothesis, I would use the data mentioned in Chapter 3: the unique data of Magistrates' Courts number, the case duration from charge to case completion (conviction duration) from MOJ, and the number of charges from HO. By comparing the impact of changes in courts and changes in conviction duration on changes in charges, this chapter analyses whether court closures can affect prosecutors' decision to charge by delaying conviction duration. If the two impacts on charges are similar enough, this will somewhat support my hypothesis. HO also provides data on charges for different crime groups, allowing us to see if prosecutorial selection about charges in a PFA changed as the courts were closed between April 2010 and March 2020. To control other factors often discussed in the literature, such as the potential prosecutor workloads, features of crimes, and the seriousness of crimes, I would also collect the number of crimes, the groups of crimes from ONS, and the average custodial sentence length of crimes from MOJ.

Regarding research methods, I would choose the TWFE OLS approach. It allows us to study the statistical relationship between court closures and changes in charges while controlling the influences of area characteristics (e.g., public interests) and policy changes (e.g., funding tied to charges). Both public interests and funding tied to charges could lead to changes in prosecutorial decisions (e.g., Cotti *et al*. 2022; Barno and Lynch 2021; Ishoy and Dabney 2018). In the model design, I would adjust all variables seasonally because the solid seasonal nature of crimes (Draca *et al*. 2011) may also make prosecutor's charge decisions of crimes have seasonality.

I find that court closures and delays in conviction have similar impacts on prosecutors' charge decisions. The results show that prosecutors typically increase charges in the first year after court closures or conviction delays, but they drop more charges in the second year. Although no particular literature explains why prosecutors respond differently in two years, the court closures and conviction delays lead to an overall decrease in charges after two years. The similar effects of court closures and conviction duration on charges somewhat suggest that court closures and prosecutorial decisions are linked by conviction duration. I also find that when charges drop in the second year, the composition of crimes in charges becomes different. Among charges, the proportion of crimes with a low

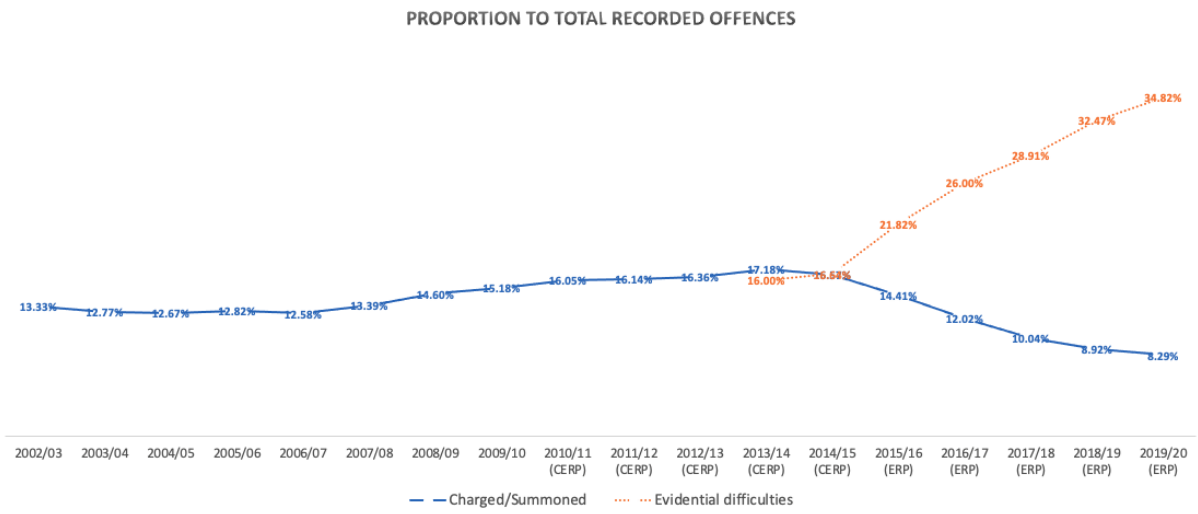
probability of conviction decreases significantly, which may be due to prosecutors' career concerns binding them to seek high convictions and conviction rates. Findings here suggest that given prosecutors' career concerns, they may want to reduce charges in response to conviction delays caused by court closures.

The rest of this chapter is organized as: Section 5.2 introduces government explanations of charge reduction including victim less supports, crimes become more complex, and limited resources for polices; Section 5.3 relates this chapter to literature on prosecutorial discretion, introduces the discussion of the prosecutor's career concerns and limited resources for courts, provides empirical evidence on prosecutors' aversion of conviction uncertainty, discusses the trade-off between conviction and convictions, compares existing aggregate-level analysis with case-level analysis, and summarizes individual preference and public interests about charges; Section 5.4 introduces the empirical strategy employed, presents summary statistics of variables, explain the using of TWFE OLS approach, and discuss the model specifications; Section 5.5 presents the findings, such as impact of court closures on charges, similar effects of court closures and conviction delays, prosecutors' selection about crimes, and effects of CERP and ERP; Section 5.6 is the conclusion section which summarizes the main findings, provides the policy implication, and covers critical reflections.

5.2 Government explanations

Although Home Office (2020) has provided three explanations for why fewer and fewer crimes are charged, these explanations tend to have limitations, and no definitive conclusion has been reached. Statistically, it may be noticed that the decrease in charges can be offset by the increase in evidential difficulties, which is one of the categories of crime outcomes[33] (see figure 5.1). A crime will be assigned into the category of evidential difficulties if the evidence is insufficient for further formal actions. The three explanations for the increase in evidential difficulties include: a victim less supports because of privacy concerns of digital evidence, recorded crimes becoming more complex, and the resources for police becoming limited.

[33] The crime outcomes refer to outcomes of crimes categorized by the government. The full categories of can be found in table A2.



- Source: Crime Outcome Statistics for 2019/20, by Home Office.
- The data of crime outcome: Evidential Difficulties is only provided from 2013/14.
- The recorded crimes exclude fraud crimes. Fraud crimes are now recorded by the National Fraud Intelligence Bureau (NFIB) rather than police forces.
- The data of financial year 208/19 and 2019/20 excludes Greater Manchester PFA due to the implementation of a new IT system in July 2019.
- CERP refers to the first court closure project: Court Estate Reform Programme; ERP refers to the second court closure project: Estates Reform Project.

Figure 5. 1 Evidential difficulties and charges

5.2.1 Victim less supports

There are some arguments explaining that the increased importance of digital evidence would cause privacy concerns and bring evidential difficulties. However, this explanation is unlikely to explain why all crime groups have seen a decrease.

Table 5. 1 The subgroups of evidential difficulties

Subgroups of Evidential Difficulties	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Evidential difficulties:	16.00%	16.64%	21.82%	26.00%	28.91%	32.47%	34.82%
Victim support police action:							
Suspect identified		7.89%	8.60%	9.30%	8.91%	9.87%	10.60%
Victim does not support police action:							
Suspect identified		1.88%	3.24%	3.90%	4.64%	4.77%	4.76%
Suspect not identified		6.86%	9.97%	12.80%	15.36%	17.83%	19.47%

- The details of data in 2013/14 is not available.
- The values present the percentage of crimes assigned to relevant outcome groups.

This explanation is based on the fact that the subgroup: "evidential difficulties: victim does not support" accounts for the largest increase in total "evidential difficulties" (see table 5.1). The category of evidential difficulties includes two main subgroups: "evidential difficulties: victim support police action" and "evidential difficulties: victim does not support police action". When a victim

declines, is unable to support or has withdrawn support from police, a crime would be recorded as "evidential difficulties: victim does not support police action". If the victim supports police action but further actions are prevented because of other evidential difficulties, a crime will be recorded as "evidential difficulties: victim support police action".

Table 5. 2 Charge rates by crime groups

Crime Groups	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Violence against the person	22.0%	16.8%	13.4%	10.7%	8.3%	6.9%
Sexual crimes	11.3%	9.6%	8.0%	5.2%	3.5%	3.2%
Robbery	17.3%	13.7%	11.8%	8.9%	7.4%	7.2%
Theft crimes	10.8%	9.0%	8.0%	6.6%	5.7%	5.2%
Criminal damage and arson	8.3%	7.5%	6.4%	5.5%	5.3%	4.7%
Drug crimes	33.3%	34.5%	34.8%	29.9%	27.0%	23.9%
Possession of weapons crimes	59.5%	54.0%	48.1%	39.6%	35.9%	35.3%
Public order crimes	31.4%	21.5%	15.2%	10.9%	9.1%	8.4%
Misc. crimes against society	38.0%	29.2%	23.9%	17.1%	13.8%	12.5%
Total	15.5%	13.1%	11.2%	9.1%	7.8%	7.0%

- Source: Crime Outcome Statistics of respective year, by Home Office.
- The recorded crimes exclude fraud crimes. Fraud crimes are now recorded by the National Fraud Intelligence Bureau (NFIB) rather than police forces.
- The data of financial year 208/19 and 2019/20 excludes Greater Manchester PFA due to the implementation of a new IT system in July 2019.

It was explained that individuals, especially victims of sexual crimes, may become less willing to support investigations due to privacy concerns when asked to surrender their digital devices. This explanation could be reasonable for crimes containing high privacy concerns (e.g., sexual crimes), considering that digital evidence has become increasingly necessary for police investigations in recent years. However, this explanation is unlikely to explain why the decrease in charges has been observed in all crime groups, including crimes having less privacy information. Table 5.2 displays that the charge rates for all crime groups have decreased considerably, including non-victim-based crimes such as miscellaneous crimes, public order crimes, and drug crimes. Depending on the nature of crimes, digital evidence tends to act in different roles in police investigations. For example, it is very less likely that evidence from victims' digital devices would be

required if one was robbed on the street or one's bicycle was stolen. Thus, privacy concerns about digital evidence seem to be an incomplete explanation.

5.2.2 More complex crimes

Another suggested reason for the increase in 'evidential difficulties' is the increasing complexity of recorded crimes. However, the evidence of this explanation may not be strong enough, and this explanation is also unlikely to explain why all crime groups are less charged.

This explanation was formed based on findings in the median time to assign an outcome to a crime. It was noticed by Home Office (2020) that the number of days to assign the outcome of "evidential difficulties: victim supports action" increased from 36 days in 2015/16 to 45 days in 2019/20. Particularly, it would take much longer for more complicated crimes (e.g., sexual crimes) than other crimes to be assigned an outcome, which was viewed as a sign that the complexity of crimes should account for the increase in "evidential difficulties". It is unlikely that all crime groups have suddenly become more complex concurrently if there is no certain and substantial stimulus altering criminal behaviours. Such stimulus was not provided with this explanation.

5.2.3 Limited resources for police

A more general but still limited explanation was that the police require more resources to carry out investigations. It may become more difficult to investigate if the police workforce is insufficient. Although table 5.3 illustrates that the average police workforce in 2003/04-2013/14 (before the charge reduction) is less than the workforce in 2014/15-2019/20 (since the charge reduction), there is other evidence that seems not to support this explanation.

This explanation tends to assume that a less police workforce is associated with fewer completed investigations. However, the intuitive data does not support this assumption. Table 5.4 shows the trend in the police workforce, the number of "investigations complete with no suspect identified", and the days to assign "investigations complete with no suspect identified". A crime will be assigned as a crime outcome: "investigation complete – no suspect identified" only if no suspect is identified after the crime has been investigated as reasonably as possible (see

table A2). It is the available data found relevant to investigations. Intuitively, less police workforce is not necessarily associated with fewer completed investigations. It can be noticed from table 5.4 that the police workforce in 2016/17 (198,686) is less than in 2013/14 (209,362), but the completed investigation in 2016/17 (2,062,492) is larger than in 2013/14 (1,823,403). In addition, comparing 2017/18 with 199,753 police workforce to 2019/20 with 210,620, the fewer police workforce days seem to take fewer days to complete investigations. Intuitively, it may even suggest that a smaller workforce may be more efficient in completing investigations as long as the crime is still investigated as reasonably possible. Therefore, limited resources for the police are also unlikely to adequately explain the decrease in charges.

Table 5. 3 Charge rates and police workforce

	From 2003/04 to 2013/14	From 2014/15 to 2019/20	Changes
Charge rates (average)	14.42%	11.71%	-2.71%
Total police workforce (average)	224,078.84	203,291.39	-9.28%

- Source: charge rates from Crime Outcome Statistics 2019/20, by Home Office; total police workforce (full-time equivalent) from Police Workforce Statistics 2019/20, by Home Office.
- Data of charge rates exclude fraud crimes.
- Data of total police workforce excludes British Transport Police and National Crime Agency.

Table 5. 4 Police workforce and completed investigations

	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20
Total number of "Investigation complete - no suspect identified"	1,823,403	1,747,301	1,875,104	2,062,492	2,323,272	2,190,530	2,155,723
Total number of police workforce	209,362	207,728	200,922	198,686	199,753	202,039	210,620
Days (Median) taken to assign "Investigation complete - no suspect identified"	N/A	N/A	4	2	1	1	3

- Source: relevant data of "Investigation complete – no suspect identified" from Crime Outcome Statistics 2019/20, by Home Office; data of the total number of police workforce from Police Workforce Statistics 2019/20, by Home Office.
- The data of the number of "Investigation complete – no suspect identified" is unavailable before 2013/14 because it is a newly introduced group of crime outcomes.
- The data of days taken for assigning crime outcome: "investigation complete - no suspect identified" is not available before 2015/16.
- Data of "investigation complete – no suspect identified" excludes fraud crimes.
- Data of the total police workforce excludes the British Transport Police and National Crime Agency.

5.3 Literature on prosecutorial discretion

The question of charge decision is essential to understand justice practices and has received academic attention for decades (e.g., Miller 1969). The prosecutor is usually the ultimate decision maker for charging crimes in common law jurisdictions, such as England and Wales and US etc. Therefore, the charge

decision is commonly explored from the perspective of prosecutorial discretion (e.g., Ligeti 2019; Albonetti 1987; Reinganum 1988; Ulmer et al. 2007; Shemer and Jonson 2010; Kingsnorth *et al*. 2022 etc.).

5.3.1 Limited resources for courts and prosecutors' career concerns

Despite a long history of research in prosecutorial discretion, little is on the impacts of court closures and case delays on charge decisions. A possible reason is a lack of actual cases of court closures and incomplete data on case duration (European Network of Councils for the Judiciary 2012),

The limited resources in court indicate prosecutors can charge fewer crimes than they wish because there is a limited number of judges and hearing rooms dealing with the charges. In other words, prosecutors must be selective about charged crimes to maintain cohesion with judges (Shermer and Johnson 2010). Meanwhile, prosecutors want to remove uncertainty from charged cases to increase convictions and conviction rates because these are indicators of prosecutorial competence and are salient for their prestige and enhance political area (Rasmusen *et al*. 2009; Reinganum 1988; Meares 1995). Given that the case delays brought by court closures would reduce convictions and conviction rates over a period and bring overcrowded caseloads[34], prosecutors may drop criminal cases with a low probability of conviction either for their career concerns or cooperation with judges.

5.3.2 Uncertainty of conviction

As most literature on prosecutorial discretion is case-level studies, the discussion about uncertainty of conviction is usually about specific case features, such as the defendant-victim relationship, the strength of evidence, and prior records of the defendant etc. These features are generally found in the literature to influence prosecutors' charge decisions significantly.

The relationship between defendants and victims is likely to affect the uncertainty of conviction because the closer relationship could increase the uncertainty that the victim withdraws the case during proceedings. For example,

[34] Judges do not prefer overcrowding caseloads (Shermer and Johnson 2010).

the closed relationship between defendants and victims of domestic violent crimes can make the victims frequently withdraw their support (Ishoy and Dabney) and thus largely sharp prosecutors' charge decisions (Spohn *et al*. 2001). Similar impacts were also noticed in Kingsnorth *et al*.'s (2002) logistic regression with 1,427 domestic crime cases processed through the Sacramento County District Attorney's office between July 1999 and October 1999. They noticed that victims of domestic crimes withdraw their support very frequently, which significantly reduces the prosecutor's willingness to charge. The impact of the defendant-victim relationship on prosecutorial decisions is also observed in other types of crime. For instance, it was found in Albonetti's (1987) probit model using 6,041 samples in 1974 from the Superior Court of Washington D.C. that felony crimes were also less likely to be charged if defendants and victims were not strangers. Besides, it was also noticed in Albonetti's (1992) logistic regression with 400 burglary and robbery crimes brought by police to the prosecutor's attention in Jacksonville, Florida, between 1979 and 1980. It was also noticed that prosecutors' preference to charge would become lower if defendants and victims were not strangers.

The strength of evidence is directly linked to the uncertainty of conviction. Although empirical works tend to suggest prosecutorial decisions are significantly affected by the strength of evidence, the evidence could have different importance across crimes depending on how much it helps secure convictions. For example, it was found in Albonetti's (1987) probit model that prosecutors' willingness to charge a felony crime would significantly decrease with the presence of exculpatory evidence but increase with the presence of more witnesses. In contrast, a witness's presence seems less important in burglary and robbery crimes. Albonetti's (1992) logistic regression found that prosecutors are unlikely to alter charge decisions of burglary and robbery crimes according to the presence of a witness. It was argued that whether the stolen goods will be recovered from the defendant's possession is a more important concern than the presence of witnesses during burglary and robbery. Another example is that the presence of a witness could be more important in domestic crimes than felony crimes because it can offset the uncertainty of conviction caused by the close defendant-victim relationship. For example, compared to felony crimes in Albonetti (1987), the

presence of corroborating witnesses could have more potent influences on domestic violence in Kingsnorth *et al*. (2002).

In addition, prosecutors usually assume a high probability of conviction if the prior records of defendants show they were convicted once (Albonetti 1987; Albonetti and Hepburn 1996; Shermer and Johnson 2010). There are relatively consistent empirical findings on prior records across different crimes. For example, in Albonetti and Hepburn's (1996) logistic regression with 5,553 cases of drug possession from the County Attorney's Office in the US, it was noticed that prosecutors are more likely to charge a defendant if this defendant has prior records. Similar results were found in other crimes (e.g., Metcalfe and Ciricos 2018; Ulmer *et al*. 2007), such as felony crimes (Albonetti 1987), burglary and robbery (Albonetti 1992).

5.3.3 Convictions versus conviction rates

According to the prosecutor's career concerns, there could be a trade-off between conviction and conviction rates. The conviction rates are likely to be an alluring indicator for prosecutors as they can be easily achieved by charging less complicated crimes. The government is aware of this issue and has made securing convictions an additional requirement for prosecutors. For example, the prosecutor appointed by the government usually has a record of lower conviction rates but convictions than elected ones (Rasmusen *et al*. 2009). However, convictions are certainly not an impeccable indicator because court resources are inefficiently wasted if too many acquittals of crime are pronounced from unselected charge decisions.

There is no optimal equilibrium between convictions and conviction rates addressed in the literature, but indirectly, Lowrey-Kinberg *et al*. (2022) 's work may signify how prosecutors balance it differently. Based on individual interviews of US prosecutors of all ranks and responsibilities, they divided interviewers into three types according to different primary orientations: Enforcer, Reformer, and Advocate. Prosecutors who apply the law, whatever the law is, are summarized as Enforcer. Those who evaluated the social influences of their charge decisions are summarized as Reformers. Those who feel responsible for attaining justice for the victim are summarized as advocates. Intuitively, the Advocate could care more

about convictions because they want to obtain as much justice as possible for victims. The Enforcer may weigh more on conviction rates as they care more about the practical circumstances (e.g., the strength of evidence). The Reformer may have no preference between convictions and conviction rates since they consider all relevant information, such as police behaviour, the defendant's intentions, and the message sent to the community.

5.3.4 Aggregate-level study versus case-level study

Most of the empirical evidence of prosecutorial discretion comes from the background of the US, and there could be two levels of studies, i.e., aggregate-level study and case-level study. The aggregate-level data could be preferred for investigating the impacts of aggregate-level policies on charge decisions (e.g., Cotti *et al*. 2022; Rasmusen *et al*. 2009). Case-level data might be preferred by sociologists and criminologists seeking to study patterns in prosecutorial decisions in individual criminal cases.

Cotti *et al*. (2022) were interested in whether the funding tied up with the number of charges can increase the number of charges. To answer the question, they collected 1,207 annual samples at the district attorney level of processing records from Wisconsin state for 1998-2015. They used the number of charged felony crimes because they are bound with the funding. They additionally used the total number of arrested violent crimes to control the possible felony workloads of prosecutors, a time trend variable to control the national trend in prosecutor's charge decisions, and an area-fixed dummy variable to control persistence differences across districts. Their OLS regressions displayed that the number of charges became significantly larger after introducing the funding scheme. Among control variables, the number of criminal cases and the number of arrested violent crimes were positively significant, and other results were not detailly provided.

Rasmusen *et al*. (2009) were interested in prosecutors' responses to the amount of prosecutorial budget. To answer this question, they collected 1,625 samples at the state prosecutorial district level from a US National Prosecutor's Survey in 2001. The number of charged felony crimes was collected to indicate prosecutorial decisions at the aggregate level. They additionally collected the

salary of prosecutors etc., to control the prosecutors' characteristics, the number of all crimes to control the possible workloads of prosecutors, the minority population, and a dummy of the metropolitan area to control area characteristics. Their OLS regressions showed that an increase in the prosecutorial budget could bring the most significant increase in charges compared to other control variables. Among the control variables, the number of crimes was insignificant, most of the prosecutors' characteristics were insignificant, the minority population was insignificant, and the dummy of the metropolitan area was insignificant.

Although Cotti *et al*. (2022) and Rasmusen *et al*. (2009) were interested in different questions, both suggest an aggregate-level analysis of prosecutorial discretion could consider policy changes, workloads of prosecutors, area characteristics, prosecutors' characteristics, and demographic characteristics. The policy changes could be important as they were found significant in both works. Although the workloads of prosecutors were found insignificant by Rasmusen *et al*. (2009), workloads could still be important because the insignificance may come from the biased measurement. The bias could be caused by Rasmusen *et al*. (2009) using the number of total crimes rather than felony crimes to control the possible workloads charged felony crimes due to the unavailability of data. The area characteristics could be worthy of attention as it is a common concern for much panel data analysis. Besides, the prosecutors' characteristics were not controlled by Cotti *et al*. (2022), perhaps because of the unavailability of data. Failing to control them might be a slight concern as they are more likely to be insignificant in Rasmusen *et al*.'s (2009) findings. Furthermore, the demographic characteristics may be less critical. Intuitively they do not necessarily result in changes in the workloads of prosecutors, and they were found insignificant by Rasmusen *et al*. (2009).

Between aggregate-level analysis (e.g., Cotti . *et al*. 2022; Rasmusen *et al*. 2009) and the case-level analysis, there seem to be differences in dependent variables, sample sizes, control variables, and methodologies. For the dependent variable, in the limited amount of aggregate-level analysis, prosecutors' charge decisions are usually measured by the number of charges in an area because it can indicate changes in prosecutorial decisions at the aggregate level (e.g., Rasmusen *et al*. 2009; Cotti *et al*. 2022). In contrast, the dependent variable is frequently

measured by binary values, i.e., charged or not (e.g., Albonetti 1987; Albonetti 1992; Albonetti and Hepburn 1996; Kingsnorth *et al*. 2002; Lynch *et al*. 2021; Metcalfe and Chiricos 2018; Shermer and Johnson 2010; Ulmer *et al*. 2007). Besides, the case-level analysis could include larger sample sizes and more detailed control variables. The reason is that the caseloads could be large, and the case documents could recode much detailed information, e.g., Lynch *et al*. (2021) managed to collect 327,943 cases from the US Sentencing Commission data between 2004 and 2019. Although aggregate-level data may have relatively limited sample sizes and less adequate control variables, aggregate-level analysis can cover longer time intervals, enabling research to examine a policy's long-term impacts. For methodologies, aggregate-level analysis usually employs the OLS approach, while case-level analysis usually applies a logistic approach. The difference in methodology could depend on the measurement of the dependent variable. When quantity values measure the dependent variable, the OLS approach could be preferred even by case-level analysis. For example, Kingsnorth *et al*. (2002) and Shermer and Johnson (2010), who used case-level data, still applied the OLS approach when replacing the binary-dependent variable with quantity values.

5.3.5 Public interests and ideological factors

Prosecutorial decisions tend to be a product of the dynamic interplay of social knowledge (Barno and Lynch 2021). While prosecutors have ideological factors in charging cases, their decisions are also bound by public interests (Barno and Lynch 2021; Ishoy and Dabney 2018). In England and Wales, the codes for charge decisions (Crown Prosecution Service 2018) require prosecutors to consider public interests, including the seriousness of crimes, level of culpability, harm to a victim, age of a suspect, impact on the community etc. A case with sufficiently strong evidence will only lead to charges if it meets the criteria of public interest. The public may have a higher tolerance for minor crimes (e.g., Shermer and Johnson 2020) and young offenders (e.g., Ulmer *et al*. 2007) and offenders who have excused psychiatric traits (e.g., Millspaugh *et al*. 2022). Meanwhile, prosecutors could have ideological factors such as race, gender, and personal credibility.

The empirical findings could support that prosecutors prefer to charge more severe crimes. For example, it was found in both common felony crimes (Albonetti 1987) and burglary and robbery crimes (Albonetti 1992) that prosecutors' willingness to charge would become more potent if the crimes involve using of weapons. Furthermore, it was also noticed in domestic crimes that if the crime leads to victim injury, the crimes will become more likely to be charged (Kingsnorth *et al*. 2002). In addition, from another perspective, empirical findings also show that prosecutors could have a higher tolerance for crimes not causing real harm to a person. For instance, it was found in Albonetti's (1987) probit model that victim-less crimes are less likely to be charged (e.g., uttering/forgery, grand larceny, and unauthorized use of motor vehicle etc.). Similar empirical evidence can be noticed in Shermer and Johnson's (2010) logistic regression with 39,688 case samples from the US Federal Justice Statistics program for 2001/02. They found that the culpability of crimes not harming a person directly (e.g., fraud, property crime, and possession of weapons) are more likely to be mitigated by prosecutors. Furthermore, for a crime not causing real harm to a person and property (e.g., drug possession crime), a charge decision is likely to be replaced by a rehabilitation programme if the programme is assumed to be effective (Albonetti and Hepburn 1996).

Gender issues remain a controversial topic across all nations. Some research (e.g., Ulmer *et al*. 2007; Sherman and Johnson 2010; Barno and Lynch 2021) noticed that females could be more likely to receive reductions in charge decisions. It reflects an argument that female offenders' unique victimization histories and special circumstances can often mitigate their culpability (Shermer and Johnson 2010). However, the prosecutor's preference for gender is not always the same across every crime. For instance, prosecutors are likely to treat females and males equally in burglary and robbery crimes (Albonetti 1992). The different findings of gender in different crimes may also link to prosecutors' preference for convictions. It was found by Anwar *et al*.'s (2017) empirical study in England and Wales that a jury could be more likely to agree on a conviction when the victim is female in sexual and violent crimes. Moreover, the all-male judiciary could be even more lenient for females and affect the conviction rates of a crime involving females (Bindler and Hjamarsson 2020).

Whether minorities are more likely to be charged by prosecutors is a frequent topic in a multicultural nation like the US (e.g., Shermer and Johnson; Barno and Lynch 2021; Albonetti 1987). Although it was noticed that race tends to be significant at the general level (e.g., Ulmer *et al*. 2007; Metcalfe and Chiricos 2018; Kingsnorth *et al*. 2002), the race problem could vary across specific crimes. For example, the minority suspect may be more likely to experience disparity in possession of weapons (Shermer and Johnson 2010) but not in felony and drug crimes (Albonetti 1987; Anlbonetti and Hepburn 1996).

There are also empirical findings on age, marriage status, education etc. For example, it is frequently found that young offenders could be less likely to be charged because public interests prefer to see rehabilitation rather than pure punishment (e.g., Metcalfe and Ciricos 2018; Albonetti 1987; Ulmer *et al*. 2007). In addition, marriage status was found significant in domestic crimes by Kingsnorth *et al*. (2002) while insignificant in total crimes by Shermer and Johnson (2010). Furthermore, education was found only significant in fraud crimes by Shermer and Johnson (2010). These different findings may also imply prosecutors from different areas may have different ideological factors.

5.4 Empirical strategy

5.4.1 Data description

I will use the built panel database (see Chapter 3) to examine the correlation between court closures and charges. Apart from the number of Magistrates' Courts and the number of charges, I also consider crime-level information such as the total number of crimes, the composition of crimes, average custodial sentence length (ACSL), and additional information on conviction duration (see table 5.5). The total number of crimes is used to control the possible workloads of prosecutors. The composition of crimes and average custodial sentence length (ACSL) are used to control prosecutors' preference for crimes. The conviction duration is used to compare its impacts on charges to court closures.

Table 5.6 illustrates several stylized factors from the collected information in this chapter. It can be noticed that the crimes tend to only cause real harm to property, e.g., theft crimes (45%) are the most frequent crimes recorded by polices. Among crimes that tend to cause real harm to a person, violent crimes account for the

largest proportion (24%). In addition, public crimes (5%) and drug crimes (4%) account for over half the proportion of victimless crimes[35].

Table 5. 5 Variables in the analysis of charges

Variables	Definitions
Total number of charges	The total number of charged crimes by prosecutors.
Ratio of violent crimes in charges	The ratio of violent crimes charged by prosecutors to the total charged crimes.
Ratio of theft crimes in charges	The ratio of theft crimes charged by prosecutors to the total charged crimes.
Number of Magistrates' Court:	The number of Magistrates' Courts remained open by the end of a period.
Total number of crimes:	The total number of crimes recorded by police.
Compositions of crimes:	The ratio of a specific crime group recorded by police to the total recorded crimes.
Average custodial sentence length:	Average months of custodial sentence for crimes received "immediate custodial" outcome.
Conviction duration:	The average days taken for a defendant from being charged to case completion.

Table 5. 6 Summary statistics of the analysis of charges

Spatial level: 42 PFAs **Time frequency and interval:** quarters between April 2010 to March 2020

Variables	Obs.	Mean	Std. Dev.	Min	Max
Dependent variable (days)[36]:					
Total number of charges	1,677	3,239	3,329	635	27,096
Ratio of violent crime in charges	1,677	30%	4%	17%	19%
Ratio of theft crime in charges	1,677	32%	5%	17%	57%
Explanatory variable:					
Number of Magistrates' Courts	1,680	5	4	1	34
Control variables:					
Total number of crimes	1,680	24,858	30,280	4,031	236,625
Compositions of crimes:					
Violence against person	1,680	24%	8%	10%	45%
Sexual crimes	1,680	2.5%	1.0%	0.6%	8.1%
Robbery	1,680	1.0%	.7%	10.2%	5.1%
Theft crimes	1,680	45%	8%	22%	62%
Criminal damage and arson	1,680	15%	3%	6%	27%
Possession of weapons	1,680	0.7%	0.2%	0.2%	1.6%
Miscellaneous crimes against society	1,680	1.6%	0.5%	0.5%	5.9%
Public order crimes	1,680	5%	3%	2%	21%
Drug crimes	1,680	4%	2%	1%	20%
Average custodial sentence length (months)	1,680	19	4	2	38
Additional variable:					
Conviction duration (days)	1,638	58	13	32	125

[35] Victim-less crimes include drug crimes, possession of weapons, public order crimes, and miscellaneous crimes against society.

[36] The observations of number of charges are fewer than 1,512 because Greater Manchester PFA is unable to provide the data for July 2019 to March 2020 due to the implementation of a new IT system in July 2019

5.4.2 Methodology

I intend to employ the TWFE OLS approach to investigate if court closures reduce charges. This approach allows us to examine the statistical correlation between court closures and changes in charges while controlling area characteristics (e.g., public interests) and policy changes (e.g., funding tied to charges). The public interests in different PFA might differ as there might be area-specific social norms. As addressed by literature (e.g., Barno and Lynch 2021), prosecutors would consider public interests while making charge decisions. In addition, the policy changes such as funding tied to charges could influence prosecutors' willingness to charge (e.g., Cotti *et al*. 2022). Besides, the OLS is preferred by literature when the dependent variable is quantity values (e.g., Kingsnorth *et al*. 2002; Shermer and Johnson 2010).

The endogeneity issue between charges and court closures is less of a concern in the analysis. Suppose case duration is endogenous with court closures. In that case, there could be an endogenous relationship between charges and court closures that charges may affect case duration, influencing decisions of closures. However, I have provided supporting evidence in Chapter 4 that case duration is less likely to be endogenous with court closures. Thus the endogeneity issue is less concerning in this analysis.

5.4.3 Model specifications

I employ a FE OLS approach to design model specifications for analysing court closures and prosecutors' charge decisions. The model specifications are as follows:

$$\begin{aligned}\%\Delta_4 ChargeNumber_{it} &= \beta_0 \,|\%\Delta_4 CourtNumber|_{it} + PFA_i + Quarter_t + \lambda_1 \%\Delta_4 CrimeNumber_{it} \\ &+ \lambda_2 \%\Delta_4 ACSL_{it} + \lambda_3 \Delta_4 crime\_composistion_{it} + +\varepsilon_{it}\end{aligned} \tag{5.1}$$

where the i represents a specific PFA, the t indicates a specific period of quarters; the $t - z$ represents the lagged z quarters (z is an ordinal value from 0 to 8). The Δ_4 means the changes between four periods[37] (or seasonal difference), and

[37] e.g., $\Delta_4 crime\_composistion_{2020q1} = crime\_composistion_{2020q1} - crime\_composistion_{2019q1}$

the $\%\Delta_4$ means the per cent changes between four periods[38]. The dependent variable, $\%\Delta_4 ChargeNumber$, represents the per cent change in the total number of charges over four periods. The explanatory variable, $|\%\Delta_4 CourtNumber|$, is the absolute value[39] of per cent changes between four periods in the number of Magistrates' Courts. The PFA is an area-fixed dummy variable of 42 PFAs, and the $Quarter$ is a time-fixed dummy variable of periods (quarters). And other control variables, $\%\Delta_4 CrimeNumber$ is the per cent changes between four periods in the total number of recorded crimes, $\Delta_4 crime\_composistion$ is the changes between four periods in the ratio of a specific crime group to total recorded crimes, $\%\Delta_4 ACSL$ is the per cent changes between four periods in average custodial sentence length. The ε is a matrix of error terms of the regression. The β_0 is the interested coefficient, and a negatively significant β_0 implies that court closures can discourage prosecutors from charging.

I measure variables by their changes across four periods (or seasonal differences) to control for seasonality in the number of charges. The literature on prosecutorial discretion addresses that prosecutors could have different charging preferences for crimes. Thus, the composition of recorded crimes could affect the decision of charges. And it is suggested by the literature on crime reduction (e.g., Draca *et al*. 2011) that committed crimes tend to have seasonality, e.g., there might be fewer domestic burglary crimes in winter because the households are more likely to study at home. Therefore, the crimes entering prosecutors' workloads could also vary across seasons. Although the seasonality in crimes could be controlled by the number of crimes and the ratio of crime groups, they cannot control other seasonality, such as seasonality in prosecutors' working performance. Thus, I intend to control the seasonality in charges by seasonally differencing variables. Furthermore, the seasonal changes in the number of charges are

[38] e.g., $\Delta\%_4 ChargeNumber_{it} = (ChargeNumber_{2019q4} - ChargeNumber_{2018q4})/ ChargeNumber_{2018q4} \times 100$

[39] The absolute value does not change the estimates of per cent changes in court number, regardless of the sign, because the number of courts in a PFA monotonically decreased between April 2010 and March 2022.

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adjusted into per cent changes to address that the total number of charges differs in PFAs[40].

The court closures are measured by per cent changes to avoid measurement bias caused by different court numbers in PFAs and to ensure the commonality of findings with other chapters. The measurement bias that the same numeral changes in courts could have different effects in different areas was addressed in the previous analysis of case duration (in Section 4.3.3). This chapter assumes closing courts affect prosecutors' charge decisions by delaying conviction duration. Thus, a similar measurement bias of numeral changes could also exist, and per cent change measurement is preferred.

I investigate $|\%\Delta_4 CourtNumber|$ at time $t-z$ respectively because less literature suggests the timing of alteration in prosecutorial decisions. Prosecutors are hypothesised to alter their charge decisions when their favoured convictions and conviction rates in a certain period are affected by the delay in conviction duration. However, there are no theories suggesting which period of convictions and conviction rates prosecutors would care about. Suppose prosecutors care about quarterly convictions and conviction rates. In that case, prosecutors may observe the delay in conviction duration in the same quarter of closures and alter their charge decisions in the next quarter. Suppose the prosecutor cares about annual convictions and conviction and conviction rates. In that case, prosecutors may observe the delay in conviction duration in the first year (i.e., four quarters) after closures and alter their decisions in the next year after closures. Therefore, I lagged the explanatory variable, i.e., court closures, by eight quarters respectively, to capture the timing of alteration in prosecutorial decisions.

The area-fixed (PFA_i) and time-fixed ($Quarter_t$) dummy variables are included to control the linearly changing trend in the area (PFA) characteristics and the changes in nation-level policies between periods (quarters), respectively. As the variables are differenced, the specific constant characteristics in a PFA, such as weather, environment, public interests etc., are already offset. If these characteristics have changing trends across periods, the trends could be controlled

[40] Unlike the analysis of case duration in Chapter 4, where different caseloads in PFAs have been addressed by average estimates of case duration, the different number of charges in PFAs is not yet addressed in this chapter because the estimates are based on total number of charges. Therefore, changes in charges are measured by per cent changes rather than numerical changes.

by the area-fixed dummy variables of 42 PFAs. These characteristics, such as public interests, could affect prosecutorial decisions (e.g., Barno and Lynch 2021; Ishoy and Dabney 2018). Besides, the literature, such as Cotti *et al*. (2022) and Rasmusen *et al*. (2009), suggest that policy changes could affect charges in an area, e.g., funding tied up charges and budget to prosecution service. The time-fixed dummies would control these policy changes.

I use $\%\Delta_4 CrimeNumber$ to control the per cent changes in the possible workloads of prosecutors. The total workloads of prosecutors are usually considered as a control variable in aggregate-level analysis, e.g., Cotti *et al*. (2022) and Rasmusen *et al*. (2009). This chapter assumes closing Magistrates' Courts could affect prosecutors' charge decisions of all crimes because every charged crime would need to wait for the availability of Magistrates' Courts. Therefore, I intend to use the total number of recorded crimes to indicate the workloads of prosecutors.

The $\%\Delta_4 ACSL$ and $\Delta_4 crime\_composistion$ are used to control prosecutors' different preferences for different crimes. Firstly, the literature suggests that prosecutors could prefer to charge more serious crimes (e.g., Barno and Lynch 2021; Ishoy and Dabney 2018). I intend to use the ACSL (months) to indicate the seriousness of committed crimes. The longer ACSL might indicate that a crime is more serious. In addition, it is indicated by literature that prosecutors could have different tolerances for different crimes. For example, prosecutors could have less tolerance for crimes causing real harm to a person, like violent crimes, compared to crimes only causing harm to property, like theft crimes (e.g., Albonetti 1987); Shermer and Johnson 2010; Albonetti and Hepburn 1996). I intend to use the ratio of a specific crime group to total recorded crimes to control the prosecutors' tolerance of crimes.

While the number of prosecutors and the number of guilty pleas during charges might also affect the number of charges, the unavailability of data does not allow us to include them. The unavailability of these data is common in previous aggregate-level studies, such as Cotti *et al*. (2022) and Rasmusen *et al*. (2009). If these data change at the national level, time (quarter) fixed-effects dummies could control them.

5.5 Results

5.5.1 Court closures and charges

The estimates of the influences of court closures on charges at timing $t-0$ are reported in table A3. Court closures are quantified as percentage changes in the number of courts within each PFA, which helps avoid any measurement bias arising from variation in the number of courts across different PFAs. In all regressions, any seasonal variability in charges and the differences in constant area characteristics (e.g., public interests etc.) of PFAs are controlled for by seasonally adjusting the variables. The results show R^2 of regressions increases with the addition of more controls. Successively, I exclude all controls in column (1); use PFA FE dummies to capture the linear trend in area characteristics in column (2); use quarter FE dummies to capture policy changes related to charges, such as budget and funding in column (3); use per cent changes in the crime numbers to capture changes in prosecutors' workloads in column (4); use per cent changes in ACSL to capture the seriousness of crimes in column (5); use changes in the ratio of crime groups to capture changes in the composition of recorded crime in column (6). I focus on the regressions that include all controls because they provide a better fit for the models.

Table 5.7 reports the estimates of court closures at timing $t-z$. Different timings are examined to detect whether prosecutors change their behaviours according to annual or quarterly convictions. The negatively significant estimates of court closures in columns (7) and (8) imply that closing Magistrates' Courts can discourage prosecutors from charging in the sixth and seventh quarters after closures. Specifically, the results indicate that if 1% of courts are closed in a PFA, charges could decrease by 0.07% in the sixth quarter and by 0.09% in the seventh quarter after closures. Although the statistically significant positive estimates in column (4) indicate a 0.06% increase in charges in the third quarter after closures, this increase would soon be offset by a larger decrease in charges in the sixth and seventh quarters following the closures.

Table 5. 7 Court closures and charges

	Dependent variables: $\%\Delta_4 ChargeNumber_{it}$								
	(1) $t-0$	(2) $t-1$	(3) $t-2$	(4) $t-3$	(5) $t-4$	(6) $t-5$	(7) $t-6$	(8) $t-7$	(9) $t-8$
Court closures in four periods (%) at timing $t-z$	-.001 (.03)	.04 (.03)	.04 (.03)	.06* (.03)	-.02 (.04)	-.05 (.04)	-.07** (.04)	-.09** (.04)	-.06 (.04)
All controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
P-value of F-test	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
Adjusted R^2	0.1512	0.1526	0.1546	0.1576	0.1567	0.1556	0.1536	0.1543	0.1520
Observations	1,509	1,467	1,425	1,383	1,341	1,299	1,257	1,215	1,173

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- All controls include PFA FE dummies, quarter FE dummies, per cent changes in number of crimes, per cent changes in ACSL, and changes in ratio of crime groups.
- Full estimates can be found in table A11.

Table 5. 8 Conviction duration and charges

	Dependent variables: $\%\Delta_4 ChargeNumber_{it}$								
	(1) $t-0$	(2) $t-1$	(3) $t-2$	(4) $t-3$	(5) $t-4$	(6) $t-5$	(7) $t-6$	(8) $t-7$	(9) $t-8$
Changes in Conviction Duration (days) in four periods at timing $t-z$	-.02 (0.3)	-.01 (.03)	.01 (.03)	.03 (.03)	.06** (.03)	.02 (.03)	-.02 (.03)	-.04 (.03)	-.07** (.03)
All controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
P-value of F-test	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
Adjusted R^2	0.1531	0.1509	0.1528	0.1552	0.1586	0.1531	0.1503	0.1506	0.1538
Observations	1,468	1,467	1,425	1,383	1,341	1,299	1,257	1,215	1,173

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- Conviction Duration refers to days taken from charging crime to case completion.
- All controls include PFA FE dummies, quarter FE dummies, per cent changes in number of crimes, per cent changes in ACSL, and changes in ratio of crime groups.
- Full estimates can be found in table A12.

These findings suggest that prosecutors may be more responsive to annual changes in convictions, as opposed to quarterly changes. The increase in charges is noticed in the third quarter after court closures which belongs to the first four quarters (the first year) after closures, and the reduction in charges is noticed in the sixth and seventh quarters after closures which belongs to the next four quarters (the next year) after closures. The observed variation in prosecutors' behaviour between the first four quarters and the subsequent four quarters following closures may indicate that prosecutors adjust their decisions on charges on an annual basis.

The different behaviours of prosecutors in the two years may suggest that prosecutors in England and Wales put higher weight on convictions than conviction rates in their career concerns. It is found in the previous analysis of case duration (Chapter 4) that closing courts can delay case duration, including conviction duration, instantly in the first year. When the conviction duration is delayed, both convictions and conviction rates will decrease in the first year. The increased charges in the first year might indicate prosecutors will first attempt to charge more to maintain favoured convictions. And the established reduction in charges in the next year after closures may imply that prosecutors' career concerns are transferred from convictions to conviction rates when prosecutors realise the favoured convictions cannot be maintained anymore due to lower court productivity. After shifting their focus from the number of convictions to conviction rates in the year following the closures, prosecutors decrease the number of charges in order to attain their preferred conviction rates, thereby offsetting the increase in charges made in the first year.

The different behaviours of prosecutors in the two years may suggest that prosecutors in England and Wales put higher weight on convictions than conviction rates in their career concerns. It is found in the previous analysis of case duration (Chapter 4) that closing courts can delay case duration, including conviction duration, instantly in the first year. When the conviction duration is delayed, both convictions and conviction rates will decrease in the first year. The increased charges in the first year might indicate prosecutors will first attempt to charge more to maintain favoured convictions. And the established reduction in charges in the next year after closures may imply that prosecutors' career concerns are

transferred from convictions to conviction rates when prosecutors realise the favoured convictions cannot be maintained anymore due to lower court productivity. After prosecutors target their career concerns to conviction rates in the next year after closures, they reduce many charges to achieve favoured conviction rates and offset the extra charges made in the first year.

There could also be another explanation for why the prosecutor could charge more in the first year after closures. Prosecutors probably tried to get things on books desperately before closing courts. Then when courts were closed, there was already a long waiting list in their workloads books, which resulted in an increase in charges in the first year. After the workloads on the books were resolved in the first year, prosecutors began to face the changes due to court closures and generated a new decision process in the second year.

Although the predicted reduction in charges does not explain all changes in real data, the findings establish an innovative explanation for the reduction in charges in England and Wales. Approximately, the 1% closures of Magistrates' Courts could result in a 0.1% reduction in charges after eight quarters (two years) since closures. Considering an average of 50% closures of Magistrates' Courts in PFAs since April 2010, the findings roughly predict a 5%[41] reduction in the number of charges in each PFA. As the average annual charges were around 15,588 in a PFA in 2010/11, my findings may predict a reduction of 779[42] in charges in each PFA after closures (2019/20). The prediction could account for a 14% reduction in reality between 2010/12 and 2019/20.

5.5.2 Court closures versus conviction duration

I replace the explanatory variable, i.e., court closures, with conviction duration changes to compare their impact on charges. The conviction duration refers to days from charging a defendant to case completion. A conviction is an outcome produced when courts complete a case. Thus, conviction duration measures the time it takes for prosecutors to achieve a conviction from the time a charge is laid. If there is a delay in conviction duration, the conviction number and conviction

[41] $predicted\ percentage\ reduction = average\ closures \times estimated\ coefficient = 50 \times 0.1 = 5\%$

[42] $predicated\ reduction\ in\ number\ of\ charges = predicted\ percentage\ reduction \times average\ number\ of\ charges = 5\% \times 15{,}588 = 779$

rates of a particular period will decrease if other things remain constant. According to prosecutors' career concerns of seeking high convictions, it is hypothesised that prosecutors alter their decision of charges responding to changes in conviction duration caused by court closures. Findings from table 5.7 above indicate that prosecutors consider changes in annual convictions. Suppose estimates of changes in conviction duration also suggest prosecutors charge more in the first year and fewer in the next year after conviction delay. In that case, it tends to support that closing courts alter prosecutorial decisions by delaying conviction duration to some extent.

Table 5.8 reports the estimates of changes in conviction duration at timing $t - z$. The different timings are compared to estimates of court closures in table 5.7. The same control variables are fully included in all regressions. The positively significant estimate of conviction duration in column (5) indicates prosecutors increase charges in the fourth quarter after conviction delays. Furthermore, the negatively significant estimate of conviction duration in column (9) implies that prosecutors decrease charges in the eighth quarter after case delays. The findings suggest that prosecutors charge more in the first year and charge fewer in the next year after case delays, which is similar to prosecutors' response to court closures.

The findings from table 5.8 imply prosecutors have similar responses to court closures and conviction delays. Firstly, prosecutors respond to both at similar timings. Prosecutors similarly increase charges in the first year and then reduce them in the subsequent year following both court closures and conviction delays. Secondly, the effects of both on prosecutorial decisions are similar. For example, 1% of court closures and a 1-day delay in conviction duration could lead to a 0.06% reduction in charges after three and four quarters, respectively, and a 0.07% reduction in charges after six and eight quarters, respectively.

The similar responses of prosecutors to court closures and conviction delays support the mechanism that closing courts influence changes by delaying case duration to some extent. As established in the previous analysis of case duration (Chapter 4), closing courts delay the waiting duration for hearings instantly[43], indicating that court closures and conviction delays could happen in the same year.

[43] The conviction duration equals to waiting duration plus trial duration.

Thus, it could be reasonable for the prosecutor to respond to court closures and conviction delays at similar moments.

Compared to conviction delays, 1% court closures could additionally lead to a 0.09 % reduction in charges after seven quarters. It may be explained by the accumulation of delays found in Chapter 4. The case delays brought by court closures could accumulate because court closures bring extra burdens on courts accumulate over periods. In contrast, the delay in conviction duration alone does not necessarily indicate extra burdens in courts and thus may not accumulate. Therefore, the accumulation of delays brought by court closures could make court closures have stronger effects on charges than conviction delay.

5.5.3 Court closures and prosecutorial selection

I examine the changes in charged violent and theft crimes to detect prosecutors' selection of crimes after court closures. The data of charges provided by MOJ allow us to break down the charges into crime groups. The literature on prosecutorial discretion suggests two main preferences influencing prosecutorial decisions. Firstly, according to prosecutorial carer concerns, they would prefer to charge crimes with a high probability of conviction (e.g., Spohn *et al*. 2011; Kingsnorth *et al*. 2002). Secondly, according to prosecutors' individual preferences and public interests, prosecutors may prefer to charge crimes causing real harm to persons (e.g., Albonetti 1987; Albonetti and Hepburn 1996).

There could be a conflict between the two preferences in England and Wales. For example, violent crimes could have a lower probability of conviction than theft crimes. Crime outcome statistics provided by the Ministry of Justice (MOJ) reveal that, between 2009/10 and 2019/20, violent crimes had an average annual conviction rate of 48%, compared to 77% for theft crimes[44]. Meanwhile, violent crimes are more likely to bring real harm to persons, and theft crimes tend only to cause harm to property. Therefore, a conflict could arise between choosing to prosecute violent crimes versus theft crimes. If prosecutors prefer to charge crimes with a high probability of crimes, they will prefer theft to violent crimes. In

[44] In addition, the violent crimes and theft crimes account from over half proportion (around 62%) of all charges. If prosecutors want to increase convictions or conviction rates, these two could be their choices.

contrast, if they prefer to charge crimes causing harm to a person, they could prefer violent to theft crimes.

Comparing the prosecutorial preference between violent and theft crimes could enable us to understand whether the charge reduction is due to career concerns or other individual preferences. If there's a shift from prosecuting violent crimes to theft crimes, it suggests a prosecutor's personal preferences are yielding to career considerations. Therefore, I focus on changes in charged violent and theft crimes to understand prosecutors' selections about crimes after closing courts.

Table 5. 9 Prosecutorial selection in crimes

Dependent variables:	$\Delta_4 violence\_charges_{it}$		$\Delta_4 theft\_charges_{it}$	
	(1a) $t-7$	(1b) $t-8$	(2a) $t-7$	(2b) $t-8$
Court closures in four periods (%) at timing $t-z$[45]	-.018** (.007)	-.018** (.007)	.022** (.009)	.017** (.009)
All controls	Yes	Yes	Yes	Yes
P-value of F-test	0.00***	0.00***	0.00***	0.00***
Adjusted R^2	0.2510	0.2523	0.2110	0.2083
Observations	1,257	1,215	1,257	1,215

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- $\Delta_4 violence\_charges$ represents the changes in ratio of charged violent crimes to total charges in four periods.
- $\Delta_4 theft\_charges$ represents the changes in ratio of charged theft crimes to total charges in four periods.
- All controls include PFA FE dummies, quarter FE dummies, per cent changes in number of crimes, per cent changes in ACSL, and changes in ratio of crime groups.
- Full estimates can be found in table A13.

Table 5.9 reports the estimates of court closures at timing $t-7$ and $t-8$ in regressions of charged violent crimes and charged theft crimes. The timing $t-7$ and $t-8$ are mainly reported because they are the timings when prosecutors reduce charges. I use changes in the ratio of charged violent and theft crimes to total charges to measure the changes in the compositions of total charges. All regressions include the same full set of control variables. The negatively significant coefficient of court closures in columns (1a) and (1b) indicates the ratio of charged violent crimes decreased in the seventh and eighth quarters after closures. And the positively significant coefficient of court closures in columns (2a) and (2b) imply the ratio of charged theft crimes increased in the seventh and eighth quarters after closures.

[45] The estimates of other timing $t-z$ can be found in table A4.

The findings suggest that in response to court closures, prosecutors tend to prioritize career concerns and avoid prosecuting crimes with a lower probability of conviction. It is manifested in the transfer from charging violent crimes to charging theft crimes. This transfer implies that even though violent crimes could be more serious than theft crimes, prosecutors still drop them more frequently when they have to reduce charges to maintain favoured conviction rates.

5.5.4 Charges in CERP and ERP.

I study the two court projects, i.e., CERP between April 2010 and March 2015 and ERP between April 2015 and March 2022, separately to examine if they impact charges differently. It was established in Chapter 4 that the impact of closures under the ERP could be more significant than those under the CERP, probably due to the superimposed effects of the ERP on the CERP. I intend to test if similar findings can be found on charges.

The estimates of court closures are reported in table A5. The results show that while the second project (ERP) can increase the charges more significantly in the first year after closures, the first project (CERP) can reduce charges more significantly in the following year after closures. The different impacts may not only account for the possible superimposed effects but also imply the changes in prosecutors' expectations of the results of court closures.

5.6 Conclusion

England and Wales face a large charge reduction and need for referable explanation. This chapter proposes a hypothesis based on the prominent court closures during the same period that the charge reduction may be related to the risk of case delays brought by court closures. This hypothesis could be linked to prosecutors' career concerns and limited resources for courts in the literature on prosecutorial discretion. The research in this chapter might not only enrich the existing literature on the interpretation of prosecutorial decisions but also emphasises the differences in criminal and civil courts that should be considered in the policy of closing courts.

To verify the hypothesis, I collected unique data on the number of Magistrates' Courts, conviction duration from the MOJ, and charge data from the HO, to analyse

whether changes in court availability and changes in conviction duration have similar effects on charges. If their effects on charges are similar enough, it would suggest that court closures and charges could be linked by conviction duration to some extent. While using the TWFE OLS method to control area differences (e.g., public interests) and policy changes (e.g., finding and budgeting to prosecutors), I collected the number of crimes and the groups of crimes from ONS and the ACSL of crimes from MOJ to control the potential workload of prosecutors, the crime groups, and the severity of crimes.

My estimates show that in a PFA, closing 1% of courts could lead to a 0.06% increase in charges after three quarters and a 0.07% decrease in charges after six quarters. Additionally, a one-day delay in average conviction duration could lead to a 0.06% increase in charges after four quarters and a 0.07% increase in charges after eight quarters. The findings imply similar responses of prosecutors to court closures and conviction delays. They would add fewer charges in the first year after court closures and conviction delays and then drop more in the second. It partly supports my hypothesis that the delay problem is a link between court closures and charges. Prosecutors seem to respond to year-to-year changes because the high convictions and conviction rates they seek in their career appeals refer to annual convictions and conviction rates. More literature still needs to be on why prosecutors increase charges in the first year. My guess is twofold. Firstly, prosecutors in England and Wales may care more about convictions than conviction rates. Thus, when the delay problem reduced their convictions and conviction rates, they would first try to add charges to maintain convictions. When they realised the dwindling resources for courts no longer keep up with the previous conviction load, they turned to dropping criminal cases with a probability of conviction to maintain their favoured conviction rates. The first assumption may be partially supported by my findings that the reduction in charges in the second year is accompanied by a decrease in the proportion of violent crimes (which have a relatively lower probability of conviction) to total charges. Secondly, prosecutors probably tried desperately getting things on books before closing courts. Then when courts were closed, there was already a long waiting list in their workloads books, which resulted in an increase in charges in the first year. After the workloads on the books were solved in the first year, prosecutors faced

changes due to court closures and generated a new decision process in the second year.

Compared to conviction delays, closing 1% of courts would additionally lead to a 0.09% increase in charges after seven quarters, implying that court closures significantly impacted charge reduction in the second year than conviction delays. One possible reason for this difference is that court-imposed delays can accumulate (found in Chapter 4) and thus have a more considerable impact than changes in conviction duration alone. Consequently, the overall charges would fall two years after court closures and conviction delays. Based on the average charges (15,588) in 2010/11 in PFAs, my findings may predict that closing 51% of Magistrates' Courts would make charges fall by around 799 in 2019/20, which could explain 14% of changes in real data.

This chapter provides a fresh perspective on the declining charges in England and Wales. When thinking about changes in the behaviour of one part of the justice system, the government may think about it from the perspective of the entire justice system because agents in the system need to maintain cohesion to ensure organisational efficiency and could influence each other. In addition, this chapter also emphasises the need for more careful consideration of the differences between criminal courts and civil courts (e.g., the differences between court users) in the policy of court closures. The prosecutors in criminal courts could have different incentives than plaintiffs in civil courts. They may respond differently and bring different consequences. There still seem to be many unexplained reasons behind the decline in charges in England and Wales, and more relevant theoretical and empirical evidence is desired.

Although my estimates are consistent across controls, the fit of regressions is still relatively low. The reason could be that I cannot control the prosecutors' characteristics, such as the number of prosecutors, type of prosecutors, salary of prosecutors, guilty pleas during charges etc., because relevant data is unavailable at the local level. Future research may examine this when the data become available. Moreover, it could be ideal if future research could attempt to derive the link between charges, case duration, and court closures with diversified methodologies.

6 Do Court Closures Increase Crimes?

6.1 Introduction

Criminal activities may cause direct and indirect losses to the entire society. The crime itself is a form of illegal plundering of the resources allocated within society. It could directly cause the loss of citizens' property and even threaten the safety of life. In addition, the increase in crime may also lead to a decrease in legitimate economic activities because legitimate profits are not guaranteed, so the government may have to spend more resources to control crime on the basis of the losses caused by the crime (Freeman 1991).

Between 2010/11 and 2019/20, HO statistics show that police-recorded crimes in England and Wales rose by 23%, signifying a significant increase in crimes in comparison to a relatively minor change in population (a rise of around 7%). Over the same period, Magistrates' Courts in England and Wales have been closed by about 51%. Magistrates' Courts are basic-level criminal courts, where about 95% of criminal cases are completed (Courts and Tribunals Judiciary 2022). Given the importance of Magistrates' Courts in dealing with crimes, a link between the rise in crimes and court closures may exist. Nevertheless, few studies on this issue have been noticed.

6.1.1 Hypothesis

In this chapter, I propose a hypothesis based on the literature on crime reduction that the potential threat of court closures to case delays and charge reduction may be a reason for the decline in crimes. Becker's (1968) rational crime theory anticipates that individuals will be more inclined to commit crimes when the costs of crimes are lower than the benefits. The case duration could be regarded as a time discount factor (Vereeck and Mühl 2000), and the charges could be linked to the certainty of punishment (Schneider 2019; Abramovaite *et al*. 2018). Extended time discounts and a lower certainty of punishment may reduce the expected costs of committing crimes, thus potentially incentivising more criminal activity (e.g., Pellegrina 2008; Machin and Meghir 2004).

This chapter could diversify the discussion of the rational crime theory. The existing literature sometimes validates the theory by considering factors directly

related to the costs of crimes, such as using the prison population as an indicator of the severity of punishment (e.g., Han *et al*. 2013; Lin 2008) and using police to indicate the probability of punishment (e.g., Levitt 1997) etc. However, such research frequently faces an endogeneity problem between crimes and factors of their interests. Court closures in this chapter are less likely to be endogenous to crime than those direct factors. In this aspect, this chapter enriches the perspectives of discussing the rational crime theory.

This chapter also fills a gap in the literature on the relationship between court closures and crimes. Before this thesis, literature on crime reduction overlooked the consequences of court closures for crimes. The lack of samples might explain the literature gap because massive closures of courts were not frequently observed until the 2008 financial crisis and fewer countries closed criminal courts even after the 2008 financial crimes.

6.1.2 Strategy

To examine the link between court closures and crime changes, I intend to use the quarterly crime number data from ONS and the uniquely obtained court number data mentioned in Chapter 3. I directly use crimes instead of crime rates because existing literature differs in the base population of crime rate measurement, such as crimes per 100,000 population (e.g., Han *et al*. 2013), crimes per 10,000 population (e.g., Vollaard and Hamed 2012), and crimes per 1,000 population (e.g., Draca *et al*. 2011) etc. I prefer to go straight to crimes in a PFA and use a separate variable to control the population. The ONS also provides data on the number of different crime groups, which enables us to examine how different offenders reacted between April 2010 and March 2020. In addition to the total population mentioned earlier, I will also collect other demographic characteristics from the ONS, such as unemployment rates, age ratio, gender ratio, and ethnic ratio, to account for other possible factors influencing crime rates, as identified in the literature. Moreover, I would also collect average custodial sentence length (ACSL) and sentence rates to control for other changes in the criminal justice system.

For method selection, I would opt for the FE OLS approach, with the inclusion of a time trend variable. The FE OLS approach could allow this chapter to control for

differences between PFAs, such as local criminal groups, while examining the statistical association between court closures and crimes. The time trend variable would be used to control the upward trend of the crime itself, which may occur due to the expansion of criminal groups. Since the crime itself also has a strong seasonality (Draca *et al*. 2011), the variables in my model would be seasonally differenced.

My results show a significant association that 1% closures of courts could lead to a 0.06% rise in crimes. The assumption in the rational crime theory that individuals are more likely to commit crimes when the costs of crimes are lower than the benefits can attribute this finding to reduced expected costs due to case delays and fewer charges. My results also show a displacement effect transferring violent crimes into theft crimes. The rational crime theory may explain this as the costs and benefits of theft are more easily measured rationally and may be affected more significantly. My results highlight that court closures are likely to impact crimes indirectly.

The remainder of this thesis is organised as follows: Section 6.2 relates this chapter to the literature on crime reduction, induces the rational crime theory and its relationship with other theories, discusses empirical findings on costs of crime (e.g., time discount, the certainty of punishment, and severity of punishment), presents findings on benefits of crime (e.g., income, unemployment rates, education level), and summarises arguments of demographic characteristics (e.g., age, gender, ethnicity); Section 6.3 discusses the empirical stagey including introducing collected variables, explanation of using FE OLS approach, and design of model specifications; Section 6.4 presents results of this chapter, such as the impacts of court closures on crimes, the displacement effects between violent and theft crimes, and crimes in CERP and ERP; Section 6.5 concludes the main findings in this chapter, discusses policy implications, and presents suggestions for future research.

6.2 Literature on crime reduction

6.2.1 Existing crime theories

Although crime behaviours can be various (e.g., theft, violence, arson etc.), implying various reasons behind these behaviours, crime could be generally

defined as behaviours undesired by law. This general definition allows scholars to focus on the simple question of why individuals break the law.

Table 6. 1 Existing crime theories

Crime Theories
Attachment Theory; Behavioural Theory; Biological Positivism Theory; Black Feminist Theory; Cognitive Theory; Communication Accommodation Theory; Contact Theory; Containment Theory; Critical Race Theory; Cultural Transmission Theory; Deterrence Theory; Differential Association Theory; Family Disruption Theory; Gender-Based Theory; Importation Theory; Integrated Theory; Intersectional Theory; Labelling Theory; Left Realism Theory; Lifestyle Theory; Life Course Theory; Marxist/Conflict Theory; Modernization Slavery Theory; Polarity Management Theory; Protection Motivation Theory; Psychodynamic Theory; Rational Choice Theory; Routine Active Theory; Self-Control Theory; Self-Efficacy Theory; Social Bond Theory; Social Conflict Theory; Social Construction Theory; Social Control Theory; Social Disorganisation theory; Social Ecology Theory; Social Learning Theory; Socio-biological Theory; Square of Crime Theory; Strain Theories; Symbolic Interaction Theory; Theory of Arrest

Source: Walden University Library

A large number of crime theories have been provided by scholars (see, for example, Table 6.1). While the diversified theories indicate scholars have been discussing the cause of crimes from multiple perspectives, this diversity also brings complexity to the discussion. Burke's (2019) book makes a valuable contribution to clarifying the discrete theories into five groups.

According to the basic theoretical assumptions, the five groups include theories based on rational assumption, predestined assumption, victimised assumption, integrated assumption, and uncertain assumption. The rational theory assumes individuals break the law when the expected benefits from crimes are greater than the costs; the predestined theory assumes some individuals are "born criminals" and their behaviour can be hardly altered; the victimised theory assumes criminals can be individuals who are disadvantaged by the society; the integrated theories combine multiple assumption theories such as the predestined and victimised assumptions; and the uncertain theories emphasise the uncertain perception of criminal behaviour in the post-modern condition.

These five groups of criminal theories have different advantages and disadvantages. As an early attempt, the rational or "free will" assumption

provided a systematic logic to the punishment system and largely influenced European and US legal thought. For example, Cesare Beccaria's (1738-94) perception of considering the crime costs as a "social debt" owned by criminals affected the later legal logic that punishment is designed for crimes, not for criminals. Besides, the rational theory points out that the punishment system can actively control crimes. However, since the rational theory emphasises the "free will" of criminals, it sometimes neglects individual differences (e.g., age, gender, background etc.) limiting the ability of "free will".

In contrast, the predestined theory highlights individual differences. It tends to suggest that criminals can be identified. Not only by the "born characteristics" such as bone, gender, and genes (e.g., Cesare Lombroso 1936-1909; Klinefelter *et al*. 1942; Stanko 1985), it argues that criminals could also be distinguished by psychological characteristics such as their patterns of reasoning and behaviours (e.g., Aichhorn 1925; Healy and Bronner 1936), social characteristics such as rates of crime, drunkenness and suicide of their living environment (e.g., Durkheim 1933; Lilly *et al*. 1986). This complements the rational theory's weakness in neglecting individual differences. However, its disadvantages can also be obvious as it assumes these predestined characteristics can be constant and can hardly be influenced by other individual experiences, underestimating the legal system's role in controlling crimes.

The victimised theory has a similarity with the predestined theory in that it also highlights the impacts of the social environment on criminal behaviours. Differently, the victimised theory emphasises the social perceptions of crimes. It generally raises two opinions. Firstly, it suggests that there are conflicts between different groups of the public and criminal behaviours tend to be defined by the "winner public" who represents the social norms (e.g., Sellin 1938). Secondly, it explains that the "loser public" could be disadvantaged by the social environment dominated by the "winner public", which means some of the "loser public" behaviours are disadvantageously labelled as crimes by the "winner public" (e.g., Max Weber 1864-1920; Simmel 1908). Beneficially, the victimised theory provides introspection on what crimes are, which is an innovative perspective for discussing the causes of crimes. Limitedly, it focuses less on criminal behaviours (e.g., theft

and violence) against the general norms which are agreed upon by both the "winner" and "loser public".

The integrated theory is a developing trend in explaining criminal behaviours. By combining assumptions, it can overcome the limitations of the single-assumption-based theory. For example, the sociobiological theory (e.g., Vold *et al*. 1998; Walsh and Ellis 2006) embraces the assumptions of predestined and victimised theory, suggesting that criminal behaviours are individual responses to the social environment and responses could vary by individual specific characteristics. Such a theory is more flexible in explaining the causes of crimes. Besides, the integrated theory could also be brought to a more specific situation. For example, the environmental theory (e.g., Brantingham and Brantingham 1981) considers the law, offender, target, and place when explaining criminal behaviours. Integrating assumptions of multiple dimensions (e.g., Wikstrom 2005) allows a specific interpretation for a specific crime, which benefices legal application in the practice. Despite there are attempts to integrate multi-dimensions theories, the existing volume of work is still limited (Burke 2019). A more comprehensive, general, well-structured, and verified integrated theory might be desired in future development.

In the current post-modern condition, the development of criminal theories may need to overcome a new challenge, that is the dynamic conceptions of crimes. Burke (2019) summarises that the dynamic conceptions could be due to globalisation trends, cultural interactions, moral development etc. In the same logic as I introduced a general definition of crimes, a constant or stable conception of crimes is a major premise for discussing crime reduction. In some cases, public perceptions of crimes can even be different and dynamic within one nation or one local area. How to perceive and give consideration to the dynamic perceptions of crimes tends to be a task for current and future scholars.

6.2.2 Economic approach in crime theories

To further develop crime theories, supporting evidence should be provided by well-designed approaches. Given that the existing theories are generated from diversified perspectives, the approaches should not come from a single perspective as well. Considering the trend of integrating rationality, individual differences,

environmental characteristics, and social developments in crime theories, approaches of economists, criminologists, psychologists, sociologists and so on should all be welcome.

Among these approaches, the economic approach is particularly suitable for verifying rationality assumption. Economists often model human behaviour as guided by the pursuit of maximising utility, which provides advantages in testing the assumption of criminal "free will". Becker (1968) is a distinguished example of modelling criminals' consideration of benefits and costs. Becker's (1968) economic model managed to provide a structure for calculating expected costs and benefits from crimes. For example, it indicated cost could be represented by an expected loss from being arrested with consideration of the severity, certainty, and celerity of punishment; and the benefits could be represented by the expected gains from crimes. Such a structure provides a basic logic for later empirical evidence on rational theory.

Except for providing a model structure for empirical tests, the economic approach leaves spaces for involving individual differences, environmental characteristics, and social development. For example, the model structure allows later economists (e.g., Amaral and Bandyopadhyay 2015; Levitt 2002; Machin *et al*. 2011; Draca *et al*. 2019) to consider control variables such as individual differences (e.g., education level, wage, social status), environment characteristics (e.g., unemployment rates, population, area factors etc.), and social development (e.g., changes in the justice system and norms etc.). The flexibility of the economic approach allows it to fit into the trend of integrating multi-dimensions crime theories.

Furthermore, the economic approach owns a unique advantage in legal practice. The development of crime theory is supposed to be applied to crime control in legal practice. Given the limited resources of the government, the cost-benefit analysis of the economic approach can uniquely evaluate whether a policy is beneficial or not (e.g., Karavias *et al*. 2023; College of Policing 2021a; College of Policing 2021b). This unique advantage can promote the application of theory in practice and guide the adjustment of justice policy.

Same as other empirical approaches, the economic approach also bears limits in integrating detailed contexts and lacks large datasets. Besides, the various gains

from crime also bring difficulty for economic measurement. For example, the subjective gains from crimes (e.g., satisfaction from violence) cannot be easily measured in economic approaches. Thus, comprehensive theoretical support is a necessity for integrating evidence from economic approaches.

6.2.3 Deterrence in rational theory

Punishment deterrence is a core element of rational theory in legal practice. The rational theory not only suggests that punishment should make criminals pay for their victims and societies but also suggests punishment should discourage future crimes. It is important for punishment to send a signal of the price of crime and prevent potential criminals from committing similar crimes.

We could notice the discussion on optimal punishment has existed since the early appearance of rational theory (i.e., classical criminology). As one of the fundamental mechanisms, the punishment is expected to be higher than any benefits or pleasures provided by criminal behaviours. Meanwhile, classicism (e.g., Jeremy Bentham, 1748-1832) also be aware that the punishment is not supposed to be as severe as to reduce the greatest happiness. Individuals' "free will", which prefers pleasure over pain, is the basic assumption of the rational theory. The classical school suggests the principle of government is to achieve the greatest pleasures at the national level. The punishment should prevent individuals from pursuing individual pleasures at the expense of the greatest pleasures. Nor should punishment itself reduce the greatest pleasures.

Around the idea that optimal punishment should not reduce the greatest pleasures, there are more and more discussions on the effectiveness of punishment deterrence since imposing punishment itself is a cost to society (e.g., Miceli 2019). With the development of other theories in the twentieth century, the different deterrent impacts on individuals become increasingly apparent. For example, predestined theorists find that offenders tend to own antisocial psychological traits developed from unhealthy prior experiences (e.g., Hindelang and Weis 1972; Eysenck *et al*. 1977). These differences in individuals were accepted especially for explaining the reoffending behaviours. It brought rehabilitation into the discussion about optimal punishment.

However, with the unsatisfied efficiency of rehabilitation interventions on crime control, the rational theory returned in the form of retributive punishment during the 1970s and 1980s. The return of rational theory in the form of retributive punishment may be attributed to past mainstream rehabilitation interventions ignoring public desire for compensation by punishing criminals. The retributive punishment was favoured by populist conservatism and became a successful election issue for Margaret Thatcher in 1979 (Burke 2019). While the populist conservatives were likely to ignore the social economic and structural variables, they gave more weight to the certainty of punishment which is one of the fundamental elements in contemporary rational theory.

The contemporary rational theory emphasises the certainty, severity, and celerity (timeliness) of punishment. It has been developing since the later "nothing works" decade (Martinson 1974) after the trend of retributive punishment led by populist conservatives. The contemporary rational theory further discusses the effectiveness of punishment deterrence while taking into account the public's need to punish crime. The effects of deterrence are separated into two kinds: general deterrence discouraging potential criminal behaviours and specific deterrence preventing reoffending or specific criminals.

The division of deterrence provides space for the interactions and development of various theories. On the one hand, it retains the validity of rational theory on general deterrence (e.g., Listokin 2007; Machin and Meghir 2004; Levitt 1997), and on the other hand, it also absorbs the supplements of other theories on specific deterrence (Nagin *et al*. 2009).

Moreover, the three elements in contemporary rational theories also provide possible solutions to the paradox of marginal deterrence. Except for the limitation of controlling reoffending, there are also arguments that severer punishments could not be applied in every case (Becker 2015). For example, excessive punishment (e.g., capital punishment) for offences such as severe assaults and rapes could make offenders more dangerous and result in the death of victims. And the harsher punishment may also lead to lower certainty because of afraid of punishing the innocent (Miceli 2019). Rather than increasing the severity of punishment to control such crimes, the contemporary rational theory provides alternative logic to raise deterrence by increasing certainty and celerity of

punishment. Such alternative logic could have less influence on the dangers of criminals and avoid the punishment paradox.

Although imposing deterrence in contemporary rational theory becomes more flexible than the classical one, the deterrent impacts are not fully explored yet. For example, there are questions such as whether individuals have complete information for rational thinking, whether individuals have different preferences, and how individuals perceive the benefits and costs of crimes (e.g., Tonry 2011; Chalfin and McCrary 2017; Miceli 2019).

6.2.4 Costs of crime

During the rational cost-benefit analysis, the cost of crime is assumed to be negatively correlated with the prevalence of crime. The costs of crimes could be related to the time discount factor, certainty of punishment, and severity. The time discount factor, which refers to the time it takes for a criminal to receive punishment, is assumed to be negatively correlated with the costs of crime. The certainty of punishment refers to the probability that a criminal could receive the punishment, which could be positively correlated with the costs of crime. The severity of punishment refers to the direct costs a criminal may receive from the legal system, which could be positively correlated with crime costs. Although there is less literature discussing the relationship between court closures and crimes, the potential risks brought by court closures, including case delays and charge reduction, could be related to the time discount factor and the certainty of punishment,

Case duration can act as a time discount factor for the cost of crime because any delay could postpone the punishment (Listokin 2007; Pellegrina 2008; Amaral and Bandyopadhyay 2015; Dušek 2015; Hernandez 2019). While there are a limited number of empirical works investigating case duration and crimes, the existing evidence from different methodologies suggests a positively significant link between them. Pellegrina (2008) could be an early work examining the relationship between case duration and crimes, which collected the annual data of 412 observations in all 103 Italian provinces between 1999 and 2002. Since the increase in crimes could endogenously delay the case duration, a two-stage least-squares (2SLS) approach was applied. It was established that one year increase in

case duration could cause around 5.25 unit rises in theft crimes (per 10,000 inhabitants). However, the significant results of case delays could be smaller in other crimes, such as robberies (0.2 units), frauds (0.372 units), and racketeering (0.03 units). These minor effects on other crimes may be explained by the rational theory that the benefits of theft crimes can be more simply measured by monetary units and thus could be easier for rational evaluations. Later, by collecting the annual data of 191 observations from 16 states between 1995 and 2007 in India, Amaral and Bandyopadyay's (2015) FE OLS results showed that the case delays could be positively related to property crime rates in the next year. In addition, Dušek (2015) analysed an annual panel of 79 Czech districts covering 24 groups of crimes between 1999 and 2008 with a 2SLS method. It was found that 1% of court delays could increase burglary by 0.04% and embezzlement by 0.2%. Moreover, Hernadez (2019) employed a difference-in-difference (DID) approach based on the New Code of Criminal Procedure (NCCP) adopted in Peru in 2006. The NCCP aimed to reduce the case duration of individual crimes but was not applied in all districts due to the lack of budget. With an annual panel of 31 districts between 2010 and 2015, it was found that districts where the NCCP was not implemented, could have significantly more crimes.

The clearance rates refer to the probability that a crime could be resolved by the criminal justice system, which is related to the certainty of punishment. The charge reduction in courts could be linked to lower clearance rates. Literature with different methodologies tends to suggest that clearance rates are negatively related to crimes. In Machin and Meghir's (2004) 2SLS study for annual data in 1975-1996 in PFAs of England and Wales, it was found that if the clearance rates of property crime increase by 10%, the property crimes will drop 8.7%, including burglary, vehicle, and theft and handling crimes. In addition, with a multilevel modelling approach, the similar negative impacts of clearance rates on crimes were also noticed by Whitworth (2011) at the district-level analysis of annual data in 2002-2009 in England and Wales, mainly on robbery and vehicle crimes. Moreover, Han *et al.*'s (2013) generalised method of moments (GMM) approach with annual data in 1992-2008 supported that clearance rates could have negatively significant impacts on property crimes (incl. burglary, theft and handling, and fraud and forgery) in a PFA.

The police workforce is another indicator of the certainty of punishment in literature, which refers to the probability of arrest. Existing evidence also tends to suggest it has significant effects on crimes. For example, Levitt's (1997) 2SLS approach found that the number of police in an area could be negatively related to crime rates. Later, it was noticed by Lin (2008) that the police per 1,000 population could have significant deterrence impacts on property crimes during OLS estimations. In England and Wales, studies found that both the number of police officers (Whitworth 2011) and support staff (Vollaard and Hamed 2012) could deter property crimes. There is also much evidence from England and Wales supporting that police efforts could also decrease crimes (e.g., Lin 2008; Abramovaite *et al*. 2018; Draca *et al*. 2011; Vidal and Kirchmaier 2018)

Although there could be an endogeneity relationship between the severity of punishment (e.g., the average custodial sentence length) and crime rates, various methodologies have been attempted to overcome this issue. Overall, empirical evidence tends to suggest the severity of punishment has deterrence on crimes, such as evidence from the 2SLS approach (e.g., Levitt 2002; Lin 2008; Evans and Owens 2007) and DID approach (e.g., Francesco *et al*. 2007; Bell *et al*. 2014; Draca *et al*. 2011; Tella and Schargrodsky 2004; Klick and Tabarrok 2005).

6.2.5 Benefits of crime

Research on the benefits of crime is still in its early stages, with many scholars seeking to understand criminals' motivations through their potential legal returns. The income level, unemployment rates, and education level could be correlated with individuals' legal returns.

Findings related to income levels and crime rates seem to be mixed in England and Wales, likely due to differing methods of measuring earnings. For example, some findings show a positive relationship between earnings and crimes. In Han *et al*.'s (2013) GMM model, the average real-term earnings (low-wage group) were positively correlated with property crimes. The annual data of Han *et al*. (2013) was collected at the PFA level between 1992-2008. In similar data periods (i.e., 1992-2007), Bandyopadhyay *et al*. (2005) also established similar results. During Bandyopadhyay *et al*.'s (2005) estimations, while the data of earnings were collected from the same data source as Han *et al*. (2013), it was separated into

25th percentile, 50th percentile, and 70th percentile earnings in order to notice if the different distributions of earnings can bring various results. However, under both OLS and 2SLS estimations, the real-term earnings could constantly positively affect either property or violent crimes. On the contrary, some findings show a potential negative relationship between earnings and crimes. For instance, in Machin and Meghir (2004), similar annual data was collected at PFA levels from earlier years (i.e., 1975-1996). Differently, the real-term hourly wage was used to represent the return from legal activities. It was observed that estimates of the 10th and 25th percentile average hourly could become negative for property crimes. Similar findings on hourly wages were also provided by Draca *et al*. 2019. These findings may imply that the measurement of the legal earnings could be a concern during analysis.

Unemployment rates, which may affect opportunities for individuals to engage in lawful activities, are another common focus in studies of crime. However, the findings on them could also be mixed. For example, some early studies found them are positively related to property crimes in the US (e.g., Britt 1997; Levitt 1997; Levitt 2002). However, some later studies argued that the effects could be less considered when the crime data is detrended (e.g., Arvanites and Defina 2006; Evans and Owens 2007). The findings could be even more mixed in England and Wales. For example, some studies found that unemployment rates could have modest and adverse effects on property crimes (e.g., Han *et al*. 2013; Abromovaite *et al*. 2018). In contrast, some studies noticed positive effects (e.g., Draca *et al*. 2019; Bandyopadhyay *et al*. 2015).

The findings on education level tend to constantly suggest that higher education level could be related to few crimes. For example, Bell *et al*. (2016) used the minimum number of years required to attend school as the instrument variable to interpret the effects of education length on crimes. It was found that with the increase in total education years, the behaviours of property crimes and violent crimes can be significantly less. Similar effects were also provided by using other 2SLS, and regression discontinuity (RD) approaches (e.g., Machine *et al*. 2011; Bell *et al*. 2018; Whitworth 2011).

6.2.6 Other demographic characteristics

Apart from factors directly related to Becker's (1968) cost-benefit analysis, other demographic characteristics such as population, age, gender, and ethnicity, can also influence crime rates.

As crimes can only happen when people exist, the population is frequently controlled in the existing literature. However, the findings on it could be mixed. For example, the city population was controlled while Levitt (2002) investigated the police' effects on US cities and displayed the population can be negatively related to crimes. Later, during Evans and Owens' (2007) analysis of crime, the population and the population growth rate were also controlled. It was found that while the population could be negatively related to crimes, its growth rates could be positively linked to crimes. In addition, Whitworth (2011) found the total population, population density, and population turnover rates positively related to property crimes.

The age group 15-24, sometimes referred to as the 'crime age', is often associated with higher levels of illegal activity (e.g., Levitt 1997; Evans and Owens 2007). In contrast, the findings on gender and ethnicity tend to be mixed. Gender is also frequently considered in literature because gendered norms may suggest males could be more likely to commit crimes than females (Stanko 1985). The impact of minority populations on crime rates is often studied in countries like the US, given its multicultural background (e.g., Levitt 1997; Evans and Owens 2007; Johnson and Raphael 2012).

6.3 Empirical strategy

6.3.1 Data description

I intend to analyse information about the number of crimes, the number of Magistrates' courts, operations of the justice system, and demographic characteristics from the same built panel database (see Chapter 3). I would mainly investigate the number of crimes and the number of Magistrates' Courts. In addition, I also consider operations of the justice system, such as average custodial sentence length and sentence rates, and demographic characteristics, such as total population, unemployment rates, male rates, youth rates and white rates (see table 6.2). It is suggested in literature reviews (see section 6.2) that changes in

the justice or legal system and demographic characteristics could also impact criminal behaviours in an area.

Table 6. 2 Variables in the analysis of crimes

Variables	Definitions
Total number of crimes	The total number of police recorded crimes.
Number of violent crimes	The number of police recorded violent crimes.
Number of theft crimes	The number of police recorded theft crimes.
Number of Magistrates' Courts:	The number of Magistrates' Courts remained open by the end of a period.
Average custodial sentence length:	Average months of custodial sentence for defendants received "immediate custodial" outcome in all courts.
Sentence rates	The rates of sentenced defendants to total number of police recorded crimes in all courts.
Total population	Total population aged 16 – 64.
Unemployment rates	The rates of unemployed population aged to 16 -64 to total economically active population aged 16 -64.
Male rates	The rates of male population aged 16 – 64 to total population aged 16 – 64.
Youth rates	The rates of youth population aged 16 – 24 to total population aged 16 – 64. .
White rates	The rates of white population aged 16 – 64 to total population aged 16 – 64.

Table 6. 3 Summary statistics of the analysis of crimes

Spatial level: 42 PFAs **Time frequency and interval:** quarters between April 2010-March 2020

Variables	Obs.	Mean	Std. Dev.	Min	Max
Dependent variables (days):					
Total number of crimes	1,680	24,859	30,281	4,031	236,625
Total number of violent crimes	1,680	6,083	7,234	701	57,688
Total number of theft crimes	1,680	11,319	15,447	1,319	116,965
Explanatory variable:					
Number of Magistrates' Courts	1,680	5	4	1	34
Control variables:					
Average custodial sentence length (months)	1,680	19	4	2	38
Sentence rates of all crimes	1,638	7%	3%	2%	18%
Total population	1,638	215,434	214,401	72,325	1,515,250
Unemployment rates	1,638	6%	2%	2%	14%
Male rates	1,638	49.6%	0.3%	48.7%	50.6%
Youth rates	1,638	18%	2%	14%	21%
White rates	1,512	91%	8%	59%	99%

Several stylised facts could be observed from the collected information. Table 6.3 shows that on average, only 7% of recorded crimes end up being sentenced by courts. In addition, within police force areas of England and Wales, most residents

(91%) are white, and the gender tends to be balanced as the male rates are around 50%.

6.3.2 Methodology

I intend to employ a FE OLS approach to investigate if court closures increase crimes. The FE OLS approach allows us to examine the statistical link between court closures and crime changes while controlling the area characteristics (e.g., local crime groups). Criminal behaviours can vary across PFAs because of different local crime groups or other area-specific characterises. It is one of the reasons why the area environment is frequently considered by literature on crime reduction (e.g., Han *et al*. 2013; Hansen and Machin 2002).

Although the endogeneity issue seems to be a frequent concern in the literature on crime reduction, this issue is of less concern in this analysis of the relationship between crimes and court closures. Suppose that case duration is endogenous with court closures. In that case, there could be an endogenous relationship between crimes and court closures that crimes may indicate more caseloads in court and thus affect case duration, which influences decisions of court closures. However, I have provided supporting evidence in Chapter 4 that suggests it's less likely for case duration to have an endogenous link with court closures in my study. Thus the endogeneity issue could be less worry in this analysis.

6.3.3 Model specifications

I employ a FE OLS approach to design model specifications for analysing court closures and crimes. The applied model is not consistent with the TWFE model in previous questions because the dependent variables have different properties.

Different from the dependent variables in previous questions, case duration and charge numbers, the dependent variable in this question, crime numbers, still has a clear increasing trend after differencing (see figure A2). The possible reason is that crime can not only increase by itself but also can increase faster and faster. The subculture theory of crime (e.g., Cohen 1955) may explain that crime can increase exponentially. For example, criminals, especially recidivists, tend to have ongoing interactions with crime groups and their subcultures. A crime group can expand exponentially, leading to an exponential increase in crimes if it

contributes to the majority of police-recorded crimes. It can be one explanation for why crime can increase faster and faster.

Therefore, a time trend variable is particularly included to control the unique feature in crime statistics, that is, the remaining increasing trend after differentiating the variables. The model specifications are as follows:

$$\begin{aligned}\%\Delta_4 CrimeNumber_{it} &= \beta_0 \,|\%\Delta_4 CourtNumber|_{it} + PFA_i + \lambda_1 TimeTrend_{it} + \lambda_2 \%\Delta_4 ACSL_{it} \\ &+ \lambda_3 \Delta_4 sentence_{it} + \lambda_4 \%\Delta_4 Polulation_{it} + \lambda_5 \Delta_4 unemployment_{it} \\ &+ \lambda_6 \Delta_4 youth_{it} + \lambda_7 \Delta_4 male_{it} + + \lambda_8 \Delta_4 white_{it} + \varepsilon_{it}\end{aligned} \tag{6.1}$$

where the i represents a specific PFA, and the t indicates a specific period of quarters. The Δ_4 indicates the changes in four quarters[46] (or seasonal differences), and the $\%\Delta_4$ indicates the per cent changes between four periods[47]. The dependent variable, $\%\Delta_4 CrimeNumber$, indicates the per cent changes between four periods in the number of crimes. The explanatory variable, $|\%\Delta_4 CourtNumber|$, indicates the absolute value[48] of per cent changes between four periods in the number of Magistrates' Courts. The PFA is an area-fixed dummy variable of 42 PFAs, and the $TimeTrend$ is a time trend variable (quarters). For other control variables, $\%\Delta_4 ACSL$ indicates the per cent changes between four periods in average custodial sentence length; $\Delta_4 sentence$ indicates changes between four periods in sentence rates; $\%\Delta_4 Population$ indicates per cent changes between four periods in the total population aged 16-64; $\Delta_4 unemployment$ indicates changes between four periods in unemployment rates; $\Delta_4 youth$ indicates changes between four periods in youth rates; $\Delta_4 male$ indicates changes between four periods in male rates; $\Delta_4 white$ indicates changes between four periods in white rates of population. The ε is a matrix of error terms of the regression. The

[46] e.g., $\Delta_4 sentence_{2019q4} = sentence_{2019q4} - sentence_{2018q4}$

[47] e.g., $\Delta\%_4 CrimeNumber_{it} = (CrimeNumber_{2019q4} - CrimeNumber_{2018q4})/CrimeNumber_{2018q4} \times 100$

[48] The absolute value does not change the estimates of percent changes in court number despite the sign because the number of courts in a PFA monotonically decreases between April 2010 and March 2022.

β_0 is the interested coefficient, and a positively significant β_0 indicates court closures could induce more crimes.

Variables are measured by changes in four periods (seasonal differences) to offset the seasonality in crimes. Literature on crime reduction (e.g., Draca *et al*. 2011) suggests a strong seasonality in crimes. For example, fewer domestic burglaries might occur in winter because people are often home at night. I intend to seasonally difference variables to offset such a seasonality in the dependent variables. By doing so, this analysis can also control other possible seasonality features related to criminal behaviours, such as criminals' daily schedules at different seasons.

Numeral data are measured by per cent changes in four periods to avoid measurement bias. For instance, there are different court numbers in PFAs before closures, e.g., 34 courts in London PFA and three in Wiltshire PFA before closures. Closing one court could have different impacts on London PFA and Wiltshire PFA. Since similar measurement bias could also exist in other numerical statistics, such as the number of crimes, ACSL, and total population, these numeral data are also adjusted into per cent changes.

I include PFA FE dummies and a time trend variable to control for the linear trend in specific area characteristics (e.g., local criminal groups) and the trend of escalating crime rates over time. As my variables measured by changes in four periods, the constant area characteristics, such as local criminal groups, weather, and environment etc., are already offset. If those characteristics are not constant and have a linear trend across periods, the PFA FE dummies would capture the trend. In addition, the subculture theory of crime (e.g., Cohen 1955) suggests individuals may commit criminal behaviours to fit in their criminal groups. Thus, a rise in crimes may increase criminal groups' size and motivate more crimes. As there could also be an increase in the number of group members, the speed of increase in crimes might have a growing tendency. I intend to use a time trend variable to control the increase in the speed of crime growth.

I use $\%\Delta_4 ACSL$ and $\Delta_4 sentence$ to control changes in operations of the justice system, such as changes in severity and certainty of punishment. In Becker's (1968) rational theory, the severity and certainty of punishment are related to individuals' expected costs from crimes and affect their decisions to commit

crimes. Low severity and uncertainty of punishment may make individuals more likely to commit crimes. I use the average custodial sentence length (ACSL) to indicate the severity of punishment. Although the ACSL maybe also affected by the seriousness of committed crimes, it is the best available data for this analysis. The longer the ACSL is, the more severe the punishment is assumed to be. Besides, similar to the measurement in Abramovaite *et al*. (2018), I use the rates of the sentenced number to police-recorded crimes to measure the certainty of punishment. Higher sentence rates imply that criminal behaviours in an area could have a higher chance of receiving punishment from courts.

I use $\%\Delta_4 Population$, $\Delta_4 unemployment$, $\Delta_4 youth$, $\Delta_4 male$, and $\Delta_4 white$ to control changes in demographic characteristics. These variables are standard controls in the literature on crime reduction. The total population is frequently included to control the size of potential criminals (e.g., Levitt 2022; Evans and Owens 2007; Whitworth 2011). Besides, as illegal earnings often accompany criminal behaviours, the unemployment rates could be used to control individuals' economic status in an area (e.g., Britt 1997; Levitt 1997; Schneider 2019). In addition, the literature suggests youth population is more frequently involved in minor illegal activities, and youth rates are a standard control for it (e.g., Arvanites and Defina 2006; Machin and Meghir 2004; Han *et al*. 2013). Furthermore, male and white rates are usually included to control different preferences of gender and ethnicity of committing crimes (e.g., Levitt 1997; Machin *et al*. 2011; Whitworth 2011).

Although factors such as police workforce, labour incentives, and education level are not included in the main regressions because the data is not provided for quarters, they are included in a robustness test using annual statistics.

Since a time-trend variable is used to replace the time-fixed variable, the model specifications lose control for area-invariant factors, such as prices, austerity measures, and changes in legal policies. These missing variables could be correlated with aspects of justice operations and the social environment, which might be captured by variables such as the number of courts, average sentence length, and unemployment rates. If there are significant area-invariant changes in the investigated time interval, the estimates of relevant variables could be biased.

6.4 Results

6.4.1 Court closures and crimes

Table 6.4 reports the estimates of the impact of court closures on crime, derived from regression analysis. The court closures are measured by per cent changes in courts because numerical measurement could be biased to indicate the influences of courts on different PFAs. The significantly positive estimates of court closures suggest that the closure of Magistrates' Courts could potentially contribute to an increase in crimes. The preciseness of estimates tends to be constant as the standard errors are the same across regressions. In all regressions, the difference in constant PFA factors, such as social norms, environment, local criminal groups, etc., is offset in my seasonally differenced variables. In column (1), I include PFA FE to control linear trends in PFA factors and a time trend variable to control the growing trend in the speed of increase in crimes. In column (2), I include changes in the justice system's operations, e.g., ACSL and sentence rates, to control changes in severity and certainty of punishment. In column (3), I include changes in demographic characteristics, e.g., population aged 16-64, unemployment rates, male rates, youth rates, and white rates, to control changes in the potential population of criminals and preference of population for committing crimes. The fitness (adjusted R^2) of regression increases with additional controls. I focus on column (3) as it has the highest fitness of regression.

The estimate of court closures in four periods, as shown in column (3), suggests that in a PFA, if the number of Magistrates' Courts decreases by 1% compared to the same season in the last year, the number of total crimes could increase by 0.06% comparing to the same season in last year. Based on Becker's (1968) rational theory of crimes, this chapter assumed that closing Magistrates' Courts could induce more crimes because it discounts the expected crime costs by delaying case duration and discouraging prosecutors from charging. The rational theory of Becker (1968) assumes that people commit crimes because the expected benefit from crime is larger than the expected costs. It was found in Chapter 4 and Chapter 5 that closing Magistrates' Courts is followed by a delay in days for completing a criminal case in the justice system (case duration) and a reduction in the number of charges brought to courts by prosecutors. The delay in case duration could act as a time discount decreasing the criminals' expected

punishment eventually given by courts, and the reduction in charges could decrease criminals' probability of receiving punishments. Thus, the established relationship between court closures and crimes is assumed to be explained by court closures' delay impacts on case duration and reduction impacts on charges.

Table 6. 4 Court closures and crimes

Dependent variables: $\%\Delta_4 CrimeNumber_{it}$			
	(1)	(2)	(3)
Court closures in four periods (%)	.10***	.08***	.06***
	(.02)	(.02)	(.02)
Linear trend in areas (PFA FE)	Yes	Yes	Yes
Time trend (Quarters)	Yes	Yes	Yes
Changes in operations of justice system	No	Yes	Yes
Changes in demographic characteristics	No	No	Yes
P-value of F-test	0.00***	0.00***	0.00***
Adjusted R^2	0.2181	0.5563	0.5614
Observations	1,512	1,470	1,344

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- The operations of justice system include ACSL and sentence rates.
- The demographic characteristics include total population, unemployment rates, male rates, youth rates, and white rates.
- Full estimates can be seen in table A14.

Between the summer of 2010 and the summer of 2020, court numbers averagely decreased by around 50% in a PFA. My estimates predict that the decrease in courts could lead to a 3% increase in quarterly crimes in each PFA between the two periods. My summary statistics (in table 6.3) show an average of 24,859 crimes recorded by police each quarter in each PFA. Adjusting into the national level of England and Wales, the court closures are roughly predicted to account for 125,289[49] increases in annual crimes comparing 2010/11 to 2019/20, which could explain around 13% of changes in real figures. Beyond the predicted direct increase in crimes caused by court closures, the increased crimes themselves might have a tendency to grow with an increasing speed. It is suggested by the subculture theory of crime (Cohen 1955) that individuals may commit criminal

[49] $average\ annual\ crimes\ at\ nation\ level = 42 \times average\ anual\ crimes\ at\ PFA\ level = 42 \times 4 \times average\ quarter\ crimes\ at\ PFA\ level = 42 \times 4 \times 24{,}859 = 4{,}176{,}312$

$roughly\ predicted\ impacts = average\ annual\ crime\ at\ nation\ level \times 3\% = 4{,}176{,}312 \times 0.03 = 125{,}289$

behaviours to conform to the code of the criminal group which they live with. The increase in crimes may be accompanied by increased influences of criminal groups, which attracts more individuals to commit crimes to fit into the groups. If the members in a criminal group expand exponentially, crimes' tendency to grow could be accompanied by an increase in speed of growth across time. This could be a possible explanation for the unaccounted-for rise in crime in the actual data.

I also report estimates of the robustness test using annual panel data in table A6. By examining the annual statistics, the robustness test could include additional controls such as changes in full-time equivalent police workforce, non-education qualification[50] population rates, and real-term hourly payments. The number of full-time equivalent police workforce indicates the criminals' probability of being arrested by police, which could be positively related to the expected costs of committing crimes. Besides, the non-education qualification population rates and real-term payments are used to imply the legal earnings of people in a PFA. In Becker's (1968) rational theory of crimes, the legal earnings could be considered during the cost-benefit analysis because individuals' legitimate economic activities could be influenced if their offensive behaviour is convicted. The non-education qualification could be negatively related to the expected costs of crimes, and the income could be positively related to the expected costs. The results in table A6 show that estimates of court closures from regression of annual data are consistently positively significant across controls, and the values of estimates are similar to regressions of quarterly data.

6.4.2 Displacement impacts on crimes

I further study the number of violent crimes and the number of theft crimes, respectively, to examine whether court closures have different influences on them. The HO separates the number of crimes by crime groups, which allows us to examine the response of different groups of criminals to the closures of Magistrates' Courts. Becker's (1968) rational theory of crimes assumes that individuals are rational when deciding to commit crimes. However, the rational assumption may not always hold across different crime groups. According to the

[50] The none-education qualification means people do not have either GCSE qualifications or NVQ qualifications.

strain theory of crimes (Merton 1957), individuals may commit offensive behaviours because of pressure and frustration. Both pressure and frustration are subjective feelings and might hardly be evaluated by individuals. Impulse crimes usually involve subjective feelings, which could be difficult for individuals to conduct a rational cost-benefit analysis before committing crimes. Crimes involving violence against a person are sometimes impulsive, as the rewards from such behaviours could include subjective feelings like satisfaction. Therefore, compared to theft crimes which earn (e.g., stolen staff) can be easily measured by clear monetary values, violent crimes might respond to the closures of Magistrates' Courts differently.

Table 6. 5 Displacement effects on crimes

Dependent variables:	$\%\Delta_4 TheftCrime_{it}$	$\%\Delta_4 ViolenceCrime_{it}$
	(1)	(2)
Court closures in four periods (%)	.15***	-.13***
	(.02)	(.04)
Linear trend in areas (PFA FE)	Yes	Yes
Time trend (Quarters)	Yes	Yes
Changes in Operations of justice system:		
Per cent changes in ACSL of theft crimes in four periods	Yes	No
Changes in sentence rates of theft crimes in four periods	Yes	No
Per cent changes in ACSL of violent crimes in four periods	No	Yes
Changes in sentence rates of violent crimes in four periods	No	Yes
Changes in demographic characteristics	Yes	Yes
P-value of F-test	.00***	0.00***
Adjusted R^2	0.3411	0.3329
Observations	1,344	1,344

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- The demographic characteristics include total population, unemployment rates, male rates, youth rates, and white rates.
- Full estimates can be found in table A15.

Table 6.5 reports the estimates from regressions of theft crimes and violent crimes. The measurement of variables is exact with previous regressions, and control variables are fully included in all regressions. In column (1), the control variables of the justice system operation are ACSL of theft crimes and sentence

rates of theft crimes. In column (2), the control variables of justice system operations are ACSL of violent crimes and sentence rates of violent crimes. The significantly positive estimate of court closures in column (1) indicates that closing Magistrates' Courts could lead to an increase in the number of theft crimes. The negatively significant estimates of court closures in column (2) represent closing Magistrates' Courts could lead to a decrease in the number of violent crimes.

The disparate signs of estimates from regressions of theft and violent crimes indicate the potential displacement effects of court closures on criminal behaviours. As discussed above, theft crimes' earnings can be more easily measured by clear monetary values than violent crimes. It is possible that closing Magistrates' Courts only directly induces more theft behaviours by reducing the expected costs of theft crimes. Although the expected costs of violent crimes are also likely to be reduced by court closures, the influence tends to be indirect. It could still be difficult to conduct a cost-benefit analysis of violent crimes considering the earns of subjective feelings are hard to be evaluated. The expected profit (results from cost-benefit analysis) from violent crimes are probably uncertain after closures, but the profits of theft crimes increase. The relatively higher profits from theft crimes may make them more attractive to potential criminals and thus transfer criminal behaviours from violent behaviours to theft behaviours.

6.4.3 Crimes in CERP and ERP

I investigate the two court projects, i.e., CERP and ERP, to examine whether the effects of court closures in ERP can be superimposed on closures in CERP. As found in Chapter 4, the impacts of court closures in ERP on case duration may have superimposed effects on closures in CERP. To examine whether closures in the two projects can have different influences on crimes, I separate the time interval of the database into April 2010 to March 2015 (i.e., CERP) and April 2015 to March 2020 (i.e., ERP) for regressions.

Table 6.6 reports the estimates of court closures in the two projects, i.e., CERP and ERP. Measurements of variables are consistent with previous regressions, and control variables are fully included in all regressions. The positively significant estimate of court closures in column (1) could imply that closing 1 % of

Magistrates' Courts in the CERP links to a 0.09% increase in crimes. The negatively significant estimate of court closures in column (2) could imply that closing 1% of Magistrates' Courts in ERP links to a 0.06% increase in the number of crimes. It seems that closures in CERP can cause larger and more significant impacts on crimes than in ERP.

Table 6. 6 Crimes in CERP and ERP

Dependent variables: $\%\Delta_4 CrimeNumber_{it}$		
Two court projects:	CERP	ERP
	(1)	(2)
Court closures in four periods (%)	.09***	.06**
	(.03)	(.02)
Linear trend in areas (PFA FE)	Yes	Yes
Time trend (Quarters)	Yes	Yes
Changes in operations of justice system:	Yes	Yes
Changes in demographic characteristics	Yes	Yes
P-value of F-test	.00***	.00***
Adjusted R^2	0.5791	0.4085
Observations	546	798

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- The operations of justice system include ACSL and sentence rates.
- The demographic characteristics include total population, unemployment rates, male rates, youth rates, and white rates.
- CERP represents quarterly information between April 2010 and March 2015.
- ERP represents quarterly information between April 2015 and March 2020.
- Full estimates can be found in table A16.

The findings of the two projects' influences on crimes tend to differ from my previous findings on case duration and charges. It is unsure whether the different findings are caused by different impacts of court closures on case duration and charges. The court closures are hypothesised to affect crimes by affecting case duration, i.e., the time discount of punishment, and charges, i.e., the certainty of punishment. It is found in Chapter 4 and Chapter 6, respectively, that closing courts have immediate impacts on case duration but delayed impacts on charges. It is uncertain if the different influences of the two projects on crimes are a combined result of the instant changes in case duration and delayed changes in charges after court closures.

6.5 Conclusion

This chapter examines whether a link exists between the 23% rise in crimes and the 51% court closures between April 2010 and March 2020. This chapter not only enriches the rational crime theory literature but also fills a gap where few have explored the impacts of court closures on crimes.

In order to answer the question, I used the quarterly crime data from ONS and the unique court data to study whether there is a statistically significant correlation between changes in crime numbers and changes in court numbers within a PFA. In addition, I collected ACSL and sentence rates to control other changes in the operations of the justice system, as well as total population, unemployment rates, age ratio, gender ratio, and ethnic ratio to control demographic characteristics. A FE OLS approach with a time trend variable analysed the relationship between court closures and crime changes. By doing so, we can control differences in PFAs (e.g., local criminal groups) and the rising crime tendency. In the model, variables were seasonally differenced to offset the seasonality of crimes.

I found that closing 1% of Magistrates' Courts in a PFA could lead to a 0.06% rise in crimes. This finding can be explained by my hypothesis based on the rational crime theory that case delays and charge reduction as results of court closures might incentivise more crime by reducing crime costs. Based on the annual crimes (4,078,475) in 2010/11 in England and Wales, my results roughly estimate that a 51% reduction in the courts of 2019/20 may lead to 122,353 increases in crimes, explaining around 13% of the actual figure. In addition, I found a significant correlation between 1% court closures, a 0.15% rise in theft crimes, and a 0.13% drop in violent crimes. The rational crime theory can attribute this displacement effect to the fact that the costs and benefits of theft are easier to measure rationally. The lower expected costs of theft crimes due to court closures may make them more attractive than violent crimes. The displacement effect on crimes may affect different groups of criminals differently.

This chapter may directly contribute to completing evaluations of court closures in England and Wales. Besides, my analysis provides an example of the government using rational crime theory within the criminal justice system. That may help governments use it in further practical policies in the future.

Furthermore, this analysis also emphasises that agents in the criminal justice system as a whole, changing one agency of the system may also affect the behaviour of other agents. In particular, crime may have a rapid growth trend due to the expansion of criminal groups, which could make society face huge expenditures to deal with direct loss from crimes and the costs of controlling crimes. At the same time, the likely increase in crimes themselves may be one reason why much of the raised crimes remain unexplained. This chapter also stresses the complexity and different responses of criminal groups that the government may want to consider when implementing crime-related policies.

Although court closures are less likely to be endogenous with crimes in my analysis, it could be a beneficial addition if a proper instrumental variable can be applied to compare results with mine considering endogeneity is frequently discussed in the literature. Furthermore, it would be ideal if a variety of approaches were attempted in the future.

7 Conclusion

This whole thesis aims to explore whether the 51% closures of Magistrates' Courts in England and Wales links to threats to timeliness (22% delay in case duration), fairness (37% reduction in charges), and effectiveness (23% increase in crimes) of justice for victims. To my best knowledge, before this, few have discussed the potential links behind them. Based on the existing literature and empirical evidence, this thesis proposes a hypothesis that court closures may pose a risk to justice by bringing adverse complementary effects.

For the timeliness of justice, based on the literature on court congestion, I proposed that court closures may delay case duration by increasing the burden of remaining courts. For fairness, based on the literature on prosecutorial discretion, I assumed that the squeeze on court resources (manifested as case delays) due to court closures might make prosecutors more selective about charges. For effectiveness, based on the literature on crime reduction, I proposed that the risk of case delays and charge reduction brought by court closures may reduce the costs of crimes and thus encourage more crimes.

This thesis simplified the examination of the complementary effects into three research questions: do court closures delay case duration, do court closures reduce charges, and do court closures increase crimes?

7.1 Main findings

To ensure my three research questions have a commonality in order to discuss the complementary effects of court closures, I build a unique panel database for all three. The unique panel database consists of quarterly administrative statistics available between April 2010 and March 2020 in 42 PFAs, which provide us with a large enough sample size while converging all court closures in the two continuous court projects (CERP and ERP). Besides, Magistrates' Courts numbers are repeatedly used in all three and are obtained by integrating public data from HOCL with unique data from MOJ. It enables this thesis to measure the per cent changes in the number of Magistrates' Courts in PFAs for all three. Such measurement allows us to neglect biases since PFAs have different court numbers while controlling cases transferring within a PFA.

The first research question aims to test the correlation between court closures and case delays. To do this, I used the timeliness statistics published by the MOJ in 2019, which provided data on the number of days taken from case initiation to completion and used the unique data of the number of Magistrates' Courts. Besides, I also used the defendant number, the name of charges for defendants, defendant type, and guilty pleas from MOJ to control the pressure of caseloads and the complexity of cases. The targeted correlation was examined with a TWFE OLS, which enabled this analysis to provide empirical evidence while controlling area characteristics (e.g., working patterns of court staff) and policy changes (e.g., SJP and ATCM). Variables were differenced in model specifications as case duration could have seasonality due to caseloads being made up of seasonal crimes.

In the first question, I found that court closures could delay justice by delaying case duration. This finding provides direct empirical evidence for the government's concern that court closures lead to case delays. Evidence suggests that 1% of court closures in a PFA are accompanied by 0.1 days delays in average case duration. This delay, when considered at the societal level, would be significant. Considering the average number of defendants per quarter (8,677) and average court closures (50%) between 2010/11 and 2019/20 in a PFA, the aggregate delay experienced by individuals in a PFA would approximate 119 years per quarter. Furthermore, the delay does not fade away automatically. It could accumulate for around three quarters after court closures. Including the accumulation of delays, 18 days delay is predicted after the around 51% closures of courts, explaining six-tenths of the real data. Such a delay would negatively impact the recovery of victims and the return of innocent defendants to regular economic activities. On top of this, I found about 60% of these delays occur after being charged while waiting for court hearings. This simple waiting process intuitively tends to have nothing to do with the quality of justice, implying that the costs to the social welfare of the 60% delay may not be worth it. Given that the results showed that the second project of court closures (ERP) has more significant effects on case duration, the consequences could be even more server if the 77 additional courts the government intended to close could have superimposed effects on previous closures.

The second research question examines the relationship between court closures and charge reduction. To do so, I used unique data on the number of Magistrates' Courts, conviction duration data from MOJ, and charge number data from HO, to investigate whether changes in courts and changes in conviction duration have similar effects on charges. If they have similar enough effects on charges, it suggests that court closures and changes in charges may be linked by conviction duration to some extent. Except for using the TWFE OLS method to control area differences (e.g., public interests) and policy changes (e.g., funding tied to charges), I also collected the number of crimes and the groups of crimes from ONS and the ACSL of crimes from MOJ to control the potential workloads of prosecutors, the features of crimes, and the severity of crimes.

In my second research question, I found 1% of court closures could be associated with a 0.06% charge reduction after three quarters and a 0.07% decrease in charges after six quarters. I also found that one day delay in conviction duration could be associated with a 0.06% increase in charges after four quarters and a 0.07% decrease in charges after eight quarters. The findings indicate that court closures and conviction duration could similarly affect prosecutors' charge decisions. That is, prosecutors are likely to raise fewer charges in the first year and then drop more charges in the second year after court closures and conviction delays. To some extent, it provides evidence for my hypothesis that court closures could affect prosecutors' charge decisions by bringing delay problems. Probably because prosecutors' career concerns of seeking high convictions and conviction rates refer to annual convictions and conviction rates, they respond to year-to-year changes. Still, there is a lack of literature explaining why prosecutors would increase charges in the first year. There could be two speculations. Firstly, prosecutors in England and Wales might focus on convictions more than conviction rates. Therefore, they primarily attempted to add charges to maintain convictions when the conviction delays reduced their annual convictions and conviction rates. They turned to drop cases with a low probability of conviction to maintain desired conviction rates when they realised the more limited resources for courts could not provide as many convictions as before. The first guess might be partly supported by my findings that when the charges decrease in the second year, there would be a decrease in the proportion of violent crimes (with a relatively low

probability of conviction) to total charges. Secondly, prosecutors may rush to record cases on books before closing courts. Then, there was already a long waiting list in their workloads when courts closed, resulting in a rise in charges in the first year. After the workloads on the books were cleared in the first year, prosecutors faced the influences of court closures and reduced charges as a response. My findings here emphasise that prosecutors may selectively drop criminal cases with a low probability of conviction after court closures.

I also found, in my second research question, that compared to conviction delays, 1% closures of courts would bring a 0.09% extra increase in charges after seven quarters. This could be because the delays imposed by court closures can accumulate (as found in the first research question), thus having a more significant effect than changes in conviction duration alone. Overall, the total charges would fall two years after court closures. Considering the average charges (15,588) in PFAs in 2010/11, findings here could roughly predict that the charges could fall by 799 in 2019/20 after 51% closures of courts, explaining around 14% of reduction in the real data.

The third research question tests the relationship between court closures and crimes. To do so, I used the quarterly crime number data from ONS and the unique court number data to study whether there could be a statistically significant link between court closures and changes in crimes within a PFA. Besides, I collected the total population, unemployment rates, age ratio, gender ratio, and ethnic ratio to control demographic characteristics, as well as ACSL and sentence rates to control other changes in the justice system. A Fixed Effects OLS approach with a time trend variable was used to analyse the relationship between court closures and changes in crime rates. It enabled the analysis to control differences in PFAs (e.g., local criminal groups) and the increase in crime rates over time. In the model specifications, variables were seasonally differenced to offset the seasonality of crimes.

In response to my third research question, I found that closing 1% of courts could lead to a 0.06% increase in crimes. This finding is somewhat consistent with my hypothesis that the consequences of court closures (e.g., case delays and charge reduction) are likely to increase crimes. Rough predictions suggest that 51% of court closures between 2010/11 and 2019/20 could lead to a 3% increase in crimes,

which may explain about a tenth of the actual crime changes. The remaining unexplained part may be due to other reasons, such as the chance that crimes may grow rapidly because of the expansion of criminal groups. In addition, I found that 1% closures of courts could be accompanied by a 0.15% increase in theft crimes and a 0.13% decrease in violent crimes. The reason may be that the costs and benefits of theft could be more rationally measured, and thus lower costs of theft crime due to court closures could make theft more attractive than violent crimes. This displacement effect suggests that crime-related policies may affect different groups of criminals differently. Overall, these findings on the third question could support that court closures may affect the effectiveness of justice against crimes.

As a whole, our findings highlight that court closures could have negative complementary effects on the timeliness, fairness, and effectiveness of justice. Court closures could directly delay case duration by increasing burdens on remaining courts (timeliness), and they caused delays might not be beneficial to the quality of justice as around 60% of delays could happen in the waiting duration for court hearings. When the waiting duration after being charged is delayed, the time taken from charge to conviction (conviction duration) could also be delayed. The delay in conviction duration would reduce annual convictions and conviction rates which are essential for prosecutors' legal reputations. Followingly, prosecutors may drop criminal cases with a low probability of conviction to maintain desired conviction rates (fairness) as long as they realise dwindling resources for courts do not allow them to charge as many as previously. Both the case delays and charge reduction under the rational crime theory could be taken as discounts for expected crime costs and thus induce more criminal behaviours (effectiveness).

7.2 Policy implication

Countries across Europe have been aware of the impacts of court closures on the court system itself at the reporting stage (e.g., House of Commons 2021; European Network of Councils for the Judiciary 2012). However, few voices argue that closures (esp. closures of criminal court) can have complementary effects on justice. The voices in European countries frequently discuss the closure of civil courts. They sometimes regard reducing litigations as a target because there could

be many unmeritorious cases but a limited budget (European Network of Councils for the Judiciary 2012). Whereas, unlike plaintiffs in civil cases who negotiate benefits with defendants and can decide whether to go to trial of their own volition, victims in criminal cases are unilateral prey for offenders and have limited influence on whether a trial will be given. Moreover, the consequences of court closures, e.g., case delays and charge reduction, could also danger the deterrence against crime. However, few empirical papers address how this might increase social loss from more crimes and conflict with the government's aim of budget conservation. Even if justice has to be sacrificed to save the budget, the potential adverse complementary effects on it are worth comprehensively considering.

This thesis emphasises that governments should consider the criminal justice system as a whole when evaluating risks to justice. Although agencies in the system have their own responsibilities, the ultimately delivered justice is the result of their group work. The policies targeting a single agency in the system may also indirectly influence the rest, which could make the policy outcomes inconsistent with expectations. Understanding the connections among agencies in the justice system during the policy-making process is necessary.

This thesis could contribute to the evaluation of previous court closures and the proposal currently under consideration for 77 further court closures by 2025/26 in England and Wales. Beyond that, it could also be used as a framework to monitor future court closures. For example, my framework of the complementary effects emphasises the importance of clearly tracking the progress and operation of supporting services, and closely monitoring changes in the behaviour of other agents in the criminal system.

In this framework, the criminal court closures could initially cause congestion and delay the waiting duration of cases. A known and applied efficient solution for the congestion problem is improving courts' productivity by simplifying the procedures or fastening processes. However, if the progress of that solution is not fast or efficient enough, the prosecutors would become selective about charges and bring fewer cases to courts. The change in prosecutors' behaviour could reduce crime deterrence and increase crimes. Then reversely, police could present more recorded crimes to prosecutors, who could then become more selective and

release more crimes from charges. Eventually, crime deterrence could reduce again and trigger more crimes. A quick and efficient supporting service could be critical to avoid such a cyclic effect. Meanwhile, such service is deemed irrelevant to the quality of justice and the incentives of other agents in the criminal justice system.

7.3 Future research

This thesis has provided evidence that court closures could be linked to current revealed risks, such as delays in case duration, drops in charges, and increases in crimes. However, there are still large parts of the revealed risks that remain unexplained, reminding more reasons behind these risks are worthy of mining, such as the cyclic features of the complementary effects.

For the analysis of court closures in England and Wales, while I have achieved unique data of Magistrates' Courts numbers to cover all court closures in two projects, the data before 2010/11 is still not available for research at the local level. If the government can make it available, research covering periods before 2010/11 may be desired to examine whether the justice system's agents would change behaviours before actual closures. Besides, if other related information, e.g., utilisation rates of courts, can be completed, the impacts of court closures might be discussed in more detail.

For the analysis of case duration in England and Wales, I have considered case-level and country-level determinants in analysis. However, the court-level determinants, such as the number of magistrates, other court staff, and their salaries, seem to be unavailable at the local level. If more local-level data relevant to case duration become available, future research may include them to test if the fitness of regressions can be improved.

For the analysis of prosecutorial discretion in England and Wales, while my estimates are consistent across controls, the fitness of regressions is still relatively low. The reason could be that I did not manage to control the prosecutors' characteristics, such as the number of prosecutors, type of prosecutors, salary of prosecutors, guilty pleas during charges, etc. because relevant data is unavailable at the local level. Future research may examine this with more diversified methodologies if the data becomes completed.

For crime reduction analysis, this thesis argued that court closures are unlikely endogenous with crimes at the PFA level in England and Wales. However, considering endogeneity is frequently discussed in the literature on crime reduction, it could be an add if a proper instrumental variable can be applied to compare results with this thesis. It could be desired that a variety of approaches could be attempted by future research.

More specifically, future research could consider using a two-period Becker-type model to explore the more detailed mechanisms of court closures. Given that the two-period Becker model links actions and post-action outcomes, the model holds an advantage for further exploring the lagged and cyclic impacts of court closures. Adjusting the Becker model to deal with the dynamic interactions among judges, prosecutors, and criminals is an appealing opportunity to unveil the consequences of court closures.

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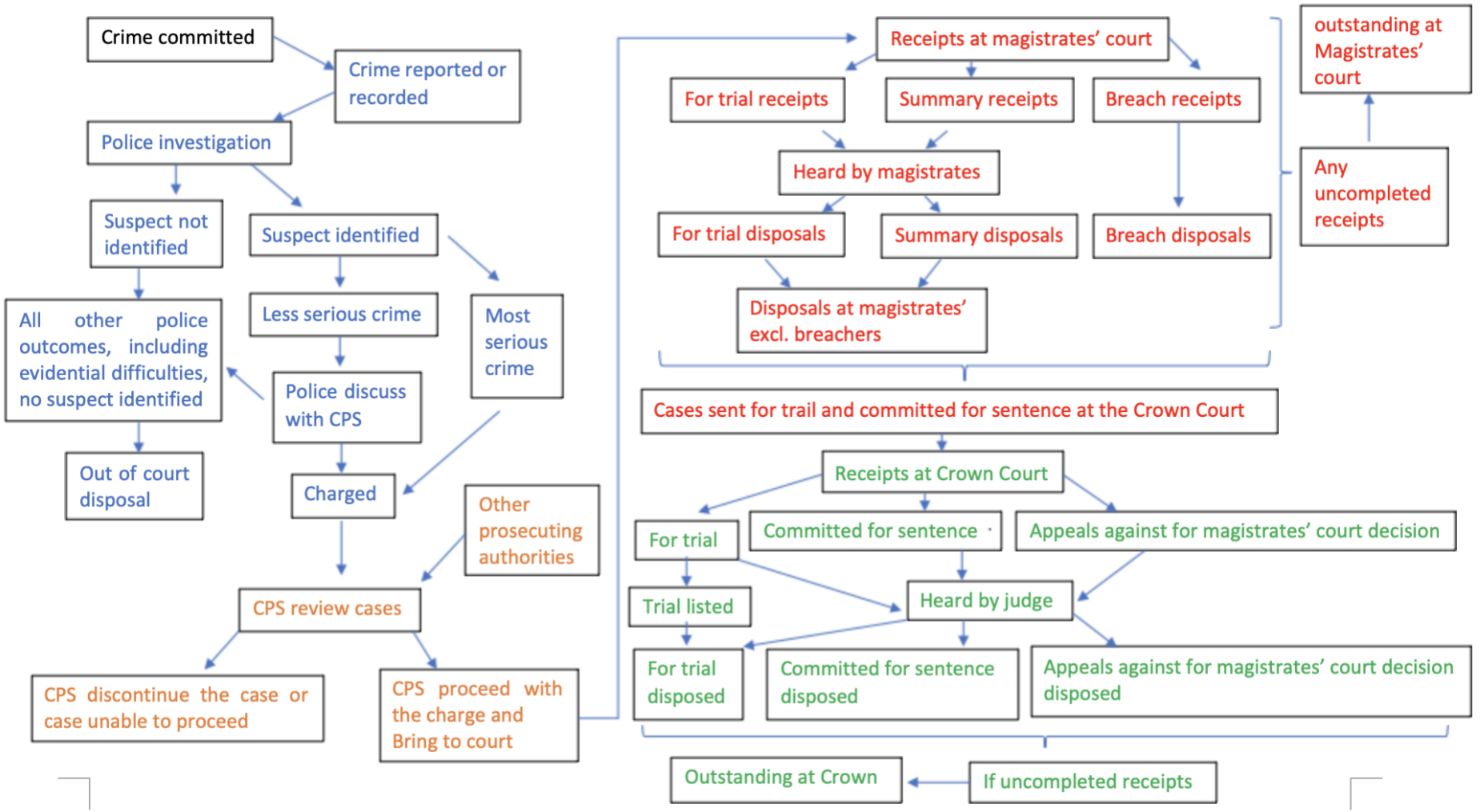
Appendix

Appendix A. Complementary tables and figures

Table A 1 Court reforms across European countries

Areas and measures of Judicial Reform	Countries
1. Rationalization and (re)organization of courts and public prosecutor offices:	
a. Closing courts	e.g., UK, Portugal, Greece, Austria, Ireland, Poland, Romania, and Turkey
b. Bringing several small courts to one	e.g., Netherlands, Poland, and Turkey
c. Revision of judicial map	e.g., Belgium, Italy
2. Reduction in the volume of court cases:	
a. Increasing court fees	e.g., Portugal, Greece, Italy, Latvia
b. Reducing the volume of (appeal) cases by law	e.g., Germany, Norway, Austria
c. Expanding alternative dispute resolution	e.g., Netherlands, Austria
3. Simplification of judicial proceedings, improvement in case management and introduction of new technologies:	
a. Simplifying procedures	e.g., Italy, Netherlands
b. Digitalizing procedures	e.g., UK, Poland, Ireland, Netherlands, Austria, Sweden, Latvia, Turkey,
c. Stricter case management	e.g., UK, Netherlands, Ireland, Austria, Norway
4. Financing of the judicial system (courts and public prosecution offices):	
a. Reduction of budgets	e.g., Belgium,
b. Reduction of salaries	e.g., UK, Portugal, Spain, Lithuania, Latvia, Romania, Ireland, Poland, Slovakia
c. Improving the funding system	e.g., UK, Netherlands
5. Court management and allocation of cases within and between courts and within and between public prosecution offices:	
a. Redistribution of tasks in court office	e.g., UK, US, Poland, Spain, Ireland, Netherlands, Spain
b. Allocation of cases over courts and judges	e.g., Romania
c. Reduction of overhead	e.g., n/a

Source: European Network of Council for the Judiciary (2012)



- Source: Ministry of Justice

Figure A 1 The flow of a criminal case through the criminal justice system

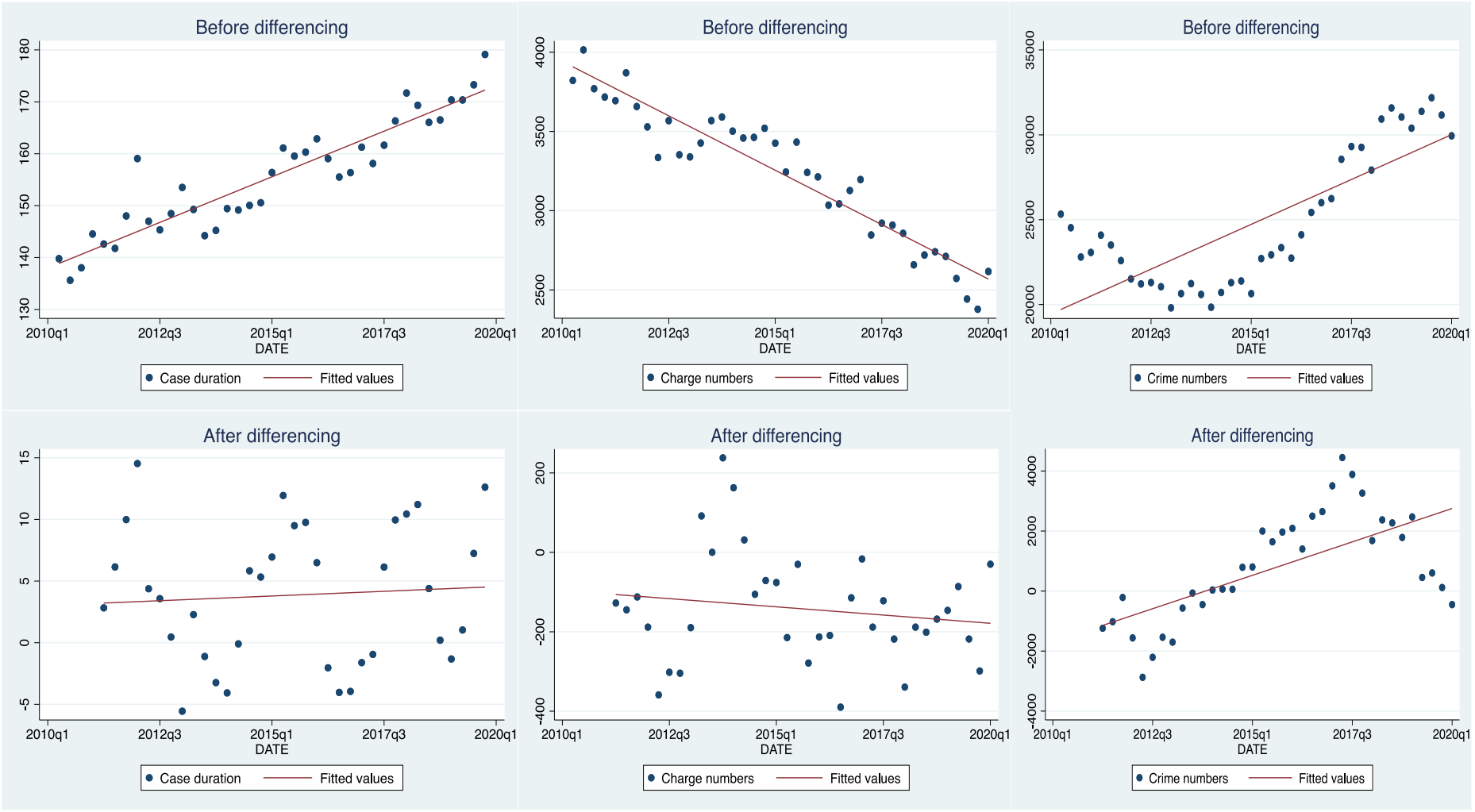


Figure A 2 Trends in the dependent variables

Table A 2 Categories of crime outcome

#	Outcome type/group	Further Information
1	**Charge/Summons**	A person has been charged or summonsed for the crime (irrespective of any subsequent acquittal at Court).
4	**Taken into consideration**	The offender admits the crime by way of a formal police interview and asks for it to be taken into consideration by the court. There must be an interview where the suspect has made a clear and reliable admission of the offence and which is corroborated with additional verifiable auditable information connecting the suspect to the crime.
	Out-of-court (formal)	
2	Caution – youths	A youth offender has been cautioned by the police.
3	Caution – adults	An adult offender has been cautioned by the police.
6	Penalty Notices for Disorder	A Penalty Notice for Disorder (or other relevant notifiable offence) has been lawfully issued under Section 1 – 11 of the Criminal Justice and Police Act 2001.
	Out-of-court (informal)	
7	Cannabis/Khat warning	A warning for cannabis or khat possession has been issued in accordance with College of Policing guidance. Note: Khat warnings were introduced from 24 June 2014 and numbers are likely to be small.
8	Community resolution	A Community Resolution (with or without formal Restorative Justice) has been applied in accordance with College of Policing guidance.
	Prosecution prevented or not in the public interest	
5	Offender died	The offender has died before proceeding could be initiated.
9	Not in public interest (CPS)	Prosecution not in the public interest (CPS decision). The CPS by virtue of their powers under the Criminal Justice Act 2003 decides not to prosecute or authorise any other formal action.
10	Not in public interest (Police)	(from April 2014): Formal action against the offender is not in the public interest (Police decision).
11	Prosecution prevented – suspect under age	(from April 2014): Prosecution prevented – named suspect identified but is below the age of criminal responsibility.
12	Prosecution prevented – suspect too ill	(from April 2014): Prosecution prevented – Named suspect identified but is too ill (physical or mental health) to prosecute.
13	Prosecution prevented – victim/key witness dead/too ill	(from April 2014): Named suspect identified but victim or key witness is dead or too ill to give evidence
17	Prosecution time limit expired	(from April 2014): Suspect identified but prosecution time limit has expired

15	**Evidential difficulties (suspect identified; victim supports action)**	(from April 2014): Evidential difficulties named suspect identified – the crime is confirmed and the victim supports police action but evidential difficulties prevent further action. This includes cases where the suspect has been identified, the victim supports action, the suspect has been circulated as wanted but cannot be traced and the crime is finalised pending further action.
	Evidential difficulties (victim does not support action)	
14	Evidential difficulties: suspect not identified; victim does not support further action	(from April 2014): Evidential difficulties victim based – named suspect not identified. The crime is confirmed but the victim declines or is unable to support further police action to identify the offender.
16	Evidential difficulties: suspect identified; victim does not support further action	(from April 2014): Evidential difficulties victim based – named suspect identified. The victim does not support (or has withdrawn support from) police action.
18	**Investigation complete – no suspect identified**	(from April 2014): The crime has been investigated as far as reasonably possible – case closed pending further investigative opportunities becoming available.
19	**National Fraud Intelligence Bureau filed (NFIB only)**	(from April 2015): Further action resulting from the crime report will be undertaken by another body or agency other than the police, subject to the victim (or person acting on their behalf) being made aware of the action being taken.
20	**Action undertaken by another body/agency**	(from April 2015): Further action resulting from the crime report will be undertaken by another body or agency other than the police, subject to the victim (or person acting on their behalf) being made aware of the action being taken.
21	**Further investigation to support formal action not in public interest**	(from January 2016): Further investigation resulting from the crime report that could provide evidence sufficient to support formal action being taken against the suspect is not in the public interest – police decision.
22	**Diversionary, educational or intervention activity, resulting from the crime report, has been undertaken and it is no in the public interest to take any further action**	(voluntary from April 2019)

Source: Ministry of Justice

Table A 3 Court closures and charges, details

Dependent variables: $\%\Delta_4 ChargeNumber_{it}$						
	(1)	(2)	(3)	(4)	(5)	(6)
Court closures in four periods (%) at timing $t-0$	.004 (.027)	-.0001 (.033)	-.006 (.034)	-.007 (.034)	-.005 (.034)	-.0008 (.033)
Linear trend in areas (PFA FE)	No	Yes	Yes	Yes	Yes	Yes
Difference in periods (Quarter FE)	No	No	Yes	Yes	Yes	Yes
Per cent changes in crimes in four periods	No	No	No	.224*** (.042)	.218*** (.042)	.268*** (.047)
Per cent changes in average custodial sentence length (ACSL) in four periods	No	No	No	No	-.039** (.017)	-.039** (.016)
Changes in the ratios of crime group (composition of crimes) in four periods	No	No	No	No	No	Yes
P-value of F-test	0.80	0.00***	0.00***	0.00***	0.00***	0.00***
Adjusted R^2	-0.0006	0.0766	0.0970	0.0943	0.0970	0.1512
Observations	1,509	1,509	1,509	1,509	1,509	1,509

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- values in the brackets represent the standard errors.

Table A 4 Prosecutorial selection in crimes, details

	Explanatory variable: court closures in four periods (%) at timing $t-z$								
	(1) $t-0$	(3) $t-1$	(4) $t-2$	(5) $t-3$	(6) $t-4$	(7) $t-5$	(8) $t-6$	(9) $t-7$	(10) $t-8$
Dependent variables of ratio of charged crimes:									
Violent crimes	.003 (.007)	.001 (.007)	.004 (.007)	.004 (.007)	-.0004 (.007)	-.004 (.007)	-.009 (.007)	-.018** (.007)	-.018** (.007)
Theft crimes	.007 (.007)	.005 (.007)	-.0008 (.008)	-.011 (.008)	-.006 (.008)	.002 (.009)	.011 (.009)	.022** (.009)	.017** (.009)

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- values in the brackets represent the standard errors.

Table A 5 Charges in CERP and ERP

Dependent variables: $\%\Delta_4 ChargeNumber_{it}$									
	(1) $t-0$	(2) $t-1$	(3) $t-2$	(4) $t-3$	(5) $t-4$	(6) $t-5$	(7) $t-6$	(8) $t-7$	(9) $t-8$
CERP: Court closures in four periods (%) at timing t-z	-.04 (.04)	-.004 (.04)	-.04 (.04)	.02 (.04)	-.04 (.04)	-.05 (.05)	-.05 (.05)	-.12** (.05)	-.08 (.05)
ERP: Court closures in four periods (%) at timing t-z	.04 (.05)	.08 (.05)	.10* (.05)	.11** (.05)	.01 (.05)	-.06 (.05)	-.08 (.05)	-.09* (.05)	-.05 (.054)

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- values in the brackets represent the standard errors.
- CERP represents the first court projects between April 2010 and March 2015.
- ERP represents the second court projects between April 2015 and March 2020.

Table A 6 Court closures and crimes, annual data

Dependent variables: $\%\Delta_1 CrimeNumber_{it}$				
	(1)	(2)	(3)	(4)
Court closures (%)	.11**	.10***	.08***	.09***
	(.04)	(.03)	(.03)	(.03)
Linear trend in areas (PFA FE)	Yes	Yes	Yes	Yes
Time trend (Quarters)	2.1***	1.1***	1.9***	1.7***
	(.2)	(.2)	(.2)	(.2)
Changes in operations of justice system	No	Yes	Yes	Yes
Average sentence length (months)		-.05***	-.04**	.04**
		(.02)	(.2)	(.02)
Sentence rates of all crimes		-7.0***	-.6.2***	-6.5***
		(.5)	(.4)	(.4)
Changes in demographic characteristics	No	No	Yes	Yes
Total population			.53*** (.05)	.53*** (.05)
Unemployment rates			-.6 (.4)	-.7* (.5)
Male rates			6 (5)	8 (4)
Youth rates			-.4 (1.0)	.1 (.9)
Additional controls	No	No	No	Yes
Police workforce				.3*** (.1)
Rates of none-education qualifications				.1 (.3)
Real-term hourly payment				-.1 (.2)
P-value of F-test	0.00***	0.00***	0.00***	0.00***
Adjusted R^2	0.2234	0.5089	0.6582	0.6633
Observations	378	378	378	370

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- The operations of justice system include ACSL and sentence rates
- The demographic characteristics include total population, unemployment rates, male rates, and youth rates.
- The additional controls include changes in police workforce, non-education qualification population rates, and real-term hourly payment.

Table A 7 Full estimates, court closures and entire case duration

Dependent variables: Δ_4Entire case duration		
	(1)	(2)
Court closures in four periods (%)	.12*	.10*
	(.06)	(.06)
Linear trend in areas (PFA FE)	Yes	Yes
Bedfordshire	3 (6)	-1 (6)
Cambridgeshire	1 (6)	-2 (6)
Cheshire	-4 (6)	-5 (6)
Cleveland	-3 (6)	-6 (6)
Cumbria	-2 (6)	-4 (6)
Derbyshire	-3 (6)	-4 (6)
Devon and Cornwall	-2 (6)	-5 (6)
Dorset	-7 (6)	-7 (6)
Durham	2 (6)	-2 (6)
Dyfed-Powys	-4 (6)	-6 (6)
Essex	2 (6)	-1 (6)
Gloucestershire	-3 (6)	-4 (6)
Greater Manchester	1 (6)	0 (6)
Gwent	-2 (6)	-5 (6)
Hampshire	-1 (6)	-3 (6)
Hertfordshire	3 (6)	1 (6)
Humberside	0 (6)	-3 (6)
Kent	4 (6)	1 (6)
Lancashire	0 (6)	-2 (6)
Leicestershire	-4 (6)	-6 (6)
Lincolnshire	0 (6)	-3 (6)
Merseyside	-3 (6)	-3 (6)
Norfolk	-3 (6)	2 (6)
North Wales	-7 (6)	-6 (6)
North Yorkshire	5 (6)	1 (6)
Northamptonshire	-1 (6)	-1 (6)
Northumbria	-3 (6)	-4 (6)
Nottinghamshire	-3 (6)	-4 (6)
South Wales	-8 (6)	-10* (6)
South Yorkshire	-1 (6)	-2 (6)
Staffordshire	-4 (6)	-6 (6)
Suffolk	3 (6)	1 (6)
Surrey	0 (6)	-3 (6)
Sussex	0 (6)	-3 (6)
Thames Valley	-5 (6)	-5 (6)
Warwickshire	-5 (6)	-6 (6)
West Mercia	0 (6)	-1 (6)
West Midlands	-3 (6)	-4 (6)
West Yorkshire	0 (6)	-2 (6)
Wiltshire	-3 (6)	-3 (6)
London	-2 (6)	-4 (6)
Difference in periods (Quarter FE)	Yes	Yes
2011q3 – 2010q3	3 (5)	4 (5)
2011q4 – 2010q4	6 (5)	7 (5)
2012q1 – 2011q1	11** (5)	13** (5)
2012q2 – 2011q2	2 (5)	4 (5)
2012q3 – 2011q3	2 (5)	3 (5)
2012q4 – 2011q4	-1 (5)	-2 (5)
2013q1 – 2012q1	-7 (5)	-8 (5)

2013q2 – 2012q2	1 (5)	-1 (5)
2013q3 – 2012q3	-2 (5)	-4 (5)
2013q4 – 2012q4	-4 (5)	-4 (5)
2014q1 – 2013q1	-5 (5)	6 (5)
2014q2 – 2013q2	-1 (5)	-3 (5)
2014q3 – 2013q3	5 (5)	3 (5)
2014q4 – 2013q4	4 (5)	3 (5)
2015q1 – 2014q1	6 (5)	5 (5)
2015q2 – 2014q2	11** (5)	9* (5)
2015q3 – 2014q3	9 (5)	7 (5)
2015q4 – 2014q4	9* (5)	7 (5)
2016q1 – 2015q1	5 (5)	4 (5)
2016q2 – 2015q2	-4 (5)	-5 (5)
2016q3 – 2015q3	-7 (5)	-9* (5)
2016q4 – 2015q4	-7 (5)	-10* (5)
2017q1 – 2016q1	-5 (5)	-9 (5)
2017q2 – 2016q2	-4 (5)	-5 (5)
2017q3 – 2016q3	4 (5)	4 (5)
2017q4 – 2016q4	8 (5)	8 (5)
2018q1 – 2017q1	9* (5)	11** (5)
2018q2 – 2017q2	10* (5)	11** (5)
2018q3 – 2017q3	3 (5)	4 (5)
2018q4 – 2017q4	-1 (5)	0 (5)
2019q1 – 2018q1	-2 (5)	-4 (5)
2019q2 – 2018q2	0 (5)	-2 (5)
2019q3 – 2018q3	6 (5)	3 (6)
2019q4 – 2018q4	12** (5)	7 (6)
Changes in case-level determinants	No	Yes
Defendant ratio:		
violence against person		0 (1)
Sexual crimes		2 (3)
Robbery		-3 (3)
Theft crime		-1.6** (.7)
Possession of weapons		-1 (3)
Miscellaneous crimes against society		4*** (1)
Public order crimes		-7*** (2)
Fraud crimes		4** (2)
Drug crimes		-.4 (1.0)
Criminal damage and arson		-5 (4)
None-motoring offences		-.6*** (.1)
Total number of defendants		.05 (.06)
Ratio of none-person defendant		1 (2)
Ratio of guilty pleas during trials		-.4** (.2)
P-value of F-test	0.038**	0.000***
Adjusted R^2	0.0161	0.0658
Observations	1,470	1,470

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- Case-level determinants include Δ_4Ratio of defendant by crime groups, $\%\,\Delta_4$Total defendant number, Δ_4Ratio of None-person defendant, and Δ_4Ratio of guilty plea.

Table A 8 Full estimates, court closures and different procedures of case duration

Dependent variables:	Δ_4Pre-charge duration		Δ_4Waiting duration		$\Delta_4 T$rial duration	
	(1a)	(1b)	(2a)	(2b)	(3a)	(3b)
Court closures in four periods (%)	.06	.05	.07**	.06**	-.01	-.01
	(.05)	(.05)	(.03)	(.03)	(.01)	(.01)
Linear trend in areas (PFA FE)	Yes	Yes	Yes	Yes	Yes	Yes
Bedfordshire	3 (5)	2 (5)	-2 (3)	-4 (3)	2 (1)	1 (1)
Cambridgeshire	2 (5)	1 (5)	-4 (3)	-4 (3)	2* (1)	1 (1)
Cheshire	-2 (5)	-2 (5)	-3 (3)	-3 (3)	0 (1)	0 (1)
Cleveland	-3 (5)	-4 (5)	-1 (3)	-2 (3)	0 (1)	0 (1)
Cumbria	0 (5)	-1 (5)	-2 (3)	-2 (3)	0 (1)	-1 (1)
Derbyshire	-3 (5)	-4 (5)	0 (3)	0 (3)	1 (1)	0 (1)
Devon and Cornwall	0 (5)	-1 (5)	-2 (3)	-3 (3)	0 (1)	-2 (1)
Dorset	-2 (5)	-2 (5)	-4 (3)	-3 (3)	-1 (1)	-3 (1)
Durham	2 (5)	1 (5)	-1 (3)	-2 (3)	1 (1)	0 (1)
Dyfed-Powys	-1 (5)	-2 (5)	-3 (3)	-4 (3)	0 (1)	-1 (1)
Essex	1 (5)	1 (5)	-2 (3)	-2 (3)	2* (1)	1 (1)
Gloucestershire	-2 (5)	-2 (5)	-4 (3)	-4 (3)	2** (1)	1 (1)
Greater Manchester	2 (5)	1 (5)	-2 (3)	-1 (3)	1 (1)	0 (1)
Gwent	0 (5)	-1 (5)	-3 (3)	-4 (3)	0 (1)	-2 (1)
Hampshire	0 (5)	-1 (5)	-2 (3)	-2 (3)	1 (1)	0 (1)
Hertfordshire	4 (5)	3 (5)	-4 (3)	-3 (3)	2* (1)	1 (1)
Humberside	-1 (5)	-2 (5)	-1 (3)	-2 (3)	2 (1)	0 (1)
Kent	4 (5)	3 (5)	-1 (3)	-2 (3)	1 (1)	0 (1)
Lancashire	1 (5)	1 (5)	-2 (3)	-2 (3)	0 (1)	-1 (1)
Leicestershire	-3 (5)	-3 (5)	-4 (3)	-3 (3)	1 (1)	0 (1)
Lincolnshire	1 (5)	0 (5)	-2 (3)	-3 (3)	2 (1)	1 (1)
Merseyside	-3 (5)	-2 (5)	-1 (3)	-1 (3)	1 (1)	0 (1)
Norfolk	0 (5)	0 (5)	1 (3)	0 (3)	3** (1)	1 (1)
North Wales	-1 (5)	-2 (5)	-3 (3)	-4 (3)	1 (1)	-1 (1)
North Yorkshire	4 (5)	2 (5)	-2 (3)	-2 (3)	1 (1)	1 (1)
Northamptonshire	0 (5)	-1 (5)	0 (3)	0 (3)	1 (1)	0 (1)
Northumbria	-1 (5)	-1 (5)	-2 (3)	-2 (3)	1 (1)	0 (1)
Nottinghamshire	-1 (5)	-2 (5)	-2 (3)	-2 (3)	0 (1)	-1 (1)
South Wales	-2 (5)	-3 (5)	-5 (3)	-6 (3)	0 (1)	-1 (1)
South Yorkshire	0 (5)	-1 (5)	-2 (3)	-1 (3)	1 (1)	0 (1)
Staffordshire	-2 (5)	-3 (5)	-3 (3)	-3 (3)	1 (1)	0 (1)
Suffolk	0 (5)	-1 (5)	1 (3)	0 (3)	2* (1)	1 (1)
Surrey	-1 (5)	-2 (5)	-1 (3)	-2 (3)	2* (1)	1 (1)
Sussex	2 (5)	1 (5)	-2 (3)	-3 (3)	-1 (1)	-1 (1)
Thames Valley	-2 (5)	-2 (5)	-2 (3)	-2 (3)	-1 (1)	1 (1)
Warwickshire	-2 (5)	-2 (5)	-4 (3)	-4 (3)	2 (1)	0 (1)
West Mercia	3 (5)	3 (5)	-3 (3)	-3 (3)	0 (1)	-2 (1)
West Midlands	-2 (5)	-2 (5)	-3 (3)	-3 (3)	2 (1)	0 (1)
West Yorkshire	2 (5)	1 (5)	-2 (3)	-3 (3)	0 (1)	0 (1)
Wiltshire	-1 (5)	0 (5)	-3 (3)	-1 (3)	0 (1)	-2 (1)
London	-1 (5)	-1 (5)	-3 (3)	-3 (3)	1 (1)	0 (1)
Difference in periods (Quarter FE)	Yes	Yes	Yes	Yes	Yes	Yes
2011q3 – 2010q3	3 (4)	3 (4)	0 (3)	0 (3)	0 (1)	1 (1)
2011q4 – 2010q4	4 (4)	4 (4)	2 (3)	2 (3)	0 (1)	1 (1)
2012q1 – 2011q1	10** (4)	11*** (4)	0 (3)	1 (3)	0 (1)	1 (1)
2012q2 – 2011q2	3 (4)	3 (4)	0 (3)	0 (3)	0 (1)	1 (1)
2012q3 – 2011q3	2 (4)	1 (4)	2 (3)	1 (3)	-2 (1)	0 (1)
2012q4 – 2011q4	1 (4)	0 (4)	-1 (3)	-2 (3)	-1 (1)	0 (1)
2013q1 – 2012q1	-5 (4)	-5 (4)	-1 (3)	-2 (3)	-1 (1)	-1 (1)
2013q2 – 2012q2	5 (4)	4 (4)	-2 (3)	-3 (3)	-2 (1)	-2* (1)
2013q3 – 2012q3	1 (4)	1 (4)	-3 (3)	-4* (3)	0 (1)	0 (1)
2013q4 – 2012q4	1 (4)	1 (4)	-5* (3)	-5** (3)	0 (1)	-1 (1)

2014q1 – 2013q1	1 (4)	0 (4)	-6** (3)	-7** (3)	0 (1)	0 (1)
2014q2 – 2013q2	3 (4)	1 (4)	-4 (3)	-5* (3)	0 (1)	1 (1)
2014q3 – 2013q3	7 (4)	4 (4)	-1 (3)	-2 (3)	-1 (1)	1 (1)
2014q4 – 2013q4	4 (4)	2 (4)	1 (3)	-1 (3)	0 (1)	1 (1)
2015q1 – 2014q1	3 (4)	2 (4)	3 (3)	3 (3)	0 (1)	1 (1)
2015q2 – 2014q2	8* (4)	6 (4)	3 (3)	1 (3)	0 (1)	2* (1)
2015q3 – 2014q3	9** (4)	6 (4)	0 (3)	-1 (3)	0 (1)	2** (1)
2015q4 – 2014q4	11** (4)	9** (4)	0 (3)	-2 (3)	-2 (1)	0 (1)
2016q1 – 2015q1	10** (4)	8* (4)	0 (3)	-2 (3)	-4*** (1)	-2* (1)
2016q2 – 2015q2	4 (4)	2 (4)	-4 (3)	-5* (3)	-4*** (1)	-2** (1)
2016q3 – 2015q3	3 (4)	1 (4)	-6*** (3)	-8*** (3)	-3*** (1)	-2*** (1)
2016q4 – 2015q4	2 (4)	0 (4)	-7*** (3)	-8*** (3)	-2 (1)	-1 (1)
2017q1 – 2016q1	3 (4)	1 (4)	-9*** (3)	-11*** (3)	1 (1)	1 (1)
2017q2 – 2016q2	3 (4)	2 (4)	-7*** (3)	7*** (3)	0 (1)	0 (1)
2017q3 – 2016q3	7* (4)	7 (4)	-4 (3)	-5* (3)	1 (1)	2 (1)
2017q4 – 2016q4	9** (4)	9** (4)	-3 (3)	-3 (3)	2 (1)	3** (1)
2018q1 – 2017q1	8* (4)	7 (4)	0 (3)	1 (3)	1 (1)	3*** (1)
2018q2 – 2017q2	7* (4)	6 (4)	1 (3)	0 (3)	2** (1)	5*** (1)
2018q3 – 2017q3	0 (4)	-1 (4)	1 (3)	1 (3)	2* (1)	4*** (1)
2018q4 – 2017q4	-4 (4)	-5 (4)	1 (3)	1 (3)	2* (1)	4*** (1)
2019q1 – 2018q1	-2 (4)	-4 (4)	-1 (3)	-1 (3)	0 (1)	1 (1)
2019q2 – 2018q2	0 (4)	1 (4)	0 (3)	-1 (3)	0 (1)	0 (1)
2019q3 – 2018q3	9** (4)	6 (5)	-3 (3)	-4 (3)	0 (1)	0 (1)
2019q4 – 2018q4	13*** (4)	9** (5)	-1 (3)	-3 (3)	-1 (1)	-1 (1)
Changes in case-level determinants	No	Yes	No	Yes	No	Yes
Defendant ratio:						
violence against person		1 (1)		-.8 (.6)		.0 (.3)
Sexual crimes		0 (2)		1 (1)		.9 (.6)
Robbery		-2 (3)		0 (2)		-.6 (.6)
Theft crime		-1.4*** (.5)		-.8** (.3)		.5*** (.1)
Possession of weapons		-1 (2)		-1 (1)		.5 (.5)
Miscellaneous crimes against society		1.9* (.9)		1.1* (.6)		.9*** (.2)
Public order crimes		-5*** (2)		-2** (1)		-.1 (.4)
Fraud crimes		1 (2)		1.5 (1.0)		1.3*** (.4)
Drug crimes		-.5 (.8)		-.2 (.5)		.3* (.2)
Criminal damage and arson		-2 (3)		-3* (2)		.6 (.7)
None-motoring offences		-.27*** (.08)		-.34*** (.05)		-.04* (.02)
Total number of defendants		.02 (.05)		.05* (.03)		-.02 (.01)
Ratio of none-person defendant		0 (1)		.7 (.9)		-.1 (.3)
Ratio of guilty pleas during trials		-.05 (1)		-.2** (.09)		-.13*** (.03)
P-value of F-test	0.196	0.007***	0.014**	0.000***	0.000***	0.000***
Adjusted R^2	0.0072	0.0251	0.0205	0.0764	0.0626	0.2366
Observations	1,470	1,470	1,470	1,470	1,470	1,470

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- Case-level determinants include Δ_4Ratio of defendant by crime groups, $\%\,\Delta_4$Total defendant number, Δ_4Ratio of None-person defendant, and Δ_4Ratio of guilty plea.

Table A 9 Full estimates, accumulation of case delays

Dependent variables: Δ_4Entire case duration					
Lagged impacts:	t	$t-1$	$t-2$	$t-3$	$t-4$
	(1)	(2)	(3)	(4)	(5)
Court closures in four periods (%)	.10*	.14**	.12*	.09	.02
	(.06)	(.06)	(.07)	(.07)	(.06)
Linear trend in areas (PFA FE)	Yes	Yes	Yes	Yes	Yes
Bedfordshire	3 (6)	-1 (6)	-1 (6)	-3 (6)	-3 (5)
Cambridgeshire	1 (6)	-2 (6)	-1 (6)	-1 (6)	-1 (5)
Cheshire	-4 (6)	-7 (6)	-6 (6)	-6 (6)	-6 (5)
Cleveland	-3 (6)	-7 (6)	-7 (6)	-7 (6)	-8 (5)
Cumbria	-2 (6)	-4 (6)	-4 (6)	-3 (6)	-3 (5)
Derbyshire	-3 (6)	-4 (6)	-4 (6)	-4 (6)	-4 (5)
Devon and Cornwall	-2 (6)	-5 (6)	-5 (6)	-4 (6)	-3 (5)
Dorset	-7 (6)	-7 (6)	-7 (6)	-6 (6)	-5 (5)
Durham	2 (6)	-2 (6)	-2 (6)	-3 (6)	-17 (5)
Dyfed-Powys	-4 (6)	-6 (6)	-7 (6)	-7 (6)	-8 (5)
Essex	2 (6)	0 (6)	0 (6)	0 (6)	1 (5)
Gloucestershire	-3 (6)	-5 (6)	-5 (6)	-5 (6)	-4 (5)
Greater Manchester	1 (6)	-1 (6)	0 (6)	0 (6)	0 (5)
Gwent	-2 (6)	-5 (6)	-5 (6)	-4 (6)	-4 (5)
Hampshire	-1 (6)	-3 (6)	-3 (6)	-3 (6)	-2 (5)
Hertfordshire	3 (6)	1 (6)	1 (6)	1 (6)	1 (5)
Humberside	0 (6)	-3 (6)	-3 (6)	-3 (6)	-2 (5)
Kent	4 (6)	2 (6)	2 (6)	2 (6)	1 (5)
Lancashire	0 (6)	-2 (6)	-2 (6)	-1 (6)	-1 (5)
Leicestershire	-4 (6)	-7 (6)	-8 (6)	-7 (6)	-7 (5)
Lincolnshire	0 (6)	-4 (6)	-4 (6)	-4 (6)	-3 (5)
Merseyside	-3 (6)	-3 (6)	3 (6)	-3 (6)	-3 (5)
Norfolk	-3 (6)	1 (6)	2 (6)	1 (6)	1 (5)
North Wales	-7 (6)	-7 (6)	-7 (6)	-7 (6)	-7 (5)
North Yorkshire	5 (6)	1 (6)	1 (6)	1 (6)	1 (5)
Northamptonshire	-1 (6)	0 (6)	0 (6)	0 (6)	1 (5)
Northumbria	-3 (6)	-3 (6)	-4 (6)	-4 (6)	-4 (5)
Nottinghamshire	-3 (6)	-4 (6)	-4 (6)	-4 (6)	-4 (5)
South Wales	-8 (6)	-10 (6)	-10 (6)	-9 (6)	-9 (5)
South Yorkshire	-1 (6)	-2 (6)	-2 (6)	-2 (6)	-2 (5)
Staffordshire	-4 (6)	-5 (6)	-4 (6)	-4 (6)	-3 (5)
Suffolk	3 (6)	0 (6)	0 (6)	1 (6)	1 (5)
Surrey	0 (6)	-2 (6)	-2 (6)	-1 (6)	-1 (5)
Sussex	0 (6)	3 (6)	-2 (6)	-2 (6)	-2 (5)
Thames Valley	-5 (6)	5 (6)	-5 (6)	-4 (6)	-4 (5)
Warwickshire	-5 (6)	-5 (6)	-6 (6)	-7 (6)	-8 (5)
West Mercia	0 (6)	-2 (6)	-2 (6)	-2 (6)	-3 (5)
West Midlands	-3 (6)	-5 (6)	-4 (6)	-4 (6)	-4 (5)
West Yorkshire	0 (6)	-3 (6)	-3 (6)	-2 (6)	-2 (5)
Wiltshire	-3 (6)	-3 (6)	-3 (6)	-4 (6)	-4 (5)
London	-2 (6)	-4 (6)	-4 (6)	-4 (6)	-3 (5)
Difference in periods (Quarter FE)	Yes	Yes	Yes	Yes	Yes
2011q3 – 2010q3	3 (5)				
2011q4 – 2010q4	6 (5)	3 (5)			
2012q1 – 2011q1	11** (5)	8 (5)	5 (5)		
2012q2 – 2011q2	2 (5)	-3 (5)	-6 (5)	-11* (5)	
2012q3 – 2011q3	2 (5)	-2 (5)	-7 (5)	-13** (5)	-2 (5)
2012q4 – 2011q4	-1 (5)	-6 (5)	-20* (5)	-18*** (5)	-7 (5)
2013q1 – 2012q1	-7 (5)	-12** (5)	-16*** (5)	-22*** (5)	-13*** (5)
2013q2 – 2012q2	1 (5)	-4 (5)	-7 (5)	-15*** (5)	-6 (5)
2013q3 – 2012q3	-2 (5)	-7 (5)	-11* (5)	-17*** (6)	-9* (5)
2013q4 – 2012q4	-4 (5)	-8 (5)	-11** (6)	-8*** (6)	-10* (5)
2014q1 – 2013q1	-5 (5)	-10 (5)	-13** (6)	-20*** (6)	-12** (5)
2014q2 – 2013q2	-1 (5)	-6 (5)	-10* (6)	-16*** (6)	-7 (5)

2014q3 – 2013q3	5 (5)	-1 (5)	-5 (5)	-11* (6)	-1 (5)
2014q4 – 2013q4	4 (5)	-1 (5)	-6 (6)	-11** (6)	-1 (5)
2015q1 – 2014q1	6 (5)	2 (5)	-3 (5)	-8 (6)	1 (5)
2015q2 – 2014q2	11** (5)	5 (5)	3 (5)	-5 (6)	5 (5)
2015q3 – 2014q3	9 (5)	3 (5)	0 (5)	-7 (6)	3 (5)
2015q4 – 2014q4	9* (5)	3 (5)	0 (6)	-7 (6)	3 (5)
2016q1 – 2015q1	5 (5)	1 (6)	-3 (6)	-9 (6)	1 (5)
2016q2 – 2015q2	-4 (5)	-8 (6)	-12** (6)	-18*** (6)	-9 (5)
2016q3 – 2015q3	-7 (5)	-12** (5)	-15*** (6)	-21*** (6)	-12 (5)
2016q4 – 2015q4	-7 (5)	-4** (5)	-16*** (5)	-22*** (6)	-12 (5)
2017q1 – 2016q1	-5 (5)	-13** (5)	-16** (6)	-21*** (6)	-11 (5)
2017q2 – 2016q2	-4 (5)	-9* (5)	-12 (5)	-18*** (6)	-8 (5)
2017q3 – 2016q3	4 (5)	-1 (5)	-5 (5)	-10* (5)	0 (5)
2017q4 – 2016q4	8 (5)	4 (5)	0 (5)	-7 (5)	4 (5)
2018q1 – 2017q1	9* (5)	7 (5)	3 (5)	-4 (6)	7 (5)
2018q2 – 2017q2	10* (5)	7 (5)	3 (5)	-3 (5)	7 (5)
2018q3 – 2017q3	3 (5)	0 (5)	-4 (5)	-10* (5)	0 (5)
2018q4 – 2017q4	-1 (5)	-3 (6)	-7 (6)	-14** (6)	-3* (5)
2019q1 – 2018q1	-2 (5)	-7 (6)	-11* (6)	-17*** (6)	-8** (5)
2019q2 – 2018q2	0 (5)	-5 (6)	-8 (6)	-15** (6)	-6** (5)
2019q3 – 2018q3	6 (5)	0 (6)	-4 (6)	-10* (6)	-1** (5)
2019q4 – 2018q4	12** (5)	3 (6)	0 (6)	-7 (6)	2 (5)
Changes in case-level determinants	Yes	Yes	Yes	Yes	Yes
Defendant ratio:					
violence against person	0 (1)	0 (1)	0 (1)	0 (1)	-1 (1)
Sexual crimes	2 (3)	2 (3)	2 (3)	2 (3)	4 (3)
Robbery	-3 (3)	-3 (3)	-4 (3)	-4 (4)	-2 (3)
Theft crime	-1.6** (.7)	-1.6** (.6)	-1.6** (.7)	-1.6** (.7)	-1.5** (.6)
Possession of weapons	-1 (3)	-1 (3)	-1 (3)	-1 (3)	0 (2)
Miscellaneous crimes against society	4*** (1)	4*** (1)	4*** (1)	4*** (1)	3*** (1)
Public order crimes	-7*** (2)	-7*** (2)	-7*** (2)	-7*** (2)	-6*** (2)
Fraud crimes	4** (2)	4** (2)	4* (2)	4* (2)	5*** (2)
Drug crimes	-.4 (1.0)	-.4 (1.0)	0 (1)	0 (1)	0 (1)
Criminal damage and arson	-5 (4)	-5 (4)	-5 (4)	-5 (4)	-7* (4)
None-motoring offences	-.6*** (.1)	-.6***(.1)	-.6*** (.1)	-.6*** (.1)	-.61*** (.09)
Total number of defendants	.05 (.06)	.05 (.06)	.05 (.06)	.06 (.06)	.07 (.05)
Ratio of none-person defendant	1 (2)	1 (2)	1 (2)	1 (2)	2 (2)
Ratio of guilty pleas during trials	-.4** (.2)	.4** (.2)	-.4** (.2)	-.4* (.2)	-.3 (.2)
P-value of F-test	0.000***	0.000***	0.000***	0.000***	0.000***
Adjusted R^2	0.0658	0.0668	0.0647	0.0596	0.0904
Observations	1,470	1,428	1,386	1,344	1,302

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- Case-level determinants include Δ_4Ratio of defendant by crime groups, $\%\,\Delta_4$Total defendant number, Δ_4Ratio of None-person defendant, and Δ_4Ratio of guilty plea.

Table A 10 Full estimates, case duration in CERP and ERP

Dependent variables:	Δ_4Entire case duration			
Two court projects:	CERP		ERP	
	(1a)	(1b)	(2a)	(2b)
Court closures in four periods (%)	-.002	.03	.20***	.18***
	(.1)	(.1)	(.06)	(.06)
Linear trend in areas (PFA FE)	Yes	Yes	Yes	Yes
Bedfordshire	2 (10)	-4 (10)	3 (6)	-1 (6)
Cambridgeshire	-2 (10)	-9 (10)	4 (6)	1 (6)
Cheshire	-2 (10)	-5 (10)	-7 (6)	-7 (6)
Cleveland	-3 (10)	-7 (10)	-5 (6)	-7 (6)
Cumbria	0 (10)	-4 (10)	-3 (6)	-5 (6)
Derbyshire	-8 (10)	-11 (10)	1 (6)	-1 (6)
Devon and Cornwall	-3 (10)	-7 (10)	-1 (6)	-3 (6)
Dorset	-23 (10)	-14 (11)	-3 (6)	-3 (6)
Durham	0 (10)	-7 (10)	4 (6)	1 (6)
Dyfed-Powys	1 (10)	-3 (10)	-9 (6)	-9 (6)
Essex	9 (10)	5 (10)	-4 (6)	-5 (6)
Gloucestershire	-3 (10)	-5 (10)	-4 (6)	-5 (6)
Greater Manchester	-3 (10)	-7 (10)	3 (6)	-3 (6)
Gwent	-8 (10)	-8 (10)	3 (6)	0 (6)
Hampshire	5 (10)	0 (10)	-6 (6)	-6 (6)
Hertfordshire	0 (10)	-5 (11)	5 (6)	-5 (6)
Humberside	1 (10)	-4 (10)	-2 (6)	-2 (6)
Kent	3 (10)	-7 (10)	9 (6)	7 (6)
Lancashire	4 (10)	-6 (10)	2 (6)	1 (6)
Leicestershire	6 (10)	-11 (10)	-2 (6)	-3 (6)
Lincolnshire	6 (10)	0 (10)	-6 (6)	-8 (6)
Merseyside	-5 (10)	-6 (10)	-1 (6)	-2 (6)
Norfolk	4 (10)	1 (10)	4 (6)	2 (6)
North Wales	-1 (10)	-5 (10)	-7 (6)	-9 (6)
North Yorkshire	-1 (10)	-10 (10)	10* (6)	8 (6)
Northamptonshire	-2 (10)	-5 (10)	4 (6)	-3 (6)
Northumbria	3 (10)	-2 (10)	-7 (6)	-6 (6)
Nottinghamshire	0 (10)	-4 (10)	-6 (6)	-5 (6)
South Wales	-9 (10)	-16 (10)	-6 (6)	-6 (6)
South Yorkshire	-1 (10)	-6 (10)	-2 (6)	-1 (6)
Staffordshire	1 (10)	-3 (10)	9 (6)	-10* (6)
Suffolk	1 (10)	-3 (10)	3 (6)	3 (6)
Surrey	-3 (10)	-5 (10)	2 (6)	1 (6)
Sussex	9 (10)	3 (10)	-8 (6)	-10 (6)
Thames Valley	-3 (10)	-6 (10)	-7 (6)	-6 (6)
Warwickshire	-8 (10)	-8 (10)	-1 (6)	-6 (6)
West Mercia	-1 (10)	-3 (10)	1 (6)	-1 (6)
West Midlands	-4 (10)	-5 (10)	-2 (6)	-2 (6)
West Yorkshire	3 (10)	-3 (10)	-1 (6)	-4 (6)
Wiltshire	-7 (10)	-5 (10)	-1 (6)	-2 (6)
London	-3 (10)	-7 (10)	-1 (6)	-2 (6)
Difference in periods (Quarter FE)	Yes	Yes	Yes	Yes
2011q3 – 2010q3	3 (6)	5 (6)		
2011q4 – 2010q4	7 (7)	8 (6)		
2012q1 – 2011q1	12* (7)	14** (7)		
2012q2 – 2011q2	2 (7)	4 (7)		
2012q3 – 2011q3	1 (7)	2 (7)		
2012q4 – 2011q4	-2 (7)	-3 (7)		

2013q1 – 2012q1	-8 (7)	-7 (7)		
2013q2 – 2012q2	-1 (7)	1 (7)		
2013q3 – 2012q3	-4 (7)	-2 (7)		
2013q4 – 2012q4	-6 (7)	-3 (7)		
2014q1 – 2013q1	-7 (7)	-6 (7)		
2014q2 – 2013q2	-3 (7)	-4 (7)		
2014q3 – 2013q3	3 (7)	0 (7)		
2014q4 – 2013q4	2 (7)	-1 (7)		
2015q1 – 2014q1	4 (7)	4 (7)		
2015q2 – 2014q2			-2 (4)	-2 (4)
2015q3 – 2014q3			-2 (4)	-2 (4)
2015q4 – 2014q4			-6 (4)	-4 (4)
2016q1 – 2015q1			-15 (4)	-15*** (4)
2016q2 – 2015q2			-19 (4)	-20*** (4)
2016q3 – 2015q3			-19 (4)	-22*** (4)
2016q4 – 2015q4			-17 (4)	-21*** (4)
2017q1 – 2016q1			-16 (4)	-17*** (4)
2017q2 – 2016q2			-8 (4)	-8** (4)
2017q3 – 2016q3			-3 (4)	-2 (4)
2017q4 – 2016q4			-2 (4)	0 (4)
2018q1 – 2017q1			-1 (4)	1 (4)
2018q2 – 2017q2			-78 (4)	-6 (4)
2018q3 – 2017q3			-12 (4)	-10** (4)
2018q4 – 2017q4			-13 (4)	-13*** (4)
2019q1 – 2018q1			-11 (4)	-11*** (4)
2019q2 – 2018q2			-5 (4)	7 (4)
2019q3 – 2018q3			1 (4)	-2 (4)
Changes in case-level determinants	No	Yes	No	Yes
Defendant ratio:				
violence against person		3 (2)		-2 (1)
Sexual crimes		0 (6)		3 (3)
Robbery		-6 (6)		-1 (3)
Theft crime		-3** (1)		-1 (1)
Possession of weapons		0 (6)		-2 (3)
Miscellaneous crimes against society		6*** (2)		2 (1)
Public order crimes		-17*** (4)		1 (2)
Fraud crimes		4 (4)		4* (2)
Drug crimes		-2 (2)		1 (1)
Criminal damage and arson		-.5** (.2)		-1 (5)
None-motoring offences				
Total number of defendants		-.1 (.1)		.15*** (.05)
Ratio of none-person defendant		-1 (4)		1 (2)
Ratio of guilty pleas during trials		-.4 (.3)		-.3* (.2)
P-value of F-test	0.988	0.007***	0.000***	0.000***
Adjusted R^2	-0.0338	0.1236	0.0856	0.1548
Observations	672	672	798	798

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- Case-level determinants include Δ_4Ratio of defendant by crime groups, $\%\,\Delta_4$Total defendant number, Δ_4Ratio of None-person defendant, and Δ_4Ratio of guilty plea.
- Regressions ERP in this table does not include time interval Jan 2020 – Mar 2020 because the data of case duration is not available.

Table A 11 Full estimates, court closures and charges

	Dependent variables: $\%\Delta_4 ChargeNumber_{it}$								
	(1) $t-0$	(2) $t-1$	(3) $t-2$	(4) $t-3$	(5) $t-4$	(6) $t-5$	(7) $t-6$	(8) $t-7$	(9) $t-8$
Court closures in four periods (%) at timing $t-z$	-.001 (.03)	.04 (.03)	.04 (.03)	.06* (.03)	-.02 (.04)	-.05 (.04)	-.07** (.04)	-.09** (.04)	-.06 (.04)
All controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Linear trend in areas (PFA FE):									
Bedfordshire	-5* (3)	-5 (3)	-5 (3)	-4 (3)	-5 (3)	-5 (3)	-5 (3)	-6* (4)	-6 (4)
Cambridgeshire	-5 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (4)	-4 (4)
Cheshire	0 (3)	1 (3)	1 (3)	1 (3)	1 (3)	1 (3)	0 (3)	0 (4)	0 (4)
Cleveland	-4 (3)	-4 (3)	-4 (3)	-5 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (4)	-5 (4)
Cumbria	-3 (3)	-3 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (4)	-4 (4)
Derbyshire	-2 (3)	-2 (3)	-3 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (4)	-2 (4)
Devon and Cornwall	-5 (3)	-5* (3)	-5 (3)	-5 (3)	-5 (3)	-4 (3)	-4 (3)	-4 (4)	-4 (4)
Dorset	-1 (3)	0 (3)	0 (3)	0 (3)	0 (3)	0 (3)	1 (3)	1 (4)	0 (4)
Durham	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (4)	-4 (4)
Dyfed-Powys	-2 (3)	-2 (3)	-1 (3)	-1 (3)	-1 (3)	0 (3)	0 (4)	0 (4)	0 (4)
Essex	-1 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-1 (3)	-2 (4)	-3 (4)
Gloucestershire	0 (3)	0 (3)	0 (3)	0 (3)	0 (3)	1 (3)	1 (3)	0 (4)	0 (4)
Greater Manchester	-7** (3)	-7** (3)	-7 (3)	-7** (3)	-7** (3)	-7** (3)	-7** (3)	-8 **(4)	-8** (4)
Gwent	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-3 (3)	-4 (3)	-4 (3)	-4 (4)	-4 (4)
Hampshire	-5 (3)	-5 (3)	-5 (3)	-5* (3)	-5 (3)	-5 (3)	-5 (3)	-5 (4)	-5 (4)
Hertfordshire	0 (3)	0 (3)	-1 (3)	-1 (3)	0 (3)	-4 (3)	0 (3)	-1 (4)	-1 (4)
Humberside	-2 (3)	-2 (3)	-3 (3)	-2 (3)	-2 (3)	-3 (3)	-3 (3)	3 (4)	-3 (4)
Kent	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-5 (3)	-5 (3)	-6 (4)	-6* (4)
Lancashire	-6** (3)	-6** (3)	-7 (3)	-7** (3)	-7** (3)	-8** (3)	-8** (3)	-9** (4)	-9** (4)
Leicestershire	-2 (3)	-2 (3)	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-4 (4)	-5 (4)
Lincolnshire	0 (3)	-1 (3)	-1 (3)	-1 (3)	-2 (3)	-2 (3)	-3 (3)	-3 (4)	-2 (4)
Merseyside	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-2 (4)	-2 (4)
Norfolk	0 (3)	0 (3)	0 (3)	0 (3)	0 (3)	0 (3)	1 (3)	1 (4)	0 (4)
North Wales	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-2 (3)	-2 (3)	-2 (4)	-2 (4)
North Yorkshire	-7** (3)	-7** (3)	-7 (3)	-7** (3)	-8** (3)	-8** (3)	-9** (3)	-9** (4)	-9** (4)
Northamptonshire	-2 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (4)	-2 (4)
Northumbria	-4 (3)	-4 (3)	-5 (3)	-5 (3)	-5 (3)	-5 (3)	-5 (3)	-5 (4)	-5 (4)
Nottinghamshire	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	0 (3)	0 (3)	1 (4)	1 (4)

South Wales	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-3 (4)	-3 (4)
South Yorkshire	-2 (3)	-1 (3)	-1 (3)	-1 (3)	-2 (3)	-2 (3)	-3 (3)	-3 (4)	-4 (4)
Staffordshire	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (4)	-3 (4)
Suffolk	-1 (3)	-1 (3)	-1 (3)	-1 (3)	0 (3)	0 (3)	0 (3)	0 (4)	0 (4)
Surrey	-3 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-3 (3)	-3 (4)	-4 (4)
Sussex	-7** (3)	-6** (3)	-6 (3)	-6* (3)	-6* (3)	-7** (3)	-7** (3)	-8** (4)	-9** (4)
Thames Valley	-3 (3)	-3 (3)	-4 (3)	-4 (3)	-3 (3)	-3 (3)	-3 (3)	-4 (4)	-4 (4)
Warwickshire	-1 (3)	0 (3)	0 (3)	0 (3)	0 (3)	0 (3)	-1 (3)	-1 (4)	-1 (4)
West Mercia	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-2 (4)	-1 (4)
West Midlands	-4 (3)	-4 (3)	-5 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-5 (4)	-5 (4)
West Yorkshire	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-2 (3)	-2 (4)	-2 (4)
Wiltshire	-1 (3)	1 (3)	1 (3)	2 (3)	1 (3)	1 (3)	1 (3)	1 (4)	0 (4)
London	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-5 (4)	-5 (4)

Difference in periods (Quarter FE):

2011q3 – 2010q3	-2 (3)								
2011q4 – 2010q4	1 (3)	3 (3)							
2012q1 – 2011q1	0 (3)	2 (3)	-1 (3)						
2012q2 – 2011q2	-4 (3)	-2 (3)	-5 (3)	-4 (3)					
2012q3 – 2011q3	-2 (3)	0 (3)	-4 (3)	-3 (3)	2 (3)				
2012q4 – 2011q4	-3 (3)	-1 (3)	-4 (3)	-4 (3)	1 (3)	-1 (3)			
2013q1 – 2012q1	-1 (3)	1 (3)	-2 (3)	-1 (3)	3 (3)	2 (3)	3 (3)		
2013q2 – 2012q2	6** (3)	8*** (3)	5* (3)	6** (3)	9*** (3)	8** (3)	9*** (3)	7** (3)	
2013q3 – 2012q3	6** (3)	8*** (3)	5* (3)	6** (3)	9*** (3)	8** (3)	10*** (3)	8*** (3)	1 (3)
2013q4 – 2012q4	10*** (3)	12*** (3)	9*** (3)	10*** (3)	13*** (3)	11*** (3)	12*** (3)	11*** (3)	4 (3)
2014q1 – 2013q1	9*** (3)	12*** (3)	9*** (3)	10*** (3)	13*** (3)	11*** (3)	12*** (3)	10*** (3)	5 (3)
2014q2 – 2013q2	5* (3)	8*** (3)	5 (3)	6** (3)	9*** (3)	7** (3)	8** (3)	5** (3)	0 (3)
2014q3 – 2013q3	3 (3)	6* (3)	3 (3)	3 (3)	7** (3)	5 (3)	5* (3)	3 (3)	-3 (3)
2014q4 – 2013q4	4 (3)	7** (3)	4 (3)	5 (3)	8** (3)	6* (3)	6** (3)	4 (3)	-2 (3)
2015q1 – 2014q1	1 (3)	3 (3)	0 (3)	2 (3)	4 (3)	2 (3)	3 (3)	1 (3)	-5* (3)
2015q2 – 2014q2	-4 (3)	-2 (3)	-4 (3)	-3 (3)	0 (3)	-2 (3)	-2 (3)	-4 (3)	-10*** (3)
2015q3 – 2014q3	-1 (3)	1 (3)	-2 (3)	0 (3)	2 (3)	0 (3)	1 (3)	-1 (3)	-7** (3)
2015q4 – 2014q4	-8** (3)	-5* (3)	-8*** (3)	-7** (3)	-4 (3)	-6* (3)	-5* (3)	-8** (3)	-13*** (3)
2016q1 – 2015q1	-4 (3)	-1 (3)	-4 (3)	-3 (3)	0 (3)	-2 (3)	-1 (3)	-4 (3)	-10*** (3)
2016q2 – 2015q2	-2 (3)	1 (3)	-2 (3)	-1 (3)	2 (3)	0 (3)	0 (3)	-2 (3)	-8** (3)
2016q3 – 2015q3	-8*** (3)	-5* (3)	-8 (3)	-7** (3)	-4 (3)	-6* (3)	-5* (3)	-7** (3)	-13*** (3)
2016q4 – 2015q4	4 (3)	6* (3)	3 (3)	5 (3)	7** (3)	5 (3)	6* (3)	4 (3)	-2 (3)
2017q1 – 2016q1	2 (3)	3 (3)	1 (3)	2 (3)	5 (3)	3 (3)	4 (3)	2 (3)	-4 (3)

2017q2 – 2016q2	-2 (3)	0 (3)	-3 (3)	-2 (3)	1 (3)	-1 (3)	0 (3)	-2 (3)	-8** (3)
2017q3 – 2016q3	0 (3)	2 (3)	-1 (3)	0 (3)	4 (3)	2 (3)	2 (3)	0 (3)	-6* (3)
2017q4 – 2016q4	-7** (3)	-4 (3)	-8*** (3)	-7** (3)	-3 (3)	-5 (3)	-4 (3)	-7** (3)	-13*** (3)
2018q1 – 2017q1	-7** (3)	-5* (3)	-8*** (3)	-7** (3)	-4 (3)	-5 (3)	-4 (3)	-7** (3)	-14*** (3)
2018q2 – 2017q2	-7** (3)	-5 (3)	-8*** (3)	-7** (3)	-4 (3)	-5* (3)	-4 (3)	-6** (3)	-14*** (3)
2018q3 – 2017q3	-7** (3)	-5 (3)	-8** (3)	-7** (3)	-4 (3)	-5 (3)	-4 (3)	-6** (3)	-13*** (3)
2018q4 – 2017q4	-5* (3)	-3 (3)	-6* (3)	-5 (3)	-2 (3)	-4 (3)	-2 (3)	-4 (3)	-11*** (3)
2019q1 – 2018q1	-4 (3)	-2 (3)	-5 (3)	-4 (3)	-1 (3)	-3 (3)	-2 (3)	-3 (3)	-10*** (3)
2019q2 – 2018q2	-2 (3)	0 (3)	-3 (3)	-1 (3)	1 (3)	-1 (3)	0 (3)	-2 (3)	-8*** (3)
2019q3 – 2018q3	-8*** (3)	-6** (3)	-9*** (3)	-8** (3)	-5* (3)	-7** (3)	-6** (3)	-8*** (3)	-15*** (3)
2019q4 – 2018q4	-8*** (3)	-6* (3)	-9*** (3)	-7** (3)	-5 (3)	-7** (3)	-6** (3)	-8*** (3)	-15*** (3)
2020q1 – 2019q1	-1 (3)	2 (3)	-1 (3)	0 (3)	3 (3)	0 (3)	1 (3)	-1 (3)	-8** (3)
Total number of crimes	.23*** (.06)	.23*** (.05)	.23*** (.06)	.23*** (.06)	.23*** (.06)	.23*** (.07)	.22*** (.07)	.20*** (.07)	.20*** (.07)
Average custodial sentence length (months)	-.04** (.02)	-.04** (.02)	-.04** (.02)	-.04** (.02)	-.04** (.02)	-.05** (.02)	-.04** (.02)	-.04** (.02)	-.04* (.02)
Compositions of crimes:									
Violence against person	-.2 (.4)	-.2 (.4)	-.1 (.4)	-.1 (.5)	-.1 (.5)	-.2 (.5)	-.2 (.5)	-.2 (.5)	-.3 (.5)
Sexual crimes	-.4 (.9)	-.5 (.9)	-.5 (.9)	-.5 (.9)	-.4 (1.0)	-.5 (1.0)	-.6 (1.0)	0 (1)	0 (1)
Robbery	-5*** (2)	-5*** (2)	-5*** (2)	-5*** (2)	-5** (2)	-5** (2)	-5** (2)	-5** (2)	-5** (2)
Theft crimes	-.4 (.3)	-.4 (.3)	-.4 (.3)	-.4 (.4)	-.4 (.4)	-.4 (.4)	-.5 (.4)	-.5 (.4)	-.6 (.4)
Criminal damage and arson	-.5 (.5)	-.4 (.5)	-.4 (.5)	-.3 (.6)	-.4 (.6)	-.4 (.6)	-.5 (.6)	-.6 (.6)	-.7 (.6)
Possession of weapons	9*** (3)	9*** (3)	8*** (3)	9*** (3)	9*** (3)	9*** (3)	9*** (3)	10*** (3)	9*** (3)
Drug crimes	2.7*** (.6)	2.8*** (.6)	3.0*** (.7)	3.1*** (.7)	3.2*** (.7)	3.2*** (.7)	3.2*** (.7)	3.4*** (.8)	3.6*** (.8)
Miscellaneous crimes against society	2* (1)	2* (1)	2* (1)	2* (1)	2 (1)	2 (1)	1 (1)	1 (1)	1 (1)
P-value of F-test	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
Adjusted R^2	0.1512	0.1526	0.1546	0.1576	0.1567	0.1556	0.1536	0.1543	0.1520
Observations	1,509	1,467	1,425	1,383	1,341	1,299	1,257	1,215	1,173

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- All controls include PFA FE dummies, quarter FE dummies, per cent changes in number of crimes, per cent changes in ACSL, and changes in ratio of crime groups.

Table A 12 Full estimates, conviction duration and charges

	Dependent variables: $\%\Delta_4 ChargeNumber_{it}$								
	(1) $t-0$	(2) $t-1$	(3) $t-2$	(4) $t-3$	(5) $t-4$	(6) $t-5$	(7) $t-6$	(8) $t-7$	(9) $t-8$
Changes in Conviction Duration (days) in four periods at timing $t-z$	-.02 (0.3)	-.01 (.03)	.01 (.03)	.03 (.03)	.06** (.03)	.02 (.03)	-.02 (.03)	-.04 (.03)	-.07** (.03)
All controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Linear trend in areas (PFA FE):									
Bedfordshire	-4 (3)	-5 (3)	-5* (3)	-5 (3)	-5 (3)	-5 (3)	-5 (3)	-5 (4)	-5 (4)
Cambridgeshire	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (4)	-4 (4)
Cheshire	1 (3)	1 (3)	1 (3)	1 (3)	1 (3)	1 (3)	0 (3)	0 (4)	-1 (4)
Cleveland	-2 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-5 (3)	-5 (3)	-5 (4)	-5 (4)
Cumbria	-3 (3)	-3 (3)	-4 (3)	-3 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (4)	-4 (4)
Derbyshire	-1 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (4)	-2 (4)
Devon and Cornwall	-4 (3)	-5 (3)	-5 (3)	-5 (3)	-5 (3)	-4 (3)	-4 (3)	-5 (4)	-4 (4)
Dorset	0 (3)	0 (3)	0 (3)	0 (3)	0 (3)	0 (3)	0 (3)	0 (4)	0 (4)
Durham	-2 (3)	-3 (3)	-3 (3)	-3 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (4)	-4 (4)
Dyfed-Powys	-1 (3)	-2 (3)	-1 (3)	-1 (3)	0 (3)	0 (3)	0 (4)	0 (4)	0 (4)
Essex	-1 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (4)	-2 (4)
Gloucestershire	1 (3)	0 (3)	0 (3)	1 (3)	0 (3)	1 (3)	0 (3)	-1 (4)	-1 (4)
Greater Manchester	-6 (3)	-7** (3)	-7** (3)	-7** (3)	-7** (3)	-7** (3)	-8** (4)	-8** (4)	-8 (4)
Gwent	-4 (3)	-3 (3)	-4 (3)	-3 (3)	-3 (3)	-4 (3)	-4 (3)	-4 (4)	-4 (4)
Hampshire	-4 (3)	-5 (3)	-5* (3)	-5 (3)	-5* (3)	-5 (3)	-5 (3)	-5 (4)	-5 (4)
Hertfordshire	1 (3)	0 (3)	-1 (3)	-1 (3)	0 (3)	0 (3)	0 (3)	-1 (4)	-1 (4)
Humberside	-1 (3)	-2 (3)	-3 (3)	-3 (3)	-3 (3)	-2 (3)	-3 (3)	-3 (4)	-3 (4)
Kent	-4 (3)	-5 (3)	-4 (3)	-4 (3)	-4 (3)	-5 (3)	-5 (3)	-6 (4)	-6 (4)
Lancashire	-6* (3)	-6** (3)	-7** (3)	-7** (3)	-7** (3)	-7** (3)	-8** (3)	-8** (4)	-9 (4)
Leicestershire	-1 (3)	-2 (3)	-3 (3)	-3 (3)	-3 (3)	-4 (3)	-4 (3)	-5 (4)	-5 (4)
Lincolnshire	0 (3)	0 (3)	-1 (3)	-1 (3)	-2 (3)	-3 (3)	-3 (3)	-3 (4)	-2 (4)
Merseyside	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (4)	-2 (4)
Norfolk	1 (3)	0 (3)	0 (3)	0 (3)	0 (3)	0 (3)	1 (3)	1 (4)	0 (4)
North Wales	-2 (3)	-2 (3)	-3 (3)	-2 (3)	-2 (3)	-3 (3)	-2 (3)	-2 (4)	-2 (4)
North Yorkshire	-7** (3)	-7** (3)	-7** (3)	-7** (3)	-8** (3)	-8** (3)	-8** (3)	-8** (4)	-9 (4)
Northamptonshire	-2 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (4)	-2 (4)
Northumbria	-3 (3)	-5 (3)	-5 (3)	-5 (3)	-5 (3)	-5 (3)	-5 (3)	-5 (4)	-5 (4)

Nottinghamshire	0 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	0 (3)	0 (3)	0 (4)	0 (4)
South Wales	-2 (3)	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-4 (4)	-4 (4)
South Yorkshire	0 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-2 (3)	-2 (3)	-3 (4)	-4 (4)
Staffordshire	-1 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-3 (4)	-3 (4)
Suffolk	0 (3)	0 (3)	-1 (3)	0 (3)	0 (3)	0 (3)	0 (3)	0 (4)	0 (4)
Surrey	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-2 (3)	-3 (3)	-3 (3)	-3 (4)	-4 (4)
Sussex	-5* (3)	-6** (3)	-6* (3)	-6* (3)	-6* (3)	-7** (3)	-8** (3)	-9** (4)	-9 (4)
Thames Valley	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-4 (3)	-4 (4)	-4 (4)
Warwickshire	0 (3)	0 (3)	0 (3)	0 (3)	0 (3)	0 (3)	-1 (3)	-1 (4)	-1 (4)
West Mercia	0 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-1 (3)	-2 (4)	-1 (4)
West Midlands	-3 (3)	-4 (3)	-5 (3)	-4 (3)	-4 (3)	-5 (3)	-5 (3)	-5 (4)	-5 (4)
West Yorkshire	-2 (3)	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-3 (3)	-3 (4)	-3 (4)
Wiltshire	2 (3)	1 (3)	1 (3)	2 (3)	2 (3)	1 (3)	1 (3)	1 (4)	1 (4)
London	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-4 (3)	-5 (4)	-6 (4)

Difference in periods (Quarter FE):

2011q3 – 2010q3	-2 (3)								
2011q4 – 2010q4	1 (3)	3 (3)							
2012q1 – 2011q1	0 (3)	2 (3)	-1 (3)						
2012q2 – 2011q2	-4 (3)	-2 (3)	-5 (3)	-4 (3)					
2012q3 – 2011q3	-2 (3)	0 (3)	-3 (3)	-2 (3)	1 (3)				
2012q4 – 2011q4	-3 (3)	-1 (3)	-4 (3)	-3 (3)	0 (3)	-1 (3)			
2013q1 – 2012q1	-1 (3)	1 (3)	-2 (3)	-1 (3)	3 (3)	1 (3)	2 (3)		
2013q2 – 2012q2	5* (3)	8*** (3)	5 (3)	6* (3)	9*** (3)	8** (3)	9*** (3)	7** (3)	
2013q3 – 2012q3	5* (3)	7*** (3)	5* (3)	6** (3)	9*** (3)	8*** (3)	9*** (3)	8** (3)	1 (3)
2013q4 – 2012q4	9*** (3)	11*** (3)	9*** (3)	9*** (3)	13*** (3)	12*** (3)	13*** (3)	11*** (3)	4 (3)
2014q1 – 2013q1	9*** (3)	11*** (3)	9*** (3)	10*** (3)	13*** (3)	12*** (3)	13*** (3)	11*** (3)	4 (3)
2014q2 – 2013q2	5* (3)	7*** (3)	5 (3)	5* (3)	9*** (3)	8** (3)	9*** (3)	7** (3)	0 (3)
2014q3 – 2013q3	3 (3)	5* (3)	2 (3)	3 (3)	7** (3)	5* (3)	6** (3)	4 (3)	-2 (3)
2014q4 – 2013q4	4 (3)	6* (3)	3 (3)	4 (3)	8** (3)	6** (3)	7** (3)	5* (3)	-1 (3)
2015q1 – 2014q1	0 (3)	2 (3)	0 (3)	1 (3)	5 (3)	3 (3)	4 (3)	2 (3)	-5 (3)
2015q2 – 2014q2	-4 (3)	-2 (3)	-5 (3)	-4 (3)	0 (3)	-2 (3)	-1 (3)	-2 (3)	-9*** (3)
2015q3 – 2014q3	-2 (3)	1 (3)	-2 (3)	-1 (3)	3 (3)	1 (3)	2 (3)	0 (3)	-6** (3)
2015q4 – 2014q4	-8*** (3)	-6* (3)	-9*** (3)	-8** (3)	-4 (3)	-5* (3)	-4 (3)	-6* (3)	-13*** (3)
2016q1 – 2015q1	-4 (3)	-2 (3)	-5 (3)	-4 (3)	0 (3)	-2 (3)	0 (3)	-2 (3)	-9*** (3)
2016q2 – 2015q2	-2 (3)	0 (3)	-3 (3)	-2 (3)	2 (3)	0 (3)	2 (3)	0 (3)	-7** (3)
2016q3 – 2015q3	-8*** (3)	-6** (3)	-8*** (3)	-7** (3)	-4 (3)	-5* (3)	-4 (3)	-6* (3)	-13*** (3)
2016q4 – 2015q4	3 (3)	5*** (3)	3 (3)	4 (3)	8** (3)	6* (3)	7** (3)	6* (3)	-1 (3)

2017q1 – 2016q1	1 (3)	3 (3)	1 (3)	2 (3)	6* (3)	4 (3)	5 (3)	4 (3)	-3 (3)
2017q2 – 2016q2	-3 (3)	0 (3)	-3 (3)	-2 (3)	2 (3)	0 (3)	1 (3)	0 (3)	-7** (3)
2017q3 – 2016q3	0 (3)	2 (3)	-1 (3)	0 (3)	4 (3)	2 (3)	3 (3)	2 (3)	-5 (3)
2017q4 – 2016q4	-7** (3)	-5 (3)	-8** (3)	-6** (3)	-3 (3)	-4 (3)	-4 (3)	-5* (3)	-12*** (3)
2018q1 – 2017q1	-7** (3)	-5* (3)	-8*** (3)	-7** (3)	-3 (3)	-5 (3)	-4 (3)	-6** (3)	-13*** (3)
2018q2 – 2017q2	-7** (3)	-5* (3)	-8*** (3)	-7** (3)	-3 (3)	-5* (3)	-4 (3)	-7** (3)	-14*** (3)
2018q3 – 2017q3	-7** (3)	-5* (3)	-8*** (3)	-7** (3)	-3 (3)	-5 (3)	-4 (3)	-6** (3)	-13*** (3)
2018q4 – 2017q4	-5* (3)	-3 (3)	-6** (3)	-5* (3)	-2 (3)	-4 (3)	-2 (3)	-5 (3)	-12*** (3)
2019q1 – 2018q1	-4 (3)	-2 (3)	-5* (3)	-5 (3)	-1 (3)	-3 (3)	-1 (3)	-4 (3)	-11*** (3)
2019q2 – 2018q2	-2 (3)	0 (3)	-3 (3)	-2 (3)	1 (3)	0 (3)	1 (3)	-1 (3)	-8*** (3)
2019q3 – 2018q3	-8*** (3)	-7** (3)	-9*** (3)	-9*** (3)	-5* (3)	-7** (3)	-5** (3)	-8** (3)	-15*** (3)
2019q4 – 2018q4	-8*** (3)	-6** (3)	-9*** (3)	-8*** (3)	-5 (3)	-6** (3)	-5 (3)	-7** (3)	-15*** (3)
2020q1 – 2019q1		1 (3)	-2 (3)	-1 (3)	3 (3)	1 (3)	2 (3)	0 (3)	-7** (3)
Total number of crimes	.24*** (.06)	.23*** (.06)	.24*** (.06)	.24*** (.06)	.24*** (.06)	.24*** (.07)	.22*** (.07)	.20*** (.07)	.18*** (.07)
Average custodial sentence length (months)	-.04** (.02)	-.04** (.02)	-.04** (.02)	-.04** (.02)	.04** (.02)	-.04** (.02)	-.04** (.02)	-.04* (.02)	-.04* (.02)
Compositions of crimes:									
Violence against person	-.1 (.4)	-.2 (.4)	-.2 (.4)	-.1 (.5)	-.1 (.5)	-.2 (.5)	-.3 (.5)	-.3 (.5)	-.4 (.5)
Sexual crimes	-.4 (.9)	-.5 (.9)	-.5 (.9)	-.5 (.9)	-.3 (1.0)	-.4 (1.0)	-.4 (1.0)	0 (1)	0 (1)
Robbery	-5 *** (2)	-5*** (2)	-5*** (2)	-5*** (2)	-5** (2)	-5** (2)	-5** (2)	5** (2)	-5** (2)
Theft crimes	-.4 (.3)	-.4 (.3)	-.4 (.3)	-.4 (.4)	-.3 (.4)	-.4 (.4)	-.5 (.4)	-.6 (.4)	-.7* (.4)
Criminal damage and arson	-.3 (.5)	-.4 (.5)	-.4 (.5)	-.3 (.6)	-.4 (.6)	-.4 (.6)	-.6 (.6)	-.7 (.6)	-.8 (.6)
Possession of weapons	9*** (3)	9*** (3)	8*** (3)	9*** (3)	10*** (3)	10*** (3)	9*** (3)	9*** (3)	9*** (3)
Drug crimes	2.7*** (.6)	2.8*** (.6)	3.0*** (.6)	3.2*** (.7)	3.3*** (.7)	3.3*** (.7)	3.2*** (.7)	3.4*** (.8)	3.5*** (.7)
Miscellaneous crimes against society	2 (1)	2* (1)	2* (1)	2* (1)	2* (1)	2 (1)	1 (1)	1 (1)	1 (1)
P-value of F-test	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***	0.00***
Adjusted R^2	0.1531	0.1509	0.1528	0.1552	0.1586	0.1531	0.1503	0.1506	0.1538
Observations	1,468	1,467	1,425	1,383	1,341	1,299	1,257	1,215	1,173

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- Conviction Duration refers to days taken from charging crime to case completion.
- All controls include PFA FE dummies, quarter FE dummies, per cent changes in number of crimes, per cent changes in ACSL, and changes in ratio of crime groups.

Table A 13 Full estimates, prosecutorial selection in crimes

Dependent variables:	$\Delta_4 violence\_charges_{it}$		$\Delta_4 theft\_charges_{it}$	
	(1a) $t-7$	(1b) $t-8$	(2a) $t-7$	(2b) $t-8$
Court closures in four periods (%) at timing $t-z$[51]	-.018** (.007)	-.018** (.007)	.022** (.009)	.017** (.009)
All controls	Yes	Yes	Yes	Yes
Linear trend in areas (PFA FE):				
Bedfordshire	-.2 (.7)	-.2 (.7)	-1.1 (.8)	-1.1 (.8)
Cambridgeshire	-.5 (.7)	-.6 (.7)	-.1 (.8)	-.1 (.8)
Cheshire	.2 (.7)	.3 (.7)	-.4 (.8)	-.3 (.8)
Cleveland	.7 (.7)	.7 (.7)	-1.5 (.8)	-1.4 (.8)
Cumbria	-.2 (.7)	-.2 (.7)	-.5 (.8)	-.5 (.8)
Derbyshire	-.5 (.7)	-.5 (.7)	.2 (.8)	.2 (.8)
Devon and Cornwall	.0 (.7)	.0 (.7)	-.8 (.8)	-.8 (.8)
Dorset	-.4 (.7)	-.3 (.7)	.0 (.8)	.1 (.8)
Durham	.3 (.7)	.3 (.7)	-.2 (.8)	-.2 (.9)
Dyfed-Powys	-.4 (.7)	-.2 (.7)	-.9 (.8)	-1.1 (.9)
Essex	-.3 (.7)	-.4 (.7)	-.2 (.8)	-.1 (.9)
Gloucestershire	.3 (.7)	.4 (.7)	-.8 (.8)	-1.0 (.8)
Greater Manchester	.5 (.7)	.4 (.7)	-1.3 (.8)	-1.2(.9)
Gwent	.1 (.7)	.0 (.7)	-.7 (.8)	-.6 (.8)
Hampshire	.5 (.7)	.4 (.7)	-.7 (.8)	-.6 (.8)
Hertfordshire	-.8 (.7)	-.8 (.7)	.4 (.8)	.6 (.8)
Humberside	.2 (.7)	.1 (.7)	.2 (.8)	.3 (.8)
Kent	-.1 (.7)	-.1 (.7)	.0 (.8)	.2 (.9)
Lancashire	-.2 (.7)	.0 (.7)	-.6 (.8)	-.7 (.8)
Leicestershire	.3 (.7)	.2 (.7)	-1.2 (.8)	-1.1 (.9)
Lincolnshire	.1 (.7)	.1 (.7)	-.5 (.8)	-.5 (.8)
Merseyside	-.1 (.7)	.0 (.7)	-.5 (.8)	-.6 (.9)
Norfolk	-.2 (.7)	-.3 (.7)	-.4 (.8)	-.2 (.8)
North Wales	.1 (.7)	.0 (.7)	-.7 (.8)	-.6 (.8)
North Yorkshire	.1 (.7)	.0 (.7)	-.7 (.8)	-.5 (.8)
Northamptonshire	.4 (.7)	.4 (.7)	-1.1 (.8)	-1.1 (.8)
Northumbria	1.1 (.7)	1.0 (.7)	-.8 (.8)	-.7 (.8)
Nottinghamshire	-.3 (.7)	-.4 (.7)	-.5 (.8)	-.4 (.8)
South Wales	.3 (.7)	.3 (.7)	-.3 (.8)	-.3 (.8)
South Yorkshire	.5 (.7)	.5 (.7)	-.8 (.8)	-.7 (.8)
Staffordshire	-1.2* (.7)	-1.2* (.7)	-.1 (.8)	.0 (.8)
Suffolk	-.2 (.7)	-.2 (.7)	.3 (.8)	.3 (.8)
Surrey	.5 (.7)	.6 (.7)	-.8 (.8)	-.7 (.8)
Sussex	.1 (.7)	.0 (.7)	-.6 (.8)	-.5 (.8)
Thames Valley	.1 (.7)	.0 (.7)	-.8 (.8)	-.6 (.8)
Warwickshire	.0 (.7)	.0 (.7)	-.5 (.8)	-.6 (.8)
West Mercia	-.6 (.7)	-.6 (.7)	.3 (.8)	.4 (.8)
West Midlands	-.7 (.7)	-.7 (.7)	-.2 (.8)	-.1 (.8)
West Yorkshire	-.1 (.7)	-.1 (.7)	.2 (.8)	.3 (.8)
Wiltshire	-.9 (.7)	-.7 (.7)	.4 (.8)	.4 (.8)
London	.1 (.7)	.0 (.7)	-1.1 (.8)	-1.0 (.8)
Difference in periods (Quarter FE):				
2013q2 – 2012q2	.4* (.6)		1.4* (.7)	
2013q3 – 2012q3	1.0*** (.6)	.8 (.6)	.0 (.7)	-1.5** (.7)
2013q4 – 2012q4	2.0*** (.6)	1.8*** (.6)	-.2 (.7)	-1.6** (.7)

[51] The estimates of other timing $t-z$ can be found in table A4.

2014q1 – 2013q1	1.5*** (.6)	1.6*** (.6)	1.0 (.7)	-.9 (.7)
2014q2 – 2013q2	2.0*** (.6)	1.9*** (.6)	-.4 (.7)	-2.1*** (.7)
2014q3 – 2013q3	1.9 (.6)	1.7*** (.6)	-.1 (.7)	-1.7** (.7)
2014q4 – 2013q4	1.0** (.6)	.7 (.6)	.6 (.7)	-1.0 (.7)
2015q1 – 2014q1	1.5* (.6)	1.3** (.6)	-.2 (.8)	-1.8** (.8)
2015q2 – 2014q2	1.1 (.6)	.8 (.6)	.0 (.8)	-1.6** (.8)
2015q3 – 2014q3	1.0** (.6)	.8 (.6)	-.3 (.8)	-1.9** (.8)
2015q4 – 2014q4	1.4** (.6)	1.2* (.6)	-1.0 (.8)	-2.6*** (.7)
2016q1 – 2015q1	1.5* (.6)	1.2* (.6)	-.8 (.8)	-2.5*** (.8)
2016q2 – 2015q2	1.1 (.6)	.8 (.6)	-.7 (.7)	-2.3*** (.7)
2016q3 – 2015q3	1.0 (.6)	.7 (.6)	-.5 (.7)	-2.1*** (.7)
2016q4 – 2015q4	1.0 (.6)	.8 (.6)	.0 (.7)	-1.6*** (.7)
2017q1 – 2016q1	.8 (.6)	.6 (.6)	.2 (.8)	-1.4*** (.7)
2017q2 – 2016q2	1.9*** (.6)	1.6** (.6)	-.8 (.8)	-2.3*** (.8)
2017q3 – 2016q3	2.3*** (.6)	2.0*** (.6)	-.5 (.8)	-2.1*** (.7)
2017q4 – 2016q4	2.3*** (.6)	2.0*** (.6)	-.9 (.8)	-2.4*** (.7)
2018q1 – 2017q1	2.0*** (.6)	1.7*** (.6)	-1.0 (.7)	-2.5*** (.7)
2018q2 – 2017q2	2.4*** (.6)	1.9*** (.6)	-.8 (.7)	-2.1*** (.7)
2018q3 – 2017q3	2.2*** (.6)	1.9*** (.6)	-1.2* (.7)	-2.7*** (.7)
2018q4 – 2017q4	1.3** (.6)	1.0* (.6)	-1.7** (.7)	-3.2*** (.7)
2019q1 – 2018q1	.9 (.6)	.7 (.6)	-1.8** (.8)	-3.3*** (.7)
2019q2 – 2018q2	.0 (.6)	-.1* (.6)	-1.2* (.7)	-2.9*** (.7)
2019q3 – 2018q3	-.9 (.6)	-1.1* (.6)	-.6 (.7)	-2.2*** (.7)
2019q4 – 2018q4	-.3 (.6)	-.5 (.6)	-.4 (.7)	-2.0*** (.7)
2020q1 – 2019q1	1.0 (.6)	.8 (.6)	-1.4* (.7)	-3.0*** (.7)
Total number of crimes	-.06*** (.01)	-.06*** (.01)	.03* (.02)	.02 (.02)
Average custodial sentence length (months)	.006 (.004)	.007* (.004)	-.013*** (.005)	-.013*** (.005)
Compositions of crimes:				
Violence against person	.35*** (.09)	.35*** (.10)	-.0 (.1)	.0 (.1)
Sexual crimes	2 (.2)	.2 (.2)	-.1 (.2)	-.1 (.2)
Robbery	-.5 (.4)	-.5 (.4)	-.2 (.5)	-.2 (.5)
Theft crimes	-.08 (.07)	-.09 (.08)	.49*** (.09)	.50*** (.09)
Criminal damage and arson	-.0 (.1)	.0 (.1)	-.1 (.1)	-.1 (.2)
Possession of weapons	.6 (.6)	.7 (.6)	-1.8** (.7)	-2.0*** (.7)
Drug crimes	-.9*** (.1)	-.9*** (.1)	-.1 (.2)	-.1 (.2)
Miscellaneous crimes against society	-.5** (.2)	-.5** (.2)	-.1 (.3)	-.1 (.3)
P-value of F-test	0.00***	0.00***	0.00***	0.00***
Adjusted R^2	0.2510	0.2523	0.2110	0.2083
Observations	1,257	1,215	1,257	1,215

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- $\Delta_4 violence\_charges$ represents the changes in ratio of charged violence crimes to total charges in four periods.
- $\Delta_4 theft\_charges$ represents the changes in ratio of charged theft crimes to total charges in four periods.
- All controls include PFA FE dummies, quarter FE dummies, per cent changes in number of crimes, per cent changes in ACSL, and changes in ratio of crime groups.

Table A 14 Full estimates, court closures and crimes

Dependent variables: $\%\Delta_4 CrimeNumber_{it}$			
	(1)	(2)	(3)
Court closures in four periods (%)	.10***	.08***	.06***
	(.02)	(.02)	(.02)
Linear trend in areas (PFA FE)	Yes	Yes	Yes
Bedfordshire	1 (2)	1 (2)	0 (2)
Cambridgeshire	0 (2)	0 (2)	2 (2)
Cheshire	3 (2)	3* (2)	7*** (2)
Cleveland	3 (2)	-2 (2)	1 (2)
Cumbria	2 (2)	0 (2)	4** (2)
Derbyshire	0 (2)	0 (2)	3 (2)
Devon and Cornwall	-1 (2)	-1 (2)	1 (2)
Dorset	-1 (2)	0 (2)	3 (2)
Durham	5** (2)	3* (2)	6*** (2)
Dyfed-Powys	2 (2)	0 (2)	3 (2)
Essex	3 (2)	3 (2)	4** (2)
Gloucestershire	-1 (2)	-1 (2)	1 (2)
Greater Manchester	2 (2)	0 (2)	2 (2)
Gwent	0 (2)	0 (2)	2 (2)
Hampshire	0 (2)	0 (2)	1 (2)
Hertfordshire	1 (2)	1 (2)	2 (2)
Humberside	1 (2)	1 (2)	4* (2)
Kent	5** (2)	4** (2)	5** (2)
Lancashire	2 (2)	-1 (2)	2 (2)
Leicestershire	1 (2)	2 (2)	2 (2)
Lincolnshire	1 (2)	2 (2)	4* (2)
Merseyside	1 (2)	-1 (2)	2 (2)
Norfolk	3 (2)	2 (2)	4** (2)
North Wales	2 (2)	0 (2)	4** (2)
North Yorkshire	-1 (2)	-1 (2)	2 (2)
Northamptonshire	0 (2)	1 (2)	2 (2)
Northumbria	5** (2)	1 (2)	2 (2)
Nottinghamshire	1 (2)	1 (2)	3 (2)
South Wales	-1 (2)	-1 (2)	1 (2)
South Yorkshire	2 (2)	1 (2)	2 (2)
Staffordshire	-1 (2)	0 (2)	3 (2)
Suffolk	0 (2)	0 (2)	3 (2)
Surrey	0 (2)	1 (2)	3 (2)
Sussex	1 (2)	0 (2)	1 (2)
Thames Valley	-3 (2)	-2 (2)	0 (2)
Warwickshire	1 (2)	3 (2)	5*** (2)
West Mercia	0 (2)	1 (2)	4* (2)
West Midlands	0 (2)	0 (2)	0 (2)
West Yorkshire	3 (2)	2 (2)	4** (2)
Wiltshire	0 (2)	1 (2)	4* (2)
London	-1 (2)	-1 (2)	-2 (2)
Time trend (Quarters)	.51*** (.03)	.41*** (.02)	.40*** (.02)
Changes in operations of justice system	No	Yes	Yes
Average custodial sentence length (months)		-.03*** (.01)	-.03*** (.01)
Sentence rates of all crimes		-6.3*** (.2)	-6.5*** (.2)

Changes in demographic characteristics	No	No	Yes
Total population			13*** (2)
Unemployment rates			-.4 (.5)
Male rates			19*** (5)
Youth rates			-1 (1)
White rates			-.3 (.5)
P-value of F-test	0.00***	0.00***	0.00***
Adjusted R^2	0.2181	0.5563	0.5614
Observations	1,512	1,470	1,344

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- The operations of justice system include ACSL and sentence rates.
- The demographic characteristics include total population, unemployment rates, male rates, youth rates, and white rates.

Table A 15 Full estimates, displacement effects on crimes

Dependent variables:	$\%\Delta_4 TheftCrime_{it}$	$\%\Delta_4 ViolenceCrime_{it}$
	(1)	(2)
Court closures in four periods (%)	.15***	-.13***
	(.02)	(.04)
Linear trend in areas (PFA FE)	Yes	Yes
Bedfordshire	3 (2)	-3 (4)
Cambridgeshire	4** (2)	3 (4)
Cheshire	2 (2)	14*** (4)
Cleveland	3 (2)	12*** (4)
Cumbria	4* (2)	13*** (4)
Derbyshire	2 (2)	6 (4)
Devon and Cornwall	0 (2)	3 (4)
Dorset	2 (2)	7 (4)
Durham	5** (2)	14*** (4)
Dyfed-Powys	4** (2)	12*** (4)
Essex	2 (2)	7* (4)
Gloucestershire	1 (2)	5 (4)
Greater Manchester	2 (2)	2 (4)
Gwent	0 (2)	7* (4)
Hampshire	1 (2)	4 (4)
Hertfordshire	4** (2)	1 (4)
Humberside	4* (2)	9** (4)
Kent	3 (2)	8* (4)
Lancashire	3 (2)	7 (4)
Leicestershire	2 (2)	0 (4)
Lincolnshire	1 (2)	11*** (4)
Merseyside	2 (2)	9** (4)
Norfolk	3 (2)	6 (4)
North Wales	1 (2)	8 (4)
North Yorkshire	2 (2)	5 (4)
Northamptonshire	3 (2)	3 (4)
Northumbria	4* (2)	10** (4)
Nottinghamshire	3 (2)	3 (4)
South Wales	0 (2)	1 (4)
South Yorkshire	2 (2)	5 (4)
Staffordshire	3 (2)	4 (4)
Suffolk	2 (2)	8 (4)

Surrey	3 (2)	4 (4)
Sussex	1 (2)	1 (4)
Thames Valley	1 (2)	2 (4)
Warwickshire	5** (2)	11 (4)
West Mercia	3* (2)	8 (4)
West Midlands	2 (2)	-2 (4)
West Yorkshire	1 (2)	12 (4)
Wiltshire	3 (2)	6 (4)
London	2 (2)	-9 (4)
Time trend (Quarters)	.12*** (.02)	.73*** (.05)
Changes in Operations of justice system:		
Per cent changes in ACSL of theft crimes in four periods	-.024*** (.02)	No
Changes in sentence rates of theft crimes in four periods	-4.0*** (.2)	No
Per cent changes in ACSL of violence crimes in four periods	No	-.02* (.01)
Changes in sentence rates of violence crimes in four periods	No	-10.7*** (.6)
Changes in demographic characteristics	Yes	Yes
Total population	11*** (2)	36*** (5)
Unemployment rates	-.6 (.4)	-1.8* (1.0)
Male rates	12** (5)	62*** (12)
Youth rates	-2* (1)	-2 (2)
White rates	-.4 (.4)	.3 (1.0)
P-value of F-test	.00***	0.00***
Adjusted R^2	0.3411	0.3329
Observations	1,344	1,344

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- The demographic characteristics include total population, unemployment rates, male rates, youth rates, and white rates.

Table A 16 Full estimates, crimes in CERP and ERP

Dependent variables: $\%\Delta_4 CrimeNumber_{it}$		
Two court projects:	CERP	ERP
	(1)	(2)
Court closures in four periods (%)	.09***	.06**
	(.03)	(.02)
Linear trend in areas (PFA FE)	Yes	Yes
Bedfordshire	2 (2)	1 (3)
Cambridgeshire	2 (2)	3 (3)
Cheshire	5** (2)	4 (3)
Cleveland	4* (2)	-3 (3)
Cumbria	4* (2)	-1 (3)
Derbyshire	2 (2)	0 (3)
Devon and Cornwall	1 (2)	0 (3)
Dorset	0 (2)	3 (3)
Durham	5** (2)	4 (3)
Dyfed-Powys	3 (2)	-2 (3)

Essex	3 (2)	4 (3)
Gloucestershire	1 (2)	-1 (3)
Greater Manchester	2 (2)	1 (3)
Gwent	1 (2)	0 (3)
Hampshire	1 (2)	1 (3)
Hertfordshire	3 (2)	1 (3)
Humberside	2 (2)	1 (3)
Kent	7*** (2)	4 (3)
Lancashire	3 (2)	0 (3)
Leicestershire	1 (2)	3 (3)
Lincolnshire	0 (2)	4 (3)
Merseyside	3 (2)	0 (3)
Norfolk	7*** (2)	1 (3)
North Wales	3 (2)	1 (3)
North Yorkshire	2 (2)	-1 (3)
Northamptonshire	5** (2)	0 (3)
Northumbria	1 (2)	1 (3)
Nottinghamshire	3 (2)	2 (3)
South Wales	3 (2)	-1 (3)
South Yorkshire	4* (2)	0 (3)
Staffordshire	4* (2)	-1 (3)
Suffolk	3 (2)	0 (3)
Surrey	1 (2)	2 (3)
Sussex	3 (2)	-1 (3)
Thames Valley	0 (2)	-1 (3)
Warwickshire	2 (2)	4 (3)
West Mercia	3 (2)	2 (3)
West Midlands	2 (2)	0 (3)
West Yorkshire	0 (2)	5** (3)
Wiltshire	4* (2)	2 (3)
London	0 (2)	-2 (3)
Time trend (Quarters)	1.2*** (.09)	.22*** (.06)
Changes in operations of justice system:	Yes	Yes
Average custodial sentence length (months)	-.02 (.01)	-.03* (.01)
Sentence rates of all crimes	-3.4*** (.3)	-8.0*** (.4)
Changes in demographic characteristics:	Yes	Yes
Total population	4 (4)	5 (3)
Unemployment rates	.5 (.5)	-.2 (.7)
Male rates	11 (7)	3 (8)
Youth rates	-1 (1)	1 (1)
White rates	-1.4** (.6)	.1 (.6)
P-value of F-test	.00***	.00***
Adjusted R^2	0.5791	0.4085
Observations	546	798

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.
- The operations of justice system include ACSL and sentence rates.
- The demographic characteristics include total population, unemployment rates, male rates, youth rates, and white rates.
- CERP represents quarterly information between April 2010 and March 2015.
- ERP represents quarterly information between April 2015 and March 2020.

Appendix B. Police force areas and judiciary territories

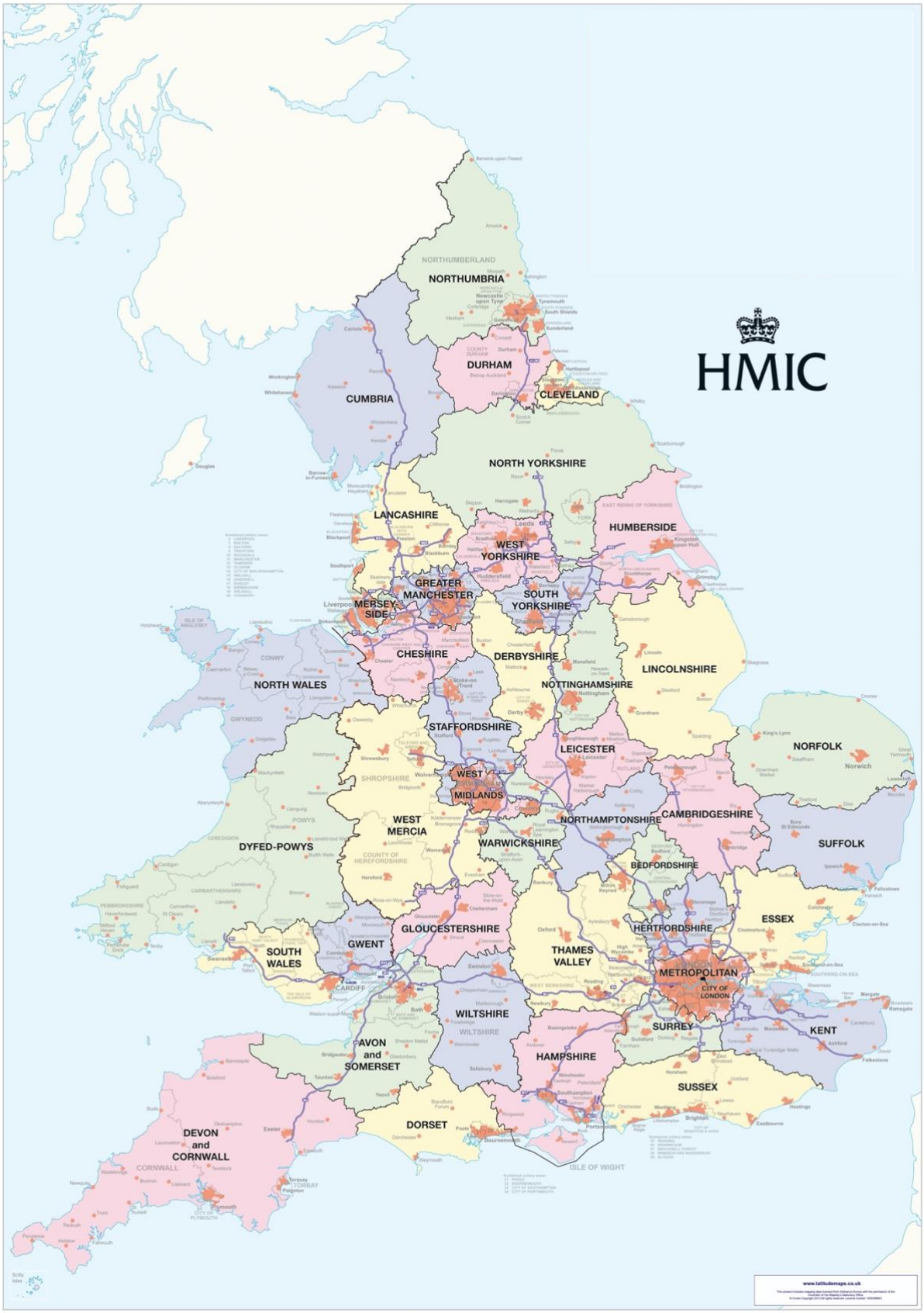
Based on the Court Act 2003, which is a reform of criminal courts' administration, the court territory in England and Wales has been separated as local criminal justice boards (LCJBs) in order to improve services and support joint working with other relevant services at the police force areas (PFAs). The Court Act 2003 has been valid since 01/04/2005, and since then, the territory of Magistrates' Courts has become comparable to the PFAs.

I also received confirmation through the Freedom of Information Act from the Ministry of Justice that judicial boundaries of courts map onto police force areas except in the London/Metropolitan area. There are 49 LCJBs under the Court Act 2003, compared to 43 PFAs in England and Wales (see table B1). The difference between the number of LCJBs and PFAs is that London is separated differently. London is separated into 8 LCJBs, including Central London LCJB, East London LCJB, North London LCJB, North-East London LCJB, North-West London LCJB, South London LCJB, South-East LCJB, and South-West LCJB. In contrast, London is separated into 2 PFAs, including the City of London PFA and the Metropolitan Police PFA. To make them comparable, I aggregate the 8 LCJBs in London and 2 PFAs in London into one London LCJB/PFA. Then, there will be 42 LCJBs/PFAs, and their map can be seen in figure B1.

Table B 1 Police force areas (PFAs) and local justice boards (LCJBs)

PFAs	LCJBs
Avon and Somerset PFA	Avon and Somerset LCJB
Bedfordshire PFA	Bedfordshire LCJB
Cambridgeshire PFA	Cambridgeshire LCJB
Cheshire PFA	Cheshire LCJB
Cleveland PFA	Cleveland LCJB
Cumbria PFA	Cumbria LCJB
Derbyshire PFA	Derbyshire LCJB
Devon and Cornwall PFA	Devon and Cornwall LCJB
Dorset PFA	Dorset LCJB
Durham PFA	Durham LCJB
Dyfed-Powys PFA	Dyfed Powys LCJB
Essex PFA	Essex LCJB
Gloucestershire PFA	Gloucestershire LCJB
Greater Manchester PFA	Greater Manchester LCJB
Gwent PFA	Gwent LCJB
Hampshire PFA	Hampshire and Isle of Wight LCJB
Hertfordshire PFA	Hertfordshire LCJB
Humberside PFA	Humberside LCJB

Kent PFA	Kent LCJB
Lancashire PFA	Lancashire LCJB
Leicestershire PFA	Leicestershire LCJB
Lincolnshire PFA	Lincolnshire LCJB
Merseyside PFA	Merseyside LCJB
Norfolk PFA	Norfolk LCJB
North Wales PFA	North Wales LCJB
North Yorkshire PFA	North Yorkshire LCJB
Northamptonshire PFA	Northamptonshire LCJB
Northumbria PFA	Northumbria LCJB
Nottinghamshire PFA	Nottinghamshire LCJB
South Wales PFA	South Wales LCJB
South Yorkshire PFA	South Yorkshire LCJB
Staffordshire PFA	Staffordshire LCJB
Suffolk PFA	Suffolk LCJB
Surrey PFA	Surrey LCJB
Sussex PFA	Sussex LCJB
Thames Valley PFA	Thames Valley LCJB
Warwickshire PFA	Warwickshire LCJB
West Mercia PFA	West Mercia LCJB
West Midlands PFA	West Midlands LCJB
West Yorkshire PFA	West Yorkshire LCJB
Wiltshire PFA	Wiltshire LCJB
City of London PFA	Central London LCJB
Metropolitan Police PFA	East London LCJB
	North London LCJB
	North-East London LCJB
	North-West London LCJB
	South London LCJB
	South-East London LCJB
	South-West London LCJB



- source: GOV.UK

Figure B 1 Map of police force areas

Appendix C. The 2SLS analysis of case duration

I employ a 2SLS approach as the comparative test for OLS regression of case duration and court closures. I have examined in Chapter 4 that the reverse causality that low utilization rates (case duration) of a court make the court more likely to be closed unlikely exists in our aggregate-level analysis. Still, I conduct a 2SLS approach to increase the credibility of our estimates from the OLS approach.

The Traveling time of court users tends to meet the rank condition and exclusion condition of a valid IV. For a valid IV, econometrists require the IV to meet two conditions: rank condition and exclusion condition. The rank condition requires our IV to be closely related to the selection of closing courts, and the exclusion condition requires our IV must not to be correlated with case duration. In England and Wales, ensuring the residents' access to court within one hour is another principle of selecting closed courts (discussed in Chapter 2). Therefore, courts could be less likely to be closed when the travailing time to courts is close to 1 hour or over 1 hour, which refers to the rank condition. In addition, the travelling time of court users in a PFA seemly not listed as a consideration for the schedule of a court hearing, implying the travelling time tend to be unrelated to case duration, i.e., exclusion condition.

I use the area size (km^2)[52] per court to indicate the travelling time of court users in a PFA. While the government of England and Wales has provided some theoretical estimates of the travelling time of court users, the estimates are not time series and are incomplete, so that does not fit in our aggregate-level analysis (see table C4). Thus, I attempt to adjust the area size (km^2) per court (travel-time estimates) in a PFA to indicate the travelling time of court users. It is assumed that the larger the area size per court, the longer the travelling time of court users.

The difference between estimates of present travelling time and estimates of 1-hour travelling time (travel-time gap) is employed as the instrumental variables (IV). As addressed above, courts are less likely to be closed if the travelling time is close to or over 1 hour. If the principles of closing courts are obeyed, the average travelling time of PFAs should be closed to 1 hour after closures.

[52] The area size per court equals to the area size (km^2) of a PFA divided by the number of magistrates' courts in a PFA.

Therefore, I use the average area size (km^2) per court after closures, i.e., after 2019/2020, to represent the 1-hour travelling time (1-hour estimates). Then, the smaller the travel-time gap, i.e., the difference between area size per court after closures (1-hour estimates) and area size per court in a period (travel-time estimates), the less likely courts would be closed in a PFA.

$$travel\_time\ esimates\ in\ a\ period\ = \frac{area\ size\ of\ a\ PFA}{Magistrates'\ Court\ numbers\ of\ a\ PFA\ in\ a\ period} \quad \text{(C1)}$$

$$1\_hour\ esimates = \frac{area\ size\ of\ a\ PFA}{Magistrates'\ Court\ numbers\ of\ a\ PFA\ after\ closures} \quad \text{(C2)}$$

$$travel\_time\ gap\ = \frac{travel\_time\ esimates\ in\ a\ period - \ 1\_hour\ esimates}{1\_hour\ esimates} \times 100 \quad \text{(C3)}$$

The influences of population density on travelling time in a PFA are controlled. The population density may also affect the average travelling time in a PFA as it is an estimate for court users. To control the different populations in PFAs, I divided the 42 PFAs between England and Wales into seven groups using the population density (see table C1). Doing so allows PFAs with different population densities to have different 1-hour estimates.

Table C 1 Population density by groups

Groups	**1**	**2**	**3**	**4**	**5**	**6**	**7**
Range of population density ($(population/km^2)$)	0~100	100~200	200~400	400~800	800~1600	1600~3200	>3200
Number of PFAs	7	11	15	5	2	1	1
Average population density of groups	66.9	150.2	281.8	544.6	1373.2	1950.5	3654.1
1-hour estimates ($km^2\ per\ court$)	2028.5	1504.3	957.7	551.2	208.4	180.3	92.4

The model specifications of the first stage of the 2SLS approach are structured as follows:

$$|\%\Delta_4 CourtNumber|_{it} = \beta_1\, \Delta_4 travel\_time\_gap_{it-1} + PFA_i + Qurter_t + \lambda_1 \Delta_4 defendant\_ratio_{it} + \lambda_2 \%\Delta_4 DefendantNumber_{it} + \lambda_3 \Delta_4 none\_person_{it} + \lambda_4 \Delta_4 guilty\_plea_{it} + \varepsilon_{it} \quad \text{(C4)}$$

where $\Delta_4 travel\_time\_gap_{it-1}$ is lagged by one period because it is assumed that government evaluate the travelling time of court users before closures. All other repeated variables and notations represent the same meanings as those in the OLS approach. A positively significant coefficient, β_1, tends to imply the rank condition of our instrumental variable, travel-time estimates, tends to be satisfied.

The new values of $|\%\Delta_4 CourtNumber|_{it}$ are estimated using $\Delta_4 travel\_time\_gap_{it-1}$ and used for the second stage regression of 2SLS. The model specifications of the second stage of 2SLS are structured as follows:

$$\Delta_4 CaseDuration_{it} = \beta_2\, |\%\Delta_4 \widehat{CourtNumber}|_{it} + PFA_i + Qurter_t + \lambda_1 \Delta_4 defendant\_ratio_{it} + \lambda_2 \%\Delta_4 DefendantNumber_{it} + \lambda_3 \Delta_4 none\_person_{it} + \lambda_4 \Delta_4 guilty\_plea_{it} + \varepsilon_{it} \quad \text{(C5)}$$

where $|\%\Delta_4 \widehat{CourtNumber}|_{it}$ represents the estimated values of changes in closures rates using the instrumental variable. And other repeated variables and notations represent the same meanings as those in the OLS approach. A positively significant coefficient, β_2, tends to imply closing courts can delay case duration in a PFA.

Table C2 reports estimates of the first-stage regression of the 2SLS approach. The positively significant estimate of IV implies the rank condition is satisfied that courts are less likely to be closed if the travelling time in a PFA is close to or over 1 hour. All variables controlled in the OLS model specifications are included in the regressions. According to Staiger and Stock's rule of thumb, we can reject that the IV is weak as our value of the F-test (120.33) is greater than 10. Besides, the more formal tests also tend to suggest that our IV is not weakly identified. For example, both the Kleibergen-Paap test and Cragg-Donald test reject our IV is weakly identified at a high significance level.

Table C 2 Results of the first-stage 2SLS regression

Dependent variable: Court closures in four periods (%)	
Δ_4Lagged travel-time gap	.48***
	(.04)
All controls	Yes
F-test:	
Value of F-test	F (1, 1338) = 120.33***
Under-identification test:	
Kleibergen-Paap rk LM statistic	Chi-sq (1) = 124.64***
Weak identification test:	
Cragg-Donald Wald F statistic	794.64 > critical value of 10% maximal IV size = 16.38 (Stock-Yogo)
Adjusted R-squared	0.6183
Observations	1,482

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- All controls include linear trend in PFAs (Area FE), difference in periods (Time FE)
Δ_4Ratio of defendant by crime groups, % Δ_4Total defendant number, Δ_4Ratio of None-person defendant, and Δ_4Ratio of guilty plea.

Table C 3 Results of the second-stage 2SLS regression

Dependent variables: Δ_4Entire case duration		
	2SLS	OLS
	(1)	(2)
Court closures in four periods (%)	.21***	.10*
	(.08)	(.06)
Linear trend in areas (PFA FE)	Yes	Yes
Difference in periods (Quarter FE)	Yes	Yes
Changes in case-level determinants	Yes	Yes
Defendant ratio:		
violence against person	-.3 (1)	0 (1)
Sexual crimes	2 (3)	2 (3)
Robbery	-3 (3)	-3 (3)
Theft crime	-1.6** (.6)	-1.6** (.7)
Possession of weapons	-1.0 (2.8)	-1 (3)
Miscellaneous crimes against society	4*** (1)	4*** (1)
Public order crimes	-7*** (2)	-7*** (2)
Fraud crimes	4* (2)	4** (2)
Drug crimes	-.4 (1.0)	-.4 (1.0)
Criminal damage and arson	-5 (4)	-5 (4)
None-motoring offences	-.63*** (.10)	-.6*** (.1)
Total number of defendants	.06 (.06)	.05 (.06)
Ratio of none-person defendant	1 (2)	1 (2)
Ratio of guilty pleas during trials	-.4** (.2)	-.4** (.2)
P-value of F-test	0.000***	0.000***
Adjusted R-squared	0.0661	0.0658
Observations	1,065	1,470
Endogeneity test (Hausman test):	Prob > F = 0.441	

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- All controls include linear trend in PFAs (Area FE), difference in periods (Time FE)
Δ_4Ratio of defendant by crime groups, % Δ_4Total defendant number, Δ_4Ratio of None-person defendant, and Δ_4Ratio of guilty plea.

Table C3 reports estimates of closures from the 2SLS regression. Although there are minor differences between the estimate of court closures from 2SLS (column 1) and that from OLS (column 2), i.e., the estimate from 2SLS is more significant (1% level) but less precise (larger standard errors) than that from OLS, estimates from both approaches are generally similar. Both estimates are positively significant, indicating closing Magistrates' Courts can delay criminal case duration. In addition, while the value of the estimate from 2SLS is larger than that from OLS, the R-squared of the two regressions is similar. The similar fitness of regressions might be due to the fact that the exogeneity assumption is not violated. The validity of the exogeneity assumption is also supported by the result of the Hausman test that the exogeneity assumption cannot be statistically rejected.

Table C 4 Travelling time to courts

Court Name	Region	Percentage that will be able to reach court by car in under 1 hour	Percentage that will be able to reach court by public transport in under 1 hour
Hammersmith County Court (formerly West London County Court)	London	99%	100%
Lambeth County Court	London	100%	98%
Greenwich Magistrates' Court	London	100%	94%
Pocock Street Tribunal Hearing Centre	London	100%	94%
Accrington County Court	North West	100%	94%
Solihul Magistrates' Court	Midlands	100%	93%
Stafford Magistrates' Court	Midlands	100%	88%
Bolton County Court and Family Court	North West	100%	88%
Bow County Court	London	100%	86%
Halifax County Court and Family Court	North East	98%	83%
Accrington Magistrates' Court	North West	100%	83%
Tameside County Court	North West	100%	82%
Halifax (Calderdale) Magistrates' and Family Court	North East	98%	79%
Waltham Forest Magistrates' Court	London	100%	77%
Tottenham Magistrates' Court	London	100%	76%
Burton-upon-Trent Magistrates' Court	Midlands	100%	76%
Sandwel Magistrates' Court	Midlands	100%	76%
Neath and Port Talbot Civil and Family Court	Wales	100%	73%
Runcorn (Halton) Magistrates' Court	North West	100%	70%
Harlow Magistrates' Court	South East	99%	65%
Oldham County Court	North West	100%	60%

Feltham Magistrates' Court	London	100%	57%
Hinckley Magistrates' Court	Midlands	100%	55%
Wakefield Magistrates' Court	North East	100%	53%
Bournemouth Magistrates' Court	South West	100%	47%
North Avon (Yate) Magistrates' Court or Bath Magistrates' Court, County Court and Family Court	South West	100%	40%
Fareham Magistrates' Court	South West	100%	39%
Oldham Magistrates' Court	North West	100%	36%
St Albans County Court	South East	100%	34%
Woolwich County Court	London	100%	33%
Prestatyn Magistrates' Court	Wales	100%	33%
Gloucester Magistrates' Court	South West	99%	32%
Llangefni Civil and Family Court	Wales	100%	30%
Richmond-upon-Thames Magistrates' Court	London	100%	28%
Warrington County Court	North West	100%	25%
Chippenham Magistrates' Court, Civil Court and Family Court	South West	99%	22%
Wrexham Tribunal (Rhyd Broughton)	Wales	55%	21%
Tunbridge Wel s County Court and Family Court	South East	99%	18%
West Berkshire (Newbury) Magistrates' Court	South East	100%	15%
Dartford Magistrates' Court	South East	100%	13%
Corby Magistrates' Court	Midlands	94%	12%
Kettering County Court	Midlands	79%	12%
Shrewsbury Magistrates' Court	Midlands	99%	12%
Morpeth County Court	North East	83%	12%
Macclesfield Magistrates' Court	North West	100%	12%
Basildon Social Security and Child Support Tribunal (Acorn House)	South East	65%	12%
Colchester County Court and Family Court	South East	98%	11%
Colchester County Court Offices	South East	98%	11%
Worksop Magistrates' Court	Midlands	91%	10%
Macclesfield County Court	North West	100%	9%
Stroud Magistrates' Court	South West	98%	9%
Grantham Magistrates' Court	Midlands	96%	6%
Bicester Magistrates' Court and Family Court	South East	100%	5%
Skegness Magistrates' Court	Midlands	56%	3%
Kettering Magistrates' Court	Midlands	100%	2%
Buxton Magistrates' and County Court	Midlands	59%	0%
Kings Lynn County Court and Family Court	South East	62%	0%

Barnstaple Crown Court	South West	6%	0%
Cheltenham Rivershil House Tribunal	South West	56%	0%
Dorchester Crown Court	South West	57%	0%
Dolgel au Crown and Magistrates' Court	Wales	15%	0%
Birmingham Youth Court	Midlands	n/a	n/a
St Helens Magistrates' Court	North West	n/a	n/a
Watford Magistrates' Court and Family Court	South East	100%	80% /83%
Trafford Magistrates' Court and Altrincham County Court	North West	100%	80% /79%
Bedford and Mid Beds Magistrates' Court and Family Court and Bedford County Court and Family Court	South East	100%	74% /74% /73%
Hartlepool Magistrates' Court and County Court	North East	100%	7% /7% /5%
Bridgend Law Courts	Wales	100%	65% /67% /64%
Rotherham Magistrates' Court, County Court and Family Court	North East	100%	64% /64% /65%
Pontypridd Magistrates' Court	Wales	100%	56% /80%
Bury Magistrates' Court and County Court	North West	99%	39% /39%
Brecon Law Courts	Wales	100%	34% /33% /24%
Dover Magistrates' Court	South East	100%	32% /32%
Carmarthen Law Courts (The Guildhall)	Wales	84% /57% /72%	31% /6% /32%
Bury St. Edmunds Magistrates' Court and Family Court and Bury St. Edmunds Crown Court	South East	78% /76%	3% /3%
Ormskirk Magistrates' Court and Family Court	North West	79% /78%	29% /24%
Chichester Combined Court (Crown and County)	South East	100% /99%	29% /19%
Eastbourne Magistrates' Court, County Court and Family Court	South East	100%	20% /20% /22%
Chichester Magistrates' Court	South East	97%	19% /19%
Aylesbury Magistrates' Court, County Court and Family Court	South East	100%	17% /17%
Lowestoft Magistrates' Court, County Court and Family Court	South East	100%	13% /47% /13%
Consett Magistrates' Court	North East	90%	12% /12%
Redhil Magistrates' Court and Family Court and Reigate County Court and Family Court	South East	93% /83%	10% /8%
Torquay Magistrates' Court	South West	99% /98%	0% /60%
Scunthorpe Magistrates' Court, County Court and Family Court	North East	77% /76%	0% /0%
Kendal Magistrates' Court and County Court	North West	49%	0% /0%
Holyhead Magistrates' Court	Wales	100%	0%/0%

Source: House of Commons
- Travel time estimates were made before the consultation response, i.e. when 91 courts were being considered for closure. In some cases, multiple travel time estimates have been made for each of the court's workloads (i.e. Crown, Maigsgrates' and/or Family).

Appendix D. Seasonality issue

Existing literature on crimes has already highlighted seasonality as a major issue in the empirical analysis of crimes (e.g., Draca *et al*. 2011). Therefore, this section will focus on discussing seasonality in the data on charge numbers. If seasonality is present in prosecutorial decisions, this feature can be transferred to court duration when cases charged with a seasonal pattern are brought to court. The transfer of the seasonality feature underscores why seasonality is a significant concern in our analysis.

Crimes, as potential workloads for prosecutors that could eventually become charges, may also exhibit seasonality. The seasonality in crime data could cause police-recorded crimes to exhibit specific patterns in the number and composition of crimes, which could result in similar patterns in the data on charge numbers. Ignoring the seasonality feature could lead to inaccurate predictions, misinterpretations of trends, and underestimations of variance in empirical regressions.

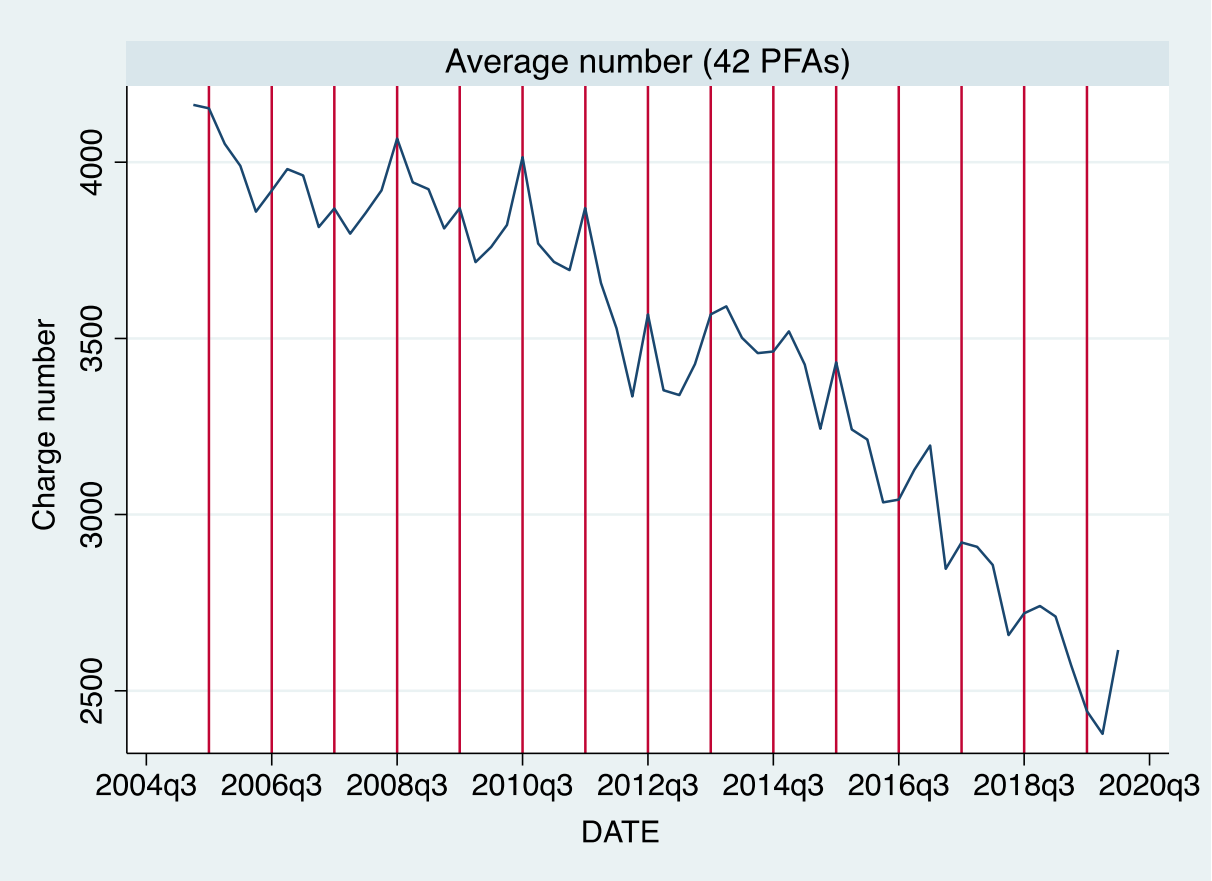


Figure D 1 Average charge numbers of 42 police force areas

To more clearly observe the seasonality in charge numbers, the time interval of data is extended back to 2005q2, when the police and judiciary territories first became comparable. Figure D1 likely displays strong seasonality in charge numbers. It can be observed that in 8 of the 15 financial years, autumn (i.e., quarter 3) has the highest charge numbers. For the remaining 7 financial years, winter (i.e., quarter 4) has the highest charge numbers 5 times. This suggests that prosecutors charge more significantly in autumn or winter.

The reasons could be the existence of seasonality in crime numbers or in the structure of committed crimes. Firstly, if all else remains consistent, more crimes would lead to more charges. This could be a direct channel for crimes to bring seasonality to charges. Alternatively, prosecutors may have specific preferences for types of crimes; their charge decisions could have seasonal patterns if they face specific cases in particular quarters. This mechanism could make the seasonality in the structure of committed crimes another explanation. Additionally, working habits might offer another possible explanation. Perhaps, prosecutors in England and Wales prefer to balance their workloads and charge more in the middle of the financial year.

Given the existence of a seasonality feature in the data on charge numbers, I follow the approach used in crime literature, specifically, Draca *et al*. (2011), to offset the feature by seasonally differencing variables.

Appendix E. The conventional dynamic panel model and GMM estimation

As a comparative test to control the increasing trend in crimes, I run a dynamic panel model with a lagged period of crimes. The model is as following forms:

$$\begin{aligned} CrimeNumber_{it} &= \varphi_0 CrimeNumber_{it-1} + \varphi_1 CourtNumber_{it} + \varphi_2 ACSL_{it} + \varphi_3 sentence_{it} \\ &+ \varphi_4 Population_{it} + \varphi_5 unemployment_{it} + \varphi_6 youth_{it} + \varphi_7 male_{it} \\ &+ \varphi_8 white_{it} + \varepsilon_{it} \end{aligned} \quad \text{(E1)}$$

Where i represents the specific police force area (PFA); t represents the specific quarter; $CrimeNumber$ represents the crime numbers of all offence groups; $CourtNumber$ represents the number of courts remaining open; $ACSL$ represents average sentence length (months) for crimes; $sentence$ represents the rates of

crimes being sentenced; $Population$ represents the population aged between 16 and 64; $unemployment$ represents the unemployment rates; $youth$ represents the rates of the population aged 16 and 24; $male$ represents the rates of the male population; $white$ represents the rates of white population; ε represents the error terms.

To control the bias due to the correlation between the lagged dependent variable and the error term, I use the Generalised Method of Moments (GMM) developed by Arellano and Bond (1991) for dynamic panels. The approach uses the lagged levels as instruments for differenced variables, which assumes that the error term does not correlate with the lagged dependent variable.

The above equation (E1) is firstly differenced to remove area-specific effects (the differenced model is shown as equation E2). In the differenced model, the lagged dependent variable $CrimeNumber_{it-1}$ is correlated with error terms. Therefore, use deeper lags, $CrimeNumber_{it-2}, CrimeNumber_{it-3}$, …, as instruments for $\Delta CrimeNumber_{it}$. The estimation from GMM can minimise the difference between the sample moments and the population moments, resulting in consistent estimators. The differenced equation is as follows:

$$\begin{aligned}\Delta CrimeNumber_{it} &= \psi_0 \Delta CrimeNumber_{it-1} + \psi_1 \Delta CourtNumber_{it} + \psi_2 \Delta ACSL_{it} \\ &+ \psi_3 \Delta sentence_{it} + \psi_4 \Delta Polulation_{it} + \psi_5 \Delta unemployment_{it} \\ &+ \psi_6 \Delta youth_{it} + \psi_7 \Delta male_{it} + \psi_8 \Delta white_{it} + \Delta \varepsilon_{it}\end{aligned} \quad \text{(E2)}$$

Where, $\Delta CrimeNumber_{it}$ is the difference of $CrimeNumber_{it}$ and $CrimeNumber_{it-1}$; $\Delta CrimeNumber_{it-1}$ is the difference of $CrimeNumber_{it-1}$ and $CrimeNumber_{it-2}$; $\Delta ACSL_{it}$ is the difference of $ACSL_{it}$ and $\Delta ACSL_{it-1}$; $\Delta sentence_{it}$ is the difference of $sentence_{it}$ and $sentence_{it-1}$; $\Delta Polulation_{it}$ is the difference of $Polulation_{it}$ and $Polulation_{it-1}$; $\Delta unemployment_{it}$ is the difference of $unemployment_{it}$ and $\Delta unemployment_{it-1}$; $\Delta youth_{it}$ is the difference of $youth_{it}$ and $youth_{it-1}$; $\Delta male_{it}$ is the difference of $male_{it}$ and $male_{it-1}$; $\Delta white_{it}$ is the difference of $white_{it}$ and $white_{it-1}$; $\Delta \varepsilon_{it}$ is the difference of ε_{it} and ε_{it-1}.

The AR(2) test and Hansen test in table E1 fail to reject the hypothesis of no autocorrelation and uncorrelated instruments, indicating the GMM model specification could be unbiased. Therefore, the estimates from GMM regressions in column (2) are preferred to that from FE regressions in column (1).

The significantly negative coefficient of court numbers from GMM estimations suggests that closing courts can increase crimes. The suggested relationship is consistent with findings in Chapter 6, supporting the hypothesis that court closures could lead to an increase in crimes. Besides, given that the GMM estimation cannot control the seasonality in crimes, the main regressions (i.e., Δ_4 model) in Chapter 6 might be preferred.

Table E 1 Estimates of GMM model

Variables	FE (1)	GMM (2)
Lagged crime numbers	.84***	.91***
	(.01)	(.01)
Court numbers	-79	-212**
	(53)	(88)
Average sentence length	-4	9
(months)	(16)	(10)
Sentence rates	-383***	-192**
	(36)	(74)
Total population	.025***	.0043***
	(.002)	(.0005)
Unemployment rates	-70	-60
	(47)	(72)
Youth rates	461***	182***
	(114)	(66)
White rates	-43	46***
	(52)	(18)
Observations	1,470	1,470
AR(2) test		-.12
Hansen test		37.92

- ***, **, * represent significance at 1%, 5%, and 10% respectively.
- Values in "()" represent the standard errors.