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Capitalism and the return on capital employed. Some further evidence

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ABSTRACT

Return on capital employed is recognised both as a symbol of capitalism and as a calculation designed to help achieve the more effective deployment of available resources. Dating the emergence of this 'accounting signature' has been the subject of vigorous debate. Rob Bryer believes that calculation of the return on capital employed played a meaningful role in business life from the eighteenth century onwards whereas Steven Toms (2006, p. 206) finds scant evidence of the existence of this emblem of a capitalist mentality until 'much later'. This paper seeks to contribute to this debate based on the contents of the Spencer Stanhope archive, Eighteenth Century Collections Online and UK Parliamentary Papers.

1. Introduction

An accounting system based on double entry bookkeeping can be designed to generate, as a matter of systematic routine, the figures for profit and capital employed (or shareholders' equity) that enable measurement of the return on capital employed (ROCE). Bryer (2000a, 2000b) argues that its calculation, by businessmen, is an emblematic feature of the rise of capitalism; an 'accounting signature' which signals the existence of a 'calculative mentality' intended to facilitate the measurement and accumulation of wealth. Bryer also claims the existence of sufficient empirical evidence, from the eighteenth century onwards, to support this hypothesis. His ideas have been challenged by Toms (2010, p. 206) for whom 'fully ROCE calculations make a much later appearance'. Moreover: 'It was only in the 20th century, with the unification of large scale industry and finance capital that the modern notion of profitability as return on capital employed finally developed' (Toms, 2010, p. 205). In Toms (2010, p. 219) estimation 'Further archival work is necessary, particularly to evidence the actual calculations performed by entrepreneurs, managers, and investors in different periods, either to confirm the commonality of accounting signatures or to record exceptions and to explain them'.

This paper seeks to contribute to the debate by studying (i) the content of the Spencer Stanhope archive covering the second quarter of the eighteenth century, and (ii) the contemporary literature as revealed in Eighteenth Century Collections Online and UK Parliamentary Papers. The Spencer Stanhope muniments,¹ which focus on ironmaking activities in south Yorkshire, Nottinghamshire and Derbyshire, are located at the Barnsley Archives and Local Study Department, Town Hall, Church Street, Barnsley, England, S70 2 TA. Eighteenth Century Collections Online is available at http://galenet.galegroup.com/servlet/ECCO and UK Parliamentary Papers through https://proquest.libguides.com/parliamentary. The research methodology employed is that used in traditional historical studies, namely the explained narrative based on the rigorous study of relevant primary and secondary sources (Previts et al., 1990a;

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¹ The Spencer component of the archive dates from the seventeenth century whereas the Stanhope material only from 1775 when John Spencer left much of his estate to a nephew, Walter Stanhope (Awty, 2004).

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Fig. 1. Renishaw Hall.

1990b).

When presenting findings from the study of these sources, no attempt is made to distinguish between the different versions of ROCE recognised by Bryer and Toms and summarised in Toms, 2010, Tables 1 and 2.² Such classification would often (but not always) be impossible given the lack of detail provided in the secondary sources studied in Section 4. But such analysis is not the purpose of this study which is limited to the provision of further evidence of the use of ROCE as a calculative device in eighteenth century Britain. We therefore employ a generic definition of ROCE where, in Toms (2010, p. 206) words, the 'ratio [is] obtained by dividing some measure of profit (as a flow of income) by some measure of capital (as a stock of wealth)'.

Before examining the Spencer Stanhope archive in Section 3 of this paper, that part of the study is first contextualised by drawing attention to the scope for major upward economic and social mobility, prior to the industrial revolution, based on income generated from the manufacture of iron. It demonstrates personal ambition which, we know, led to the development of cost accounting practices that enabled early industrial capitalists to run their businesses more efficiently and to maximise their wealth both before and during the eighteenth century (Boyns & Edwards, 2013, chapters 5–6).

2. Upward economic and social mobility among early industrial capitalists

It is well known that families were made rich by the industrial revolution, widely referenced as spanning the period 1760–1840. Confining attention to ironmasters exploiting the minerals available in the north-east corner of the south Wales coalfield – today occupied by the socially and economically disadvantaged town of Merthyr Tydfil – provides just one example of families becoming super-rich, partly through the excessive appropriation of value added. In Merthyr, once considered the 'iron capital of the world', the Guests at Dowlais, the Crawshays at Cyfarthfa, the Homfrays at Penydarren and the Hills at the Plymouth ironworks fall into that category. What is less well known is that massive iron industry-based fortunes were made long before the time-period commonly used to define the parameters of the British industrial revolution. The amassment of such fortunes proved possible, in King's (2010, p. 385) estimation, because charcoal iron production was fully industrialized as early as the sixteenth century given that (i) water-powered plant was used to drive the furnaces and finery forges that produced bar iron and rod iron, and (ii) ironmaking 'occupied its artisans full-time'. The slitting mills that converted bar iron into nails and numerous other finished products date from the following century.³

A precondition for charcoal iron making was capital availability given that 'The iron industry demanded large scale investment in the construction of furnaces, forges and slitting mills' (Hopkinson, 1961, p. 133). The ironmasters of the sixteenth and much of the seventeenth centuries were landed gentry who possessed the funds required to exploit the profit potential of unsaleable timber growing on their estates.⁴ Such ironworks were typically managed by a clerk who was accountable to the landowner in the same broad manner as stewards had for centuries been accountable to the owners of ecclesiastical and secular estates. Direct involvement in business affairs, however, became increasingly incompatible with the priorities of the landed classes. As King (2010, p. 387; see also Stone, 1965, p. 348) describes:

² Toms (2010, p. 206), in contrast, recognises the existence of 'a number of definitional permutations' and seeks to demonstrate that 'the precise form of profitability calculations is historically contingent and [that] they are subject to considerable variation'. In so doing, Toms (2010) offers a theoretical explanation of why different types of return on capital calculations were employed at different times in the past, according to the interaction of the material characteristics of the assets employed and the nature of their ownership.

³ Until then, bar and rod iron were sold to ironmongers 'who organized their *manufacture* into nails and a host of other consumer goods under the proto-industrial domestic system' (King, 2010, pp. 385–386).

⁴ For a detailed study of the involvement of the aristocracy in business in the sixteenth and seventeenth centuries, see Stone (1965, chapter 7).



Fig. 2. Witley Court and gardens.

Major landowners had heavy calls on their time (such as politics and hunting) and tended to be ill equipped to oversee a complicated business, and to ensure that they obtained the best return from it, even if they had the necessary ability. A convenient answer was to avoid management problems by leasing the works.

It was aspiring iron masters that negotiated leases which enabled families in the north and west Midlands, such as the Sitwells, Fells, Cottons and Spencers, to make their fortunes.

Prior studies (Boyns & Edwards, 2013, chapter 5; Edwards & Boyns, 1992; Edwards & Newell, 1991; Hammersley, 1973; King, 2010) have revealed that those who managed ironworks (and other industrial ventures) in the seventeenth and early eighteenth centuries put in place accounting procedures which enabled them to identify the costs and profits arising from different processes in which their businesses were engaged. King (2010, p. 408) describes them as 'evidently competent managers, who were usually able to generate a profit beyond the interest payable on any borrowed capital'. One of these 'competent managers' was George Sitwell whose contribution to organizational developments within the charcoal iron industry is summed up by Riden (1985, p. x): '[Sitwell] bridges the gap between the pre-Civil War period [i.e. pre-1642] with individual furnaces operated by landowners, and the later phase of charcoal ironmaking, characterised by complex partnerships controlling works in different parts of the country'.

By the late seventeenth century, a number of industrial units in the north Midlands had coalesced to form two partnerships – the Duke of Norfolk's Works (sometimes referred to as John Fell & Co. or the Sheffield partnership) in south Yorkshire and the Derbyshire and Nottingham company (also referred to as the Staveley business).⁵ 'A common feature of these partnerships was that they were vertically integrated organisations, controlling all the processes from the mining of the ore to the sale of the finished article' (Hop-kinson, 1961, p. 133; see also Riden, 1985, p. xiv). Their partners sometimes made vast amounts of money enabling major social advancement. As Riden (1985, p. xxxiii) put it: 'The pattern followed by so many ironmongers and ironmasters was for one generation to build up a successful integrated concern and for the next to continue it for a further twenty or thirty years' then retiring 'to the estate in which they had invested their profits and lived on the income from rent of land and any industrial enterprises which the estate might support'.

By the time the Duke of Norfolk's Works and the Derbyshire and Nottingham company emerged, George Sitwell had left the stage, the Sitwells having completed the 'transition from ironmasters to gentry' as marked by the leasing of Foxbrooke and Renishaw to the Foley family in the 1690s (Riden, 1985, p. xxxiii). That is, the Sitwells status in society was transformed from that of industrialists who reinvested their profits in business ventures to owners of a country estate whose social position was signified by an ability to live entirely on rental income and, perhaps, also on the proceeds from gentlemanly farming. George Sitwell constructed Renishaw Hall in the 1620s and that magnificent building, embellished by subsequent modifications and extensions (Fig. 1), remains the family home today.

A similar pathway was followed by the Foley family whose involvement in charcoal ironmaking was begun by Richard Foley (1579/80–1657), the son of a nailer who worked in Dudley, Worcestershire (Rowlands, 2004). Richard has been described as 'a new phenomenon, whose appearance on the scene marks the end of the leadership of the aristocracy in the [ironmaking] industry in the west midlands' (Stone, 1965, p. 348). He and his descendants 'maintained for nearly two centuries a leading position as iron masters' in that area (Schafer, 1971, p. 19). By the time of Richard's son Thomas's (1617–1677) death, the Foley's controlled 'an astounding collection of mines, woodlands, furnaces, forges, slitting mills, wire works, shipping docks, and storehouses'; an 'industrial complex' stretching from the lower Wye in Gloucestershire to Mear Heath in northern Staffordshire which 'in its extent and in the effectiveness of its organization, was certainly one of the marvels of the age' (Schafer, 1971, p. 20).

The profitability of these enterprises is signalled by the fact that Thomas was able to invest $\pounds 140,000$ – which equates to $\pounds 22.4$ million in 2021 when adjusted for changes in purchasing power and $\pounds 648$ million when expressed as a multiple of the average income needed to buy a commodity (Officer & Williamson, 2023) – in the purchase of landed estates in the 1650s and 1660s (King, 2010, p.

⁵ For details of the changing composition of the ownership of these and other ironmaking partnerships in those regions, and the operating sites they leased during the seventeenth and eighteenth centuries, see Raistrick and Allen (1939) and King (2020, pp. 159–204).



Fig. 3. Cannon Hall.

388). It was Thomas who acquired Witley Court (Fig. 2), then a substantial Jacobean mansion, as well as manors in Harborne and Kinver and a house in Austin Friars, London. Thomas's Pembroke College, Oxford educated son – also Thomas (1641–1701) – succeeded to Witley Court and, on his own death, was superseded by a third Thomas (1673–1733). The last of these Thomases, although retaining an interest in iron making, lived the life of 'an educated country gentleman' (Handley, 2004).⁶

As the Foleys disposed of many of their works, including Foxbrooke and Renishaw in the 1690s, 'domination of the industry thus passed to other families' (Rowlands, 2004) such as the Spencers who also made a fortune out of ironmaking. John Spencer (1600–1658) was a draper who moved into iron making around 1625. His success enabled his son Edward to retire to a country estate without ever playing an active role in the iron industry. The entrepreneurial baton was picked by John's nephew, also John (1629–1681), who, having trained as a clerk in a Yorkshire iron works, went on to purchase Cannon Hall in 1660. John's son, a third John (1655–1729), went on to establish the family's dominance in the south Yorkshire iron industry and rebuild Cannon Hall (Fig. 3) in 1698. Together with his own son, William (c.1690-1756), John features in this history.

It is acknowledged that these are exceptional examples of upward economic and social mobility based on the fruits of capitalist endeavours. It is also certain that many who aspired to become, say, the next George Sitwell ended up in ruin. However, the next section reveals that successful industrial capitalists sought to unlock the potential of accountancy to inform them of the impact of business activities on the accumulation of wealth and did so with a focus on the profit they were entitled to and the return on their capital employed.

3. Profits and return on capital employed

The relationship between accounting and economic development is the site of the first major critical debate within the accounting history literature, and has given rise to a discourse which continues today. It began in the early decades of the twentieth century when Werner Sombart and Max Weber claimed a symbiotic relationship between accounting and capitalism. The essence of their argument, and that of others such as Joseph Schumpeter and Walter Eucken, was that double entry bookkeeping helped create a new attitude towards economic life wherein the medieval priority of subsistence was replaced by the capitalistic goal of profit (Winjum, 1972, p. 23). It did this by enabling the routine measurement of a proprietor's capital, the calculation of periodic profit, the differentiation of personal and business affairs, and the emergence of a distinctive legal enterprise through the separation of ownership from management (Edwards et al., 2009, p. 556; Winjum, 1972, chapter 2; Robertson, 1933, pp. 52–56).

These ideas remained unchallenged until the middle of the twentieth century when Basil Yamey (from 1949) and Sidney Pollard (1965, chapter 6) found little evidence of the use of accounting to measure business performance within a selection of business records spanning the early modern period and the industrial revolution. Their findings have since been put to the test by accounting, business and economic historians based on the detailed examination of a myriad of business records. As a result, it is now accepted that, during the seventeenth and eighteenth centuries, many businessmen used accounting to manage their enterprises more effectively through a better understanding of where costs were incurred and profits were made (Boyns & Edwards, 2013, chapters 5 and 6).

The facet of the controversy surrounding the relationship between accounting and capitalism which receives attention in this paper is the use made of ROCE to assess the proprietors' income and wealth. It was Weber who suggested that 'the specific signature of capitalism was not merely double entry bookkeeping (DEB), as suggested by Sombart, but the existence of the capital account which supports rational computation of income yield through modern bookkeeping' (Toms, 2010, p. 205). Bryer extends the notion of what counts as evidence of a capitalist mentality, in Toms' (2010, p. 205; see also Chiapello, 2007) estimation, by focusing on 'the *type of calculations* that accounts are used for and manifested as accounting signatures. ... More *narrowly*, Bryer (2005, p. 25) identifies capitalism with the calculation of rates of return and more specifically, the return on capital employed'. In so doing, Bryer (2000a, 2000b) studies the emergence of capitalism through accounting.

Given that figures for profit and capital employed can be generated, as a matter of routine, for inclusion in periodic accounts

⁶ Thomas also pursued a successful parliamentary career and was elevated to the peerage as Baron Foley of Kidderminster on 1 January 1712.

prepared on the basis of double entry bookkeeping, 'Bryer's hypothesis predicts and makes claim to widespread use of rate of return calculations from a relatively early date' (Toms, 2010, p. 206). Bryer (e.g. 2005, Table 1) also provides examples of such calculations being made. These have been the subject of a detailed critique by Toms (2010, p. 216) who casts doubt on the extent to which cited examples can fairly be depicted as ROCE. He continues (Toms, 2010, p. 218):

Whereas it may be true that landlords, manufacturing entrepreneurs and ultimately managers were concerned to earn excess return on capital, there is no evidence in this case that it comes from a capitalist mentality of pursuing ROCE, since there are few surviving examples of such calculations being performed.

It is certainly the case that evidence of calculations being made is thin on the ground. But, as research continues, my suspicion is that further examples will be uncovered. Further, it is intuitively plausible that this 'signature' of modern capitalism quite naturally permeated the thinking of early industrialists. Businessmen sought to maximise the return on their investment, in terms of profit earned, and there is nothing complex about the calculation which expresses one magnitude as a proportion of another. And where the calculation was made, neither is there anything to suggest that their authors believed they were doing anything particularly radical. Indeed, Toms (2010, p. 216) observes that the 'use of forecast rates of return was common [practice] throughout the 18th century' and, assuming that to be the case, why would businessmen not also calculate post-fact rates of return?

The next two sections explore the contribution of the Spencer Stanhope archive to our understanding of ownership's concern with its share of the profits and the return on capital employed.

3.1. Profit measurement

The Duke of Norfolk's Works dates from the early seventeenth century. During that century and the next, numerous changes were made both in the range of operating units comprising the Works and in the ownership structure (King, 2020, pp. 161–164). In the context of the present study, the constituency of the partnership operating the works 'was completely reconstructed [in 1727], a new generation taking over from the old' (King, 2020, p. 163). The main works at that time were the Wardsend Forge, Attercliffe Forge, Chappell Furnace, Stone Forge, Marshborough Slitting Mill and Upper Bank Furnace. The Memorandum of Partnership dated 24 June 1727 covers the nine-year period of a lease granted by the Duke of Norfolk⁷ commencing Midsummer 1727 (Barnsley Archives (BA) SpSt 60478). The partners were to share the profits or losses as follows: John Spencer 5/32; Francis Watts 2/32; John Watts 2/32; Millington Hayford 4/32; Gervas Simpson 4/32; John Fell 8/32; Gamulul Milner 2/32; Arthur Speight 4/32; James Oates 1/32 (BA SpSt 60478). Together with their other investments, the 5/32 interest in the Duke of Norfolk's works made the Spencers the most influential family in the south Yorkshire iron trade (Awty, 2004).⁸

Participating firms in the charcoal ironmaking industry were typically organised as partnerships that might operate sites covering the entire production process from mining the iron ore through to the sale of the finished product. It was more often the case, however, that some of the output from the furnaces (pig iron) or forges (bar iron) would be supplied to forges and slitting mills owned by a different partnership. There was a degree of cooperation between ironmasters as a smoothly-run industry was in everyone's best interest. For example, a 1728 agreement between a range of ironmasters sought to allocate the production and distribution of the annual output of pig iron as follows: Nether Bank, Barnby, and Chappell furnaces to blow 3/5^{ths}, Bretton and Rockley furnaces 2/5^{ths}. The pig iron then to be allocated to forges: 5/12^{ths} to Wortley, Colnebridge and Kirkstall; 4/12^{ths} to the Duke of Norfolk Forges and Roach Abbey; and 3/12^{ths} to Kilnhurst, Thriber and Mousehole (Butler, 1954, p. 9).

But successful implementation of such plans often proved elusive. The price at which output was transferred to the next stage in the production process was a key source of dispute as this would determine the allocation of value added between different ownership groups. As Raistrick and Allen (1939, p. 175) put it: 'As the interests in the furnaces and forges were not identical but overlapped, there was considerable room for quarrelling, and from I730 onward many disputes arose about prices and proportions'.

Surviving archival evidence contains details of a long-running dispute between the Spencers and John Watts, managing partner at Kirkstall forge, concerning the price to be paid by Kirkstall forge for pig iron.

In a combine where one half of the firms have to buy their supplies from the other half there is always the risk that disputes will arise as to what is a fair and economic price. The Spencer combine experienced this friction which lasted from 1720 to 1752 largely because the Forges no longer in that period were sharing in the Profits of the Furnaces whereas previously they had shared in the Losses (Butler, 1954, p. 15).

William Spencer and John Watts had known each other for many years, and correspondence between them displays both affection and antagonism. Watts, on behalf of Kirkstall Forge, refused to pay more than £4 10s. 0d.⁹ a ton for pig iron and this placed him 'at loggerheads' with Spencer who is described by a descendant, Rodney Butler (1954, p. 14, p. 15), as 'a somewhat quarrelsome gentleman'. A settlement was attempted by calling in arbitrators, in 1739, who found in favour of Watts. Spencer was not pleased and the dispute continued. Spencer wrote to Watts on 26 December 1741:

⁷ Thomas Howard, 8th Duke of Norfolk (1683–1732), was an English peer and politician.

 $^{^{8}}$ John Spencer died on 13 April 1729 when his shares devolved on his son William.

⁹ f. s. d. are abbreviations for the words pounds (sterling), shillings and pence which describe the pre-decimalization (15 February 1971) currency in Britain. There were 12 'old' pence (d.) in a shilling (s.) and 20 shillings in a pound (f.).

I may blame you [today] with your desire to have Mettall [i.e. pig iron] at a lower price than hath been this 20 years last past and much lower you know than can be afforded; besides I should be a Rascall and Villain to my Family in complying to take less than [£]5-5-0 per ton as I believe there will be very little profitt at that price.

I shall always be glad to be in Friendship with you and in Partnership upon honourable terms ... as I ever had a great esteem for you. (Butler, 1954, p. 16).

The issue re-emerged in 1743 when the initial account prepared for the winter blast at Nether Bank Furnace revealed the main income component to be the value placed on $531\frac{1}{2}$ tons of pig iron transferred to the forges at £5 5s. 0d. per ton (BA SpSt 60459). Watts seems to have won this particular battle with a note at the foot of the account stating: 'To an Overcharge of 15s per ton for 531 tons 10cwt 0qtrs of Metall being chg. [charged] at £5. 5. 0 per ton. Mr Watts insisting upon it being chg. only at £4 10s.' The downward revision of the transfer price ($531\frac{1}{2}$ x 15s = £398 12s. 6d.) converted a profit – termed 'proceed' here and elsewhere in the Spencer Stanhope archive – of £292 0s. 7d. into a loss of £106 11s. 11d. (BA SpSt 60459).¹⁰

Spencer and Watts continued their lively exchange of letters and allegations through to the summer of 1751 when a settlement was reached by placing the dispute in the hands of arbitrators (Butler, 1954, p. 18).

Evidence contained in the Spencer Stanhope archive concerning the calculation of ROCE is next examined.

3.2. Return on capital employed

Surviving documents attest to William Spencer's interest in maintaining a record of his capital investment, his share of partnership profits and the relationship between the two figures as exhibited in the ROCE.

A single sheet of paper has survived as part of the Spencer Stanhope archive which is headed up: 'February 1740. Calculation of Int [erest] W[illiam]. S[pencer]. Stock in the Duke of Norfolk's Works. Yields yearly from 1727'. Here, the word 'Interest' signifies profit and 'Yields' refers to the calculation we now call return on capital employed. The actual calculations appear on the reverse side of the single-page document, with relevant extracts set out in Table 1 under the title: 'Abstract of the Works D.N. how much per Cent yearly' Spencer earned on his investment (BA SpSt 60478).

We can see that Spencer's initial investment in the company was £1250 and this amount was paid over to the managing clerk of the Duke of Norfolk's Works, John Fell,¹¹ in ten instalments between 26 October 1727 and 18 February 1729 (BA SpSt 60457).¹² The first entry in Table 1 is for the year to Midsummer 1728; the recorded profit of £62 0 11 is described as a return of 'under 5 per Cent' on the initial capital investment of £1250. The opening capital for the following year therefore becomes £1312 0 11 (i.e., £1250 + £62 0 11). As indicated in Table 1, calculations of the rate of return for each subsequent year were made using a figure for profit 'exclusive' of the profits or losses of the Nether Bank and Barnby furnaces which were not part of the DN Works. It is acknowledged that there appears to be an inconsistency within the calculations given that the opening capital for each of the six years to Midsummer 1734 is increased by profit for the year *including* Spencer's share of the Nether Bank and Barnby profits. Thereafter, capital remains unchanged as Spencer

Table 1

Abstract of the Works D.N. how much per Cent yearly (Amounts in £sd, but fractions of a penny omitted).

From 1727 to 1728	1250 Stock for 5/32nd under 5 per Cent	62 0 11
to 1729	1312 0 11 Stock for D° is 6½ per Cent exclusive of Bank and Barnby Furnaces	88 4 0
to 1730	1485 4 9 Stock for D ^o is under 6 per Cent exclusive of Bank and Barnby Furnaces	87 1 10
to 1731	1618 7 3 Stock for D ^o is exclusive [of Bank and Barnby Furnaces] 7 per cent	128 1 6
to 1732	1782 17 9 Stock for D ^o is exclusive [of Bank and Barnby Furnaces] 10 per cent	182 10 10
to 1733	2008 0 5 Stock for D ^o is exclusive [of Bank and Barnby Furnaces] 9 per cent	180 6 3
to 1734	2200 18 0 Stock for D ^o is exclusive [of Bank and Barnby Furnaces] 5 per cent	128 15 3
to 1735	2200 18 0 Stock for D° is exclusive [of Bank and Barnby Furnaces] under 4 per cent	81 10 6
to 1736	2200 18 0 Stock for D° is exclusive [of Bank and Barnby Furnaces] under 4 per cent	79 14 7
to 1737	2200 18 0 Stock for D ^o is exclusive [of Bank and Barnby Furnaces] under 3 per cent	63 7 11
to 1738	2200 18 0 Stock for D ^o is exclusive [of Bank and Barnby Furnaces] above 5 per cent	117 18 6
to 1739	2200 18 0 Stock for D ^o is exclusive [of Bank and Barnby Furnaces] under 5 per cent	101 2 6

Source: BA SpSt 60478 excluding memorandum figures for profits of Chappell, Nether Bank and Barnby furnaces which were not part of the Duke of Norfolk's Works

¹⁰ Raistrick and Allen (1939, p. 181) reproduce the output, profit and transfer prices for Nether Bank for each of the years 1696–1743. In 1742 the transfer price was £4 10s per ton and Watts insisted on the same figure being used for 1743, i.e., not the £5 5s per ton favoured by Spencer which had been last used in 1737.

¹¹ John Fell (1696–1762) took over from his father as clerk of the Duke of Norfolk's Works in 1724. The clerk was the 'key man in the charcoal iron industry' (Hopkinson, 1961, p. 137) typically serving as general manager of the concern. In addition, he 'kept the partners' Journals and Ledgers; cashed the bills with which he was paid with such persons as the Duke of Norfolk's agents ...; balanced the accounts between the various partnerships and remitted the dividends due to each partner in the various works' (Hopkinson, 1963, p. 138).

¹² We can therefore infer a total capital investment by the partners of ± 5000 (1250/5*32) which equates to $\pm 719,400$ in 2021 when adjusted for changes in purchasing power and over ± 13 million when expressed as a multiple of the average income needed to buy a commodity (Officer & Williamson, 2023).

Table 2					
Return on	capital	employ	ed 172	27-173	39.

	Stock (from Table 1)	Profit (from Table 1)	'per Cent' return (from Table 1)	Recalculated ROCE
1727/8	1250 0 0	62 0 11	under 5%	4.96%
1728/9	1312 0 11	88 4 0	6.5%	6.72%
1729/30	1485 4 9	87 1 10	under 6%	5.86%
1730/31	1618 7 3	128 1 6	7%	7.92%
1731/32	1782 17 9	182 10 10	10%	10.24%
1732/33	2008 0 5	180 6 3	9%	8.97%
1733/34	2200 18 0	128 15 3	5%	5.85%
1734/35	2200 18 0	81 10 6	under 4%	3.70%
1735/36	2200 18 0	79 14 7	under 4%	3.62%
1736/37	2200 18 0	63 7 11	under 3%	2.88%
1737/38	2200 18 0	117 18 6	Above 5%	5.36%
1738/39	2200 18 0	101 2 6	under 5%	4.60%

withdrew, each year through to 1739, his entire share of the profits.

The purpose of these calculations remains unstated. They were certainly not made to enable Spencer to decide, on a regular basis, whether to continue his investment in the works given that the calculations reach back over a 12-year period, but other calculations which have not survived may have been made. Also, of course, Spencer was committed to the enterprise for the period of the partnership agreement, which was initially nine years, and he would not have been able to dispose of his shares except to other members of the partnership (BA SpSt 60478). More likely, therefore, the calculations were designed to enable Spencer to assess long term rates of return for the purpose of deciding whether to continue to invest in charcoal iron making when the lease came up for renewal.

Table 2 reproduces the figures for Stock, Profit and 'per Cent' return listed in Table 1 and the ROCE for each year computed by the present writer. It can be seen that the calculations presented in columns 4 and 5 match up pretty well except for 1730–1731 and 1733–1734.

The next section adds a new dimension to the debate surrounding the emergence of ROCE as an accounting signature signalling the existence of a capitalist mentality. It does so through a study of the contemporary literature.

4. Eighteenth century literature

The contents of Proquest's online collection of U.K. Parliamentary Papers (for the period 1679–1800) and Gale's Eighteenth Century Collection Online (ECCO)¹³ were interrogated using the search term 'capital employed' combined with 'profit'. This produced, respectively, 43 and 398 'hits',¹⁴ none of which featured in the eighteenth century bookkeeping/accounting texts listed in Edwards (2011, pp. 58–67). Each of the 441 records was accessed and further interrogated using the single world 'capital', though it must be borne in mind that the digitisation process is not always sufficiently precise to achieve identity between the wording of the original records and their electronic equivalents. Several items feature in both sets of online databases which also exhibited multiple copies of certain books or reports. The 38 copies of one or other pre-1800 vol¹⁵ of Adam Smith's *Wealth of Nations* available through ECCO is, however, exceptional.

The analysis presented below is drawn from 15 different parliamentary papers and 54 books that were judged to contain material relevant to the present study. Of these, a single item was published in each of the 1720s and 1750s, seven in the 1770s, 12 in the 1780s and 48 between 1790 and 1800. All but two of these items were published, therefore, in the period subsequent to the dated onset (1760) of the British industrial revolution. Given that the limited purpose of this study is to seek evidence of a capitalist mentality through the calculation of ROCE, no attempt has been made to distinguish between the different versions of ROCE recognised by Bryer and Toms (Toms, 2010, Tables 1–3). As stated in the Introduction, we employ a generic definition where the ROCE is 'obtained by dividing some measure of profit (as a flow of income) by some measure of capital (as a stock of wealth)' (Toms, 2010, p. 206).

4.1. Recognising a relationship between profit and capital employed

Many of the identified sources signal a clear awareness of the relationship between profit and capital employed. For example, a Select Committee appointed to explore ways of improving waste land observed that, given the expected degree of government support, 'There will then be but little Risk of the Proprietor, wanting a sufficient Return for the Capital expended' (Parliamentary Papers (PP), 1795b, p. 17). In the same year, a Select Committee inquiring into the current high price of corn observed that millers wish to see the

¹³ ECCO contains over 200,000 vol printed in the United Kingdom between the years 1701 and 1800. Proquest's UK Parliamentary Papers is also a massive electronic database covering the full range of parliamentary publications dating from 1769.

¹⁴ Further searches combining 'capital employed' with 'bookkeeping', 'capital employed' with 'book-keeping', 'capital employed' with 'accompts', and 'capital employed' with 'accounts' produced few additional hits and have been omitted from this study. It is acknowledged, however, that a comprehensive interrogation of U.K. Parliamentary Papers and ECCO has not been made, with other search terms likely to provide additional evidence of ROCE calculations.

¹⁵ Fourteen copies of each of volumes 1 and 2 and ten copies of volume 3.

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price fixed at a level where 'they would receive an adequate Compensation for the Labour performed, and capital employed' (PP, 1795a, pp. 18–19).

A Committee appointed to enquire into the state of the copper trade met and reported in 1799. George Simcox, a shareholder in the Birmingham Mining and Copper Company, was called to give evidence. He confirmed the proposition that, in recent favourable trading conditions, the company was able to make 'a fair Profit upon the Capital Employed' (PP, 1799, p. 81).¹⁶ On the following day (30 April 1799), Thomas Williams, MP, was asked: 'Is the Committee then to presume that the Profit of the Capital employed in Mining in Anglesea is greater than that of the Capital employed in Mining in Cornwall?' (PP, 1799, p. 85). Williams verified that to be the case. Appearing before the same committee, the mine agent and copper maker, John Vivian, provided figures for the profits, losses and capital employed at three separate categories of Cornish mines, and summarised his findings as follows:

The Result of the Whole is, that the Quantity of Copper raised in Cornwall for the last Six Months has been 2613 Tons; it has been sold, under the Average Standard of £.113, for £.216,017; the cost of raising that Quantity has been £.197,333; the Profit of the profitable Mines has been £.40,219, the Loss on the losing Mines £.21,536, which bears a Balance of £.18,683, under a Capital of £.185,569. (PP, 1799, p. 12).

A causal relationship between profit and capital employed was recognised by major figures in the history of political economy and philosophy. In *The Wealth of Nations*, Adam Smith (1776, p. 75) observed: 'In the price of sea-fish, for example, one part pays the labour of the fisherman, and the other the profits of the capital employed in the fishery'. Both a disciple and critic of Smith, the English philosopher, jurist, and social reformer, Jeremy Bentham (1787, pp. 26–27, emphasis added), reflected as follows on the importance of an adequate rate of return:

People trust goods upon much slenderer security than they do money: it is very natural they should do so: ordinary *profit of trade upon the whole capital employed* in a man's trade, even after the expence of warehouse-rent, journeymen's wages, and other such general charges, are taken into account, and set against it, is at least equal to double [the statutory rate of] interest; say 10 per cent. Ordinary profit upon any particular parcel of goods must therefore be a great deal more, say at least triple interest, 15 per cent.: in the way of trading, then, a man can afford to be at least three times as adventurous, as he can in the way of lending, and with equal prudence.

Writers also argued that the appropriate criterion for choosing between alternatives was not figures for profit but their relationship to capital employed. According to Thomas Wallace (1798, p. 16), a member of the Royal Irish Academy:

The rent, therefore, accruing to the proprietor of land, far from being a criterion of exclusive productiveness, as has been argued, is no criterion ever of superior productiveness. The question must still be, whether the surplus, after defraying the expences of a given capital employed in the purchase and improvement of a piece of land, is greater or less than that of a like capital employed in the prosecution of a manufactory.

The remainder of this section narrates examples of commentators attaching a number to the relationship between profit and capital employed.

4.2. Calculating return on capital

At the height of the South Sea Company mania, in 1720, a 'Member of the House of Commons' conducted a critical appraisal of that company's financial prospects. It included the following hypothesis:

If all the Debts be taken in, the Capital will then consist, as I have stated the same, of 43,558,000*l*. and, I believe, that a Tenth Part of that Sum, is as much as the Company can be possibly supposed capable to employ in all the Branches of their Trade; and that 10*l*. per Cent. per Ann. clear of all Charges and Losses, is as much as can be hoped to be made of the Money so employed; and this will be only *1l. per Cent, per Ann.* on their whole Capital, *viz. 435,580l. per Ann.* clear Profits.¹⁷ (PP, 1720, p. 6).

Turning to another famous British-based corporation, the East India Company, a government investigation into the administration of its affairs in Bengal, Bahar, and Orissa contains a number of observations concerning the profit, loss and capital employed in different activities (PP, 1783, pp. 60–61). There is also the following comment from Warren Hastings who, on his return to England in 1785, was impeached by the House of Commons for alleged crimes when serving as Governor General of Bengal: 'his [the agent's] profits will be reduced to the scanty sum of 10,290 Rupees, or 3,400, Rupees a year, for his risk on a capital of 353,977, which is less than one per cent' (PP, 1783, p. 436). The author of an early history of the East India Company complained that, over the previous 80 years, the average profits 'of any reasonable period' of time 'seldom exceeded the legal current rate of interest of money, computed by the value or market price of their Stock' (Russell, 1793, p. 19). Thus 'what might otherwise have constituted a mercantile profit on the India Trade (beyond the common interest [five per cent¹⁸] of the capital employed)' accrued to the public, in the form of lower prices,

¹⁶ At a separate appearance before the committee, Simcox was asked to comment on changes in 'the Rate of Profit on the Capital' among Birmingham copper manufacturers during the 1790s (PP, 1799, p. 10).

¹⁷ Further estimates of ROCE are offered by the 'Member of the House of Commons' based on different assumptions concerning the rate of profit made and the proportion of capital employed in trade.

¹⁸ The permitted rate of interest was capped at five per cent from 1713 through to the abolition of the usury laws in 1854 (Munro, 2011, p. 19).

rather than to the shareholder who sustained 'all the risque' (Russell, 1793, p. 19).

The significance, for expected profit, of differentials in the amount of capital invested, is deliberated upon by Adam Smith who presents the case of two 'manufactures' each employing 20 workmen paid £15 per annum. In one of the factories the materials worked upon during the year are assumed to cost £700; at the other, the investment in materials amounts to £7000. Thus, the 'capital annually employed in the one will in this case amount only to one thousand pounds; whereas that employed in the other will amount to seven thousand three hundred pounds' (Smith, 1776, pp. 70–71). Smith (1776, pp. 70–71) therefore postulates: 'where the common annual profit of manufacturing stock are ten per cent ... the undertaker of the one will expect an yearly profit of about one hundred pounds' only; while that of the other will expect about seven hundred and thirty pounds'.

A number of items published between 1770 and the end of the eighteenth century focus on agriculture. Foremost amongst this literature are texts authored by Arthur Young who has been described as 'unquestionably the most significant figure in the English Agricultural Revolution' (Gazley, 1973, pp. 1741–1820, preface, p. vii). A feature of Young's work is the calculation of investments required to set up farms of different types and sizes together with estimates of the revenues, expenses and profits which might be expected to accrue from running each of them. For example, Young (1770b, pp. 2–8) sets out calculations of the capital investment (£1257 14s. 6d.) required to establish a 220 acre arable farm. He then estimates that the farm would generate a profit of £139 0s. 6d. which, in Young's (1770b, p. 8) words, 'yields but 11*l*. 1s. per cent on the capital'. It is interesting to note that the capital investment required to produce the first year's revenue includes not only the initial outlays needed to establish the business but also the first year's operating costs (including wear and tear). The recommended calculations also display the figure for 'Profit' after deducting interest at the statutory permitted rate of five per cent, i.e. £76 3s. 6d.¹⁹

Later in that book, Young (1770b, p. 198) expresses the view that a return of '24 *per cent*. on a capital, employed in a business so easy and sure as grassing, is a noble profit, and considering all circumstances, equal perhaps to an average of 28 or 30 *per cent*. on a tillage farm'. In a second text published that year, Young (1770a, pp. 552–553) estimates that an investment of £3114 would be required to make a square mile (640 acres) of land ready for farming. This done, the farm might be expected to yield a profit of £287 after deducting running costs including four per cent interest on the required capital investment. The £287 is described by Young (1770a, p. 553) as 'Clear profit, being *9l.* 4*s. per cent*.' on 'capital employed'.²⁰ In a further publication, Young (1797, p. 2, emphasis added) called for legislation designed to encourage farmers to make use of waste land to grow oats, 'so as to indemnify them for the expense of cultivation, and leave a *profit on the capital employed*, in some degree adequate to that which is invested in trade and manufactures'. Another agriculturalist, John Boys (1796, p. 44), believed that 'With regard to profit, ten or twelve per cent. is usually made on the capital employed'. Before leaving the farming industry we may note Charles Michell's (1796, p. 503) observation that 'there will be more farms to be hired at the present enormous rate of profit on the capital employed'.

Stephen Godfrey, a ship owner, informed a government committee investigating the state of the fishing industry that 'the Rate of Profit upon the Capital employed in the Mackarel Fishery is extremely small' (PP, 1785, p. 11). The committee considered proposals for the construction of a canal between Loch Crinan and Loch Gilp where one of the conditions for approval of the scheme was that investors 'shall be allowed to draw from that Period the Whole free Money arising during the current Year, if that [profit] shall not exceed the Rate of Five and a Half per Cent. on the whole Capital employed on that Undertaking' (PP, 1785, p. 309). The report was presented to parliament by the Whig politician and slave trade abolitionist Henry Beaufoy who, in the following year, addressed the House of Commons as follows: 'the intention of the Legislature in giving the bounty is the encouragement of a trade, which, if once established, would afford a reasonable return on the capital employed' (PP, 1786, p. 260). Continuing the focus on fishing, the Scottish merchant George Pitcairn (1787, p. 146) estimated 'the average chance of success and profits at from 40 to 50 per cent per annum, on the capital employed' in the case of a fleet of ten vessels 'put under the charge of intelligent industrious people', Plantations and slavery were also sites that caused interested parties to reflect upon the relationship between investment and profit. A study into the British sugar-colony trade, conducted by Joseph Massie²¹ in the late 1750s, contains general comment on the relationship between profit and capital employed with the author then moving on to 'inquire, what annual Rate of Profit or Interest per Cent. is gained, upon a Capital of Three Millions of Pounds Sterling' (Massie, 1759, p. 71). His findings are summarised in a statement headed: 'An Abstract of the Annual Profit per Cent. upon Three Millions of Pounds Sterling employed for making of Sugar, upon long established plantations, in the British Colonies'. It reveals an annual profit of £710,000 which, he says, 'is about Twenty-Four per Cent' on 'Money employed' (Massie, 1759, p. 76).

Calculations of ROCE were also used to lobby government for more favourable treatment of plantation owners. John Gardner Kemeys, who owned plantations in Jamaica, was incensed by the imposition of additional duties on sugars and rum. His text, addressed to both Houses of Parliament, complained that 'the produce of Plantations, in general, will not give the Proprietors three, many of the smaller, not one per cent. if anything, on their capital employed' (Kemeys, 1783, p. 82). John Prinsep, who made his fortune in India, was a vocal advocate for the unfettered entitlements of English merchants, as exemplified in *The right in the West-India merchants to a double monopoly of the sugar market* (Prinsep, 1792). There he focuses on the sugar colonies of the British West-India islands, and 'gives the sum of seventy millions, as the whole capital employed ... and estimates the annual profits, mostly by his account expended in Great Britain, at six per cent. per annum on the planter's stock' (Prinsep, 1792, pp. 31–32).

This section concludes with chilling extracts from government investigations into the slave trade. The Liverpool merchant John

¹⁹ £139 0s. 6d – £62 17s. 0d. (£1257 14s. 6d. x five per cent).

²⁰ Bryer (2000b, p. 376) cites a similar calculation (by Mr Ruggles) reported in Young, 1788 (pp. 235–244) which is critiqued in Toms (2010, pp. 215–216).

²¹ According to Mathias (1957 p. 33), by basing his arguments on quantitative analysis 'Massie stands out from the general press of [eighteenth-century] pamphleteers'.

Dawson informed a government committee that, in 1784, he entered into a contract for supplying the Spanish colonies – 'Trinidada, La Guira on the Spanish Main, and at the Havannah' – with 3000 to 4000 slaves at 150 dollars per head (PP, 1789a, part VI, p. 378). The slaves were purchased principally from Bonny, in West Africa, but also from the Gold Coast and Angola. Dawson complained that the trade 'had not in general been a lucrative one: If he had employed his Money in other Ways, he should have made more of it. ... [the contract] had not given him a reasonable *Profit on the Capital employed*' (PP, 1789a, part VI, p. 378, emphasis added). In the same parliamentary paper, a Mr. Spooner, agent for the Islands of Grenada and St Christopher.

gives a Calculation of the Profits made in that Island by the Cultivation and Manufacture of Sugar at the Time he was there, which he computes at 7,516l. Sterling, nett, after all Charges paid, on a Capital of 14,0001. invested in Land, &c. which is equal to 54³/₄ [sic 53³/₄] per Cent (PP, 1789a, part VI, p. 332).

In the same year, a House of Lords investigation into the slave trade quoted the Committee of the Council of the Island of Jamaica's conclusion that 'upon an Average throughout the Island, the Planter does not make more than Four per Cent. upon his Capital (PP, 1789b, Part III, p. 229). Governor David Parry of Barbados estimated that the revenue from a good crop of sugar, 'after Payment of all Expences and Plantation Losses, does not leave the Owner more, if so much as 6 per Cent. the Interest of the Island on his Capital' (PP, 1789b, Part III, p. 303). This calculation received support from J. Burton and W. Hutchinson, who were engaged by the Council of the Assembly of the Island of Antigua to lobby the British Parliament for a continuation of the slave trade, citing:

the very great Injustice which we shall suffer by so material an Alteration in the original Terms upon which so great a Property has been vested in different Parts of the Empire, exposed to various Calamities to which Great Britain is happily a Stranger, and yet, under many peculiar Disadvantages, producing at the most not more than an average Profit of Six *per Centum* on the Capital (PP, 1789b, Part III, 348).²²

This section has revealed evidence of both a general interest in the relationship between profit and capital employed and a desire to express that relationship in numerical terms. The business sectors featured comprise mainly farming, mining, fisheries, plantations and slavery. Ex ante and ex post calculations are designed to indicate the returns available on a corporate investment, the profitability of a particular type of business activity and, in some cases, thereby permitting comparison to be made with alternative investment opportunities, e.g. investing in different sized farms or, more generally, whether to engage in farming rather than manufacturing. A further feature is the use of the statutory rate of interest as a yardstick for evaluation actual or forecast ROCE. There is also evidence of the use of such data to make the case for favourable legislative intervention.

5. Conclusion

The calculation of ROCE is recognised as evidence of a calculative mentality designed to assess the effectiveness with which business resources have been deployed. Whereas Bryer hypothesises, and seeks to demonstrate, the widespread use of the ROCE beginning in the eighteenth century, Toms judges it to have made a much later appearance. This paper has attempted to throw further light on the issue by studying the content of the Spencer Stanhope archive, Eighteenth Century Collections Online and UK Parliamentary Papers.

The study has uncovered, within the Spencer Stanhope archive, a surviving fragment of evidence: a single page document containing calculations of the annual ROCE on William Spencer's capital investment in the Duke of Norfolk's Works for each of the twelve years from 1728 to 1739. This study has also revealed a dispute between two ironmasters – Spencer and John Watts – whose ownership interests did not coincide concerning the allocation of profits between furnaces and forges. Whereas it benefited Spencer (the vendor) to have a transfer price for pig iron of £5 5s. 0d., Watts (the customer) favoured a figure of £4 10s. 0d. per ton.

A single example of the calculation of ROCE, elicited from business archives, does not go far towards resolving differences of opinion concerning the emergence of this signature of a capitalist mentality. But more significant is the source of the information – a memorandum calculation on a single sheet of paper, i.e., the type of record which is recognised as far less likely to survive the ravages of time than, say, bound books of accounts. But, of course, we will never know the precise extent to which the ROCE calculation featured in business records. Certainly, however, there is nothing very sophisticated about the calculation of ROCE and we know that authors of contemporary accounting texts were keenly interested in its component elements: profit and shareholders' equity. For example, the teacher, actuary and practising accountant, James Dodson (1750, p. i), saw, as a key virtue of accounting, the fact it revealed for a merchant 'what Goods have been purchased, and sold, by him, what Gain, or Loss, has happened thereon; and whether his Expenses have been less than, or exceeded, his Income'. Turning to capital employed, the merchant Robert Colinson (1683, p. 1) trumpeted 'the satisfaction it gives to men of trade, that in one Instant can see (as he doeth his Person in a mirror) his whole estate and in what posture it is at the time'.²³

Perhaps, surprisingly, this study has adduced no evidence of pre-1800 accounting treatises explicitly recognising the notion of ROCE. Casting the net more widely, however, through interrogation of Eighteenth Century Collections Online and UK Parliamentary Papers, reveals recognition of ROCE in diverse arenas during the eighteenth century. ROCE was found to feature in studies of returns for investors in famous companies in Britain's business history, in observations from celebrated political economists, and in

²² The Council and Assembly of the Island of Montserrat pronounced that 'the nett Income [of the plantation owner] will not exceed Three *per Cent*, on the capital Sum invested' (PP, 1789b, Part III, 355).

²³ For other examples, see Edwards et al., 2009, pp. 559-561.

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commentary on measurement practices in a range of different industries.

There is nothing in this paper to disprove Toms' (2010, p. 218) assertion that ROCE calculations were 'the exception rather than the rule' during the period covered by this study. Nor is there any reason to dispute his claim that 'review of evidence uncovered so far of the employment of ROCE calculations shows that most early modern and industrial revolution entrepreneurs did not make use of such calculations' (Toms, 2010, p. 219). This study nevertheless presents further evidence of the emergence of a 'capitalist mentality' as the eighteenth century progressed, and it is difficult to imagine that further research would not yield further examples of the use of ROCE to measure business performance.

Data availability

No data was used for the research described in the article.

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