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**Creative accounting in the British Industrial Revolution: Cotton
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Abstract

The paper examines an early case of creative accounting, and how, during British industrialization, accounting was enlisted by the manufacturers' interest to resist demands, led by the 'Ten hours' movement, for limiting the working day. In contrast to much of the prior literature, which argues that entrepreneurs made poor use of accounting techniques in the British industrial revolution, the paper shows that there was considerable sophistication in their application to specific purposes, including political lobbying and accounting for the accumulation of capital.

To illustrate lobbying behaviour, the paper examines entrepreneurs' use of accounting to resist the threat of regulation of working time in textile mills. It explains why accounting information became so important in the debate over factory legislation. In doing so, it shows that a significant element was the accounting evidence of one manufacturer in particular, Robert Hyde Greg, which had a strong impact on the outcome of the parliamentary process.

The paper uses archival evidence to illustrate how accounting was used in Greg's enterprise and the reality of its economic performance. The archival evidence of actual performance is then contrasted with the figures presented by Greg to the Factories Inquiry Commission, convened by the House of Commons in 1833-1834 to hear witnesses from the manufacturing interest. These sets of figures are compared and contrasted and discrepancies noted. Conclusions show that the discrepancies were substantial, motivated by Greg's incentives to present a particular view of low profits, high fixed costs, and the threat of cheaper overseas competition. The figures appeared to lend some credibility to the apparent plight of manufacturers and to Nassau Senior's flawed argument about all profit being earned in the 'last hour' of the working day. The consequence was a setback for the Ten Hours movement, leading to a further intensification of political struggles over working conditions in the 1840s.

Key words: British Industrial Revolution, Accounting, Child labour, Factory Reform, Lancashire cotton textiles, Greg, Quarry Bank Mill

JEL: J21, J31, K31, L50, L67, M4, N13, O14, O15, O38

Creative accounting in the British Industrial Revolution: Cotton manufacturers and the 'Ten Hours' Movement

Introduction

The paper examines the use of accounting by entrepreneurs to resist the threat of regulation of working time in textile mills in the early 1830s, a period when public demand for restricting the working day to 10 hours, and for the protection of children in particular, reached its height. From the firm's point of view, regulation creates the risk of wealth transfers, or political costs, which it might rationally avoid through accounting manipulations, for example by reporting lower profits.¹ In the early nineteenth century, competitive pressures, ideologies such as *laissez faire*, or prevention of wealth transfers in favour of real wages at the expense of capital accumulation might have been motivated such manipulations. They might nonetheless assign irrational weights to the decision components, including the accounting elements, such as the determinants of profit and cost behaviour and the threat of wealth transfers at the expense of capital. For example if uncompetitive water mills were able to block legislation protecting workers they would prevent older mills exiting and perpetuate the stagnation of real wages.² The paper examines whether anti-regulation lobbying on working hours and child labour was characterised by accounting manipulation and gauges its influence.³

¹ Watts and Zimmerman, 'Towards a positive theory'. Political costs are defined as politically determined wealth transfers, p.115.

² The period of constant wages before 1850 in the midst of rising output per worker was referred to as 'Engel's pause' (Allen, 'Engels' pause').

³ Whilst acknowledging that some accounts from the supporters of regulation, for example William Dodd, may have also been misleading (Humphries, *Childhood and child labour*, p.17).

Accounting's wider role in the British Industrial Revolution has attracted considerable debate. The general consensus is that industrialists made poor use of accounting techniques, with some notable exceptions. For example, Roll argued that the pioneering firm of Boulton and Watt developed advanced accounting techniques,⁴ which others subsequently challenged.⁵ Other cases of sophistication have been identified, for example at Birley's Chorlton Mills in the 1810s.⁶ Even so, Pollard's conclusion, that the use of "accounts as a direct aid to management was not one of the achievements of the British industrial revolution,"⁷ has been widely accepted. Genealogical explanations in the Foucauldian tradition have reinforced this by arguing that accounting as a tool of effective managerial control had its origins as a device for controlling human behaviour in US armaments firms in the 1840s.⁸ Meanwhile, Pollard's critics have suggested that although he overstated the case with management accounting, financial accounting was nonetheless inadequate.⁹ This paper reviews the conclusion about financial accounting showing that it was effectively used for the purposes of recording capital accumulations in

⁴ Roll, *An early experiment*.

⁵ For example the 'fixed cost' problem, as noted by Edwards, 'Some notes on the early literature and development of cost accounting in Great Britain' pp.93-195, who concluded that whereas accounting methods were adequate for the purposes of the putting out system, once production had been internalized in factories, there was a subsequent failure to resolve the "fixed cost problem".

⁶ Stone, 'Charlton mills'. From 1810, the system at Charlton mills collected information on the gain or loss from 13 cost centers on a bi-monthly basis and flows between departments tracked using DEB.

⁷ Pollard, *The genesis of management*, p.130. Crouzet, *First industrialists*, p. 10; Mokyr, 'Editor's introduction', p. 110. For a recent accounting critique of Pollard, see Bryer, 'A Marxist accounting history', pp.36-45, c.f Toms 'Accounting for profit', for a defence and extension of Pollard.

⁸ Hoskin, & Macve, 'The genesis of accountability'; Fleischman, Hoskin, & Macve, 'The Boulton & Watt case'; Hoskin and Macve, 'Knowing more as knowing less'.

⁹ Fleischman and Parker, 'British entrepreneurs', 371. Fleischman and Tyson, 'Cost accounting during the industrial revolution', p.512. Hudson, *Genesis of industrial capital*.

complex partnerships and political lobbying. For these contexts, there is less evidence and less debate.

To investigate further, the paper uses archival evidence from the partnerships of Samuel Greg and his sons. Prior studies have mined this archive extensively.¹⁰ Rose has written a history of the firm, the performance of its management, and examined its approach to labour management and the family's portfolio of investment activities.¹¹ Harley has examined the firm's profitability as part of a broader study, but only for the period of Samuel Greg's (1758-1834) partnership with Peter Ewart (1767-1842) between 1796 and 1815.¹² Edwards's analysis focuses on the same period of Greg's activities, also commenting on the merchant partnership with James Lyle.¹³ Rose refers to profitability for other periods and other parts of the Greg business structure, but presents actual data only for the period 1822-1832.¹⁴

By taking a more comprehensive view of Greg's financial performance, the paper creates the basis for examining two hypotheses. First, that accounting demonstrated considerable sophistication in recording capital appropriations and accumulations. There were restrictions on the formation of joint stock companies under the Bubble Act, and partnerships widely used to raise and allocate capital

¹⁰ Held at Manchester Central Library, hereafter MCL.

¹¹ Rose, *Gregs of Quarry Bank*, Rose, 'Social Policy and Business'; Rose, 'The Role of the Family'; Rose, 'Diversification of investment by the Greg family, 1800–1914.'

¹² Harley, 'Was technological change in the early Industrial Revolution Schumpeterian?' Role of Ewart, see Musson, and Robinson, 'The Origins of Engineering'.

¹³ Edwards, thesis, pp.508-509.

¹⁴ Rose *Greg's of Quarry Bank*, p.53.

accumulations between partners according to differential shares contributions and successions. Accordingly, accounting might be expected to pay greater attention to appropriations and accumulations.

The second hypothesis assesses the consequences of reliance on child labour and long hours, particularly in rural mills, in an environment where regulators were unable to scrutinise factory accounts and financial records,¹⁵ so that the possible financial consequences of regulation were subject to interpretation and possible distortion. To address this question, Robert Hyde Greg's¹⁶ political evidence is compared to the actual performance of the business according to the accounts, to appraise the extent and consequences of any such distortions. The political lobbying example used in the paper centres on the Factories Inquiry Commission of 1833, which was concerned with the hours of labour in textile factories. To strengthen their arguments, opponents of regulation enlisted the support of Oxford economist, Nassau Senior. Senior argued that because profit was a specific fraction of total cost then it followed that all profit was earned in the last hour of the working day, and therefore any reduction of the working day would eliminate the profit.¹⁷ Although flawed, Senior's arguments carried weight because, as noted above, the 'fixed cost' problem was poorly understood.

Senior's arguments show why the use of accounting in these debates was important. The next section explains the context in which these arguments were

¹⁵ There is no record of visitors having inspected Quarry Bank under the stipulations of Peel's 1802 Act, notwithstanding Greg's being one of the largest employers of child labour. Rose, 'Social Policy and Business', p.22.

¹⁶ Robert Hyde Greg, 1795-1875. Eldest son of Samuel Greg and responsible for the management of Quarry Bank Mill at Styal in Cheshire on behalf of the partnership Samuel Greg and Sons.

¹⁷ Senior and Horner, *Letters on the Factory Act*, pp.4-5

made and why Greg's evidence was potentially significant. In a further section the paper retraces the history of the Greg partnership to understand the main purpose of accounting, and to assess business performance and the credibility of the accounting information. Such an assessment enables the comparison of figures used for managing the business successfully with those presented to the parliamentary commission, presented in a following section. A final section draws conclusions.

Factory reform and the Ten Hours movement

In the period 1800-1830, moves to regulate the working day, and hours worked by children in particular, were the subject of political controversy and achieved only tentative results. The first piece of factory legislation, Sir Robert Peel's bill of 1802, applied only to apprentices. Based on the principle that parliament could not legislate parental responsibility for children, it placed in *loco parentis* responsibilities on masters employing orphans, and was widely regarded as ineffective.¹⁸ A subsequent Act of 1819 stated that no children under 9 were to be employed and that the working day was limited to 12 hours for children aged 9–16.¹⁹ In 1825 Sir John Cam Hobhouse's Bill proposed a working week of 66 hours, amended by the House of Lords to 69 hours, following recommendations from Greg and another master spinner.²⁰ In 1831 Hobhouse brought in another bill proposing to limit weekly hours worked by children to 64, resulting in a further compromise Act, limiting the

¹⁸ *Health and Morals of Apprentices Act 1802* (42 Geo III c.73). Harrison and Hutchins, *History of Factory Legislation*, p.17.

¹⁹ *Cotton Mills and Factories Act 1819* (59 Geo. III c.66). The House of Lords recommended 11 hours, but this was amended to 12 by the Commons.

²⁰ BPP, *Factories Inquiry Commission, 1833*, ev Greg, pp.780. It also established a partial holiday on Saturday, and provided penalties for offences against the Act.

working day to 12 hours for all those under 18, and night work to those aged 21 and over.²¹

Although child labour was in decline by the 1830s,²² campaigns to reduce the length of the working day reached new levels of intensity. Pressure for new legislation came from public opinion, which was influenced by the publication of the Robert Blincoe memoirs,²³ the operatives, represented by the Short Time committees and also from Tory radicals such as Richard Oastler, suspicious of rapid industrialization.²⁴ As a consequence, a new bill sponsored by Michael Sadler MP and Lord Ashley, proposed restricting the working day to 10 hours, including adults, was then introduced. As Chairman of the Committee, Sadler used his position to inflame opinion further by hearing evidence mainly from victims of poor employment practice and publishing what opponents regarded as a one sided report.²⁵

Meanwhile, manufacturing interests, in cotton and other textile industries argued that long hours were essential to profitable operation and indeed their mills' survival in the face of threats from overseas competition. Robert Hyde Greg was prominent among the leaders of the manufacturing interest. As an opponent of regulation on principle, Greg had good reason to respond to Sadler's evidence, which

²¹ *Labour in Cotton Mills Act, 1831* (1 & 2 Will. IV c.39). None of the laws passed before 1833 contained procedures for enforcement.

²² Nardinelli, 'Child labor and the Factory Acts'.

²³ Brown, *A Memoir of Robert Blincoe*. The memoirs were made public in increments beginning in 1830. Waller, *The Real Oliver Twist*.

²⁴ Gray, *The Factory Question*, p.7 & 66.

²⁵ BPP, 1831-32 (706) Report from the Committee on the "Bill to regulate the labour of children in the mills and factories of the United Kingdom" (Sadler Committee).

inter alia noted that in country areas there was a tendency to work longer hours to evade restrictions.²⁶ Consequently, Greg and a group of mill owners lobbied successfully for a parliamentary Commission (The Factories Inquiry Commission) to visit the manufacturing districts and take further evidence.²⁷ Greg's evidence to the Commission, based on an analysis of the cost structure of the Greg partnership, formed an important part of the manufacturing interest's case against regulation.²⁸ The outcome of the Commission hearings shaped the ultimate Factory Act legislation of 1833.²⁹

The Greg partnerships: Accounting methods and financial performance

Before evaluating Greg's evidence, this section considers the experience of successive Greg partnerships in the years leading up to the Commission. For the purposes of contrast with Greg's commission evidence, the use of accounting data within the partnership in the decades and years immediately prior to 1833 is reviewed. Also the performance of the business is measured, again for the purposes of comparison with the apparent profitability suggested by Greg's commission evidence.

²⁶ Greg, *The factory question* p.128-9; Sadler Committee, ev. Longstone. QQ.9379-9381.

²⁷ Greg, *The factory question*, p.8. Greg's opponents referred to this as 'the Masters commission'.

²⁸ Greg had been instrumental in framing the Lord's amendment to Hobhouse's 1825 bill, mitigating its effects from the employers' point of view. Factories Inquiry Commission (450) D2, (Factories Inquiry Commission) 1833, ev Greg, pp.781.

²⁹ Grant, *The ten hours bill*, p.53. Factory Act of 1833 (3 & 4 Will. IV, c.103). Commonly referred to as Althorp's Act. No children were to work in factories under the age of nine (though by this stage numbers were few). The Act also required children under 13 to receive elementary schooling for two hours each day. Even so, the Act established a maximum working week of 48 hours for those aged 9 to 13, limited to eight hours a day; and for children between 13 and 18 it was limited to 12 hours daily.

Accounting practices

An important determinant of accounting practice was the frequent changes in partnership arrangements. Some details of these are given in the prior literature, and in conjunction with these, the archive permits a fuller picture to be presented.³⁰ A complete picture is important to better understand the series of accounting records, valuations and financial performance of different parts of the business.

Figure 1 shows the evolution of the firm and its partnerships centred on the activities of Samuel Greg. It is clear that Samuel Greg was involved in multiple partnerships, sometimes with his sons and sometimes with established trading concerns linked through marriage. Partnerships were typically short-lived and reflected changes in business strategy and changes in family circumstances. There were three main series of partnerships that can be traced through various successions, the first two related to export and marketing and the third to manufacturing. Thomas Greg (1718-1796), Samuel's father, had established the firm of Thomas Greg and Co. which became one of the most successful broking, underwriting and discounting firms in the mercantile transatlantic trade, whose clients included cotton manufacturers J and N Philips, during which period the business was managed from London by Samuel's brother, also called Thomas (1752-1832).³¹ Samuel Greg meanwhile took over Hyde and Company, then one of Manchester's largest merchant manufacturers in 1782. Greg inherited £10,000 from

³⁰ Rose, *Gregs of Quarry Bank*; Janes, *From Smuggling to Cotton Kings: The Greg Story*. MCL Partnership books, C5/1/2/2-4.

³¹ Janes, *From Smuggling to Cotton Kings*; Chapman, *Merchant Enterprise*, p.64.

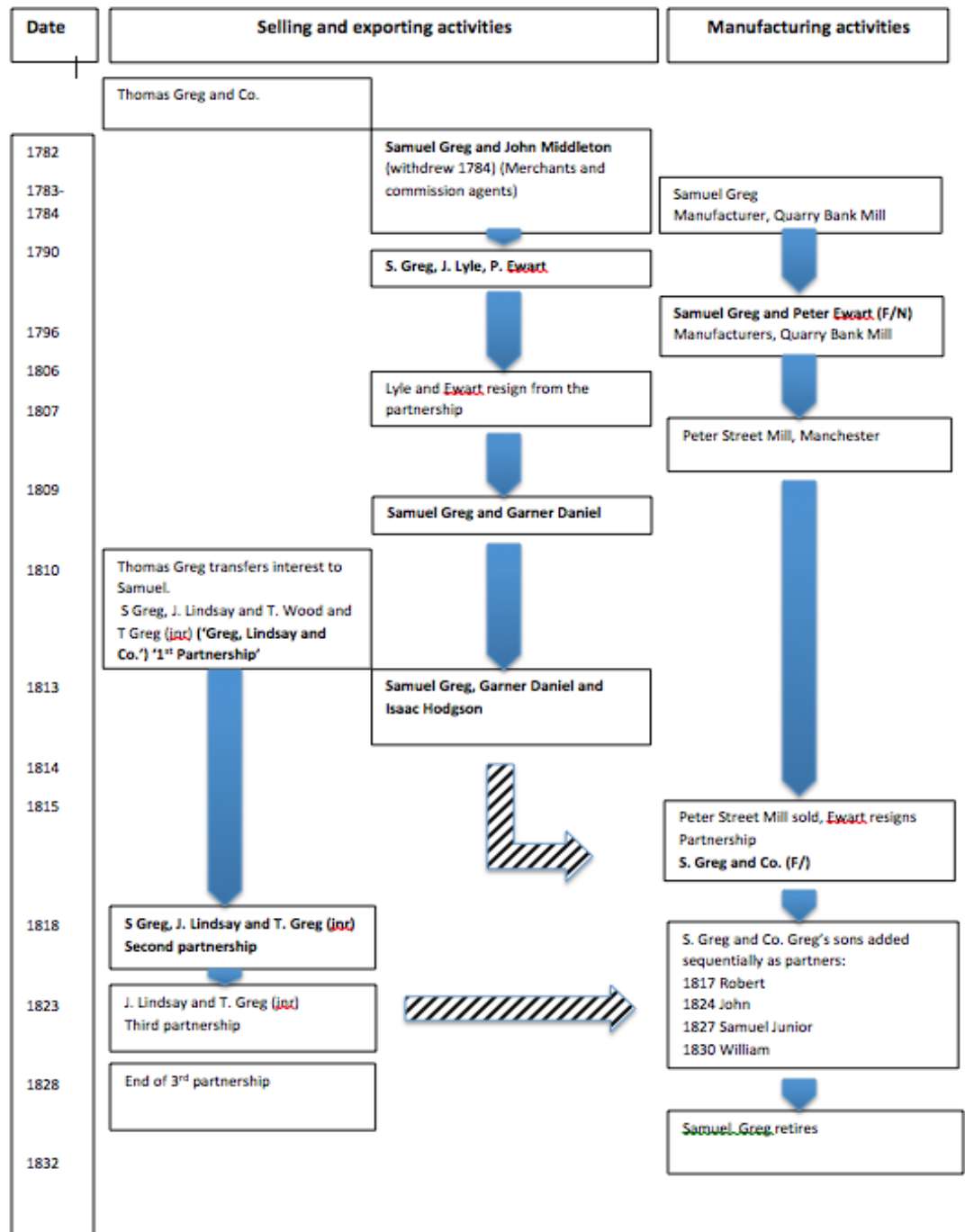
Robert Hyde, and formed a new albeit short-lived partnership with John Middleton of Tideswell.

Greg began his manufacturing activities at the same time, establishing Quarry Bank Mill in 1783 to guarantee a regular supply of yarn. Further capital was obtained through marriage when Greg's sister married Thomas Hodgson, a Liverpool merchant with spinning mills at Caton. One of these mills was subsequently acquired in 1814 in settlement of a business debt.³² In 1796 Samuel Greg joined in partnership with Peter Ewart, an engineer trained with Boulton and Watt. The Greg and Ewart partnership established a second spinning mill at Peter Street, Manchester in 1807, equipped with mule spindles. Greg and Ewart in turn formed a partnership with James Lyle handling exports to the American market. The partnership was exposed to bad debts and Lyle and Ewart left the partnership after 1806. Greg formed a new partnership, this time aimed at continental cloth markets, in 1809 with Garner Daniel and his wife's nephew, Isaac Hodgson.³³

³² Rose, *Gregs of Quarry Bank* p.17.

³³ Janes, *From smuggling to cotton kings*, pp.27, 53.

Figure 1: Samuel Greg Partnerships, 1783-1832



Notes: Bold text indicates new business involving Samuel Greg. Solid arrows indicate partnership activities involving Samuel Greg. Shaded arrows indicate Greg's resignations from partnerships and refocus on manufacturing.

Sources: MCL C5/1/2-4; Rose, *Greys of Quarry Bank*, Chapters 2 and 7; *Janes, From Smuggling*, Ch.7.

In 1811, Thomas Greg retired and passed his share of the partnership to Samuel with the new partnership taking the name Greg, Lindsay and Co.³⁴ Greg was the senior partner, entitled to one-third of the whole profit, with James Lindsay, Thomas Wood and Thomas Greg each entitled to one third of the remainder.³⁵ This partnership lasted until 1818 following Wood's retirement. The new 'second' partnership lasted until 1823 when Samuel withdrew, giving way to a third partnership of Thomas Greg and James Lindsay that was finally dissolved in 1828.³⁶ These developments reflected Samuel's increasing concentration on manufacturing after 1815. In that year the partnership with Ewart was terminated and Ewart took Peter Street mill into a new partnership with McConnel Kennedy. In 1817 he acquired Caton Mill in settlement of a debt from Isaac Hodgson.³⁷ The main partnership of Samuel Greg and Co. was now centred on Quarry Bank as part of a network of mills devolved to the management of Greg's sons on admission to the partnership. Robert joined in 1817, John in 1824 and Samuel Jnr in 1827 and William in 1830.³⁸ By the time of Samuel's retirement in 1832, as figure 1 illustrates, there had been no fewer than 12 documented new businesses or partnerships.³⁹ The Quarry Bank mill business alone went through 7 changes: S. Greg/Middleton (1783-

³⁴ Janes, *From Smuggling to Cotton Kings*. MCL Partnership Book, C5/1/2/4: Referred to as the 'first partnership', 1810-1818.

³⁵ MCL Partnership Book, C5/1/2/4. Account of First Partnership.

³⁶ MCL Partnership Book, C5/1/2/4. Accounts of Second and Third Partnerships.

³⁷ Janes, *From Smuggling to Cotton Kings*, chapter 7.

³⁸ Rose, *Gregs of Quarry Bank*, p.49.

³⁹ The total excludes other short-lived partnerships formed for specific investment opportunities, for example Greg's speculative land purchase in partnership with William Hibbert in the early 1800s (Janes, *From Smuggling to Cotton Kings*, p.30).

1784); S. Greg (1784-1796); S. Greg and Peter Ewart (1796-1815); S. Greg (1815-1817); Greg and RH Greg (1817-1824); Greg, RH and J Greg (1824-1827); S. Greg, RH, J, and S. Greg (1827-1830); Greg, RH, J, S. Greg and W. Greg (1830-1832).

Frequent changes in partnership explain accounting practice. Archival evidence suggests the Greg accounts displayed considerable sophistication and indeed meticulous attention to the division of gain between partners. Double entry bookkeeping, rather than managerial accounting, was detailed and sufficient for this purpose. Indeed, the partnership accounts reveal a complex web of transactions and wealth transfers from one part of the business to another.⁴⁰ The main purpose of the bookkeeping was to account for Samuel Greg's accumulations of wealth. This is shown in the statements of assets and liabilities and a ledger showing the partnership balance sheets and Samuel Greg's account with the stock of the various partnerships.⁴¹ Greg's sources of income from all sources are shown, with entries for rent, interest and profits, offset with amounts invested directly from his own account, including the cost of new machinery.

In the accounts of individual partnerships, the gain or loss was computed as the change in wealth arising from differences in asset valuations typically conducted at six monthly intervals. Such methods were used for the Greg and Ewart partnership and the gain or loss divided according the terms of the partnership agreement. A further account was maintained in Samuel Greg's books showing his account with the stock of the Greg and Ewart partnership, recording interest added to capital and disbursements in arriving at the balance carried forward for the

⁴⁰ MCL, Partnership accounts, C.5.1.2-4.

⁴¹ MCL, Assets and liabilities, C5/1/1.

purpose of comparison with subsequent period valuations.⁴²

An important feature of the Greg and Ewart partnership accounts was the absence of any accounting for the factory, machinery or other fixed capital. The asset valuations consisted only of inventories, book debts and creditors and sundry items.⁴³ Because Samuel Greg charged rent and interest on the fixed capital it can only be concluded that these assets were treated as his private estate and not assigned to the partnership. For example the machinery account for 1815 shows 4412 spindles valued at £22,000 for which an annual rent of £1100 was charged.⁴⁴

Such methods of accounting seem to confirm Pollard's critique of financial accounting, for example non-recognition of depreciation, and the treatment of interest on owners' investment as a cost,⁴⁵ all of which made profit calculations difficult. However, the style of accounting suggests the Greg family were concerned more with the value and distributed ownership of their business assets than the measurement of profit. Indeed, biennial valuations for the purposes of profit computation obviated the requirement for charging depreciation. Had such charges been made, they would have been relatively small before 1817, since fixed capital only represented a small proportion of total capital.⁴⁶ For example depreciation charged at 10% would have been the equivalent of the annual rental, had the 4412

⁴² MCL, Partnership accounts, F/N, C.5.1.2.2.

⁴³ MCL, Partnership accounts, F/N, C.5.1.2.2.

⁴⁴ MCL, Partnership accounts: New machinery, C.5.1.2.3.

⁴⁵ Pollard, *Genesis of management*, p.233.

⁴⁶ When considered in conjunction with Greg's other interests at this date, including the Greg Lindsay partnership and his partnership with Garner Daniel, fixed capital represented an even smaller proportion of total invested wealth.

spindles referred to above been transferred to the partnership.⁴⁷ By March 1823 the number of spindles accounted for in the new machinery account increased to 9600, valued at £38,400 giving rise to a rental charge of £2016. According to the partnership accounts total assets were £69,012 in 1815 and £54,034 by 1823.⁴⁸ Off balance sheet fixed capital then represented an initially small but constantly increasing proportion of the capital employed.

In the period 1817-1821, a new mill with associated watercourses was constructed at Styal. These investments were recorded as assets in the six monthly partnership accounts, and, once made, their value was increased by a 5% interest charge. On completion of the mill, these balances were removed entirely from the partnership accounts. The effect was that at each six monthly valuation during construction the capital invested in the business increased and each partner (at this time Samuel Greg and RH Greg) received a corresponding credit according to the profit sharing agreement. On completion, Samuel Greg's capital account was reduced by the book value of the buildings and machinery, and from then on he began to charge rent to the partnership according to these values.⁴⁹

These accounts achieved their objectives of recording the changing values of capital invested in the business and assisting the appropriation and accumulation of capital by Samuel Greg. They also gave Robert Hyde Greg and the other managing partners, the means of understanding their costs of production. From around 1822

⁴⁷ Rent was charged at 10% on machinery. The 4412 spindles were valued at £11,000 in 1815. MCL, Assets and liabilities, C5/1/1.

⁴⁸ MCL, Partnership accounts, F/N, C.5.1.2.2.

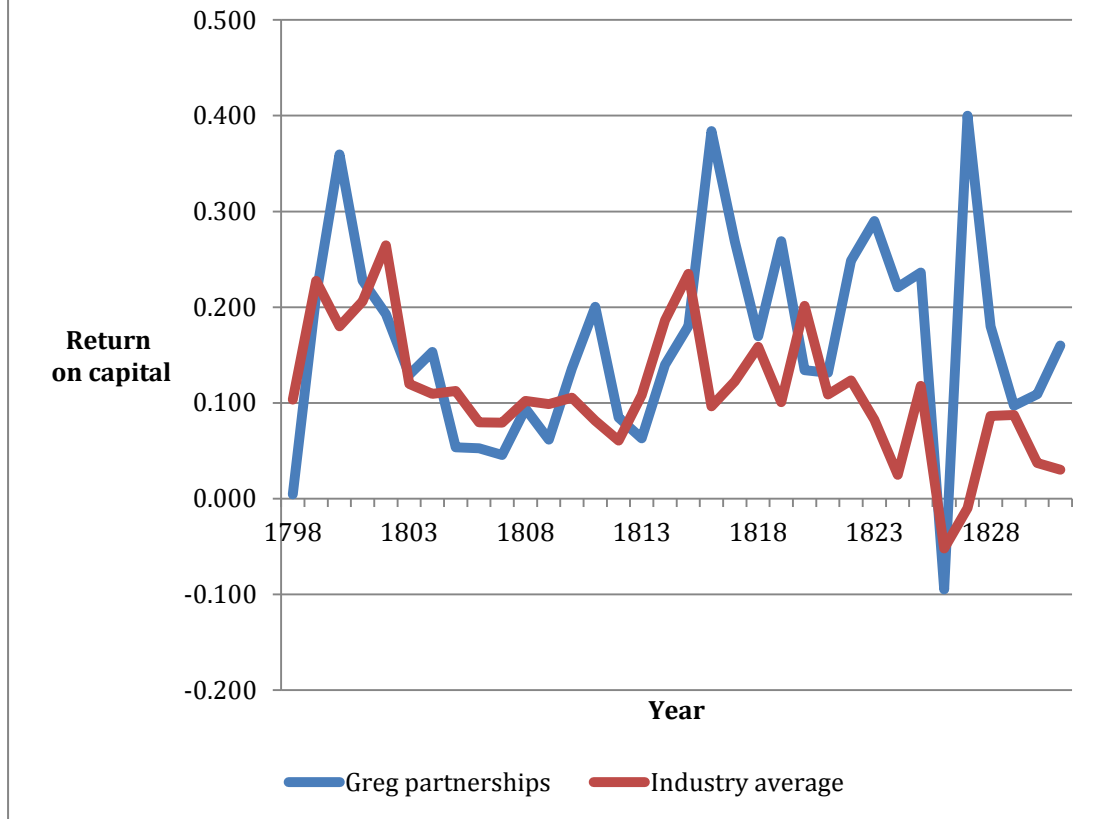
⁴⁹ MCL, Partnership book, C5/1/2/4, 1817-1822 and in particular S. Greg's account with F/ stock, 1821.

the ledgers begin to show the sales value of output and cost per pound of yarn according to the main cost categories.⁵⁰

The absence of depreciation in the accounts is perhaps unsurprising. As figure 1 shows, partnerships were regularly dissolved and reformed, so the use of annual valuations of business assets would have allowed periodic monitoring of wealth, together with its redistribution and re-division following partnership dissolution and reformation. Perhaps for this reason, mill and machinery assets were accounted for separately in the personal accounts of Samuel Greg. The main advantage of this practice from an accounting point of view was that fixed assets did not need to be included in the six monthly valuation exercise and the gain could be computed simply by valuing stocks, net book debts and cash balances. From Samuel Greg's point of view it allowed him to charge rent and interest for the premises and machinery, which he set at high levels, thereby limiting the free cash flow accessible to his sons within the partnership structure.

⁵⁰ MCL, Partnership book, C5/1/2/4. There is no evidence of cost accounting data being used before this date.

Figure 2: Greg partnerships, relative profitability, 1798-1831



Sources: Calculated from GB127.C5/1/2/2-4 'F' Partnership Books, 1796-1831; Industry average calculated from the following: Cardwell, Birley and Hornby, (English Manuscripts, Wadsworth Papers [WP], Stock books and ledgers 1199/1-6, including Armitage Papers [hereafter AP] 1208, John Rylands Library [JRL]); Nathaniel Dugdale (ibid, and WP 1200); McConnel Kennedy (GB133 MCK, JRL, Lee, *A Cotton Enterprise*, appendix, Richardson, Richardson, *The structure of capital during the industrial revolution revisited*, Table 1); Cowpe, Oldknow and Siddon [Pleasley Mill] (Pigot, Hollins, pp.37-38, Chapman, *Early Factory Masters*, table 5, p.126; Richardson, *The structure of capital during the industrial revolution revisited* table 2); New Eagley, Boyson, *The Ashworth Cotton Enterprise*, table 3, p.18.

The effect of these policies was to overstate the value of the assets. Because the assets were part of his personal estate, by ignoring depreciation, Greg was able to charge higher rents based on the assets' carrying values. Because he charged his sons rent according to the annual value of the capital, including new machinery, he had no incentive to use depreciation accounting, whereas in contrast Robert Hyde Greg would have preferred as much depreciation as possible, as this would reduce the rental value of the assets. In the event, no depreciation was charged in the partnership books before 1831.⁵¹ As a consequence, complaints by RH Greg resulted a valuation exercise conducted in 1831 by Ewart and John Kennedy, which concluded that Quarry Bank's fixed capital had been overvalued by 52%.⁵²

A further effect of high rent and interest charges was to apparently reduce the accounting profit of the business. However, because rent and interest were effectively wealth appropriations within the partnership, it is appropriate to consider the profits of the business before these charges were deducted. On this basis, figure 2 compares the return on capital for the Quarry Bank mill portion of the Greg partnerships.⁵³ The exclusion of fixed capital from the accounts possibly explains the apparent tendency to out-perform the rest of the industry, insofar as the denominator in the ratio is made smaller by its exclusion. It may also explain the apparent volatility of the ratio. Even so, apart from the effects of the 1825 banking crisis, which were felt strongly by all firms in the industry, Quarry Bank appears to

⁵¹ MCL, Partnership books, C5/1/2-4. New machinery account, Partnership book, C5/1/2/3.

⁵² Rose, *Gregs of Quarry Bank*, p.52.

⁵³ Return on capital is defined as profit per the partnership books of account (which the partners calculated as the difference between opening and closing values of net assets), plus appropriations of capital in the form of rents and interest divided by partners' total capital.

have been a profitable concern. The situation does not change when the fixed returns of Samuel Greg from rents and interest on fixed capital are factored.⁵⁴ Because these charges were transferred to Samuel, the apparent net profit of the business was much lower in the accounts and as portrayed in figure 2. Robert Hyde Greg's complaints were therefore based on his small share of the profit, not the actual profitability of Quarry Bank. It also provided the basis for a possible alternative story for the Factories Enquiry Commission.

Greg's evidence to the Factories Enquiry Commission

Greg's perspective on factory reform

Greg gave evidence to the Commission for Edward Carleton Tufnell's (D2) report, which covered Lancashire but which did not appear until 1834, seven months after the bill had passed.⁵⁵ Evidence from Lancashire was also collected by a Committee chaired by John Welsford Cowell (D1), who was strongly critical of the evidence presented by manufacturing interests represented by 'Messrs Pooley, Birley, H. Hoole, Ashworth and Greg', and particularly '...the statistical documents furnished by the latter gentleman'.⁵⁶ Greg, along with the Ashworth brothers,⁵⁷ was

⁵⁴ See below, figure 4.

⁵⁵ Greg, *The factory question*, p.8; BPP, Factories Inquiry Commission (450) D2, (Factories Inquiry Commission) 1833, ev Greg, pp.780-794.

⁵⁶ BPP, 1834 (167) Factories Inquiry Commission, Supplementary report, Cowell's preface, p.136, cited in Greg, *The factory question*, p.100.

⁵⁷ Henry Ashworth (1794-1880) and Edmund Ashworth; Boyson, *Ashworth Cotton Enterprise*, pp.158-159. Edmund Ashworth (1800-1881), along with John Pooley was deputed by the Master Spinners, to give evidence to Cowell's committee; pp.678-683.

‘(f)oremost in this movement of importing children from the agricultural districts’ and opposing ten hours bill.⁵⁸ Indeed, Greg, had the ‘last and longest word in this group... supported by elaborate calculations about costs and returns on investments’.⁵⁹ Because Quarry Bank was a remote location and water powered, the mill was more dependent on child labour than steam powered mills in metropolitan locations, and so Greg was one of the last employers to use the factory apprentice system.⁶⁰ He also had further specific reasons for objection. These included exemptions to work for extra time lost to interruptions caused by drought and that because wages in remote locations were already low, further reductions would lead to migration into the towns. High rents for leasehold access to watercourses were also cited as giving rise to higher costs.⁶¹

If Greg opposed the principle of regulation on economic grounds, from a practical point of view, he favoured measures that equalised the working day for adults and children at twelve hours, opposing night work, favouring increasing the age of admission and the provision of universal education. For Greg the inequality between regulated working days for different age groups working in the same teams was inefficient, although he later recognised that this was preferable to lower hours for all groups, as agitated for by the 10 hours movement.⁶²

⁵⁸ Grant, *The Ten Hours Bill*, p.57.

⁵⁹ Gray, *The factory question* p.71.

⁶⁰ Gray, *The factory question* p.9. Greg was foremost amongst employers seeking to recruit new apprentices following the Poor Law Amendment Act of 1834 (Grant, *The Ten Hours Bill*, p.54) and apprentices were used at Styal until 1847 (Rose, *The Gregs*, p.78).

⁶¹ BPP, *Factories Inquiry Commission*, 1833, ev Greg, p.784.

⁶² Greg *The factory question*, p.20.

Greg and other objectors to the 10 hours bill also argued that Britain's advantage over continental competitors arose from the possession of better machinery so that more work was done in the same time with the same plant.⁶³ Restricting the hours of labour would therefore limit the advantage arising from more efficient technology. Specifically they argued that time for stopping and starting the mill would increase the proportion of unproductive to productive labour time and that restrictions on the time an individual was allowed to operate his machinery was an infringement of liberty.⁶⁴

To add weight to these arguments, the campaign had the backing of Senior and his notion of the 'last hour'. Although the argument itself was incorrect, since reducing the working day would also eliminate cost in some proportion, the implied relationship was partially true insofar as some of the costs were fixed. Opponents of the bill therefore argued that reducing the working day would increase the burden of fixed charges.⁶⁵ Coupled with these arguments, objectors also believed that operatives' support for the measure was predicated on a belief that the same wages would be paid for shorter working time, and feared that these aspirations might be realised in part or in full. Further, they felt that restricting hours worked by children

⁶³ BPP, Factories Inquiry Commission, 1833, p.42, referring to the evidence of William Rathbone Greg. C.f. Clark, 'Why isn't the whole world developed', who shows that labour efficiency higher in UK than eg Switzerland therefore compensating for apparently lower wages.

⁶⁴ BPP, Factories Inquiry Commission, 1833, ev Greg, pp.784&786, Appendix B.

⁶⁵ BPP, Factories Inquiry Commission, 1833, ev Henry Ashworth, p.1106. Increase in costs from capital and standing charges would be 5 to 7%, supposing the working day was reduced from 12 to 10 hours. Similarly, Hoole's analysis showed the effect of a reduction in working time on cost per lb by virtue of fixed expenses being absorbed over less output (BPP, Factories Inquiry Commission, 1833, ev Birley and Hoole, p.730).

was merely a pretext for legislation limiting the working hours of all operatives.⁶⁶

For all these reasons, accounting evidence was crucial. Objectors, including Greg, had incentives to inflate the importance of wages as an expense and, by showing wages and other costs to be fixed,⁶⁷ demonstrate the disproportionate effects of restrictions of hours on costs and their ability to compete with unregulated foreign producers. Tufnell's report included evidence from a number of manufacturers, but although Greg used similar arguments to other witnesses, he uniquely made extensive use of accounting evidence to support his arguments.⁶⁸ These included cost breakdowns for four mills in the Greg partnership, including Quarry Bank.⁶⁹ The evidence used was particularly important because although representing only 1% of the industry, Greg's figures were used to extrapolate corresponding figures for the whole industry.⁷⁰ Greg also presented comparatives to show the comparative costs of production for foreign competitors.⁷¹

Accounting evidence

Figure 3 shows the composition of expenses at Quarry Bank Mill for the period 1827-

⁶⁶ Greg, *The factory question*, pp.17-19.

⁶⁷ Although piece rates were widely, in rural businesses such as Quarry bank wages were paid regardless of interruption to production by droughts or floods (BPP, Factories Inquiry Commission, 1833, ev Greg, p.784).

⁶⁸ Accounting evidence was also presented to Cowell's committee by Edmund Ashworth, John Pooley, Hugh Birley and Holland Hoole. Cowell was wholly unconvinced by this evidence (See Cowell's footnotes BPP, Factories Inquiry Commission, 1833 (450, D1), ev. Ashworth and Pooley, pp.682, Birley and Hoole, p. 727, and Q1, p.726).

⁶⁹ BPP, Factories Inquiry Commission, 1833, ev Greg, p.786, Appendix A. No.1, p.787.

⁷⁰ BPP, Factories Inquiry Commission, 1833, ev Greg, p.786, Appendix A. No.2, p.787.

⁷¹ BPP, Factories Inquiry Commission, 1833, ev Greg, Appendices D1-7. No.2, pp.789-794.

1833. The expenses are analysed under four headings, interest and rent, depreciation, sundry expenses and wages to correspond to the evidence used in the Commission hearings. Using data from the partnership books of account for the years 1827-1831, the expense categories are shown as percentages of the total for each year, then the average of the five years, and are calculated.⁷² The final column corresponds to the figures given in evidence by Robert Hyde Greg when called as a witness to the Factories Inquiry Commission in 1833.⁷³

As figure 3 shows, the accounting evidence presented by Greg to the Factories Inquiry Commission varied considerably from the average costs observed from the accounts of Quarry Bank Mill in the preceding five years 1827-1831. In Greg's working notes he reached the conclusion that wages constituted half of total expenses, a point he reiterated to the Commissioners.⁷⁴ In this respect his evidence was closely aligned with Hoole, whose figures showed wages to be 54.5% of total expenses.⁷⁵ In practice wages were less, representing an average of 43%, with only small deviations of 1 or 2 per cent.⁷⁶

⁷² MCL, Partnership book, C5/1/2/4.

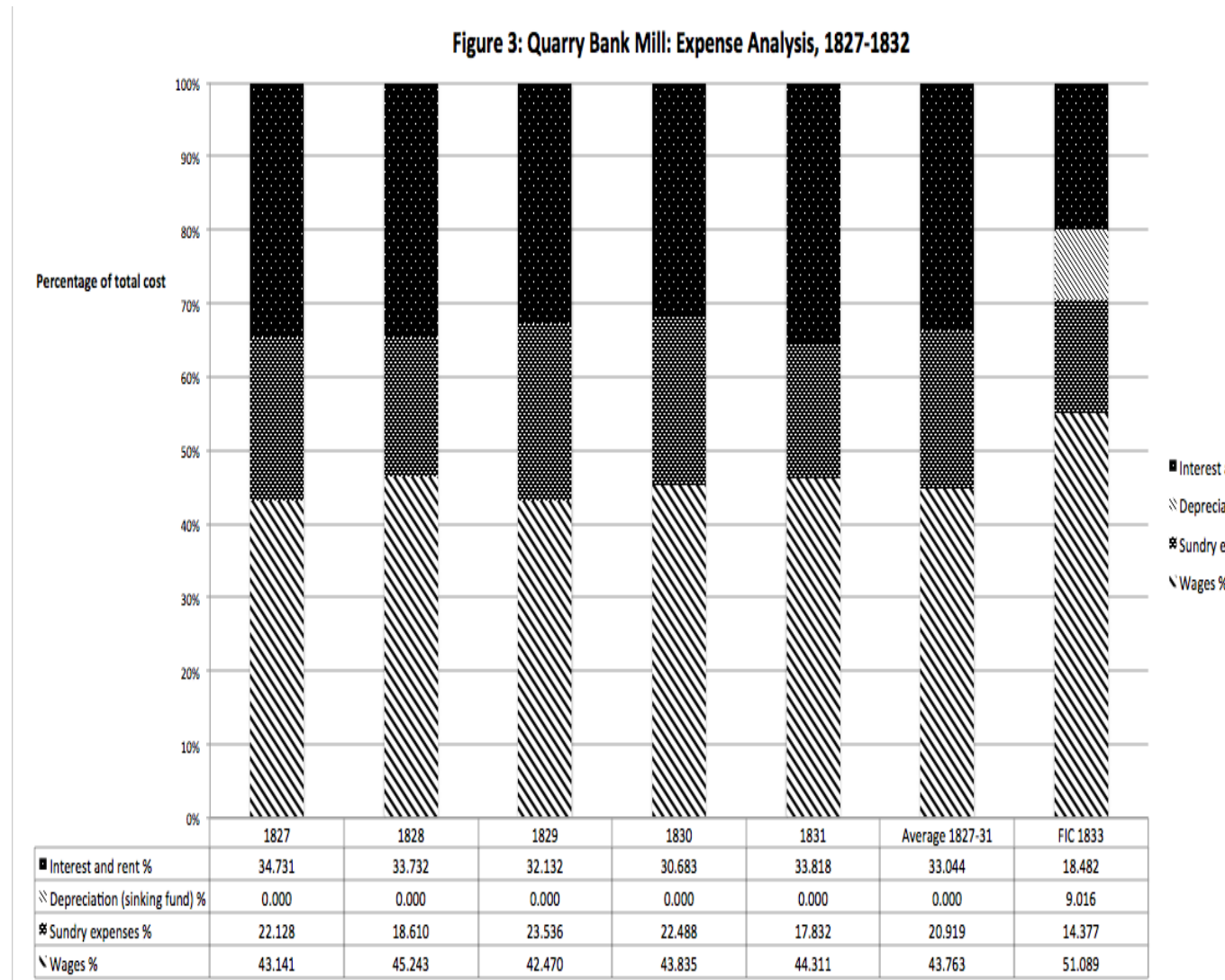
⁷³ BPP, Factories Inquiry Commission 1833, ev Greg, p.784, Appendix A., No.1, Second Mill. The figures contained in this table also correspond to a handwritten Statement of Sunk and Floating Capital, MCL, C5/8/32.

⁷⁴ Statement of Sunk and Floating Capital, MCL, C5/8/32.

⁷⁵ BPP, Factories Inquiry Commission, 1833, D1, ev. Hoole, p.729. Hoole's evidence showed wages to be 3d per lb out of total expenses of 5.5d per lb.

⁷⁶ Calculated from MCL, Partnership book, C5/1/2/4. BPP, Factories Inquiry Commission, 1833, ev Greg, p.784.

Figure 3: Quarry Bank Mill: Expense Analysis, 1827-1832



Sources: 1827-1831 summarised from MCL Partnership book, C5/1/2/4; 1833 BPP, Factories Inquiry commission, ev Greg, p.784.

Notes: For 1827-1831, accounts are you wise from underlying six monthly balances using 31 March year-end. 1832 Data refers to the year ended 30th of September 1832. In 1827 and 1828 wages were not disclosed separately and including contingency expenses. For these years wages were estimated using the proportion of wages to contingent expenses in the years 1829 to 1831.

A consistent argument made by the cotton factory masters in their evidence to the commission was that wages in their mills were higher than those paid by foreign competitors. Greg furnished additional evidence showing labour costs for mills in France, Switzerland, Prussia, Baden, Naples, and America, and Ashworth and Pooley, and Birley and Hoole used comparative figures from Ghent. According to their evidence wages were between 30-50% lower in the continental factories. On this basis they were able to argue that if a ten-hour bill were introduced, the lost production would all be captured by overseas competition. The unanimity of the masters on these points⁷⁷ is suggestive of collusion.

A point made repeatedly by opponents of restrictions on working time was that present profit levels meant that the implied increased unit labour costs could not be sustained. Assuming constant prices, Greg argued, if profits were also to be maintained, wages would require reducing by twenty to twenty five per cent.⁷⁸ It should be noted that the effect of presenting the figures in the final column of figure 3 instead of the 1831 figures per the accounts was to exaggerate the scale of this apparent wage cut. By presenting wages as a higher proportion of total cost, with other costs and profits held constant, the relative reduction in wages would be required to be larger.

⁷⁷ BPP, Factories Inquiry Commission, 1833, comparative data: ev Ashworth and Pooley, pp.679-680, ev Greg, 789-794 ev Birley and Hoole, p.726; 30-50% claim, ev Ashworth, p.678, ev Pooley, p.679, ev Greg, 783, ev. Birley and Hoole, p.726; consequences for foreign competition, ev Ashworth and Pooley, p.678. ev. Greg, pp.782-783, ev. Birley and Hoole, p.730.

⁷⁸ BPP, Factories Inquiry Commission, 1833, ev Greg, p.785.

Another important discrepancy arises when Greg's evidence on fixed charges is considered. He stated to the Commission that 'In coarse spinning the fixed charges and contingencies amount to as much as the wages; and if the former remained the same and price stationary, the reduction on the latter must be double.'⁷⁹ As can be seen from figure 3, if sundry expenses, depreciation, rent and interest, are all considered as fixed charges, then this claim appears true. To show the effect of high fixed charges, Greg used the following illustration: 'Supposing Lord Ashley's bill had been in operation the last year, we should have produced only 727,000 lbs at the expense of £12,730. We actually did produce £880,000 at an expense of £13,401 being a difference of 0.55d per lb, which is equal to a good profit.'⁸⁰ These figures imply the fraction of fixed to total expenses to equal c.71%,⁸¹ and that a substantial proportion of wages were also fixed. They can also be contrasted with similar evidence given by Holland Hoole in Cowell's report. Hoole's figures showed that ...the charge for rent, poor's (sic) rates and fixed salaries' accounted for 1.25d out of a total expenses of 5.5d, implying fixed costs to be 22.7% of total expenses.⁸² Hoole's figures differ in part because they were based on a Manchester steam powered mill, which incurred variable expenses, such as coal costs. Even using these relatively conservative assumptions, Hoole was able to demonstrate that the loss in wages across the whole industry would be 'at least £1,000,000 per annum' on a loss of

⁷⁹ BPP, Factories Inquiry Commission, 1833, ev Greg, p.782.

⁸⁰ BPP, Factories Inquiry Commission, 1833, ev Greg, p.782.

⁸¹ Calculated using the implied leveraging effects of changes in cost relative to changes in output assuming constant margins. Greg's numbers suggest a 2.75% reduction in profit for a 1.00% reduction in output.

⁸² BPP, Factories Inquiry Commission, 1833, D1, ev. Hoole, pp.729-730.

output 'at the disposal of our foreign competitors' of 40,000,000lbs.⁸³ In contrast, Greg suggestion that fixed charges were substantially higher seems implausible. Charges for rent and interest were set by the partnership, and although the lower relative proportion to the accounts (figure 3) to some extent reflected the revaluation of assets in 1832, these were essentially appropriations of profit and can be discounted. Sundry expenses necessarily include some categories of variable cost, for example selling and distribution costs.⁸⁴

A further important discrepancy between the two sets of data in figure 3 was the sudden appearance of depreciation. A possible reason for this was the 1831 dispute in the family referred to above concerning the value of the factory and machinery. A further possibility therefore is that the adoption of depreciation related to lobbying on 10 hours bill. The figures used by Greg stated that depreciation was £1,200 on a total capital sum of £26,000.⁸⁵ However, the figures are apparently inconsistent with the depreciation rates specified by Greg in the same minutes of evidence. He described the depreciation policy as 'five per cent annually on our buildings, water-wheel and engine and ten per cent annually on our smaller machinery', which covered 'not only wear and tear but also... deterioration arising out of new inventions.'⁸⁶ However, the actual depreciation charged was less than 5% of the asset value and therefore could not be the result of applying 5 and 10 per cent

⁸³ BPP, *Factories Inquiry Commission*, 1833, D1, ev. Hoole, p.730.

⁸⁴ A point acknowledged by Greg when referred to higher costs faced by firms more distant from the main markets, BPP, *Factories Inquiry Commission*, 1833, ev Greg, p.785.

⁸⁵ BPP, *Factories Inquiry Commission* (1833) ev Greg, D2, pp.784-785.

⁸⁶ BPP, *Factories Inquiry Commission* (1833) ev Greg, D2, p.780. For Pollard, this demonstrated relative sophistication Pollard, *Genesis of management*, p.243.

respectively to buildings and machinery.⁸⁷ Greg also refers to the use of a sinking fund, implying that depreciation was accumulated in a separate reserve rather than applied to reduce the balance sheet carrying value of the assets. Even so, when referring to the third mill (Lancaster) Greg's wording implied that he was using original cost minus the sinking fund.⁸⁸

To examine the reasons for this apparent discrepancy, possible alternative valuations are shown in table 1. In addition to the value cited by Greg, the first alternative is based on a reconstruction of the value of the sinking fund, the original cost of the assets and the annual depreciation charge. The partnership accounts show the carrying value of assets associated with the construction of the new mill, waterwheel and additions to machinery up to 1821 when they were transferred to the ownership of Samuel Greg. As the construction progressed between 1817 and 1821, these values were incremented by additional expenditure for that period.⁸⁹ From these figures it can be ascertained that machinery was first deployed in the six months to September 1819 and increased thereafter until the mill itself was substantially completed in March 1821. Assuming a commencement date of March 1819, the value of the sinking fund, or accumulated depreciation D at time t can be computed as follows:

$$D_t = (A - S) \times (1 + j)^{(t-1)} / \{[(1 + j)^n - 1]/j\} \quad (1)$$

⁸⁷ £1,200/£26,000 = 4.6%. Depending on the split between buildings and machinery the fraction by definition must fall between 5 and 10%, since under the reducing sum method the rate is applied to the book value of the assets.

⁸⁸ BPP, *Factories Inquiry Commission* (1833) ev Greg, D2, p.785.

⁸⁹ MCL, Partnership book, C5/1/2/4.

Where:

A = asset value,

S = salvage value,

n = useful life,

j = sinking fund rate

The calculations show that, by March 1831, the annual depreciation charge was £1,122.⁹⁰ The figure corresponds closely to the figure of £1,200 given by Greg two years later at the Factories Inquiry Commission. However, the same calculations produce an accumulated sinking fund [D_t in (1)] of £17,900 against assets with an un-depreciated original cost of £32,200. The depreciated book value of these assets is £14,300. It is this value, assuming the sinking fund policy had been correctly and consistently applied since the construction of the mill, that would have been suitable for Greg to use in his evidence to the Commission.

Other possible sources for Greg's estimation of the sunk capital might have included the valuation used by his father to settle the amount of rent. According to the partnership accounts, in March 1831, this value was £37,185, which based on 10% per annum led to an appropriation of rent of £1,859 to the credit of Samuel Greg for the six months accounting period. Elsewhere in the partnership books is a record of the per spindle valuation of capital for the purposes of arriving at the rental charge.⁹¹ The rent charges were based on the original cost, rather than the

⁹⁰ Reducing sum, or reducing balance depreciation results in higher charges in earlier years. Depreciation therefore peaks at £1,892 in the year to March 1825, following a further extension to the mill and installation of additional of machinery.

⁹¹ New machinery, Partnership Accounts C5/1/2/3.

current value and indicate per spindle capitalization of 4508 spindles at 4.88 per spindle for 1815 rising to 9600 spindles at £4.00 per spindle in 1823. The equivalent capital values were £22,000 and £38,400.⁹² When Quarry Bank fixed capital was revalued in 1831-32, Kennedy and Ewart found that the fixed capital used as the basis for rental charges had been overvalued by 52%. Applying this figure to the value in the 1831 accounts suggests a valuation of £19,240.

Table 1: Alternative valuations of sunk capital, Quarry Bank, 1831-1833

Valuation	Date	£
Factory Inquiries Commission	1833	26,000
Estimated depreciated value	1831	14,300*
Kennedy and Ewart	1832**	19,200*

Notes:

Calculated or rounded to nearest £100. Robert Hyde Greg uses similar rounding in his evidence to the Factories Inquiry Commission.

* Excludes new cottages, which although charged to the partnership are assumed not to be part of the productive capital. Also excludes pre 1815 assets, which by 1831 would have trivial book values.

** Date the valuation was completed.

Sources:

BPP, Factories Inquiry Commission, 450, D2, p.784 and Partnership Accounts, C5/1/2/4.

Summarising this evidence, although Greg appears to have cited an accurate depreciation charge, the value of the sunk capital appears to have been significantly understated. On the basis of the alternative valuations shown in table 1, Greg's

⁹² There were further minor purchases of machinery after 1823 not included in the capitalizations suggesting they were perhaps replacements for spindles scrapped. New machinery, Partnership Accounts C5/1/2/3.

lament before the Factories Inquiry Commission, that capital barely turned over once a year,⁹³ would appear to reflect the picture he would have preferred the commissioners to see, rather than the precise position. Taking the higher of the two alternative values in table 2, as £19,000 and adding floating capital of £18,000, and the value of output as £38,000, as cited in Greg's Factories Inquiry Commission calculations,⁹⁴ suggests that the total capital turnover ratio was 1.03, not 0.86 as Greg's figure implied. Even 1.03 is perhaps a low estimate as the average value of output was £39,414 for the five years to March 1831. Factoring this, and using depreciated sunk capital consistent with Greg's own assumptions, suggests the capital turnover might have been as high as 1.23 on average, and even exceeded further in some years, such as 1829, when the floating capital was as low as £8,043.⁹⁵

Even though Greg's evidence included depreciation where it had been excluded in the partnership accounts, the net effect of his presentation of cost structure was also to depress apparent profit margins. Opponents of the bill referred to 'the present low rate of profit'.⁹⁶ Although return on capital is not referred to specifically in Greg's evidence (only ratios of profit to output)⁹⁷, the committee could easily draw conclusions from his tabulated appendices. The effect of this is shown in

⁹³ BPP, Factories Inquiry Commission, 1833, ev Greg, 'only once' p.780, 'whole capital not turned over in the year', p.784.

⁹⁴ BPP, Factories Inquiry Commission, 1833, ev Greg, p.784.

⁹⁵ Sum of stock valuation plus net debts outstanding, calculated from Partnership Accounts, C5/1/2/4. Greg also suggested that 'if actively managed', floating capital might be only half the sunk capital. BPP, Factories Inquiry Commission, 1833, ev Greg, p.784.

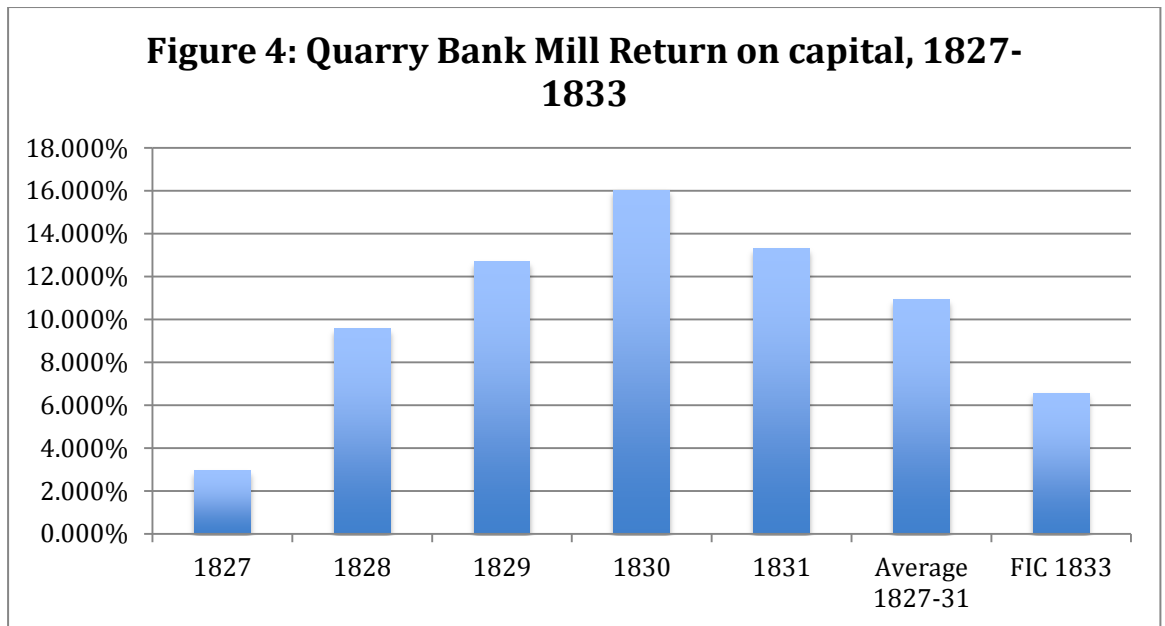
⁹⁶ BPP, Factories Inquiry Commission, 1833, ev. E. Ashworth, p.680; ev. Houldsworth, p.858.

⁹⁷ For example BPP, Factories Inquiry Commission, 1833, ev Greg, p.782.

figure 4. A consequence of underestimating yarn margins and capital turnover is that profitability would also be underestimated. Using the figures he provided, the return on capital is calculated and contrasted with the return on capital calculated from the Quarry Bank accounts. The results are illustrated in figure 4, which shows the return on capital for each year for the period 1827-1833, together with the average of the five years, calculated using the partnership books of account.⁹⁸ Figures are adjusted to include sunk capital assets and depreciation used to calculate the figures in table 1. The final column is calculated from the figures given in evidence by Greg to the Commission.⁹⁹ For the purposes of figure 4, the return on capital is defined as profit after all operating costs, including depreciation, but before rent and interest, divided by sunk capital plus floating capital. Sunk capital is the depreciated value of buildings and machinery and floating capital is stock plus net book debts. Because the sunk capital is now included in the denominator, rent is excluded in arriving at the profit used in the numerator. Interest is similarly excluded, as it represents an appropriation of profit.

⁹⁸ MCL, Partnership book, C5/1/2/4.

⁹⁹ BPP, Factories Inquiry Commission, 1833, ev Greg, p.784, Appendix A, No.1, Second Mill. The figures contained in this table also correspond to a handwritten 'Statement of Sunk and Floating Capital', MCL, C5/8/32.



As figure 4 shows, Greg’s evidence implied a rate of profit of just over 6 per cent. This was lower than all but one of the previous five years and 4% less than the five-year average. Although the rate of profit was not commented upon in the Greg’s discussions before the committee, it nonetheless forms a useful piece of historical evidence, because it effectively shows the net effect of the differences between the partnership accounts and Greg’s evidence. As the above review has suggested, the tendency throughout was to overstate costs and asset values, and the combined effects of these would be to reduce the declared rate of profit for the purposes of parliamentary scrutiny relative to the rates that were commercially achievable.

In the context of opposition to the ten hours movement, Greg had every incentive to understate the apparent rate of profit and yarn margins. Greg was also keen to discount the effects of increased efficiency from technical improvements, for example extensions to mule width, arguing that costs tend to rise in proportion.¹⁰⁰

¹⁰⁰ Greg, *The factory question*, pp.101-102. Other witnesses supported the view that newer machines would mitigate the impact of reduced hours. BPP, *Factories Inquiry Commission*, 1833, ev. Hall, Rowbotham, Gaskell, p.678.

Further, he argued that demand for cotton goods was elastic and that price rises could not therefore be passed onto consumers, suggesting that an increased price is attended by diminished consumption in a greater ratio than the rise of price.¹⁰¹ In line with the points made about the cost base, these arguments stressing the fragility of profit helped Greg underpin his case, that the ten hours bill presented a serious threat to his business.

Conclusions

The accounting evidence submitted by Greg, Ashworth, Pooley, Birley and Hoole, formed an important part of the case against the ten hours bill. When presenting their evidence they had incentives to exaggerate wages and other fixed costs and to understate apparent profitability. In Greg's case in particular, there were clear discrepancies between commercial reality and the evidence given to the commission. As the early part of the paper demonstrated, the Greg family made detailed and accurate use of accounting to appropriate profits between the various and relatively short-lived partnerships. Regular revaluation, rather than discretionary accrual was therefore the basis of accounting. The purpose of the financial evidence given to the commission was clearly different and provides an early example of accounting manipulation, or creative accounting, to achieve political objectives.

Greg's evidence, although influential was not universally accepted. Cowell was unconvinced and undertook his own analysis to show the fallacy of the arguments of the cotton masters. Puzzled by the apparent anomalies of relatively

¹⁰¹ BPP, Factories Inquiry Commission, 1833, ev Greg, p.785.

high labour cost and the rapid increase in investment in new capacity in Lancashire, he showed correctly and in detail that competitive success depended on unit labour costs, or 'payments for work done', as opposed to average money wages per employee.¹⁰² Cowell's analysis showed that although cotton entrepreneurs were skilled manipulators of accounting evidence, they were poor economists. Greg's evidence nonetheless illustrated the ability of increasingly uncompetitive water powered, apprentice dependent mill owners to exert political influence.

Even so, it was the cotton masters and not Cowell, who had the decisive influence on the final Factory Act. The final commission report referred to the financial arguments of the entrepreneurs and coupled that with limited recommendations on child labour and inspection. Lord Althorp used the Commission report as the basis of a new bill, which was carried by a large majority, to the disappointment of Ashley and his followers, who were forced to surrender the original ten hours bill.¹⁰³

Althorp would not have had the opportunity for this revision had not the masters lobbied for the commission that allowed their evidence to be heard. As the above analysis has demonstrated, accounting formed an important part of this evidence. Further research may shed light on similar practices as the regulatory framework of nineteenth century Britain evolved. The paper has shown the importance of accounting and provided an insight into how accounting was used by

¹⁰² BPP, *Factories Inquiry Commission, 1834*, Cowell's preface (pp.119-145) and footnotes in, *Factories Inquiry Commission, 1833*, ev. Ashworth and Pooley, pp.682, ev. Birley and Hoole, p. 727, and Q1, p.726.

¹⁰³ Grant, *The ten hours bill*, p.53. Viscount Althorp, John Charles Spencer, 3rd Earl Spencer (1782–1845). Lord Althorp used his position as Leader of the House to promote the new bill. Grant refers to Althorp as the Prime Minister.

entrepreneurs. In doing so, it has contributed to the debate on the effectiveness of their use of accounts, not so much as an aid to management decisions, but as a means of influencing others. In this respect, the use of accounting was opportunistic rather than sophisticated, and as a polemical tool, rather than signal to aid regulation and the rational allocation of economic resources.

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