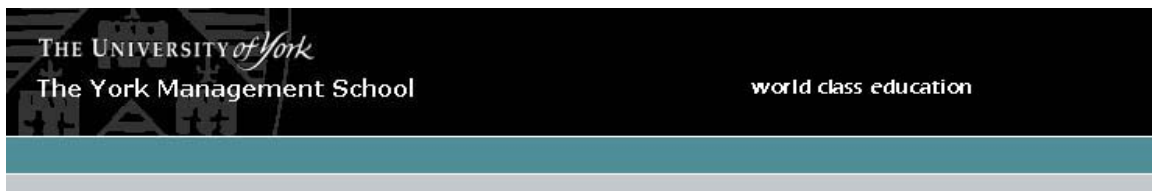


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**Calculating Profit:
A Historical Perspective on the Development of Capitalism**

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This paper is circulated for discussion purposes only and its contents should be considered preliminary.

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Calculating profit: a historical perspective on the development of capitalism

Abstract

The paper introduces the notion of different methods of calculating and analysing profitability as signatures of capitalism at different stages of development. Interactions between the development of the productive forces and the socialisation of capital ownership jointly impact on these signatures, such that profit calculations are historically contingent. These interactions take the identification of capitalism beyond simple associations with the presence or absence of double-entry bookkeeping (DEB), the capital account or return on capital calculations. Profit calculations are implicated in the process of transition from feudalism to capitalism by enabling the private enforcement of profit levels in excess of legally regulated interest rates or through fairly remunerated labour. The modern usage of ROCE is linked to the development of the productive forces and the socialisation of capital ownership.

Introduction

The ‘Sombart thesis’ that it is impossible to envisage accounting without capitalism and impossible to envisage capitalism without accounting (Sombart, 1916), has been usefully extended first by Weber and more recently by Bryer (2000a, 2000b, 2005, 2006a). Weber (1927) suggested that the specific signature of capitalism was not merely DEB, as suggested by Sombart, but the existence of the capital account which supports rational computation of income yield through modern bookkeeping. Bryer develops the point, arguing *broadly* that what is important is the capitalist mentality, evidenced by 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 still, the return on capital employed (ROCE).

It is evident however, that if ROCE is an accounting signature, there are a number of definitional permutations, for example with reference to opening closing or average values in the denominator, deduction of depreciation in the numerator, denominator, or

both, definition of items to be included in the numerator or denominator etc. Rather than attempt a definition of ROCE consistent with a specific mentality, in this paper it is argued that the method of calculation reflects the organisation of the forces of production *and* the socialisation of capital *and* the process of their interaction. The accounting signature thereby follows, and is manifested in corresponding and contingent analytical computations of profit and profitability. The Sombart-Weber thesis is extended by suggesting that the feudal superstructure, particularly the Church's antipathy to usury, imposed significant limits on the computation of profit, the method of computing the rate of return and the openness of its disclosure. ROCE itself is a product of fully developed capitalism.

To develop these propositions, the remainder of the paper is set out as follows. Section two examines the Sombart-Weber thesis and develops the notion of the private enforcement of profit levels in excess of legally regulated interest rates. Section three reviews the evidence on utilisation of return on capital calculations and similar or alternative measures since the industrial revolution. Section four summarises and draws conclusions.

II

Capitalism is defined as a system of private enforcement of profit rates in excess of amounts obtainable through legally regulated interest rates or through fairly remunerated labour. Transitional capitalism is evidenced by private enforcement of profit rates in excess of that obtainable through legally regulated interest rates or through fairly remunerated labour. Fully developed capitalism is characterised by generalised private

enforcement of profit at any rate without reference to legal interest rates or fair remuneration to labour effort.¹ Capitalism is about the private appropriation of profit, which is enforceable through contract and other institutions of law and governance. Because contracts are often incomplete, private enforceability is partial and therefore risky. The association between capitalism and excess profit also implies that there must be a measurement process, achieved by accounting techniques, such that profit can be ascertained. Under feudalism, the required institutions of law that presuppose a legal and measurable surplus did not exist. Transitional capitalism and associated accounting measurement is thereby implicitly defined by the removal of intolerance to usury which characterised feudalism.

Restrictions on usury descended from tribal custom and later ecclesiastical law, which opposed lending within the common group, and tended to permit it only when loans were made to groups outside the jurisdiction (Weber, 1927, p.267-8). Weber's argument can be extended to conceptualise the social nature of risk. In this case, an important feature of intra-group transactions was elimination of risk through its socialisation, providing a material basis for feudal opposition to usury. Specification of the social nature of risk in feudal societies is important at this stage of the argument in order to offer contrasts with subsequent alternatives.

External trading activities created exceptions to the social elimination of risk. 'Sea Loans' made between Italian merchants reflected differential levels of risk in voyages of

¹ Transitional and fully developed capitalism are specific categories for the purpose of these definitions, both of which correspond to a generic definition of capitalism, as a mode of production characterised by the private ownership of the means of production by a class to the exclusion of the majority of the population (Desai, 1991, p.71).

differing length and perceived hazard, but these and all other usurious loans were opposed by the medieval church, most vigorously by Pope Gregory IX (1224-1243). Latent conflict between the Church and mercantile classes ultimately erupted into the Protestant reformation and the progressive dismantling of restrictions on lending, in which Calvinists recognised the desirability of lending within the rich elite who carried on business using borrowed money (Weber, 1927, pp.267-71). From this recognition follows Weber's characterisation of capitalism as dependent on a calculable law and accounting's ability to determine capital's income yielding power (Weber, 1927, p.275). For Weber, this is achieved by striking the balance, a device first suggested by Simon Stevin in 1698. However this process does not explain how capitalists carried out their calculations, be it in terms of calculative mentality (Bryer, 2000a, 2005) or, as suggested here, that as capitalism develops a number of possibilities for computing income yielding power arise. These might include residual income, dividend yield, return on partner's capital, return on equity, ROCE etc. All of these methods were made difficult or impossible by restrictions on lending at interest under the usury laws.²

Restrictions on usury therefore have serious implications for the development of capitalism and accounting, and moreover, represent the social enforcement of the labour theory of value. Capitalism does not abolish the theory, but through developing its own institutions, overcomes restrictions on its practical enforcement. As noted above opposition to usury was entrenched in the settled rural communities of feudal Britain and

² In England, the outright restriction on such activities ended with the Act of 1571, which introduced a legal maximum interest rate of 10%. A subsequent Act of 1623, amended this to 5% and there were further adjustments throughout the seventeenth (Grassby, 1969) and eighteenth (Pressnell, 1960) centuries.

legislative Acts marked gradual staging posts in its protracted demise.³ So much so that even architects of the Protestant reformation such as Luther argued that merchants' profits were indeed nothing more than the fruits of their labour (Tawney, 1960, pp.35-6). Aquinas and other Catholic scholars equated merchants' money to their tools of labour so that lending to others reduced their capacity to work and therefore entitled them to compensation for enforced idleness (Noonan, 1957, p.127; Ashley, 1931, p.392). Such physiocratic sentiments became even more embedded in orthodox political economy until the mid-nineteenth century (Tawney, 1960, pp.35-6).⁴ Application of labour theory of value to merchant's profits so that they appear as wages and the general social unacceptability of excess returns, suggest that it would be extremely unlikely that businessmen would use accounts to compute the *ex post*⁵ ROCE. As England's economic base expanded from the 15th century, *lucrum cessans* became the sine qua non of partnership accounting, so that as Ashley explains (1931, pp.399-401, 404, 412-416), the 'sleeping partner' Italian commenda system was supplanted, and partners only shared profits if they shared the risk.

³ The 1571 Act explicitly allowed interest to be charged (at a maximum rate of 10%), and subsequent Acts for example in 1624 and 1651 modified the rate downwards. The 1571 Act remained in force until 1854 (Kerridge, 2002, p.74).

⁴ Tawney (1960, p.36) notes the first of these schoolmen was Thomas Aquinas and the last was Karl Marx.

⁵ Equalisation of risk through the Sea Loans system, associated development of insurance contracts, and the doctrine of *lucrum cessans* (loss of profit through merchants' labour), led to the revision of scholastic doctrine by Cardinal Cajetan in the early sixteenth century, such that differences in expected risk justified *ex ante* lending decisions at differential interest rates (Noonan, 1957, pp.252-255). The parallel doctrine of *turpe lucrum*, or ill-gotten gains, which specified the remedy for monopoly profit at the expense of unknown persons, as the requirement to give alms to the poor [as opposed to restitution under usury] (De Roover, 1951, p.498) would have reinforced this attitude.

In accounting terms, the socialisation of capital⁶ as it progresses implies new rules about circulation and distribution of profit and processes of accountability through the development of DEB as ownership is widened and credit relations multiply. Socialisation also implies profit sharing within legally established rules and social norms which changed as a function of the latent conflict between medieval laws on usury, discussed above, and the steady accumulation of mercantile profit. In the 1570s there is no evidence that woollen merchant John Isham calculated return on capital or that this could have been done accurately (Ramsay, 1962, p.lxxxiii). Throughout the period 1494-1840, balances were struck irregularly and the capital account provided no basis for rational calculation (Pollard, 1963, p.78). Merchants' ledgers of the seventeenth century did not give them the means to compute the return on capital, but their accounts did record transactions (Grassby, 1969), giving them the financial control and accountability they needed. Indeed capital socialisation provides a convincing explanation of the adoption of DEB in the sixteenth and seventeenth centuries and risk related profit sharing schemes (Bryer, 2000b, pp. 336-7).

However, capital socialisation gives only a partial explanation of accounting for profit. If the analysis of the forces of production is added, a framework to explain the variety and transition of rate of return calculations can be developed as a dialectic of the centralisation of the forces of production and the socialisation of the ownership of

⁶ Socialisation refers to the pooling of money reserves, whether through banks or capital markets (Campbell, 1998, p.134), which as a process applied to ownership begins with partnerships, extends through capital markets to promote the mobility of capital (Marx, 1984, p.196, Bryer, 2005, p.29), to its fullest expression as pooled capital on a globalised basis (Henwood, 1998, p.241, Desai, 2002, Toms, 2005), as restrictions on the transfer of capital are broken down. In similar and parallel fashion, capitalist property relations emerge and develop from the internal contradictions of existing property relations (Dobb, 1946).

production (Toms, 2005). In early industrial forms, such as the putting out system and in early textile factories, capital is owned by sub-contractors and employees and labour is only formally subsumed, so global ROCE calculations are rendered difficult and relatively useless by capital decentralisation, whilst the importance of bookkeeping is reinforced by attenuated social relations, moral hazard and contract enforcement requirements. Samuel Oldknow relied on a detailed double entry system debiting each weaver's account with specification, quantity and price of yarn given out and credited with the quantity of cloth returned and wages paid. Oldknow and others received support from the development of small debtors' courts and anti-embezzlement legislation (Unwin et al, pp34-37, 48-50).

As centralisation occurs through vertical integration, businesses become more internally complex and accounting mechanisms are required to trace costs expended in production and levels of efficiency. Charging capital costs to departments becomes useful in this respect, but the use of segmental ROCE remains problematic due to the presence of shared assets. On the other hand, as capital centralises through horizontal integration, ROCE becomes more useful as it provides managers⁷ with a homogenous standard for diverse businesses and allows them to manage without detailed understanding of the separate complexities of individual branches. The modern origin of ROCE has been linked to the emergence of such organisations (Johnson, 1984). Because they are relative latecomers, their accounting methods are more a product of the second rather than the first industrial revolution.

⁷ 'Managers' as opposed to 'agents' are associated with the development of diversified businesses from the mid nineteenth century onwards and consistent with the etymology of 'Management' as a collective noun (Williams, 1976).

Meanwhile as capital socialised in joint stock companies corresponding mechanisms for equitable distribution of profit emerged. Such arrangements lead to specific analytical performance measures such as dividend yield and price/earnings ratios, as opposed to Bryer's ROCE. Even so, these do not appear simultaneously, but reflect the state of development of capital markets (Rutterford, 2004). If price/earnings for example is related to the degree of socialisation, then its use would be rare under conditions of thin capital markets, individual share ownership and full dividend distribution, and more common where there is capital accumulation by corporations whose shares are traded in deep markets, for example where channelled by investment institutions. However, neither centralisation nor socialisation proceeds in historical straight lines. The forces interact, so that changes in the forces of production can reorder socialisation, or vice versa,⁸ setting accounting calculations in the context of a historical dialectic.

Evidence from a systematic review would allow two propositions (P1 and P2) to be examined. The first, P1, and following the discussion on usury above, notwithstanding their increasing ability to develop the productive forces, is that businessmen might be expected to be coy about profitability, either in terms of its calculation and disclosure, until the legislative remnants of feudalism were dismantled. The second (P2), by contrast following Bryer (2005, p.35) accounting signatures of capitalism and might be expected to correspond to 'capitalist' ROCE calculations which correspond to the real subsumption

⁸ For examples of capital market imposed 'downsizing' in the 1980s, see Jensen (1993) Toms and Wright (2002).

of labour and include depreciation adjustments. Each of the empirical propositions is examined against the evidence, in approximate chronology.

III

The objective of this section is to examine the propositions and to build on the work of Bryer and others who have conducted detailed and disparate enquiries into rate of profit calculations. Specific attention is given first to the transition from feudalism to capitalism, and Bryer's theoretical and empirical account of this insofar as it affects the computation of the rate of profit. The empirical evidence for later capitalist ROCE calculations is then reviewed.

For Bryer, capitalist ROCE appears where depreciation is deducted from the numerator and denominator, and where no allowance is made for depreciation, the calculation is the 'feudal' rate of return, for example at New Mills in 1681 (Bryer, 2000a, p.146). Bryer distinguishes between two rates of return that correspond to prevailing mentalities in different epochs of economic history (Bryer, 2000a, p.146):

From Marx's perspective, by contrast, only if DEB calculates the feudal rate of return on capital is there evidence of the capitalistic mentality, and use of DEB is only evidence of the capitalist mentality if it produces the return on capital employed in production.

Although this one possible interpretation of Marx, it seems an unlikely one since Marx, unlike Weber, gave no recognition to the calculable aspect of technology, or to the causal importance of calculable law (Collins, 1980, p.938). Nonetheless, in the context of accounting history it does suggest one possible relation between the calculative mentality and accounting signature.

According to P2, (Bryer, 2005), joint-stock trading companies were the first to pursue the rate of return on capital using DEB. These were 'semi-capitalist' because they calculated the 'feudal rate of return' by taking 'feudal surplus' and dividing it by initial

capital advanced. However, as Baladouni points out (1986, p.28) in the case of the East India Company, and as the evidence from Grassby (1969) suggests, there was no consistent conceptual framework underlying these calculations.⁹ Whilst there is certainly evidence that some merchants in the sixteenth and seventeenth century, of the East India Company [EIC] (Chaudhuri, 1965), and others (Grassby, 1969, p.749) did calculate rates of return, and in the case of the EIC calculations responded to the socialisation of capital (Bryer, 2000b, p.365), they did so in a context of colonisation and licensed privateering and associated profit sharing calculations (Andrews, 1964, p.16). As discussed earlier, in the feudal period excess profits were acceptable where earned at the expense of foreigners, which in the case of usurious gains from the Indian trade were dealt with secretly (Grassby, 1995, p.238). Grassby provides exhaustive evidence of rate of return calculations (1995, pp. 234-36), but stresses contemporary calculations were usually gross profits on particular transactions, in most cases assisting the merchant with the pricing decision, and that ‘merchants rarely calculated their net return on capital.’ (1995, p. 236).

Whilst mark-up calculations were useful to merchants for pricing, commission and customs calculations, the purpose of the ‘feudal rate of return’ seems less obvious. For Bryer (2000b, p.328), ‘Marx’s theory predicts that feudal merchants *only* became capitalistic, signatored by their use of DEB to calculate the feudal rate of return on capital, when they socialised their capital’ (emphasis added). As Bryer (1994, p.317) suggests correctly, from Marx’s perspective feudal surplus was based on labour coercion. Bryer

⁹ The political economist Thomas Munne suggested an investors’ target ratio of value returned to value invested of 3.5 to 1, which would seem to approximate to the notion of a rate of return (Chaudhuri, 1965, p.67). At the Dutch East India Company ‘the strict notion of profit was never grasped...’ (Levy, 1950, vol. 1, p.19).

(2005, 2006a, p.370) then argues that where farmers use feudal surplus semi-capitalistically ‘they accounted for feudal surplus as the increment to initial capital, that is, for the feudal rate-of-return’.¹⁰ Leaving aside the apparent confusion between a difference and a ratio, the example cited, Grange Farm, which comes from Monteague in 1675 shows that wages were paid. It is difficult to see how Besse Hobbes¹¹ could have her labour coerced and be paid wages at the same time, unless the numerator in Bryer’s feudal rate of return is something other than ‘feudal surplus’. Meanwhile there is no evidence of the ‘initial capital’ being used as a denominator in any such calculation, nor does the cited example show how profit is incremented to the initial capital and carried forward. What actually happens is that profit of £136 is computed as cash received minus cash paid minus the loss of value of the lease during the accounting period. It is not clear how any of the numbers in the calculation relate to feudal surplus or the feudal rate of return except that in another example of 1618, Bryer (2000b, p.375) says the rate of return on the opening capital *would be* $\text{£}85/\text{£}1455 = 5.8\%$ (and) ...Nicholas Toke *could have* calculated the feudal rate of return on capital’ (emphasis added). There is no evidence that Toke did any such calculation. Moreover, Toke was accountable only to himself and his father (Bryer, 2000b, p.374), and this hardly constitutes socialised capital. Similarly according to Bryer, (2000b, p.342), ‘These merchants (as discussed by Grassby, 1969) *could have* calculated the feudal rate of return on capital’ (emphasis added).

¹⁰ The feudal rate of return is Bryer’s term and defined (2005, p.29-30) as the feudal surplus divided by the initial capital advanced. As a matter of semantics, in this case the ‘increment to initial capital’ is not the same as a rate of return as a ratio. As demonstrated below, there is further confusion as to Bryer’s use of the term feudal surplus.

¹¹ Besse Hobbes is the sole employee on Monteague’s hypothetical Grange Farm.

Table 1 about here

As this review suggests, there is some imprecision as to the use of the term return on capital and an associated doubt about the interpretation of empirical evidence. Therefore a further detailed review of the use of the term in prior studies is warranted. Bryer (2005) survey is a useful starting point for such a review, since it provides a reasonably comprehensive summary. Table 1 provides an analysis of the examples directly cited by Bryer (2005) and elsewhere (2000b, 2006c) of uses of the ROCE measure (Panel A). Selected calculations used by others not cited by Bryer are shown in Panel B. The table shows the name of the entrepreneur or business, the date at which the ROCE calculation was observed and the industry in which the firm was involved. The next column provides a summary of the method used and in Panel A where there is a claim of ROCE from Bryer, the method described in the original source cited by Bryer is also outlined in italic underneath as a commentary.

The earliest example cited by Bryer is Robert Loder who developed ‘a single entry system for calculating the return on capital’ (Bryer, 2000b, p.376) and who in 1611, was performing residual income calculations (Bryer, 2005, p.39). For Bryer, Loder is a transitional character, half feudal, half capitalist. Loder apparently ‘capitalised interest as a cost of production’ which ‘is evidence of a feudal mentality’ (Bryer, 2000b, p.373). However, this is not obviously feudal. In modern accounting it can be quite legitimate to add interest charges to the capitalised cost of fixed assets, for example FAS34 And IAS23 both consider the circumstances in which such capitalisation is appropriate (Deloitte, 2006). Loder also charged 10% on the capital tied up in his crops as a

deduction from his surplus and according to Bryer (2000b, p.373), 'charging notional interest on total capital employed to divide the surplus between the required rate of return on capital and the residual income is evidence of the modern capitalist mentality' (see also, Bryer, 1994, p.225). As suggested by P1, such calculations reflected the productive forces employed and the process of social accountability. So the charge was partial, applied only to that proportion of capital tied up in crops and not the other assets such as livestock etc which are listed in Loder's 1611 balance sheet (Bryer, 2000b, p.372) and in any case as Bryer says (2000b, p.373), 'he fails to account for all his fixed capital'. Again following P1, the 10% charge was based on the legal maximum rate of interest then in force following the Act of 1571, and the surplus beyond that corresponded to reasonable remuneration for Loder's labour according to medieval scholastic doctrine. As Fussell (1936, p.xxiii) suggests, his objective was to make a living from his estate and obtain the maximum return from his expenditure of capital and his managerial and manual labour. Therefore it does not make sense to quantify the latter two components of the investment as a *rate of return*. Instead, it is sensible to compute it as an *amount*, in the seventeenth century sense as a reward for husbandry (Tribe, 1987, pp.54-59) having deducted the charge for capital. Loder was not a merchant but a farmer and was therefore concerned with profit in its relation to revenue, as the main emphasis of his accounts show, so that his concern was with the gross margin (Freear, 1994).

Another example of ROCE used by Bryer was Arthur Young's illustration of the accounts of Mr Ruggles of Clare, in the period 1784-1787. According to Bryer (2000b, p.376), this is a 'single-entry system for calculating the return on capital employed'. Again the assertion is difficult to sustain against the evidence. Young (1787, p.238)

calculates the rate of profit as £205/£646, or 31%. £205 is the average profit over four years and £646 is the capital advanced at the beginning of the period in the form of a stock valuation and the amount paid to the preceding tenant for labour, rents and taxes.¹² Like Loder, Ruggles (or Young on his behalf) uses residual income, and again the calculation has nothing to do with ROCE in the modern sense. Even so, Bryer (2000b, p.377) says ‘...that this profit is authentically capitalist is signified by including in the expenses the *decrease in value* of the capital assets which “are no more” by £398 4s 1d. Buried in this charge is the *depreciation* of the livestock...’ (emphasis added). However, the depreciable assets at the beginning of the period were only valued at £289 in total. Because the original £646 is the combination of opening stock and an accrued payment for work done by the preceding tenant, split £289 and £357 respectively, when like is compared with like, the opening and closing stock values for the livestock, deadstock, manure tillage etc are £289 and £248 respectively. Only £51 is therefore ‘depreciation’ in a loose sense (ie a difference between two stock valuations four years apart) and the remainder is a write off of accrued expenses.

An important omission, from the point of view of Weber and Bryer, is the absence of a capital account, since Young makes no attempt to aggregate the assets at the period-end or reconcile the change in value to the profit figure.¹³ Meanwhile in a separate calculation Young (1788, p.238) believes the annual charge for ‘wear and tear’ is £30 and

¹² Curiously, the £205 is arrived at by deducting only three years’ interest, whereas the profit after interest, £180, is after deducting four years’ interest. The interest charged throughout was 5%, which compares with the official rate of 4.5% and the usury law limit of 5% (Pressnell, 1960, p.192).

¹³ Such a calculation would have involved adding the value of unsold production, £660 and the £248 for livestock. Young does not provide details of Ruggles’ cash or drawings, so the closing capital cannot be ascertained or reconciled to the profit.

presumably this is Bryer's 'buried' charge, but this is unrelated to Ruggles's cattle as the costing is for arable output only. In the absence of accuracy and any clear accounting for capital or definition of depreciation or consistent use it is difficult to draw any conclusion about the nature of these accounts, capitalist or otherwise. A similar conclusion can be drawn about Coton Hall, whose accounts resembled Loder's and Young's (Bryer, p.390), and which 'allowed', or meant that ROCE 'could' be calculated (Bryer, 2006a, pp.383, 386), whereas the only evidence of farmers actually calculating ROCE is in the late nineteenth century (Stamp, 1916, cited Bryer, 2006a, p.393).

The earliest example of a specific rate of return calculation is the New Mills Cloth Manufactory, 1681 (Table 1: Panel B). Although New Mills is cited extensively, Bryer (2005) makes no mention of this calculation and does not list the example in his Table 1 on p.35. Sir James Stansfield computed forecasted profit in order to compare to the legal rate of interest (Mephram, 1988, p.60). It is unclear for Mephram (or Scott, 1905, cited in Mephram, 1988) whether Stansfield computed the rate of return on the investment or compared the forecasted level of profit with what would have been realised from an investment of equivalent capital at the legal rate of interest. The use of forecast rates of return was common throughout the subsequent century as evidence from textile firms such as Richard Coxeter, Paul-Wyatt, and J&N Phillips suggests (Wadsworth and Mann, 1931; Table 1, panel B). Such an approach, and indeed the use of differential discount rates on bills of exchange by Thomas Marsden of Bolton in 1683, is consistent with P1 and the scholastic doctrine of *lucrum cessans*, and its reliance on *ex ante* estimates (there is no evidence of the capital employed being computed *ex post* in any of these cases), and

is in any case is more consistent with the residual income approach that became increasingly common.

Such residual income, or more accurately capital charging computations were as important as ROCE calculations. Of the seven examples cited by Bryer as using ROCE (2005, table 1, p.35), only three (Ashington, British Iron and Robert Morris) were using rate of return on assets calculations of any kind, two (Charlton and Mona) used capital charging, whilst Boulton and Watt used mark-up on cost¹⁴ and Thomas Hall used discounted cash flow (DCF) [Table 1]. Capital charging indicates the treatment of interest as a cost for the purpose of planning new ventures, but might equally be used in conjunction with partnership profit sharing systems for example at the Knight's Stourbridge partnership the partners credited their accounts with interest on undistributed capital (Pollard, 1963, p.80). In this sense, methods of accounting for profit by early industrialists are explained by capital socialisation through partnerships (P1).

Meanwhile, the New Mills calculations of 1681 are characterised by Bryer (2005, pp.56-59) as semi-capitalist, despite the obvious similarity of the method of calculating profits to those used elsewhere and subsequently, as detailed in Table 1. Pollard's (1963, 1965) extensive surveys suggest few cases of ROCE calculations at this time and his evidence is accordingly disputed by Bryer. In particular, Pollard (1965, p.235) finds no evidence of ROCE calculations because capital mainly financed fluctuating current assets and liabilities. For Bryer (2005, p.40) this is proof that Pollard

¹⁴ Specifically, Boulton and Watt include depreciation charges in arriving at cost (thereby satisfying Bryer's condition for a capitalist ROCE calculation) and add the required mark-up.

‘does not understand the modern meaning of capital employed...and seems unaware that the fluctuating balance of the owners' capital is the residual after profit or loss that, no matter how “wildly” it fluctuates, always does so around a positive capital employed, that is, the sum of assets. Pollard assumes management is not accountable for all its assets and its debts, that is, here he defines capital employed as owner's equity!’

Even if it were true that Pollard does not understand the *modern* meaning of capital employed, it would not necessarily undermine his ability to recognise earlier forms of these calculations. Pollard meanwhile notices that loan finance was conflated with partners' capital, attracting interest as a division of profit (Pollard, 1965, p.234) and rightly equates owners' equity with net assets as capital employed. As in earlier times, interest rates used to determine the division of partners' profits corresponded to the usury laws, for example the 5% rate used by the firm of Cowpe, Oldnow Siddon and Co. in the late eighteenth and early nineteenth centuries (Piggot, 1949, p.35).

Such conflation meant it was entirely likely to expect early partnerships to have wildly fluctuating balances on their residual capital accounts. For example Edwards's (1967, pp.255-58) analysis of the accounts of Birley which indicates that in 1796, the firm had fixed assets of £160, current assets of £182,764 and partners' capital of c.£78,000 (estimate based on the capital of one of the partners, John Hornby, Edwards, 1967, p.255). The assets are for the weaving side of the business only, suggesting current assets, factoring in the spinning operation, for the total business in excess of £300,000. These fluctuations were compounded by ordinary drawings, partners' salaries and the requirement for capital withdrawals on partner retirements.¹⁵

¹⁵ For example the partnership agreement of 1791 establishing the firm of McConnel Kennedy (MCK/1/2)

Not only did such features of industrial finance preclude meaningful ROCE calculations, but they also extended the influence of the usury laws on profit calculations well into the nineteenth century. The legal maximum interest rate of 5% applied throughout the period of the industrial revolution. Businesses such as Birley and similar cotton concerns with large working capital balances depended on the use of bills of exchange for trade finance and demonstrated similar practices to Thomas Marsden over a century earlier.¹⁶ They could not ignore the 5% rule without risking non-enforceability of debts. An important component of profit calculation was the technique of usury law evasion that evolved, exemplified by McConnel and Kennedy, Evans and Sons of Derby and Strutts. These firms charged higher prices for their output but allowed customers to deduct a percentage in return for prompt payment. By setting terms of trade in this fashion and allowing discounts differentially by product, returns on book debts for these firms could vary between 7.5% at McConnel Kennedy and 20% for Evans candlewicks (Shapiro, 1967, pp.66-67).

The organisation of productive forces determined the precise nature of profit calculations in other cases. The use of DCF calculations at Thomas Hall is illustrative and the use of risk adjusted discount rates (in this case 12.5%) was a useful method of relating required return to the impact of geological and similar conditions on invested assets, analogous to the use of Sea Loan finance in the Renaissance period. Bryer's hypothesis relies on generalisation of the Thomas Hall case: 'Finally, evidence of present value and other rate-of-return on capital calculations *abounds* in the extractive industry,

¹⁶ Although these examples are taken from the cotton industry, the practice of using book credit to generate high implicit rates of return was quite general in the early modern period (North, 1691, p.7).

for example, by Thomas Hall in the 1830s [Fleischman & Parker, 1997, p. 130]' (Bryer, 2005, p.40, emphasis added). Whilst it is true that the extractive industries did use DCF calculations in the nineteenth century (Pollard, 1963, p.84, 1965, p.238, Taylor, 1980, pp.59-61), because it reflected the underlying risky nature of the managed assets,¹⁷ it should be noted that Fleischman & Parker, (1997) only cite two examples: Thomas Hall and Ashington Colliery, with only the latter cited as using return on capital, and with 'shocking' inaccuracies.¹⁸

At Carron, it is clear that profit on capital was calculated in 1766 (Bryer (2006c), but as Carron's ownership became less socialised, the coherence of the accounts declined (Bryer, 2005, p.60). Factional division between the partners prevented them from imposing common standards of accountability, so that the managing partner, Joseph Stainton was able to enlarge his block shareholding and run the firm for his own benefit (Campbell, 1961, pp.170-80). Consistent with Toms (2005), and P1, the evidence shows that the consequence of reduced socialisation is actually reduced accountability.

The above discussion has shown in line with P1 but not P2, that ROCE calculations were the exception rather than the rule before 1840. So when did modern ROCE calculations emerge? From Marx's perspective, a capitalist mentality means understanding the real source of value but suppressing that knowledge for the purposes of conducting business and drawing up accounts. It also means vulgarisation of value theory

¹⁷ There is at least as much evidence of DCF calculations in the 'semi-capitalist' seventeenth century for the purposes of lease valuation (Lewin, 1970).

¹⁸ So much so that the capital could not be ascertained on the subsequent dissolution of the firm and analysing the figures provided (Fleischman and Parker, p.139), it is impossible to reconcile the change in profit to the change in sales within any reasonable range of assumptions about change in assets or profit margins.

by non-Marxist economists. Therefore if ROCE is used it follows developments in non-Marxist economics. For example by 1840s classical economics had developed a complete and consistent theory of economic rent,¹⁹ so we would expect to see charging for capital (and residual income accounting), which is consistent with the modern notion of economic income and with the evidence. The organisation of production, for example with some partners providing labour and therefore drawing salaries, and social relations of production, for example partnership accounting also explain the use of capital charging.

The use of return on investment incorporating all capital invested and associated monitoring of returns reflected the integration of previously specialised businesses, for example Du Pont's integration of the Gunpowder Trade Association after 1903. Integration of production, sales and purchasing provided the basis of the analytical system of measuring return of investment developed by Dupont after 1914 (Previts and Merino, 1998, Johnson and Kaplan, 1987, p.66-88). At Hawthorn Leslie on Tyneside, similar ROCE calculations were performed by reference to the three departments in the period 1896-1902, although the capital allocations suggested by the firm's auditors were arbitrary and the resulting figures treated with some credulity by the management (McLean, 2006). ROCE along these lines also reflects entity theory, which argues the objective of business is to increase the wealth of all sources of financing and which was not recognised until 1922 (Paton, 1922). In parallel investors began to use profit rates on equity instead of dividend yields to value shares, although the development was delayed by the Wall Street crash, and in Britain investors continued their nineteenth century

¹⁹ The theories of differential rent explained by Ricardo and of absolute rent by Marx (Fine, 1991).

fixation with dividend yield for much longer (Rutterford, 2003, pp.136-8). Such approaches influenced the perception and calculation of ROCE. When *The Economist* used the term ROCE when reporting cotton company results, its method was to take the simple average of dividend yield and bond coupon rate.²⁰ There were two reasons why they used this method. First, because firms tended to distribute rather than accumulate profits (Toms, 2001), and second because the taxation system did not allow an accurate imputation of pre-tax and pre-interest profits (Seligman, 1914).

In stark contrast to this late development interpretation, for Bryer, the triumph of the bourgeoisie in the mid-seventeenth century is nothing less than the victory of the rate-of-return mentality (Bryer, 2000a). Although the evidence reviewed above casts doubt on such a view, the transition from feudalism to capitalism is explained thus (Bryer, 2005, p.30):

Harnessing the merchant's rate-of-return mentality to the farmer's mentality of exploiting labour in production gave us the *capitalist mentality* of pursuing the rate-of-return on *capital employed*. It was revolutionary because it drove farmers, and then landlords, manufacturing entrepreneurs and ultimately managers, to constantly 'improve' production; to continuously increase the intensity and productivity of labour to earn an *excess return* on capital (emphasis added).

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 examples of such calculations being performed. An excess return on capital implies a rate above some required rate, which for Bryer, originates in the 1690s. First citing Marx, Bryer (2005, p.30) argues:

²⁰ For example, *The Economist*, 22nd February, 1895, pp.26-27.

in a word, it [the National Debt] has given rise to stock-exchange gambling and the modern bankocracy...whose full development dates from the founding of the Bank of England in 1694” (Marx, 1976b, pp.919-920). In these markets for social capital, the *required return on capital appears* and becomes related to market prices. (Emphasis added).

For such an outcome to be possible, it would be necessary for fictitious stock market capital to be realisable through the expansion of the credit system, or in other words the unity of commercial and bank capital through the medium of the stock market. Such unity, as Marx suggests, was embryonic in 1694, and pushed backwards by restrictions of market development following the bubble collapse of 1721 (Neal, 2000). The inclusion of industrial activities in required rate of return calculations required the further unity of industrial capital with bank and commercial capital, in effect the creation of finance capital (Hilferding, 1981). Indeed the rise of finance capital in the early 20th century coincides with the origins of modern ROCE calculations in the review of evidence above.

Meanwhile, industrial capitalists are responsible for the real subsumption of labour, and, as Bryer, 2005, p.35 suggests:

‘relative surplus value - the ratio of surplus value to wages - underlies the accounting rate-of-return on capital employed... [So] ... the tell-tale signature of real subsumption is accountability for the rate-of-return on capital employed. Present value calculations *ex ante* and rate-of-return or residual income calculations *ex post* provide evidence that management is accountable for the rate-of-return on capital employed (Bryer, 2004b)’.

If this were the case, it would be expected that profit calculations would follow the method suggested by Marx, to include the relation between surplus value (s) and variable capital (v), relative surplus value as a component of the rate of profit s/C (where $C =$ capital advanced). However variable capital expenditure, or labour cost, is neither a necessary condition for such calculations nor reflected empirically in any actual rate of

return calculations performed. Some residual income calculations resemble 'return on capital advanced' through their use of opening book value (Peasnell, 1982, Ohlson, 1994), but again, these are not typically found in the accounting notebooks of industrial capitalists.²¹ On the other hand where management is accountable for ROCE, it does not follow that they are at the same time managing the process of the real subsumption of labour. Indeed such calculations could be performed for a variety of other useful purposes, such as the reduction of a principal's monitoring costs. Therefore, whereas in all probability the real subsumption of labour and accounting for the ROCE co-exist, using ROCE to infer real subsumption is insufficient.

In summary, the evidence suggests that the usury laws had a lasting impact on calculative mentality, which in combination with decentralised production, restricted the extent and disclosure of return on capital calculations in general before 1840 and ROCE calculations in particular prior to 1914. There is accordingly value in attempting to explain the British Industrial Revolution in terms of calculative mentality, but not in terms of the adoption of ROCE calculations alone. The evidence therefore tends to support P1 and not P2.

IV

Bryer suggests that (2005, p.27) 'the capitalist mentality drove revolutions in the technical and social relations of production in key sectors of the economy'. Instead it can

²¹ In all the examples of residual income accounting cited by Bryer (2005), the evidence amounts to a charge on capital, which might be expected in partnership accounting, without reference to whether the charge is on opening capital or how the cost of capital was derived.

be argued that the capitalist mentality arises from revolutions in the organisation of the forces of production, or the material base, which themselves ultimately arise from the physical and mental activities of the inventors. The physical and mental labour process of others is then subsumed in the economic base and capital is valorised as abstract labour in the superstructure. Following accumulation and capital socialisation the investing capitalist is confronted with abstract labour as accumulated capital. Accounting is therefore concerned directly with money capital circuits and the distribution of money capital and only very indirectly with subsumed labour. In other words accounting is the administration of the social relations of production.

Bryer's notion of calculative mentality and accounting signature has taken the Sombart-Weber debate into a new dimension. Instead of associating capitalism with the existence of basic accounting techniques, the concern becomes instead the rationale behind accounting calculation, and therefore with the mentality of economic decision-makers. Mapping these calculations is a new and important part of the research agenda.

Whilst accepting Bryer's broad view, his narrow view has been challenged and needs revising in three areas. The first is that Bryer uses the capitalist mentality to predict behaviour in all forms of capitalism with only partial reference to the organisation of productive forces, leading to over-reliance on ROCE as the accounting signature of interest to the accounting historian. Therefore a second challenge to Bryer is that evidence on the employment of ROCE calculations, shows that most early modern and industrial revolution entrepreneurs did not make use of such calculations, and their partial use and later adoption reflected the both the organisation of production and social ownership of capital. There is evidence to suggest that the methods of calculating and

dividing profit emerged in tandem with institutions that governed the accumulation and distribution of profit, particularly the mechanisms for interest rate regulation. Early or transitional capitalism contains only partial aspects of the calculations necessary for the computation of ROCE, which is why there are only limited and partial examples before 1900. The slow retreat of feudalism and its replacement with personal (as opposed to corporate) capitalism slowed the adoption of modern accounting calculations in Britain. Modern capitalism as a mentality required the demise first of usury in the courts and associated restrictions on risk free returns, and then of the labour theory of value in the realm of political economy. Only then could the doctrine of capital as a *sui generis* factor of production emerge and demand its own return, independent of rent and wages, as profit, and only then was the computation and analysis of profit and profitability made possible.

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Table 1: Profitability analysis in the agricultural and industrial revolutions

	Date	Industry	Method used according to Bryer/ <i>Commentary</i>	Sources
Panel A)				
Examples cited by Bryer				
Robert Loder of Romney Marsh	1611	Agriculture	Residual Income <i>Notional interest charged on capital invested in crops</i>	Bryer 2005, p.39 Freer, 1970, p.28.
Robert Morris's copper smelting partnership	1726	Metal	Return on capital <i>Forecast profit on advanced as fixed capital plus stock</i>	Bryer, 2005, table 1 Jones, 1985, p.20
Coton Hall	1744	Agriculture	Return on capital <i>Change in cash plus difference between opening and closing capital values</i>	Bryer 2006a, p.283
Carron	1766	Metals	Return on capital <i>10% Interest on capital stock</i>	Bryer, 2006c Bryer, 2006c
Mr Ruggles (Arthur Young's example)	1788	Agriculture	Return on capital <i>Notional interest charged on capital advanced as stock and expenses</i>	Bryer 2000b, p.376 Young, 1788, pp.235-244
Mona Mine	1793-1800	Coal	Return on capital <i>10% charge on capital</i>	Bryer, 2005, table 1 Boyns and Edwards, 1997, p.52
Boulton and Watt	1801	Hardware	Return on capital <i>40% mark-up on cost</i>	Bryer, 2005, table 1 Roll, 1930, p.248
Charlton Mills	1810	Textiles	Return on capital <i>5% charge on capital</i>	Bryer, 2005, table 1 Stone, 1973, p.77.
British Iron Co.	1826	Metal	Return on capital <i>Forecasted rate from promoters' cost estimates</i>	Bryer, 2005, table 1 Jones, 1985, p.216
Thomas Hall	1834-	Coal	Return on capital	Bryer, 2005,

	1835		<i>Forecast revenues discounted at risk 12.5%</i>	table 1 Fleischman and Parker, 1977, p.130.
Ashington Colliery	1843	Coal	Return on capital <i>Return on partners' capital</i>	Bryer, 2005, table 1 Fleischman and Parker, 1977, p.139.

Panel B) Other examples

New Mills Cloth Manufactory	1681	Textiles	Forecast profit rate c/f interest rate	Mephram, 1988, p.62
Thomas Marsden of Bolton	1683	Textiles	Bills discounted differentially, 4-5%	Wadsworth and Mann, 1931, p.94.
McConnel	1800-	Textiles		
Kennedy, Evans, Strutts	1830		Bills discounted differentially, 7.5-20%	Shapiro, 1967, pp.66-7.
Richard Coxeter	1720	Textiles	Bubble scheme for Indian calico plantation, promised 4-5% fixed returns	Wadsworth and Mann, 1931, p.120
Paul-Wyatt	1744	Textiles	Forecast rate of profit on capital = 20% on fixed capital, 15% on circulating capital	Wadsworth and Mann, 1931, p.439
J & N Philips and Co	1765	Textiles	Forecast rate of profit on capital = 5%	Wadsworth and Mann, p.291
Northumberland mines generally	1818	Coal	Revenue capitalising using risk adjusted interest rate	Pollard, 1965 p.238.