Calculating profit: a historical perspective on the development of capitalism

By

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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, 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 double-entry, 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 identifies capitalism with the calculation of rates of return and more specifically still, the return on capital employed (ROCE). 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).
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 [double-entry bookkeeping] 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.

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.

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).

\(^1\) 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).
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 (the social risk free model), 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 risk free model. ‘Sea Loans’ made between Italian merchants reflected differential levels of risk in voyages of 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. For Weber, this is achieved by striking the balance, a device first suggested by Simon Stevin in 1698 (Weber, 1927, p.275). 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

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2 For further theoretical elaborations of this argument, see Toms (2007a, 2007b).
these methods were made difficult or impossible by restrictions on lending at interest under the usury laws.  

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 these Acts marked gradual staging posts in its protracted demise. 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). 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). Physiocratic sentiments such as these became even more embedded in orthodox political economy until the mid-nineteenth century (Tawney, 1960, pp.35-6). 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 ROCE as suggested by

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3 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.

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).
Bryer or that such calculations could be used to regulate the distribution of profit. Instead, restrictions meant that lenders could only share in partnership profits if they shared the risk, thereby translating sleeping partners providing loan finance into equity holders and at the same time giving accounting calculation a potentially important role in profit sharing arrangements.

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. In accounting terms, the socialisation of capital as it progresses implies new rules about circulation and distribution of profit and processes of accountability as ownership is widened. Socialisation also implies profit sharing within legally established rules and social norms. These arrangements changed as a function of the latent conflict between medieval laws on usury, discussed above, and the steady accumulation of mercantile profit.

Even so capital socialisation gives only a partial explanation of accounting for profit and 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. An alternative explanation of accounting change in the transition from feudalism to 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.

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).
capitalism and in transitions in the phases of capitalist development is offered by the
dialectic of the centralisation of the forces of production and the socialisation of the
ownership of production (Toms, 2005). Specifically the dialectic can be extended to
explain accounting for profitability and the adoption of ROCE. 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 the
measurement of ROCE is rendered difficult and relatively useless by capital
decentralisation.

As centralisation occurs through vertical integration, businesses become more
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 managers\(^7\) 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 likely to be a
product of the second rather than the first industrial revolution.

Meanwhile where there was greater socialisation, for example in joint stock
companies or their precursors in the Commenda system of Northern Italy, there were
corresponding mechanisms for equitable distribution of profit (Lopez, 1976, Cipolla,
1981, Braudel, 1984, Bryer, 1993). These might occur through profit sharing

\(^7\) ‘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).
arrangements where partnerships are established and subsequently in dividend payments by joint stock companies. 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, setting accounting calculations in the context of a historical dialectic.

Evidence from a systematic review would allow this and other propositions to be examined. First, (P1), and following the discussion on usury in section II, notwithstanding their increasing ability to develop the productive forces, 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. Second (P2), by contrast following Bryer accounting signatures of capitalism and feudalism might be expected to correspond to ‘capitalist’ ROCE calculations which include depreciation adjustments and ‘capitalistic’ which do not, and capitalist ROCE calculations which correspond to the real subsumption of labour. Third (P3), if there is a widespread belief that capital begets more capital, simply of itself, and if

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8 For examples of capital market imposed ‘downsizing’ in the 1980s, see Jensen (1993) Toms and Wright (2002).
accounting practice follows that belief, the calculative mentality and accounting signature of capitalism would be to account for the rate of return on realised money capital, ie the total capital in circulation, from whatever source and without regard to the precise source of its creation. In doing so, the effect is to disguise inner connections, precisely as Marx suggested (Marx, 1984, p.43). Each of the three empirical propositions is examined against the evidence, in approximate chronology.

III

The objective of this section is to build on the work of Bryer and others who have conducted detailed and disparate enquiries into rate of profit calculations. 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 the notion of a feudal rate of return as a calculation used in the transition from feudalism to capitalism is confusing. As Bryer (1994, p.317) suggests correctly, from Marx’s perspective feudal surplus was based on labour coercion. Bryer (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’.9 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 Hobbes10 could

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9 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 demonstrated below, there is further confusion as to Bryer’s use of the term feudal surplus.

10 Besse Hobbes is the sole employee on Monteague’s hypothetical Grange Farm.
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 £85/£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.

Nonetheless, according to 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). 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, seems to come into existence in the 1690s. First citing Marx, Bryer (2005, p.30) claims:
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).

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). Some residual income calculations resemble ‘return on capital advanced’ through their use of opening book value (Peasnell, 1982, Ohlson, 1994), but these are not typically found in the accounting notebooks of industrial capitalists. 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

11 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.
reviewing the evidence below therefore it is appropriate to investigate the use of s/v as a component of s/C if P2 is to be accepted.

Table 1 about here

Bryer (2005) is a useful starting point for a review of the empirical evidence since his paper includes a survey of much of the historical evidence. 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). But why is this 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 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 this 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.\textsuperscript{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 signatured by including in the expenses the decrease in value of the capital assets estimated “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.\textsuperscript{13} Meanwhile in a separate calculation Young (1788, p.238) believes the annual charge for ‘wear and tear’ is £30 and 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

\textsuperscript{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).

\textsuperscript{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’s cash or drawings, so the closing capital cannot be ascertained or reconciled to the profit.
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 (Mepham, 1988, p.60). It is unclear for Mepham (or Scott, 1905, cited in Mepham, 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.

As far as Bryer is concerned however, there is no difference between residual income and ROCE calculations. Of the seven examples cited as using ROCE (Bryer,
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 cost\textsuperscript{14} and Thomas Hall used discounted cash flow (DCF) [Table 1]. Capital charging indicates the possibility of residual income calculations, but might equally be used in conjunction with partnership profit sharing systems. 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 (1965) extensive survey suggests 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

‘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!'\textsuperscript{14}

Even if it were true that Pollard does not understand the \textit{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

\textsuperscript{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.
rightly equates owners’ equity with net assets as capital employed. Such conflation meant it was entirely likely to expect early partnerships to have wildly fluctuating balances on their residual capital accounts. These fluctuations were compounded by ordinary drawings, partners’ salaries and the requirement for capital withdrawals on partner retirements.

If residual income and capital charging were characterised by profit-sharing arrangements in partnership capital, 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, 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, 1965, p.238, Taylor, 1980, pp.59-61), because it reflected the underlying risky nature of the managed assets, it should be noted that

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15 See for example Edwards’s (1967, pp.255-58) analysis of the accounts of Birley. 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, p.255). The assets are for the weaving side of the business only, suggesting current assets for the total business in excess of £300,000.

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

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).
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 by mainstream economists. Therefore if ROCE is used it follows developments in mainstream economics. For example by 1840s classical economics had developed a complete and consistent theory of rent,\(^{19}\) so we would expect to see charging for capital (and residual income accounting), which is consistent with the evidence. The organisation of production, for example with some partners providing

\(^{18}\) 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.

\(^{19}\) The theories of differential rent explained by Ricardo and of absolute rent by Marx (Fine, 1991).
labour and therefore drawing salaries, and social relations of production, for example partnership accounting also explain this method, consistent with Toms (2005).

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). 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 fixation with dividend yield for much longer (Rutterford, 2003, pp.136-8). Such approaches influenced the perception and calculation of return on capital employed. 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. Taken together the evidence suggests that there is little historical evidence of modern ROCE calculations prior to 1914. There is little support for P2 and the evidence tends to support P1 and P3.
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 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.

Although more research is needed as to how these calculations developed in specific cases, from the examples analysed it is apparent that if accounting transitions

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20 For example, *The Economist*, 22nd February, 1895, pp.26-27.
are to be identified in terms of signatures of social relations, where such signatures do utilise ROCE, they belong to Bryer, not to Marx. Therefore another challenge to Bryer is that evidence on the employment of ROCE calculations, from the beginnings of the industrial revolution to the present day, shows that most early modern and industrial revolution entrepreneurs did not make use of such calculations, and their subsequent 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 evolved in tandem with institutions that governed the accumulation and distribution of profit.

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. Modern capitalism as a mentality required the demise first of usury in the courts and then of the labour theory of value in the realm of political economy. Only then could the doctrine of capital as a *suí 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.
References


Johnson, H.T. (1984), The role of accounting history in the education of prospective accountants (Glasgow).
Lopez, R.S. (1976), The commercial revolution of the middle ages, 950-1350. Cambridge, CUP


### Table 1: Profitability analysis in the agricultural and industrial revolutions

<table>
<thead>
<tr>
<th>Panel A) Examples cited by Bryer</th>
<th>Date</th>
<th>Industry</th>
<th>Method used according to Bryer/Commentary</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Robert Loder of Romney Marsh</td>
<td>1611</td>
<td>Agriculture</td>
<td>Residual Income</td>
<td>Notional interest charged on capital invested in crops</td>
</tr>
<tr>
<td>Robert Morris’s copper smelting partnership</td>
<td>1726</td>
<td>Metal</td>
<td>Return on capital</td>
<td>Forecast profit on advanced as fixed capital plus stock</td>
</tr>
<tr>
<td>Coton Hall</td>
<td>1744</td>
<td>Agriculture</td>
<td>Return on capital</td>
<td>Change in cash plus difference between opening and closing capital values</td>
</tr>
<tr>
<td>Carron</td>
<td>1766</td>
<td>Metals</td>
<td>Return on capital</td>
<td>10% Interest on capital stock</td>
</tr>
<tr>
<td>Mr Ruggles (Arthur Young’s example)</td>
<td>1788</td>
<td>Agriculture</td>
<td>Return on capital</td>
<td>Notional interest charged on capital advanced as stock and expenses</td>
</tr>
<tr>
<td>Mona Mine</td>
<td>1793-1800</td>
<td>Coal</td>
<td>Return on capital</td>
<td>10% charge on capital</td>
</tr>
<tr>
<td>Boulton and Watt</td>
<td>1801</td>
<td>Hardware</td>
<td>Return on capital</td>
<td>40% mark-up on cost</td>
</tr>
<tr>
<td>Charlton Mills</td>
<td>1810</td>
<td>Textiles</td>
<td>Return on capital</td>
<td>5% charge on capital</td>
</tr>
<tr>
<td>British Iron Co.</td>
<td>1826</td>
<td>Metal</td>
<td>Return on capital</td>
<td>Forecasted rate from promoters’ cost estimates</td>
</tr>
<tr>
<td>Thomas Hall</td>
<td>1834-1835</td>
<td>Coal</td>
<td>Return on capital</td>
<td>Forecast revenues discounted at risk 12.5%</td>
</tr>
<tr>
<td>Ashington Colliery</td>
<td>1843</td>
<td>Coal</td>
<td>Return on capital</td>
<td>Return on partners’ capital</td>
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</table>

<table>
<thead>
<tr>
<th>Panel B) Other examples</th>
<th>Date</th>
<th>Industry</th>
<th>Method used according to Bryer/Commentary</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>New Mills Cloth Manufactory</td>
<td>1681</td>
<td>Textiles</td>
<td>Forecast profit rate c/f interest rate</td>
<td>Mepham, 1988, p.62</td>
</tr>
<tr>
<td>Thomas Marsden of Bolton</td>
<td>1683</td>
<td>Textiles</td>
<td>Bills discounted differentially, 4-5%</td>
<td>Wadsworth and Mann, 1931, p.94.</td>
</tr>
<tr>
<td>Richard Coxeter</td>
<td>1720</td>
<td>Textiles</td>
<td>Bubble scheme for Indian calico plantation, promised 4-5% fixed returns</td>
<td>Wadsworth and Mann, 1931, p.120</td>
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<tr>
<td>Paul-Wyatt</td>
<td>1744</td>
<td>Textiles</td>
<td>Forecast rate of profit on capital = 20% on fixed capital, 15% on circulating capital</td>
<td>Wadsworth and Mann, 1931, p.439</td>
</tr>
<tr>
<td>J &amp; N Philips and Co</td>
<td>1765</td>
<td>Textiles</td>
<td>Forecast rate of profit on capital = 5%</td>
<td>Wadsworth and Mann, p.291</td>
</tr>
<tr>
<td>Northumberland mines generally</td>
<td>1818</td>
<td>Coal</td>
<td>Revenue capitalising using risk adjusted interest rate</td>
<td>Pollard, p.238.</td>
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</tbody>
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