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Evidence from the nineteenth century cotton
textile industry**

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Abstract

The relative efficiency of producer cooperatives is investigated through an examination of the financial performance of a group of cotton spinning firms that emerged from the spread of cooperative ideals after the mid nineteenth century. Reflecting such influences these firms adopted two particularly important aspects of democratic governance: use of low denomination partly paid shares to encourage wide share ownership amongst local working class operatives, and the use of a one shareholder one vote rule at company meetings. Prior literature, much of which predicts the failure of producer cooperatives due to incentive problems, has not specifically examined these aspects of democratic control. Moreover because the case study utilises samples of stock market quoted companies, there is an opportunity to quantify the financial performance effects of these governance mechanisms. The case study therefore offers a unique insight and important contribution to the wider literature. The results show that both aspects of democratic governance contributed to the economic success of the companies that adopted them, enabling them to satisfy the high demand for cash dividends that characterised investor requirements. However, the cyclical nature of the cotton industry and the stock market booms and slumps that resulted led to redistributions of wealth through time that in the long run undermined the cooperative project.

Introduction

The paper examines the proposition that cooperatives are relatively inefficient, as argued in mainstream economic theory, due to incentive and collective action problems, particularly

amongst producer co-ops where ownership is distributed amongst employees.¹ The proposition is based on theory and evidence that might be contradicted by a previously under-researched example of apparently successful cooperative performance. There is prima facie evidence that the producer cooperatives of nineteenth century Lancashire, located in the Oldham cotton spinning district,² were relatively efficient. They survived for a fairly long period and were able to compete effectively with non-cooperative firms during that time.³ The reasons for this have not been fully explored, notwithstanding the considerable contemporary press commentary that these companies attracted, partly as a result of their apparent efficiency.⁴

The paper also builds on previous research on the Oldham Limiteds. There has been limited work from a business history perspective, excepting Farnie's chapter⁵ on the subject, which describes the Oldham business system, including the important aspects of co-operation. Other research has examined the financial policies of these firms and other firms in the wider cotton industry, and has also examined the use of accounting information in their governance and management and has investigated the effectiveness of the Oldham stock market.⁶ None of this research however has examined the link between ownership and performance, and the paper will develop the literature by examining the ownership, performance and business strategies of individual companies.

In the nineteenth century cooperative ideas influenced the development of retail and producer co-operatives alike, although only the former enjoyed longer run success.⁷ Perhaps as a consequence producer cooperatives have attracted relatively little attention. Even so, following the pioneering experiments in Rochdale and the Lowbands Farm tea party at Jumbo near Oldham,⁸ producer co-operatives flourished as the cotton spinning trade developed in the south east Lancashire industrial district. From the mid nineteenth century until the mid 1890s, cooperatives dominated the important coarse section of the cotton trade,⁹

utilising Companies Act legislation to adapt the Owenite ideals upon which they were founded. Companies Act 1862 provided example but permissive Articles of Association, with the consequence that many cooperative companies' Articles stated that Table A of the Act did not apply and clauses were inserted stating that each member shall have one vote only.¹⁰ These adaptations included shareholder democracy, promotion of the dividend, and high standards of corporate accountability¹¹. Such features were promoted by two particular aspects of corporate governance, the use of a one-shareholder one vote, or 'show of hands' rule at company meetings, and denomination shares to ensure diffuse ownership.

Paying particular attention to these variables, the paper will examine the extent to which they contributed to financial performance of the cotton spinning firms that adopted them, relative to benchmark indicators of firms using less democratic methods. Contemporary press sources, including local newspapers, such as the *Oldham Standard* and *Oldham Chronicle*, and co-operative publications, such as *The Co-operator* and *Co-operative News*, will be analysed together with business archives of case study companies and British Parliamentary Papers.¹² These sources will be used to identify samples of firms with particular governance characteristics and to obtain share price and dividend data so that their financial performance can be compared. The second section of the paper below reviews the prior theoretical and historical literature, explaining the rationales and evidence for the predicted inefficiency and failure of producer cooperative experiments. The third section introduces the special features of the Oldham limiteds, including the economic and institutional context in which they operated to explain why they offer a useful test case for evaluating the efficiency of these variants of producer cooperative organisation. The financial performance of Oldham limited is then compared to firms operating in the wider economy, other sectors of cotton textiles, and sub samples of firms within the coarse spinning sector, as differentiated by cooperative governance characteristics. Following this analysis, the paper

examines the reasons for the decline of the cooperative firms. In a concluding section, it then summarises the factors likely to promote the success and survival of producer and other cooperative organisations.

Producer cooperation and economic efficiency: theory and historical evidence

Mainstream economic theory makes two important and general predictions that are relevant to assessing the likely performance and success of cooperative organisations. The first is that ownership rights and governance arrangements matter. So, in addition to inputs of capital, labour and technology, according to the influential framework of economic analysis outlined by Jensen and Meckling, the output of a firm also depends on the specification of contracting and property rights. The second prediction is that because co-operatives and other forms of industrial democracy are rare, they conclude that these alternative organisational forms are less efficient than their conventional capitalist counterparts. Reasons might include the incentive to restrict output and raise wages in response to an increase in demand, and the horizon problem, which suggests that workers will be incentivised only to invest in capital investment projects with shorter lives than their expected period of employment with the firm. Employees also have an incentive to use long term structured debt to fund shorter-term consumption of benefits and perquisites. Thirdly theorists hypothesise that producer cooperatives ‘degenerate’ over time as members are replaced by non-members.¹³

Mainstream economic theorists are confident of their predictions, based on the absence of successful real world models of producer cooperation and argue that the burden of proof of successful performance lies with the proponents of alternatives.¹⁴ Nonetheless, the empirical studies that have been undertaken tend to reject the hypothesis that worker participation damages productivity. They also find that it does not cause sub-optimal allocation of labour in the form of employment maximisation, and reject the degeneration thesis.¹⁵ Although these

studies have addressed questions of economic efficiency, there is a scarcity of firm level financial data,¹⁶ so that there are few studies that examine comparative financial performance.

Even so, there are further theoretical difficulties for co-operatives. An important one is that employee co-operatives suffer from the non-transferability problem, which arises because employees cannot sell their jobs, leading to the greater prevalence of retail societies. The success of some co-operatives is also linked to the use of high initiation fees.¹⁷ As a result, employee co-operators cannot use portfolio diversification to mitigate their risk. A further difficulty arises from the monitoring problem, which means that in the absence of a market in which claims on employees' wealth invested in the firm can be traded a market for corporate control cannot develop, so that the market has no mechanism for disciplining inefficient managers through takeovers. Managers will not therefore be incentivised to reduced shirking and wastage.¹⁸ Such problems can be mitigated or overcome entirely where co-operative firms issue negotiable shares on the market, depending on the extent to which employee control is retained through non-negotiable shares.¹⁹ A co-operative that does not retain such control cannot be a co-operative, but in the presence of non-negotiable employee shares the value of the firm to an outside investor is reduced due to the perceived risk of residual claims being neglected for the benefit of firm insiders. These problems are compounded by agency costs which prevail in all organisations.²⁰ With a stock market, and in the absence of asset diversification by the firm, efficiency of production decisions requires that control rights be vested with the shareholders.²¹ In summary, as this discussion suggests, there are factors associated with corporate governance in particular that might enhance financial performance for producer co-operatives.

However, none of this literature has considered a further compromise solution in which all shares are negotiable but democratic rights for employees are promoted through one-shareholder-one-vote arrangements for general meetings and governance rules designed to

promote employee ownership of those shares (for example employee pre-emption rights, low share denominations). Jensen and Meckling's propositions that co-operative organisations are somewhat rare and that successful employee co-operatives are rarer still might be accepted if such cases of democratic governance are not considered. Because Jensen and Meckling accept that co-operatives might succeed as a consequence of special legal rules,²² it would follow that the absence of a suitable legislative framework could be a reason for the apparent lack of successful producer coop experiments. Moreover, in a more permissive legislative environment there is no reason why one share one vote should be preferred to one shareholder one vote, in view of the potential benefits of the latter for overcoming problems associated with non-transferability.

However, the instances of such rules being allowed under corporate law are comparatively rare,²³ and the apparent failure of employee co-operatives might plausibly be a consequence of prescriptive legislation on shareholder voting, rather than inherent organisational inefficiency. To examine this hypothesis, the paper investigates a historical case study of the Oldham limited liability spinning companies in the nineteenth century. These firms operated in a period of permissive company legislation and as a consequence voluntarily adopted the one shareholder one vote rule, and for a period of around twenty years promoted a large and apparently profitable expansion of the already powerful Lancashire cotton industry. For the purposes of analysing the modern economy, these companies are an interesting case study because the protection of the shareholder interest via a voting rule of one share one vote has become near universal in the USA and UK. Present day regulators therefore have restricted access to evidence about the likely effects of modifying corporate governance regulations in favour of more democratic shareholding structures.

Where such evidence has been examined previously, it has tended to draw negative conclusions about the economic performance of co-operatives. Several reasons have been

advanced, and these overlap to some extent with economic theory. In Marx's view, the transition from cooperative social relations based on what he regarded as utopian socialist principles to capitalist social relations was rooted in the development of the credit system and the inability of the cooperative organisations to set up durable alternatives to it.²⁴ For Bowles and Gintis, cooperatives failed because in the face of rising economies of scale, they could not accumulate sufficient capital.²⁵ Marglin argues that workers simply lacked the entrepreneurial knowledge and skill to successfully manage their own firms,²⁶ a view which Clark endorses, citing the examples of Sun Mill in Oldham and the co-operatives of the Rossendale valley studied by Beatrice Webb in the 1880s and 1890s. Resentment towards managerial control in these organisations manifested itself in the form of egalitarian wage structures that extended to managerial functions.²⁷ A contrasting argument is that where management itself is less of a scarce resource, the success of participatory organisations tends to be promoted.²⁸ If the former explanations are correct, co-operatives cannot escape the mistrust between capital and labour that characterises capitalist organisation. In the general case, efficiency depends on how capital responds to the behaviour of labour as a social group and the mistrust that arises. Clark also argues 'that if radical economists are correct (that giving control of production to workers is more efficient) then, ironically, the efficient organization disappeared because workers used control of production to drive up wages and limit output'. In other words, Clark believes that co-operative experiments in nineteenth century Britain were unsuccessful for reason of incentive problems similar to those suggested by Jensen and Meckling.²⁹ On the other hand, neither radical nor neo-classical economic historians have spent much time examining circumstances in which cooperatives have been successful and investigating the reasons. For instance, Clark's citation of the example of Sun Mill above refers only to the mistrust of managers by operatives and not to the apparent commercial success arising from the involvement of operatives in financial management and control.³⁰ Further research into

the actual economic performance of producer cooperatives such as Sun Mill is therefore well justified. The next section discusses the origin and development of this and similar companies examining the economic and institutional context that promoted their growth and apparent success.

The development of co-operation in nineteenth century Oldham

The Rochdale Co-operative Manufacturing Society, which became known as the Mitchell Hey Mill was formed on orthodox co-operative principles in 1854. All the promoters were members of the Society, all employees were shareholders and surpluses were paid as a bonus to labour.³¹ The 'bounty' to labour, which had been an important principal upon which the Rochdale Co-operative Manufacturing Society had been founded was abolished in 1862, so that from then on all profits accrued to capital.³² Anti-bountyites argued that the bonus to labour rewarded lazy and indolent workers at the expense of thrifty working class savers, who should be encouraged to invest through issuing low denomination shares.³³ Pro-bountyites attributed these new ideas to new investors who had joined the society since its inception.³⁴ As late as 1880, pro-bountyites such as William Marcroft tried but failed to introduce a labour bonus at Sun Mill in 1880. He believed that a standard dividend of 5% on share capital should be charged as a trade expense and that any remaining surplus should then be distributed as a bonus to labour.³⁵ Marcroft's views were increasingly marginalised as attracting local investment through new share issues became a dominant motive for mill promoters. Sun Mill directors resolved that shares to finance the development of the mill be advertised in the Manchester press and regularly in the local papers.³⁶ In this fashion, and reflecting the use of cooperative principles, new mills created large shareholder bases of working class investors and attracted investment from other cooperative societies.³⁷ At Sun Mill, once local investment had been mobilised, it was then resolved that shareholders should be the first to be employed in the

mill.³⁸ As a consequence, these firms were an interesting hybrid of community and employee cooperatives and as such constitute a unique and interesting case.

With the resolution of these debates in favour of wider participation and against labour bounties, as co-operatives developed in nearby Oldham, dividends became the most important feature of the system from the point of view of the working class investor. Dividends were always paid in preference to retention of profits for reinvestment in the mill. Oldham thus earned the nickname 'diviborough', as a result of the perceived obsession of its people with dividends.³⁹ They were preferred to bonuses to labour, particularly where experiments were conducted, for example at Sun Mill, Central, and Oldham Twist, which linked incentive payments to managers and senior employees to the size of the dividend paid. In the Sun Mill scheme, introduced in 1869, directors were offered a bonus on a sliding scale related to the dividend payment and two years later bonuses were extended to the mill manager, salesman, carders, spinning master and engineer.⁴⁰ In the years immediately following the introduction of these schemes the company paid record dividends, averaging 22.75% in 1870 and 29.75% in 1871.⁴¹ It is easy to see why this might be opposed by some operatives at least, since the effect would be to fix the return to capital and place the return to labour entirely at the mercy of the trade cycle. A fixed wage, topped up by a dividend in good years might be the preferred combination for the cautious hard working employee. Managerial incentives meanwhile were considered to be better aligned with the investors where bonuses were not paid, for example because managers would be less inclined to manipulate lower quality cotton to receive a higher price for yarn.⁴²

From the 1860s a new a cycle of mill building activity developed, reflecting the use of the new limited liability provisions of the Companies Act 1862, the use of new mills as a vehicle to mobilise working class savings, and the cotton industry's pronounced business cycle. Product market features and trends, and the skill of individual managers in manipulating them,

were crucial determinants of economic success. Share prices were driven by underlying corporate profitability but also that the latter depended heavily on prices and positions in the Liverpool cotton spot and futures markets and the Manchester yarn and cloth markets. The former responded to wires detailing the latest American crop movements, the latter to demand shifts in Eastern export markets. Under the operation of the Gold Standard demand for Lancashire goods in silver using markets was linked with the gold/silver price relationship.⁴³ In the regular boom/recession cycle of the period 1870-1890, there were mill promotion booms in 1873-5, 1883-4 and 1889-90.⁴⁴

The consequence was the development of a deep, but informal market by modern standards, in the equities of cotton spinning firms. Market listing imposed no requirements on its constituent companies and attempts to formalise the exchange were largely unsuccessful.⁴⁵ Some companies were therefore able to use high share denominations and tended to be secretive.⁴⁶ Of the 100 or so companies that typically were quoted in the period 1875-1900, some 70%, usually those with the broader shareholder base, voluntarily subjected themselves to public and shareholder scrutiny. The usual practice was to invite the press to attend quarterly meetings and to issue them with the published balance sheet.⁴⁷

Share ownership was diverse and, in the town of Oldham itself, may have been as large as a quarter of the adult population.⁴⁸ The small shareholder was the norm, although larger, concentrated shareholdings began to emerge through time.⁴⁹ Insider trading rules were non-existent, and such practices were possible and undoubtedly took place. On the one hand, insider traders might have included workers participating in quarterly stock-taking, on the other, market makers who were also company promoters and multiple directors. The most prominent example was John Bunting, who by 1890, was serving on the board of half a dozen companies and also writing a weekly report on share trading in the *Oldham Standard*. His column provided readers with details of those companies whose stocks were in or out of

favour. The period of 1860-1890 might be described as an "Age of Democratic Investment". As a consequence of these developments the two defining characteristics of producer co-operation were the one shareholder one vote rule and the use of low denomination shares. Only the former genuinely differentiates these firms from the ordinary capitalist joint stock enterprise which might equally issue low denomination shares. In the case of the Oldham limiteds where the voting system was democratic, the use of low denomination shares encouraged participation by operatives and less wealthy sections of society.

There is considerable anecdotal evidence from contemporary and more recent literature that this system of democratic accountability had positive consequences for economic efficiency. Referring to cotton operatives and other working class shareholders, Farnie notes they "... proved to be the strictest of economists and were prepared to oust a whole board which failed to produce an acceptable balance sheet, displaying as much ruthlessness as the Athenian Ecclesia or the leaders of the French Revolution towards their unsuccessful generals." (p. 266).⁵⁰ In the slump year of 1891, shareholder wrath at the scale of financial losses was expressed vigorously at many company meetings.⁵¹ The expertise and scrutiny of these shareholders over their businesses was thought by some to contribute towards improved efficiency⁵² and contrasted with the poor management of other companies which were run as 'investment unions' and owned by those who 'know nothing of the business carried on'.⁵³

By 1866, Sun Mill had a reputation for producing the best 32s yarn on the Manchester market.⁵⁴ Private and unincorporated businesses, viewing the limited liability ventures as dangerous rivals, were prompted to set their own houses in order.⁵⁵ Ellison, quoting a contemporary report, provides testimony to the contribution of this governance structure to the promotion of economic efficiency:

The daily discussions which take place amongst the shareholders as to why dividends are small or otherwise, have led almost every intelligent operative to become more economical with materials, more industrious and to see what effect his individual efforts have on the cost of the

materials produced. In fact, the bulk of the working class operatives of Oldham have more knowledge of the buying of cotton, working it up, and selling the manufactured good than most private employers had ten years ago. The competition between the managers of one company and those of another, and also between the directors of different companies and the pride which each body of shareholders take in their own mill is leading to improvements.... so that *it is almost impossible for the management of any mill owned by working men to be seriously defective for any length of time.*" p. 138 [emphasis added].⁵⁶

At the Guidebridge Spinning Company quarterly meeting, reported in the *Oldham Standard* on 30th October 1886, a shareholder complained that they were being beaten by another local company by £94 9s 3d in oil and £45 7s 8d in tallow. Although apparently trivial, it is easy to see how analysis of these cash based expenses would have been symmetrical with the day to day experiences of operatives who were cognisant with the detailed productive workings of a cotton mill. Larger expenses, in particular wages and cotton costs were also disclosed as cash paid amounts in published balance sheets, so these figures could be more easily checked than in modern accounts, which by using accruals of costs, potentially facilitate manipulation. Such simple reporting formats encouraged disputes not about accounting manipulation but about amounts paid and relative efficiency (for example at the Hope and Hollinwood Spinning Companies).⁵⁷ Operatives' knowledge of the cotton economy and the workings of the mills helped form expectations about likely profits. Raw material prices were published in the local press and mill expenses were standard and well known. Hence operatives and other shareholders, assisted by press commentators formed expectations about the earning power of their investments. Almost all press share market reports and many company reports discussed expected results against actual.⁵⁸

The extent of financial scrutiny by operatives lends further credence to Ellison's important point about efficiency being promoted by co-operative organisation. What then was the source of local belief at least regarding the superior performance of the Oldham cooperatives? It is possible to investigate such claims of efficient business operation by looking at the actual financial results of the co-operative companies. In the next section, these

claims are examined in more detail.

Cooperation and efficiency: Empirical evidence

Several levels of comparison can usefully be conducted. First, a comparison of stock returns between Oldham firms and the London stock market. Second, a comparison within the cotton textile sector of Oldham firms with privately owned cotton companies outside the district. Third, because dividends were such an important aspect of the Oldham system, it is useful to compare dividend yields of Oldham companies compared to firms elsewhere. Fourth, a series of comparatives for dividend yield and total shareholder return can be conducted between companies operating within the Oldham district. These companies can be grouped and differentiated in terms of their adoption or non-adoption of two 'democratic' governance principles: one shareholder one vote, and low denomination shares.

Figure 1 shows the their performance in terms of the return to an investor in an index of the Oldham market compared to the returns available to an investor in a portfolio of stocks of all quoted British firms for the period 1875-1896.⁵⁹ The graph calculates these returns by adding dividends to the difference between prices at the beginning and end of each year and dividing the total by the opening share price. Annual returns are then cumulated into an index taking 1st January 1875 as the base = 100.

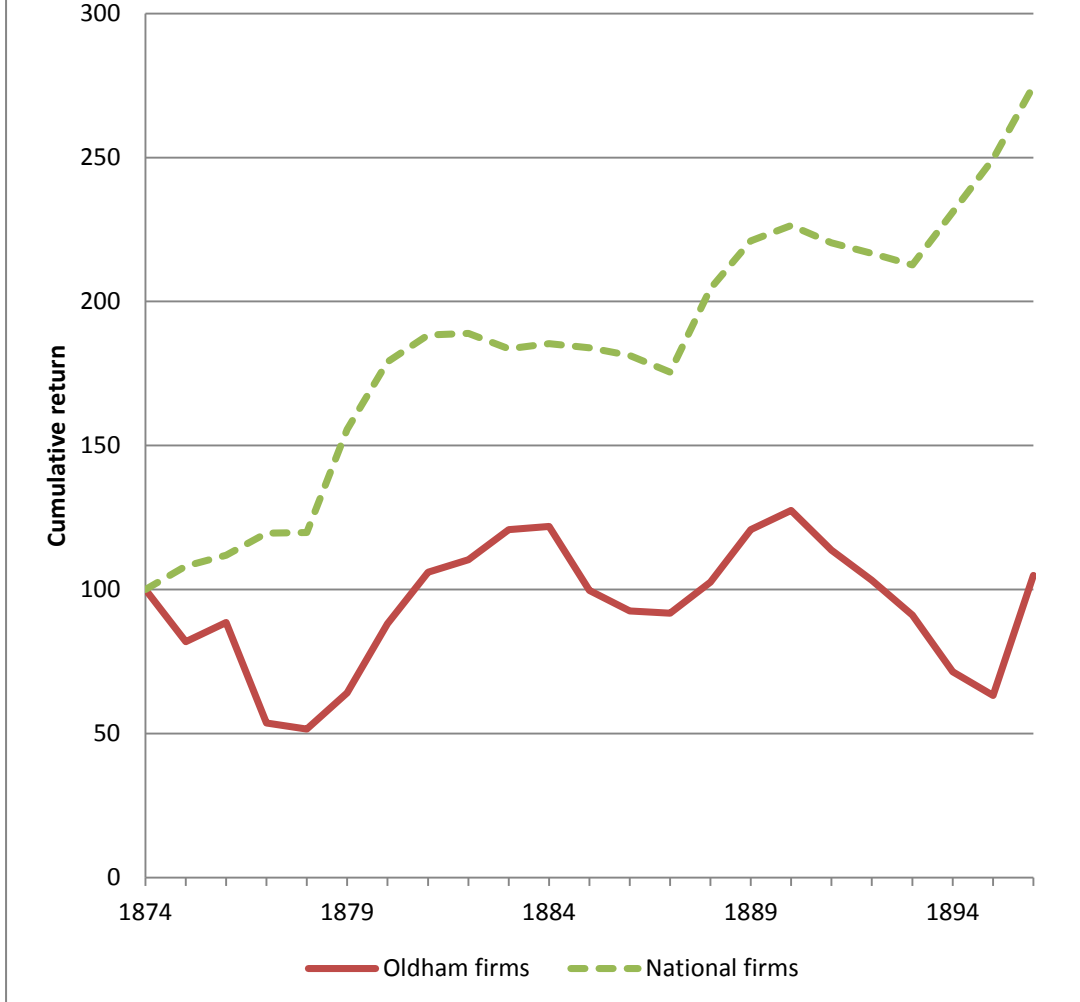
The results show that cumulative returns to national firms outpaced Oldham firms throughout the period and in all sub-periods. The average annual return to an investor in national firms was 4.97% per annum, whereas for the Oldham co-operative investor the return was 2.41% per annum, so that the index values of their investments in 1896 were 274.9 and 104.8 respectively. The underperformance of the Oldham companies is difficult to explain, if contemporary claims of relative efficiency are true. Of course the standard of comparison might be misleading, as nationally quoted stocks were dominated by utilities,

infrastructure and overseas investments. Spinning and weaving companies are represented in the Grossman indices, which have been used for the purposes of this comparison, but carry relatively small weight.⁶⁰

Figure 2 shows comparative accounting returns for Oldham companies compared to a sample of private spinning and weaving companies and a sample comprising all types of firms. Accounting data for a sample sufficient to carry out such a comparison are only available from around 1885 onwards. Even using other cotton firms as a comparator, the Oldham sector seems to do badly, at least after 1885. Returns on capital employed for Oldham firms averaged 3.09% in this period compared to 6.48% for private firms and 6.03% for the overall index of cotton companies. It seems possible that whatever the efficiencies identified by Ellison, writing in the mid 1880s and reflected in the quotation earlier dissipated fairly soon thereafter. It is also possible that they were insubstantial in economic efficiency terms before then, looking at the evidence in figure 1.

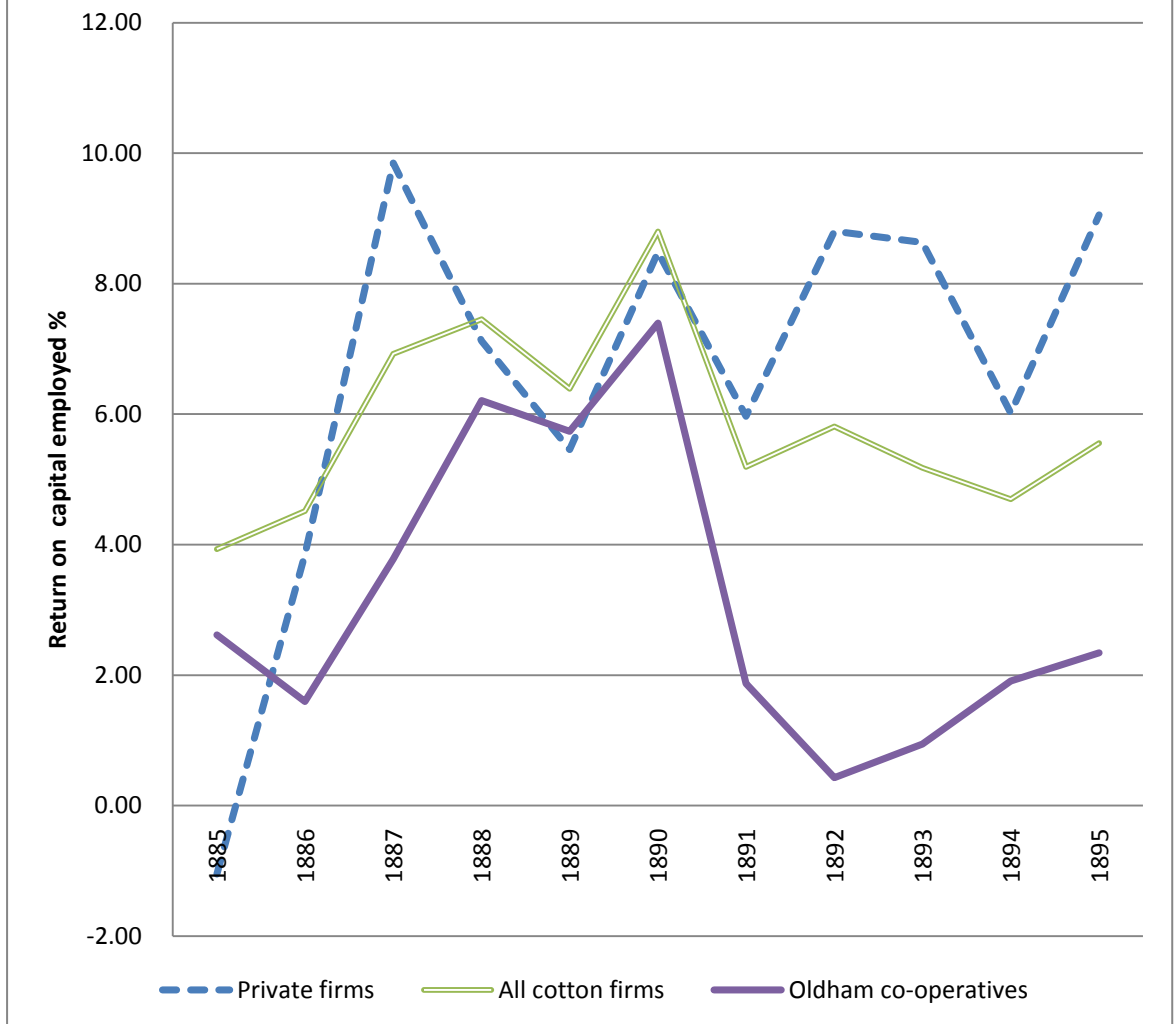
A further measure worth comparing is the dividend yield. As discussed above, dividends were an important part of the local culture of share-ownership, and although not successfully integrated into labour bonus payments, were nonetheless a significant source of income for operative shareholders. Figure 3 compares the dividend yield on Oldham co-operative investments with dividend yields in the national firm portfolio.

Figure 1: Comparative stock market performance, Oldham co-operatives and national firms, 1874-1896

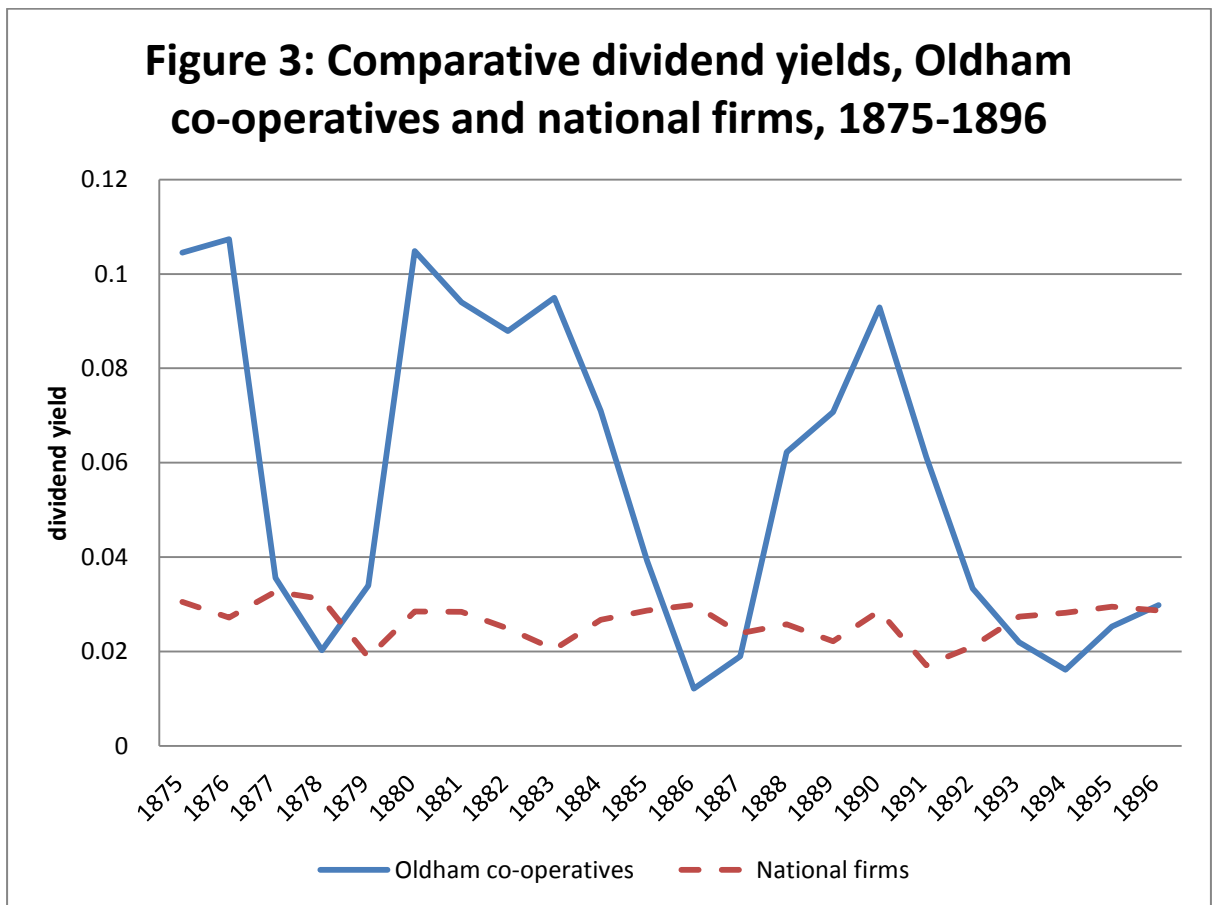


Sources: Oldham co-operatives share price and dividend data calculated from a sample of 33 Oldham firms whose share price quotations were published in weekly editions of the *Oldham Standard*. National firms calculated using annual total return data weighted by share capital, Grossman, ‘New Indices of British Equity Prices, 1870–1913’, table 5.

Figure 2: Comparative returns on capital employed, 1885-1896



Sources: Toms 1998, table 5, p.19.



Sources: As figure 1 above

As figure 3 shows, dividend yields were considerably higher in aggregate for Oldham companies when compared to the national average. Oldham co-operatives paid 5.63% over the period compared to 2.64% for firms nationally. The very important aspect of figure 3 is the volatility of dividend payments made by the Oldham firms, and their tendency to pay out very high dividends when they were able, typically during boom years. Mill building booms coincided with upswings in the trade cycle and dividends played an important role in signalling the likely profit opportunities available to investors in the larger, more efficient mills which were developed in each new wave of construction. In the boom years of 1880-81, very high dividends were paid and yields of 17.86%, at Sun Mill, 23.80% at Albert and 18.37% at Borough in 1880 were typical.

To analyse performance differentials within the Oldham district, data were collected from the share price lists for the period 1875-1896. The period start date coincides with the first publication of the share list and the end date corresponds to the de facto expiration of the co-operative experiment. All 12 companies with high denomination shares (defined as \geq £20) were included in the sample, along with a larger sub-sample of 21 firms with small denomination shares (defined as \leq £20 but typically $<$ £5) from a sample of 70 mills listed as operating in the following districts: Oldham; Ashton, Stalybridge, and Mossley; Middleton, Heywood and Bury; Rochdale, Milnrow and Rossendale. The sampling process was non random, and instead based on purposeful inclusion of pioneering co-operatives and firms whose organisation was known to be influenced by cooperative principles.⁶¹ High denomination shares are indicative of a wealth qualification for ownership. Since the average wage of a cotton operative in 1872 was £37 7s per annum,⁶² denominations higher than £20 would be beyond their means. Even so, firms that espoused co-operative principles nonetheless used such high denominations, for example at the Green Lane Spinning Company and Oldham Twist Spinning Company.⁶³ Grimshaw Lane Spinning Company shareholders numbered around 50 for most of period and typically consisted of professional classes such as architects, solicitors, estate agents and local small business owners. Shiloh Cotton Spinning Company by contrast had a large number of shareholders (295), including many operatives.⁶⁴ Not all firms used the one shareholder one vote (hereafter OSOV and firms not using this rule = NOSOV) and the sample was also stratified in order to select firms using OSOV (n=20) and one share one vote (n=13) rules, bearing in mind the availability of archival and press evidence.⁶⁵ Because firms combined different aspects of LD and OSOV, the sample was accordingly stratified varying from the most democratic (LD + OSOV) n=15, to the least democratic (HD and NOSOV) n=7, with the remainder featuring either LD or OSOV but not both. For each company in the sample the annual return was computed as

described above for figure 1. Using annual data, the total sample of 33 companies resulted in 550 firm year performance observations across the period of the study.

Constructing the sample in this way allows comparatives to be conducted through time between groups and differences in averages for specified periods to be measured for statistical significance. Performance is contrasted between LD and HD sub-samples by total shareholder return (figure 4) and dividend yield (figure 5) and between OSOV and NOSOV for the same measures respectively (figures 6 and 7) and a summary table (Table 1) contrasts sample means.

Figure 4 compares total shareholder return for LD and HD firms applied to a base index of 100 in 1875. The results show consistently higher total returns for the higher denomination shareholder group. The gap in performance is statistically significant (table 1, column 1), bearing in mind that firms in both groups were similar age, product range (average yarn count) and size (spindleage). The difference is not significant before 1885 (table 1, column 2), suggesting that in that period working class involvement in corporate governance at least did not impair financial performance.

As noted earlier, working class investors were effective at pressurising boards and it is likely that they might have used their voting power to induce high dividend payments. To test this proposition it is possible to compare the dividends paid by two groups of company: those with high share denominations and those with low share denominations of less than five pounds paid up capital. Only those firms with lower denominations would have been readily accessible to working class investors and such firms would have typically had more shareholders in numerical terms due to the lower entry qualification. Figure 5 shows the dividend yields of the two groups in the period 1875-1896. Although the trends of the two groups track each other closely, the low denomination index of dividend yield is slightly more volatile, particularly before 1886, with a tendency to pay higher dividends during

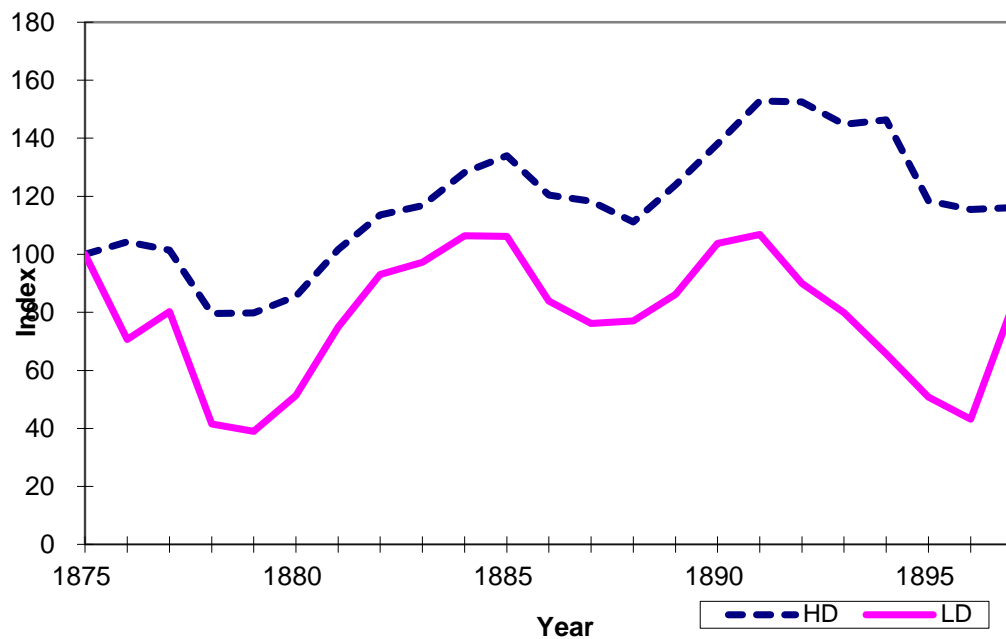
booms, for example in the boom of 1879-81.⁶⁶ Higher denomination firms in contrast seem to have a more conservative strategy. However with yields averaging 5.2% and 5.0% for the full period, these differences were insignificant (table 1, column 3). In the period up to 1886, the difference was greater (6.2% vs 5.4%), but again not statistically significant. If these cash pay-outs did offer any reward to working class investors, however marginal, the consequence of higher dividends would be to reduce the capital value of the shares and investors' stock of wealth, assuming constant total shareholder returns. In other words, because LD firms matched if not bettered HD firms in terms of dividend yield, it is clear that investors in the HD group were more than compensated in terms of retaining the value of their investments. Indeed, the evidence in figure 5 seems to suggest that HD share-ownership promoted better aggregate financial performance. Bearing in mind that most of the firms in figure 5 were founded on co-operative principles, but differentiated only in terms of their openness to less wealthy investors, it would appear that it was wide participation and the associated demand for dividends, rather than the co-operative principle itself that was inimical to financial performance.

Figures 7 and 8 contrast the performance of the OSOV and NOSOV sub-sample groups, which can be interpreted with further cross sectional comparisons in table 1. Figure 7 shows the total cumulative shareholder return for the two sample groups, revealing a performance advantage to the OSOV group up to 1886, which reversed subsequently, particularly in the slump period of 1891-95. Before 1886, there was a statistically significant difference in performance averaging 5.5% for the OSOV group, and which notwithstanding the subsequent trend is still positive at 3% for the full period (table 1 columns 1 and 2). Dividend yield was also higher throughout, and significantly (2.5%) higher for the OSOV group before 1886 (table 1 columns 3 and 4 and figure 8). These results support the

hypothesis of democratic ownership generating superior profits and the propensity to pay those profits as dividends, albeit becoming less pronounced in the later period.

The discussion so far has considered only the separate effects of share denomination and voting mechanisms. Table 1 also reports means for combinations of these features. Firms with OSOV and LD combinations produced the highest returns of +3.0% compared to the lowest returns for the HD and NOSOV group of -2.7% (1.03 and 0.973 respectively in table 1). The difference is marginally significant at the 10% confidence interval. The performance gap was higher before 1886 in terms of the mean difference (7.5%) at the same confidence interval, and of a statistically significantly higher dividend yield before 1886 (7.0% vs 4.3%). Table 1 also compares the marginal effects of specific governance mechanisms. Within the HD group, OSOV firms generated significantly higher total returns in the period before 1886 relative to NOSOV firms (+5.7%). For firms with OSOV the impact of LD was more marginal with only a 3.8% advantage in total return which was statistically insignificant. There were similar small and insignificant differences in the pre-1886 sub period and for dividend yields. For NOSOV firms only, the effect of LD shares was to improve overall performance by 4.8% and by 6.1% in the pre 1886 period, with the differences marginally significant at the 10% confidence interval. These differences suggest that much of the superior performance in HD firms in figures 5 and 6 is accounted for by those HD firms that also used OSOV. The message from table 1 is that democratic voting and financial inclusivity both promoted financial performance, certainly before 1886 and that OSOV probably had the stronger effect.

Figure 4: Shareholder Total Return, 1874-1896



	Average Total Return, 1875-1896	Average Total Return, 1875-1885	Average Dividend Yield 1875-1896	Average Dividend Yield, 1875- 1885
All firms	1.015	0.998	0.051	0.059
Sub-group				
LD	1.027	1.002	0.052	0.062
HD	0.992	0.990	0.050	0.054
Difference	0.035*	0.012	0.002	0.009
OSOV	1.027	1.019	0.055	0.069
NOSOV	0.997	0.964	0.045	0.044
Difference	0.030*	0.055*	0.011	0.025***
Combinations				
HD/NOSOV	0.973	0.931	0.046	0.043
HD/OSOV	0.992	0.988	0.050	0.054
LD/NOSOV	1.021	0.992	0.044	0.044
LD/OSOV	1.030	1.006	0.056	0.070
Mean differences				
HD/OSOV-HD/NOSOV	0.019	0.057***	0.004	0.010
LD/OSOV- HD/OSOV	0.038	0.018	0.006	0.016
LD/NOSOV- HD/NOSOV	0.048*	0.061*	-0.002	0.001
LD/OSOV- HD/NOSOV	0.056*	0.075*	0.010	0.026**
Sample sizes N				
HD	12	11	12	11
LD	21	21	21	21
Total	33	32	33	32
NOSOV	13	12	13	12
OSOV	20	20	20	20
Total	33	32	33	32

Notes: *** p<0.01, **, p<0.05, * p<0.1, using one tailed tests of the hypotheses that cooperative democratic governance features (LD and OSOV) enhance returns and yields, reported as the lower of t tests on mean differences and Mann-Whitney-Wilcoxon sum of rank z tests.

LD = Low denomination (<=£5 paid up); HD = High denomination (=>£10 paid up) [No firms had paid up shares in the £5- £10 range]. OSOV = One-shareholder one vote; NOSOV = Not one shareholder one vote, ie one share one vote.

Sources: Returns are shown as decimal equivalents, standardised to 1 and together with dividend yields are calculated from weekly share price and dividend lists in the *Oldham Standard* and *Oldham Chronicle*.

Figure 5: Comparative dividend yields, High and low denomination Oldham firms, 1875-1896

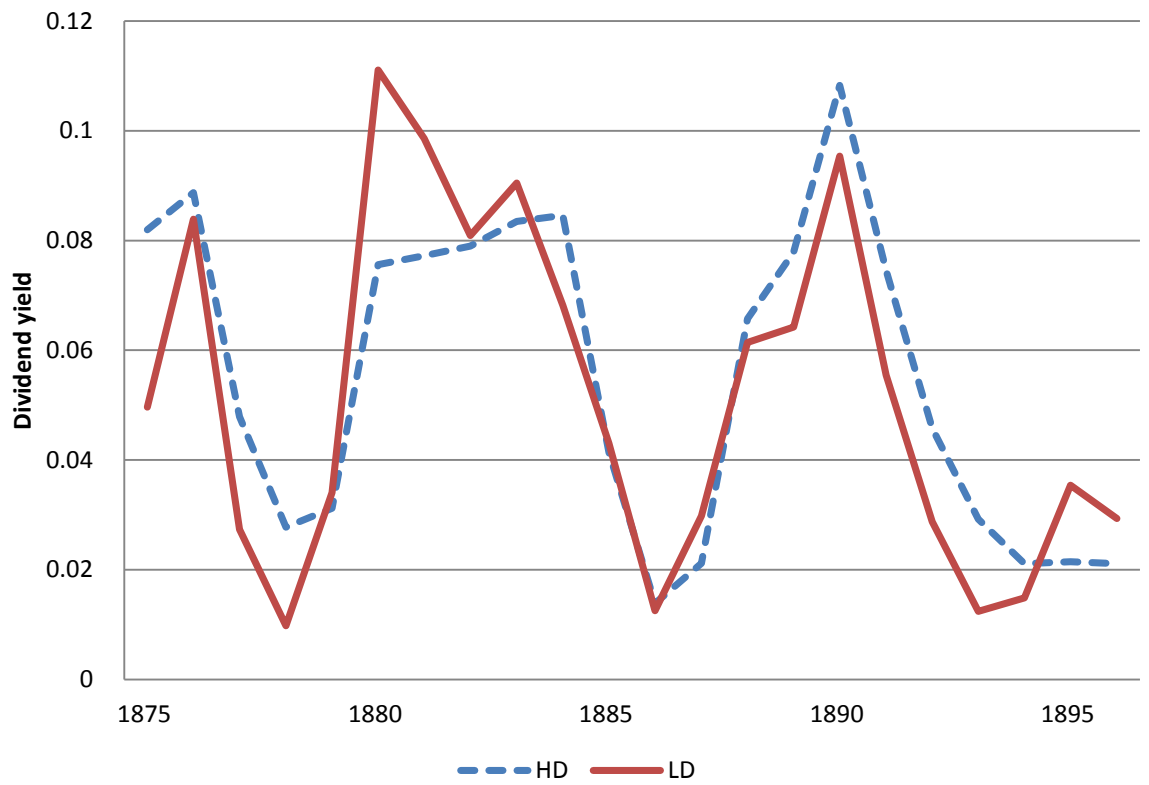


Figure 6: Comparative dividend yields, OSOV and NOSOV Oldham firms co-operatives, 1875-1896

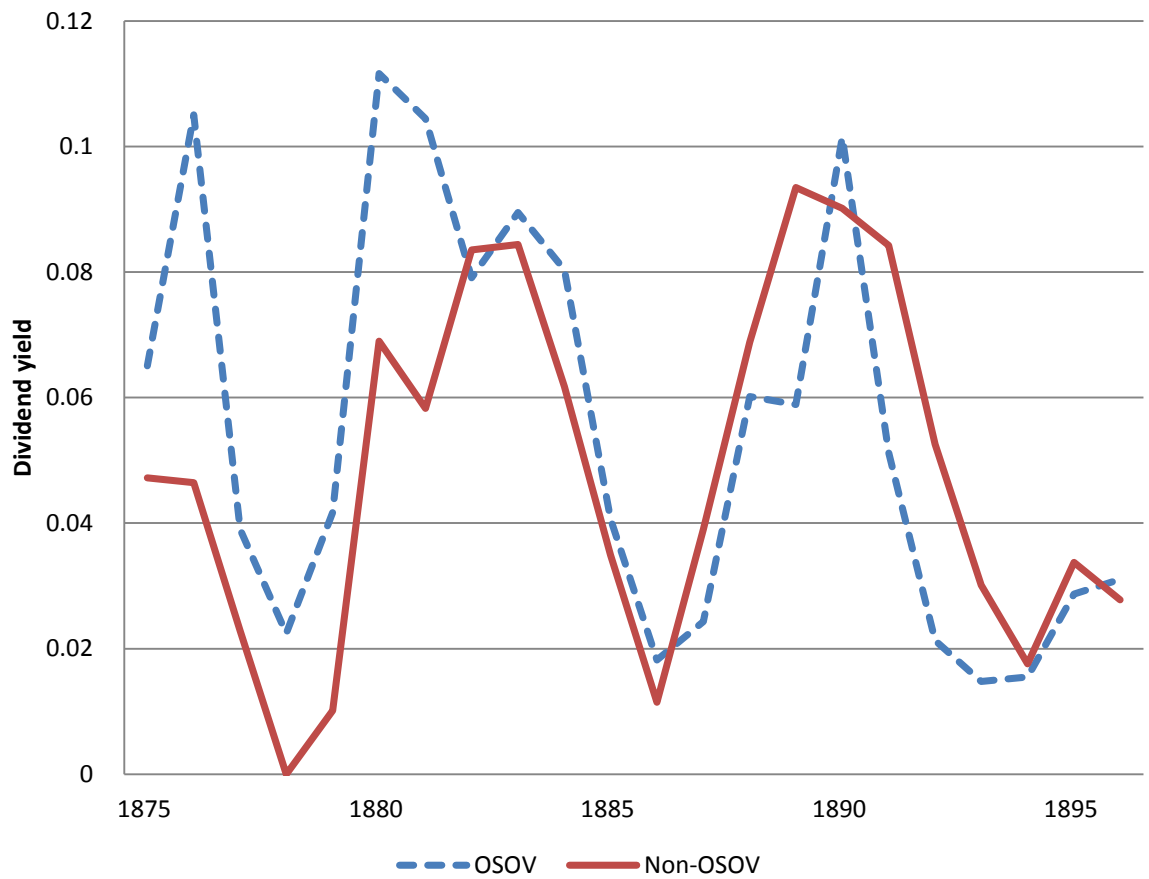


Figure 7: Comparative Total Returns, OSOV vs NOSOV, 1874-1896

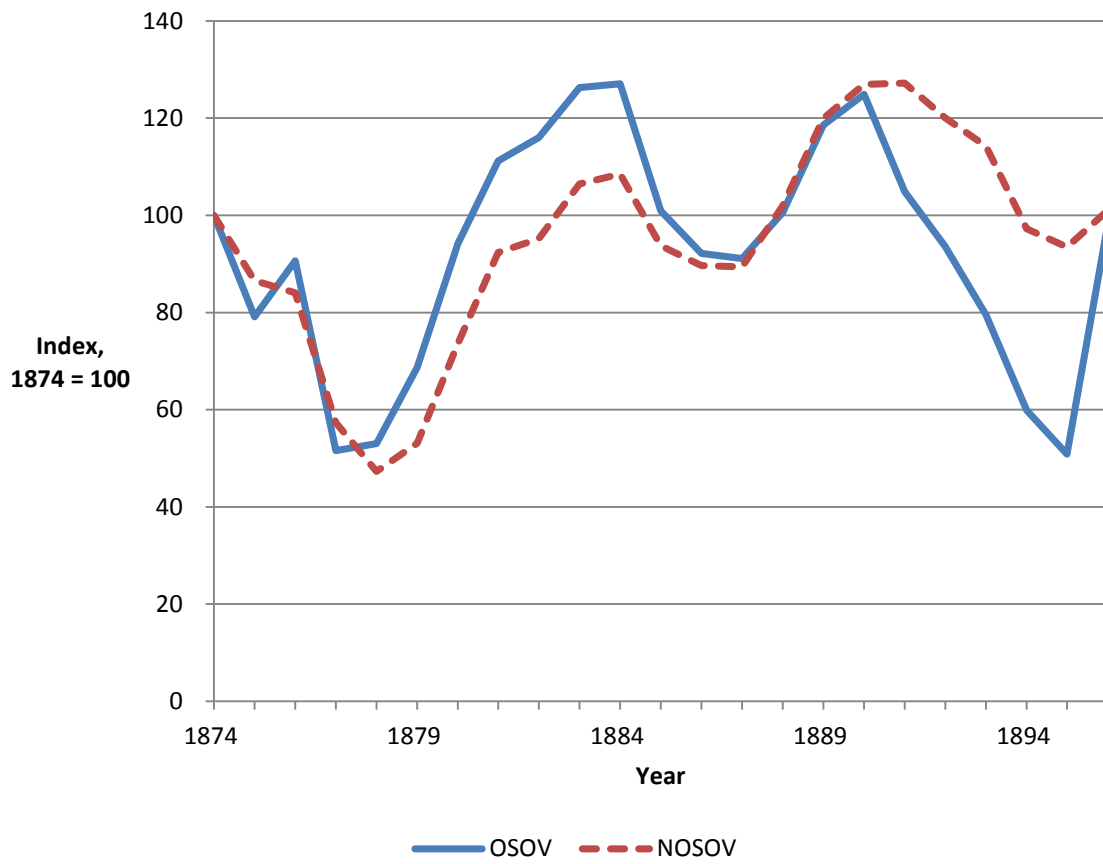
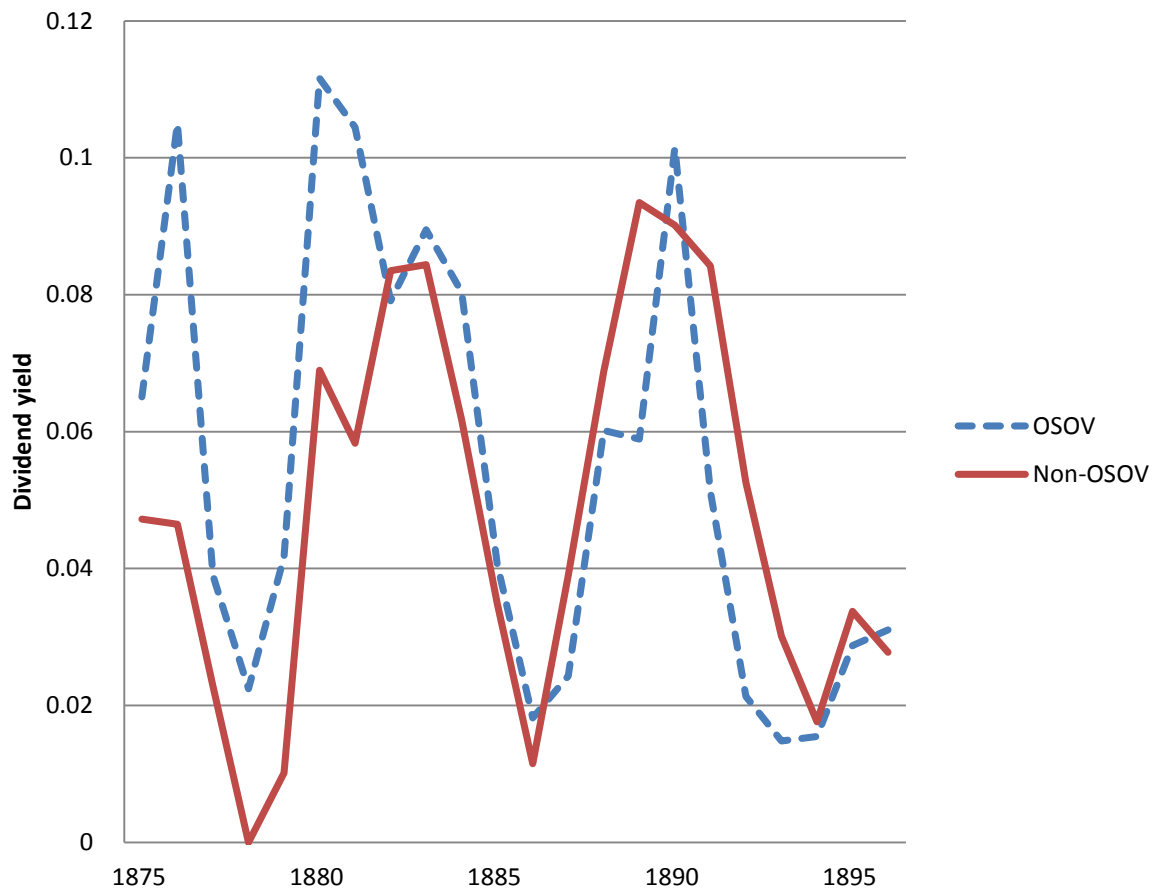


Figure 8: Comparative dividend yields, OSOV and NOSOV Oldham firms, 1875-1896



In general the above evidence shows that the adoption of democratic governance structures enhanced financial performance to some degree and certainly did not detract from it, at least before 1886. A residual question therefore is if these firms were indeed successful, why did they not survive during the further phase of expansion of the Lancashire textile industry up to 1914? With the working class of Oldham controlling over 3 million spindles in 1875,⁶⁷ and working cooperative factories to high levels of efficiency, it would be only a matter of time before they supplanted the privately controlled mills in Oldham and elsewhere in the industry. The issue has already been addressed in the prior literature to a large extent.⁶⁸ Trade union organisation created both economic and political opposition to the cooperation, with collective bargaining emerging as the preferred mechanism to insure workers against the risks of the trade cycle.⁶⁹ As trade union membership increased, worker-shareholders were treated with suspicion on the shop floor.⁷⁰ In the slump of the early 1890s, the deepest since the cotton famine,⁷¹ firms accumulated losses and prospects of future dividends became remote, so working class investors sold their shares as wages fell and savings were eroded.⁷² Figure 7 shows that OSOV firms suffered particularly badly in this slump and figure 8 that there was a disproportionate fall in dividend pay outs. By the mid 1890s shares had fallen to low values and provided an opportunity for investors to purchase control of the firms cheaply. By securing voting blocks in this way, investors were able to abolish democratic methods of control, for example the one shareholder one vote rule, shareholder audit and limitations of directors salaries.⁷³ Company promoters, who no longer had anything in common with co-operative principles, were blamed for the depressed condition of the industry in the 1880s and for using laudatory prospectuses to guarantee high initial share prices and then selling their own holdings soon after flotation, which tended to defraud the longer term investor, making large profits for themselves in the process.⁷⁴ Share-ownership centralised around cliques, accounting became secretive, and the

stock market became narrower as the proportion of listed companies fell.⁷⁵ It was not purely the expansion of the credit system, as Marx suggested, but cyclical effects in production and related wealth redistribution effects of a cyclical stock market that undermined the cooperative experiment. As the empirical evidence above shows, the performance benefits of cooperation were stronger before 1886, which reinforces other evidence in the literature that the distinctions between cooperative and joint stock companies were increasingly blurred after that date.

Conclusions

The paper has addressed a gap in the literature by illustrating the potential success of producer cooperation when developed in conjunction with shares traded in a stock market. Such cases are rare today and difficult to replicate in the absence of experimental legislation, and consequently the evidence analysed above is all the more valuable to present day regulators and the promoters of cooperative organisations. It has specifically investigated the value of democratic shareholder voting rights in conjunction with working class investment through the use of low denomination shares.

The evidence shows that democratic voting rights promoted improved financial performance, at least until 1886, after which time cooperation began to lose its impetus. The evidence for low denomination shares is more equivocal. Firms using low denomination shares underperformed high denomination firms through time, although low denomination firms had a marginally better long run average. This discrepancy arose from the distribution of returns, since low denomination shares were more volatile.

In addition to the financial success enjoyed by one shareholder one vote firms there was also a successful sub group of firms that combined high denomination shares with the one shareholder one vote rule. These firms were not strictly producer cooperatives since

shareholders were typically middle class professionals and cotton entrepreneurs, rather than operatives. They owned small fractions of total capital and did not have significant blocks of shares but participated in company management. As a consequence, they appear to have been as effective as working class investors in promoting financial success.

High rates of dividend payment were associated with enthusiasm for participation in governance and management, and may have been self reinforcing. At the same time, the excessive distribution of capital by the democratic participatory cooperatives tended to reduce their economic performance. Wide participation was also associated with reinvestment in new ventures, not capital accumulation in established concerns. However, although these new ventures attracted high initial participation through generous dividends, the increasing influence of speculative promoters undermined their value as investments and ultimately the participation of working class investors. Meanwhile, cooperatives that limit wider participation through higher entry qualifications and pay moderate dividends may be more effective under certain conditions.

The co-operative principles of democratic participation in cotton companies at first promoted economic growth and perhaps efficiency, and were assisted by certain factors that through time placed limits on co-operative production as a sustainable system. Most important was the effect of the trade cycle. World market conditions, including raw cotton and yarn prices were the fundamental determinants of this, but activities by cooperative and later speculative promoters accentuated it. Early cooperators, and later, speculative cliques both used the lure of high dividends to attract investment, the former to satisfy the demand for safe returns in cash from working class investors, the latter to profit at their expense through mis-priced share offers. A second factor was the improvement of mill technology, which meant that each successive wave of new mills was more efficient than the previous, so that the earlier mills where cooperation was more entrenched were at a competitive

disadvantage to their better equipped and higher capacity competitors. The pressure to pay higher dividends in the working class co-operatives also meant there was less funding for reinvestment, and the re-equipment and extension of these mills. Whereas the analysis above compares firms of similar age, there is scope for further research offering more precise measurements of technology and product range.

A third factor was limited liability legislation. At first this provided co-operators an alternative to the Industrial and Provident Societies Act as a means of limiting liability whilst enshrining democratic principles. Later it was flexible enough for the cliques of local capitalists to undermine these principles and concentrate their control. Finally, there was the stock market. Like the trade cycle and technology, access to the stock market through the vehicle of joint stock organisation at first reinforced the dominance of producer cooperatives. Stock market share quotations reduced entry barriers for the promoters of newer, less cooperative and more overtly capitalist mills. Ultimately, the stock market was in contradiction to the cooperative principle, because the buying and selling of shares on the open market could not guarantee the replacement of principled shareholders with those sharing the same values. These firms were vulnerable to takeover and the advance of technology, vulnerability to the trade cycle, rise of the labour movement and the ability of external profit maximising investors to use Companies Act legislation to their own advantage, destroyed their long term future.

Notes

¹ Jensen and Meckling, 'Rights and Production functions'.

² The 'Oldham District' comprised a large area of South East Lancashire and included Rochdale to the north, Ashton to the south and Middleton to the west.

³ Ellison, *The cotton trade*, p.138.

⁴ For example, *Oldham Standard*, 10th July, 1875, p.8c; Jones, 1894, *Co-operative Production*, pp. 284-85.

⁵ Farnie, *The English Cotton Industry*.

⁶ See respectively, Toms 'Windows of Opportunity in the Textile Industry'; Toms 'The Supply of and Demand for Accounting Information in an Unregulated Market'; Toms 'The Rise of Modern Accounting and the Fall of the Public Company'; Toms, 'Information Content of Earnings Announcements in an Unregulated Market'.

⁷ On the success of retail in northern England, see Purvis 'Stocking the Store', 55-78.

⁸ Redfern, *The Story of the CWS*, pp.19-20. Producer co-operatives and limited liability dominated the agenda of this influential meeting on 12th August 1862, which was attended by 'a few friends from Rochdale, Oldham, and Middleton,' including William Marcroft, the founder of Sun Mill Cotton Spinning Company.

⁹ The Oldham 'limiteds' constituted the most important group of joint-stock *manufacturing* corporations in Britain and were responsible for 12 percent of the *world's* cotton spinning capacity in 1890 (Farnie, 'The emergence of Victorian Oldham as the centre of the cotton spinning industry', pp. 41-53). The 'Oldham District' comprised a large area of South East Lancashire (much of present day Greater Manchester) and included Rochdale to the north, Ashton to the south and Middleton to the west.

¹⁰ For examples see Toms 'The Rise of Modern Accounting and the Fall of the Public Company', p.68.

¹¹ Toms 'The Supply of and Demand for Accounting Information in an Unregulated Market' Toms 'The Rise of Modern Accounting and the Fall of the Public Company', pp.61-84.

¹² For example: *Depression of trade and industry. Second report of the Royal Commission appointed to inquire into the depression of trade and industry 1886* [C.4715].

¹³ Jensen and Meckling, 'Rights and Production functions', pp.469-506; Ben-Ner, 'On the Stability of the Cooperative Type of Organization', pp.247-260.

¹⁴ Jensen and Meckling, 'Rights and Production functions', pp.469-506.; see particularly, p.473, p.477, pp.482-83.

¹⁵ See respectively, Dow *Governing the firm*; Pencavel, Pistaferri & Schivardi, 'Wages, Employment, and Capital in Capitalist and Worker-Owned Firms', pp.23-44; Estrin, and Jones, 'The Viability of Employee-Owned Firms', pp. 323-338.

¹⁶ Arando et al, 'Assessing Mondragon: Stability and Managed Change in the Face of Globalization', William Davidson Institute Working Paper No. 1003, November.

¹⁷ For example in the case of private clubs, Jensen and Meckling, 'Rights and Production functions', p.500.

¹⁸ Jensen and Meckling, 'Rights and Production functions' pp.484, 500.

¹⁹ Dreze, 'Some theory of labor management and participation', pp. 1125-39.

²⁰ Jensen and Meckling, 'Rights and Production functions', pp.487-88.

²¹ Dreze, 'Some theory of labor management and participation', p.1134. The cotton spinning industry in the second half of the nineteenth century was characterised by increasing asset and product specialisation. Kenney, 'Sub regional specialization in the Lancashire cotton industry, pp. 41-63.

²² Jensen and Meckling, 'Rights and Production functions', p.500.

²³ Other voting systems, including dual class rights and cumulative voting for directors, have disappeared altogether from some States of the USA and are found infrequently elsewhere. The egalitarian decision rule of *one-shareholder-one-vote* was sometimes used in corporate decision-making in the early nineteenth century, but has subsequently disappeared. Dunlavy, 'Corporate Governance in Late Nineteenth Century Europe and the U.S. The Case of Shareholder Voting Rights'.

²⁴ Marx, *Capital III*, p.440, Engels, *Anti-Duhring*, pp. 284-98.

²⁵ Clark, (1984), 'Authority and Efficiency: The Labor Market and the Managerial Revolution of the Late Nineteenth Century', pp. 1069-1083; Bowles and Gintis, *Schooling in Capitalist America*.

²⁶ Marglin, 'Knowledge and Power', pp.146-64.

²⁷ Clark, 'Authority and Efficiency: The Labor Market and the Managerial Revolution of the Late Nineteenth Century', p.1079, see also Potter, *The Co-operative Movement in Great Britain*; Jones *Co-operative production*, p.288.

²⁸ L. Putterman, 'Some behavioural perspectives on the dominance of hierarchical over democratic forms of enterprise' p. 157.

²⁹ Clark, 'Authority and Efficiency: The Labor Market and the Managerial Revolution of the Late Nineteenth Century' pp.1072, 1077, 1082-83.

³⁰ c.f. Clark, 'Authority and Efficiency: The Labor Market and the Managerial Revolution of the Late Nineteenth Century', p.1079 and Ellison, *The cotton trade*, p.138.

³¹ 'Rise and progress of the Rochdale limiteds', *Rochdale Observer*, 10th May, 1890.

³² William Cooper, *The Co-operator*, 1862, No.31 (September), p.70.

³³ 'Old Pioneer', *The Co-operator*, 1862, No.32, pp.84-85, October, F. Wilson, *The Co-operator*, 1861, No.18, 15th October, p.86.

³⁴ William Cooper, *The Co-operator*, 1862, No.31 (September), p.70.

³⁵ Marcroft, *The Companies Circular*, Oldham. Marcroft was also an advocate of maximising dividend payments. Redfern, *The Story of the CWS*, p.20.

³⁶ Sun Mill Archive, John Rylands Library, Minutes of Directors Meetings, SM/1/1, 10th September 1861 and *passim*, eg 3rd May 1864.

³⁷ Belgian, Shiloh and Thornham were typical companies with large numbers of working class shareholders. Respectively these companies had 639, 295 and 406 shareholders and

average shareholdings of 22, 17 and 18 (PRO BT31/14469/7869, 14486/8310 and 14494/8449). Oldham Equitable Co-operative Society took up 200 shares the Equitable Spinning Company and 100 in the Glodwick and Thornham Spinning Companies, whilst placing £3000, £3000 and £1000 respectively on deposit with the loan accounts of each company (Toms, 'The Rise of Modern Accounting and the Fall of the Public Company', pp.67-68 and table 2; Taylor, *The Jubilee History of the Oldham Industrial Co-operative Society Limited*, p. 75)

³⁸ SM/1/1, 6th January, 1863.

³⁹ 'Diviborough', see Farnie, *English cotton*, p. 263, and for comparisons of dividend rates of Oldham companies see Toms 'Financial constraints on economic growth' and Toms 'Finance and Growth'.

⁴⁰ SM/1/1, 7th August, 1869 and 10th July 1871.

⁴¹ Calculated as a percentage of called up share capital from the table in *Co-operative News*, 'The Sun Mill, 23rd November 1872.

⁴² Jones, *Co-operative Production*, pp. 289-91.

⁴³ For example see the press commentary on role of these factors in the slump of 1891-92 (*Oldham Standard*, 7th February, 14th February, 28th February, 23rd May 1891, 12th March 1892,).

⁴⁴ Farnie, *English cotton* 1979, pp. 250-1.

⁴⁵ Thomas, *The Provincial Stock Exchanges*, pp.149-151.

⁴⁶ In 1877, 59 companies had shares of £5 each and a further 11 had shares of =>£10, *Co-operative News*, 7th April, 1877.

⁴⁷ BPP, *Royal commission on the depression of trade and industry*, minutes of evidence, 4336 and 4586, *CWS Annual 1884*, quoted in Ellison, *The cotton trade*, p. 138.

⁴⁸ Smith, 'An Oldham Limited Liability Company, 1875-1896', pp. 34-53.

⁴⁹ For example in 1874, 772 shareholders held an average of 18 (£4) shares each in the Moorfield Spinning Company (calculated from Smith, 'A History of the Lancashire Cotton Industry between the Years 1873 and 1896', p. 188). When the Dowry Spinning Company was floated ten years later, 127 shareholders held an average of 94 (£2 10s) shares each (calculated from form E Summary of Capital and Shares 1884, Dowry Spinning Company, PRO BT31/37928/16753).

⁵⁰ Farnie, *English cotton*, p.266.

⁵¹ For example the losses at the New Earth and Boundary Spinning Companies, *Oldham Standard*, 17th July, 1891, 22nd August, 1891.

⁵² Ellison, *The cotton trade*, p. 138.

⁵³ BPP, *Royal commission on the depression of trade and industry*, q. 5275.

⁵⁴ Jones, 1894, *Co-operative Production*, pp. 284-85.

⁵⁵ *Textile Manufacturer*, February 1877; p.62.

⁵⁶ Ellison, *The cotton trade*, p.138.

⁵⁷ *Oldham Standard*, 17th January 1885.

⁵⁸ See *Oldham Standard*, and *Oldham Chronicle*, all Saturday issues, c.1875-1900; for a specific example see the report on the Stock Lane Spinning company, *Oldham Chronicle*, 25th December, 1897.

⁵⁹ Grossman, 'New Indices of British Equity Prices, 1870–1913', table 5.

⁶⁰ Grossman, 'New Indices of British Equity Prices, 1870–1913'.

⁶¹ For example Mitchell Hey, Sun Mill, Central, Oldham Twist, Green Lane, Royton.

⁶² *Co-operative News*, 13th January, 1872.

⁶³ Jones, *Co-operative Production*, pp.292-293. Green Lane shares were called up at their £50 nominal values and Oldham Twist used £20 shares (Oldham share list, *Oldham Standard*, various issues).

⁶⁴ Respectively, National Archives Form E Summary of Capital and Shares, PRO BT31, 14485/8274 and 14486/8310.

⁶⁵ Mill building companies typically used OSOV, whereas 'turnover' companies tended to use one share one vote, reflecting their conversion from previously private companies, most commonly in 1873; Yonekawa, 'Public cotton spinning companies and their managerial characteristics, 1870-1890', p.67. Some companies, for example Grimshaw Lane Cotton Spinning Company used a show of hands, and for this reason was classified as OSOV but members could under certain conditions force a ballot in which case a one share one vote ballot was used (National Archives, Articles of Association s.74, BT31/14485/8274). In 1874, the company had 28 shareholders with an average holding of 16 shares with the largest shareholding of 40 shares (8.8% of the total), so ballots would have made little practical difference.

⁶⁶ LD standard deviation = 3.05%; HD = 2.81%; pre 1886, LD = 3.26%, HD = 2.32%

⁶⁷ At the inauguration of the new Industry mill in 1875, the mill engine was christened the "Oldham", as a tribute to the 3.375 million spindles now controlled by the working class of Oldham (*Textile Manufacturer*, June, 1877, p. 180).

⁶⁸ Toms 'The Rise of Modern Accounting and the Fall of the Public Company', pp.61-84. Toms, 'Information Content of Earnings Announcements in an Unregulated Market', pp.175-190.

⁶⁹ Industry agreed wage lists negotiated by industry federation and trade unions became the norm from the mid-1880s onwards (Huberman, *Escape from the Market*, pp.136-139).

⁷⁰ BPP, *Royal commission on labour*, Group C, Textiles', qq. 190-3. Trade union leaders argued against the appropriation of profits by operatives, partly because it encouraged competition on the shop floor and created jealousy and monitoring difficulties (William Mullin, *Royal Commission*, 1892).

⁷¹ 'Is the Cotton Trade Leaving the Country?' *Textile Mercury*, 21 January, 1893, p.43. See also figure 1 above.

⁷² A survey in the *Oldham Standard*, 29th December 1894 showed that the Belgian, Gladstone, Hope and Werneth Cotton Spinning Companies had adverse balances greater than £20,000 (the average subscribed equity capital per company in 1885 was £38,200 (calculated from the appendix data in Smith, 'An Oldham Limited Liability Company, 1875-1896', pp.52-3). From a list of average profits per company for the last ten years (*Oldham Standard, ibid*), the average profit per company per year was £993 (based on 980 company/years).

⁷³ Toms 'The Rise of Modern Accounting and the Fall of the Public Company', pp.61-84. Toms, 'Information Content of Earnings Announcements in an Unregulated Market, pp.175-190.

⁷⁴ BPP, *Royal commission on the depression of trade and industry*, qq. 5041, 5117.

⁷⁵ Toms, 'Windows of Opportunity in the Textile Industry', Toms, 'The Supply of and Demand for Accounting Information in an Unregulated Market'. In the longer run, these changes caused a mis-allocation of capital that undermined the international competitiveness of the industry from 1914 onwards (Toms, 'Growth, Profits and Technological Choice', Toms 'The English cotton industry and the loss of the world market, pp.70-73. Higgins and Toms, 'Firm Structure and Financial Performance'.

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