The character and denomination of shares in the Victorian equity market*

Graeme G. Acheson
Ulster Business School
University of Ulster
g.acheson@ulster.ac.uk

&

John D. Turner
Queen's University Management School
Queen's University Belfast
j.turner@qub.ac.uk

&

Qing Ye
Queen's University Management School
Queen's University Belfast
q.ye@qub.ac.uk

Abstract

The seminal work of J.B. Jefferys highlighted two unusual features of the Victorian equity market, namely high share denomination and uncalled capital. This paper examines the extent to which publicly-traded company stocks had these features. It also analyses the effect of these features on stock returns using monthly data for the London stock market over the period 1825-70. We find that stocks with unpaid capital earn a higher return, which is consistent with investors being rewarded for the risk of a call on their personal assets. We also find that stocks with a high share denomination earn a lower return, which is consistent with the view that this feature was conducive to superior corporate governance.

Preliminary draft July 2010

1. Introduction

The seminal work of J.B. Jefferys highlights two unusual features of the Victorian equity market: the high denomination of shares and the presence of uncalled capital.[1] According to Jefferys, these two features existed to ensure good governance of publicly-traded corporations and to exclude unsuitable investors, such as middle class rentiers, from company ownership.[2] However, these two features may have made stocks illiquid, may have resulted in making portfolio diversification very costly, and, by restricting market participation, may have increased the equity risk premium.[3] This ultimately could have hindered the development of the British capital market.[4] Indeed, it might be more than coincidence that the market for securities grows quite rapidly after the early 1880s, which is when Jefferys dates the demise of high share denominations and uncalled capital.[5]

In this paper we have two objectives. First, as Jefferys simply gives an impressionistic overview of the prevalence of high share denominations and uncalled capital in the nineteenth-century stock market, we provide a comprehensive overview of the extent to which these features occurred over the period 1825 to 1913 amongst publicly-traded corporations. Second, using monthly stock price data for the period 1825-70, the heyday of high share denominations and uncalled capital, we examine the

---

[1] Jefferys 'Denomination', *Business Organisation*, chap. 4. Uncalled capital is where a portion of the nominal capital of a company's shares is unpaid, but is callable on demand by the company's board or by its creditors if the company enters bankruptcy.

[2] Jefferys 'Denomination', *Business Organisation*, pp.169, 174-8, 194, 209.

[3] On the effect of segmentation and participation on the equity premium see Kockerlakota, 'Equity Premium' and Heaton and Lucas, 'Importance', 'Stock Prices'. See Rousseau, 'Share Liquidity' for the effects of high share denomination on participation and market growth in the early Boston market.

[4] There is, of course, a long-running debate on the role of the capital markets in the alleged failure of the Victorian economy (see, for example, McCloskey, 'Did Victorian'), and there is a view that financial infrastructure was defective - see Edelstein, *Overseas Investment* and Kennedy, *Industrial Structure*. See Michie, 'Finance of Innovation' for a rebuttal of this view.

[5] See Michie, *London Stock Exchange*, p.89 for the growth of the equity market. Jefferys, *Business Organisation*, pp.144-5.

impact of these features on stock returns to see whether investors were compensated for investing in shares with these characteristics.

Our findings suggest that Jefferys was correct to identify 1867-85 as the watershed in the demise of the prevalence uncalled capital. However, Jefferys was incorrect in identifying the period 1867-85 as the watershed in the demise of high share denominations as we find that average share denominations trended downwards quite significantly over the period 1825-70, and simply continued to trend downwards in the subsequent period.

Our analysis of how the above two features affected stock returns reveals that investors received a higher return if stocks had uncalled capital. We suggest that this return was simply a reward for the risk of calls on their personal assets that investors faced and not a reward for the alleged illiquidity of such stocks. Our results also suggest that stocks with high denomination earned lower returns. This suggests that even if high denominations hindered portfolio diversification, investors did not seem to demand a compensatory return. Our findings are more in line with the view that higher denominations resulted in better corporate governance, and, as a result, investors demanded a lower risk premium.

A study of uncalled capital in Britain may have wider relevance as it also existed in other countries during the nineteenth and twentieth centuries, thus an analysis of this feature might aid our understanding of how early capital markets evolved.[6] Our study

---

[6] See Fohlin, *Finance Capitalism*, pp.230-1; Freedeman, *Joint-Stock Enterprise in France,* pp. 103-4, 117; Martel and Marco, 'Bank of Barcelona', p.14; Polsi, 'Financial Institutions in Nineteenth-Century Italy', p.125; Stephens, *Joint Stock Companies under the Canadian Acts,* p.113; Nanjo and Kasuya, 'Part-paid Stock'.

also has some resonances for current work in financial economics on the nominal share price puzzle.[7]

The rest of the paper is structured as follows. The next section describes our sample, assesses the extent to which uncalled capital and high share denominations were prevalent in the nineteenth century, and advances various reasons as to why companies had these features. Section three contains a discussion on the hypothesised effects of uncalled capital and high share denomination. Section four analyses the effect of these two features on stock returns. Section five summarises our findings and briefly discusses their implications.

2. Character and denomination of shares

2.1 Sample companies

Our sample covers the majority of equity securities traded on the London stock exchange in the period 1825-70, which, as we shall see, was the heyday of high share denomination and uncalled capital. The prices of equity securities as well as dividends, nominal capital, paid-up capital and number of issued shares are all reported in the *Course of the Exchange*, a stockbroker list which effectively was the official price list for the London market. After excluding colonial and foreign railways, stocks with missing data, and all companies which listed for less than 12 months, there are 681 companies in our sample.[8] This enables us to see how share denomination and uncalled capital evolved over the 1825-70 period.

---

[7] Weld *et al*, 'Nominal Share Price'.
[8] For a more detailed description of the sample see Acheson *et. al*., 'Rule Britannia', pp.1109-10.

The beginning of our sample period marks the beginning of the liberalization of incorporation law with the repeal of the Bubble Act and legislation which gave banks freedom to incorporate.[9] Freedom to incorporate was only extended to other enterprises in 1844, and freedom to incorporate as a limited liability company was only granted to all companies in a series of acts from 1855 to 1862.[10] Consequently, our sample includes limited liability companies created under these acts. However, it also includes limited liability companies which were incorporated by Royal Charter or by means of a private parliamentary bill. In the eyes of the legislature, canals, railways, waterworks, docks, and gas works had a good claim to incorporation and limited liability due to the public-good nature of their business. Indeed, the need to sequester land as well as the need to generate large quantities of capital usually necessitated an act of incorporation for these types of companies.[11]

The sample also includes banks incorporated under the 1825 Irish Banking Copartership Act and the 1826 Banking Copartnership Act. As a consequence, these banks all incorporated with unlimited shareholder liability. Although two insurance companies prior to 1862 had been incorporated with limited liability, the vast majority of insurance companies in the sample up until 1862 were unincorporated joint-stock companies. These insurance companies contracted so as to have a separate legal

---

[9] 6 Geo. IV, c. 91 and 7 Geo. IV, c.46.

[10] The Joint Stock Companies Acts 1856 and 1857 (19 & 20 Vict. c.47; 20 & 21 Vict. c.14). Banks and insurance companies were excluded from these acts. Banks were granted the right to incorporate freely with limited liability under acts passed in 1857 and 1858 (20 & 21 Vict. c.49; 21 & 22 Vict. c.91). Insurance companies were granted the right to incorporate freely with limited liability in the 1862 Companies Act (25 & 26 Vict. c.89).

[11] Cooke, *Corporation,* p. 119. On the railways, see Shannon, 'General Liability', p.375. On gas companies, see Falkus, 'Before 1850', p. 495. The majority of incorporation charters to gas companies had been granted by the 1820s; thereafter the capital requirements of gas works establishing in small towns tended to be small enough that they established without the need for incorporation with limited liability.

personality and limited liability.[12] Such a state of affairs was possible because the Court

of Chancery, unlike the common law, did not make a distinction between an ordinary

deed of partnership and a deed of settlement.[13] As a consequence, unincorporated

insurance companies were commonplace in this era, but they were *de jure* and *de facto*

unlimited under the common law.[14]

The sample also includes the Cornwall and Devon stannary mines whose

securities traded on the London market. These companies, which operated under the

stannary law, operated as entities separate from their owners, had tradable shares, and in

principle had unlimited liability.[15] However, these companies had procedures in place

(mainly placing limits or prohibitions on the company's ability to borrow) which resulted

in individual shareholders being able to limit their liability and having a large say over

the extent of liability they faced.[16]

In our sample of 681 companies, 26 per cent are railways and 20 per cent are

other public-good providers (canals, gas, waterworks, bridges). Banks constitute 16 per

cent of the sample and insurance companies a further 10 per cent. Mines (both foreign

and British) constitute close to 20 per cent of the sample. The remainder of the sample is

made up of miscellaneous companies from a variety of industrial and commercial sectors

e.g. brewing, docks, finance, food production, land investment, manufacturing, shipping,

---

[12] Supple, *Royal Exchange*, p.118.
[13] Cooke, *Corporation,* pp.95-97.
[14] Macgillivray and Browne, *Insurance Law*, p.3. Insurance companies could limit their liability *inter se*, but not to third parties (Harris, *Industrializing*, p.143). Investors were also wary about claims of these companies to have limited liability – see Raynes, *British Insurance,* p.211. Pearson, however, argues that shareholders in fire insurance companies were indemnified beyond their share capital against claims made by policyholders (Pearson, *Insuring*, p.239).
[15] Burke and Richardson, 'Decline and Fall', p.4; Burt and Kudo, 'Adaptability', p.34.
[16] Bartlett, *British Mining*, pp.21-37; Burt and Kudo, 'Adaptability', pp.34-6.

and telegraph. 165 out of the 681 companies in our sample were formed after the 1862 Companies Act.

2.2 Uncalled capital

Uncalled capital existed temporarily in some companies as they essentially operated an instalment plan for investors by calling up capital in small amounts over an unspecified period of time.[17] This made investment in such stocks more attractive to middle-class investors of modest means. With regards to railways, investors simply had to pay up 10 per cent of capital, and if the railway received Parliamentary sanction, they had to pay up the remaining capital when called by the directors.[18]

Uncalled capital may have had at least two other non-mutually-exclusive purposes. First, in the nineteenth-century market, company promoters and investors were wary of pure limited liability.[19] Consequently, some companies, in an era when limited liability was usually associated with public utilities, had uncalled capital in order to assure both voluntary and involuntary creditors (i.e. suppliers, customers and employees) as to the security of their company.[20] Indeed, banks and insurance companies, because of the nature of their business, had more reason than most to create confidence in their company by having a pool of resources that depositors, policyholders and investors could

---

[17] During the nineteenth century, some companies in the United States, France, Germany and Japan operated similar installment plans. See Davis, *American Corporations,* p.243; Fohlin, *Finance* Capitalism, pp.229-31; Freedeman, *Joint-Stock Enterprise in France,* p.80; Nanjo and Kasuya, 'Part-paid Stock'.
[18] Michie, *Money, Mania and Markets*, p.96; Campbell, 'Leveraging the British Railway Mania'.
[19] Jefferys, 'Denomination', pp.47-8; Taylor, *Creating Capitalism*, p.174.
[20] See *Select Committee on the Limited Liability Acts* (P.P. 1867), q.188. The security offered by uncalled capital was such that liquidators would first call unpaid capital from shareholders to pay creditors and then proceed to liquidate the company's assets. See *Report from the Select Committee on the Companies Acts, 1862 and 1867* (P.P. 1877), qq. 1820-22. See also Freedeman, *Joint-Stock Enterprise in France,* p.137 and Stephens, *Joint Stock Companies under the Canadian Acts* pp.112-113, for discussions on how uncalled capital acted as a similar guarantee in France and Canada respectively.

draw on in the event of financial distress.[21] Second, uncalled capital may have existed to allow managers in a nascent equity market to tap capital without the need to issue new shares.[22]

From Figure 1 we can see that the number of stocks which were partially-paid tended to fluctuate in tandem with the total number of stocks on the market, Over the sample period, about 44 per cent of companies in any one month had uncalled capital. There are three periods where the number of companies with uncalled capital rises rapidly and subsequently falls. The first two periods, the mid-1830s and mid-1840s, correspond to the establishment of the railways. The third period from 1862-67 corresponds to the establishment of many new companies after the 1862 Companies Act. A large proportion of these companies had uncalled capital, but after the collapse of Overend and Gurney in May 1866 many of them failed.

INSERT FIGURES 1 & 2

Figure 2 shows the average proportion of capital which was paid-up for partially-paid companies over the sample period. Over the sample period, companies with uncalled capital had, on average, only 38 per cent of their capital paid up. As can be seen from Figure 2, there is almost no trend in the levels of uncalled capital over this period. The increases in the proportions of paid-up capital just after 1825 are mainly due to the failure of companies with large levels of uncalled capital in the financial crisis of 1825/26. The fall and subsequent rise in the proportions of paid-up capital in the mid-1830s and mid-1840s are largely due to the two periods of railway company formation.

---

[21] See Kerr, 'Scotland and the Texas Mortgage Business', p.96. Hickson and Turner, 'Bagehot Hypothesis', p.935 suggest that capital held beyond the firm may be less costly than holding capital in the form of low-yielding assets.

[22] Nanjo and Kasuya, 'Part-paid Stock' suggest that uncalled capital played this role in Japan in the early 1930s.

Table 1 reveals the sectors where uncalled capital was most prevalent. Three features are of note. First, uncalled capital was rarely present in utility companies (i.e. bridges, canals, docks and waterworks) which were established prior to the start of our sample period. Second, uncalled capital appears to have been temporary in some sectors, such as the railways. If one compares the uncalled capital in the railway sector in 1845 to 1850 (which is when the majority of railway construction had been completed), the average paid-up capital / nominal capital ratio increases from 42.0 to 82.5 per cent. Third, uncalled capital appears to have been a permanent feature in three sectors: banks, finance and insurance. As can be seen from Table 1, by 1865 the vast majority of uncalled capital in the London market was in these three sectors.

As can be seen from Table 2, which examines calls on capital made by companies in our sample, railways made more calls on average and they typically made calls on their capital until the stock was fully paid. On the other hand, the banking, finance and insurance companies which made calls did so less frequently, and with very few calls resulting in the stock becoming fully paid.[23] Indeed, 98 banking, finance and insurance stocks never made any calls on their unpaid portion during our sample period, suggesting that uncalled capital was a permanent feature of stocks in these sectors.[24] In the rest of the market, calls were less frequent than in the railways sector, and stocks were less likely to become fully paid after a series of calls than in the railway sector,

---

[23] Of the 22 stocks in Panel B which eventually became fully paid, 16 were foreign and colonial banks which had extended liability and four were reversionary companies, where the norm was to have fully-paid stock.

[24] The calling up of capital in the banking, finance and insurance sector was so uncommon that when the Unity Joint-Stock Bank decided to increase its paid-up capital in June 1858, *The Morning Chronicle* (17th June 1858) described the decision as unprecedented in the history of joint-stock banking.

suggesting that uncalled capital in the rest of the market was less of a temporary feature than in the railway sector

INSERT TABLE 2

According to contemporaries, uncalled capital was a lot less common from the 1870s onward. For example, William Turquand, the President of the Institute of Accountants, in giving evidence before a Parliamentary committee in 1877, suggested that the era of low proportions of capital being paid up was over, and Samuel Price, a liquidator giving evidence before the same committee, suggested that new companies in the mid-1870s were unlikely to have uncalled capital.[25] As noted above, Jefferys suggests that uncalled capital largely disappeared in the years after 1885. Using data collected from the *Investor's Monthly Manual*, we assess the extent to which companies listed on the London and on other provincial markets had uncalled capital. As can be seen from Table 3, outside of the banking, finance, and insurance sectors, about one-third of companies had uncalled capital in 1885, but by 1913 this had fallen to 5.4 per cent.[26] However, although uncalled capital had virtually disappeared from the rest of the market, it was still prevalent in the banking and insurance sectors in 1913, which together constituted about 25 per cent of market capitalization of the British equity market.[27] Indeed, an analysis of the 1929 *Investor's Monthly Manual* reveals that (a) 36 out of 80 banks still had uncalled capital with the average paid-up / nominal capital being 71 per cent, and (b) 34 out of 45 insurance companies still had uncalled capital with the average

---

[25] *Report from the Select Committee on the Companies Acts, 1862 and 1867* (P.P. 1877), qq. 433, 1253, 1352-3.

[26] The increased number of companies in the banking sector in 1885 can largely be explained by the inclusion of the provincial banks in the *Investor's Monthly Manual*.

[27] See Grossman, 'New Indices', p.129. See Jefferys, *Business Organisation*, p.194 on the disappearance of uncalled capital in the finance sector.

paid-up / nominal capital being 46 per cent.[28]   The uncalled capital of insurance companies was largely eliminated during the 1930s and 40s, and the uncalled capital of banks was only eliminated in the 1950s.[29]

<div align="center">INSERT TABLE 3</div>

2.3 Share denomination

Jefferys suggests that share denominations only started drifting downwards after the 1866 financial crisis and that high share denominations had largely disappeared by 1885.[30] However, as we can see from Figure 3, the nominal value of stocks halved over the 1825-70 period for both fully and partially paid stocks. This finding is confirmed in Table 1, where we can see that not only does the average nominal value fall, but so does the average paid-up value and stock price. This downwards trend is not due to stock splits, but new companies with lower share denomination entering the market. Indeed, stock splits were uncommon in our period, probably because they were expensive for many companies as they had to liquidate and reconstitute in order to reduce their share denomination.[31] As can be seen from Table 3, this downwards trend continues after our sample period, but average nominal values and stock prices were still high relative to modern stocks.

<div align="center">INSERT FIGURE 3</div>

---

[28] French insurance companies appear to have had uncalled capital in this period (Hautcoeur, 'Efficiency', p.23).

[29] See *The Times*, May 28th 1930, p.25 and April 13th 1945, p.9 for the demise of uncalled capital in the insurance sector. On the demise of uncalled capital in the banking sector, see Billings and Capie, 'Capital in British Banking' p.145.

[30] Jefferys 'Denomination', pp.50-51.

[31] See *Select Committee on the Limited Liability Acts* (P.P. 1867), q. 618. The 1867 Companies Act (1862) Amendment Bill permitted companies to reduce their share denomination without having to liquidate and reconstitute.

There are at least four things worthy of note regarding share denomination from Table 1. First, high nominal and paid-up values were common in the established utilities.[32] Second, by 1865, railways have common equity stocks which have a relatively high paid-up and nominal value for the time period. Third, although mines had high share denominations in 1825, this had fallen dramatically by 1865. Fourth, although banks and insurance companies had high nominal values, they had relatively low paid-up values (and share prices) due to the presence of uncalled capital.

There are several possible reasons why companies may have selected high share denominations. The first possibility is that high denomination shares may have signaled quality to investors because many of the established companies that were in existence from the eighteenth century had high denominations.

The second possibility is that brokerage costs in the period may have disproportionately favoured larger share denominations. However, in 1870, for example, to invest £100 in one company, cost £5 for shares with a £1 price, £1 for £5 shares, £0.75 for £10 shares, £0.50 for £50 and £100 shares.[33] These figures suggest that apart from shares under £5, differentials in brokerage costs were not large enough to explain the prevalence of high share denominations.

The third possibility, and the one which was voiced by contemporaries, was that high share denominations prevented the ownership of stocks falling into the hands of middle-class investors who were unacquainted with business and cared only about the marketability of and return on their shares.[34] High share denominations may also have

---

[32] On the high denominations of canals, see Ward, *Finance of Canal Building*, chap. 2.

[33] *Investor's Monthly Manual*, Dec. 1870, p.376.

[34] Jefferys, *Business Organisation*, pp. 169-176, 209. See also See *Select Committee on the Limited Liability Acts* (P.P. 1867), qq.1387-9.

discouraged speculators from buying stocks.[35]   In addition, high share denominations meant that investors could only have an interest in a small number of companies and were therefore more likely to play an active governance role.[36]

The fourth possibility, and the one that only applies to companies that also had uncalled capital, is that high share denominations restricted ownership to those who had adequate wealth to pay potential calls. Such views were expressed by several witnesses before the Parliamentary *Committees on Joint Stock Banks* in the mid-1830s.[37] However, as noted by other witnesses, share denomination had no bearing on the quality of shareholder constituencies as directors had the responsibility and power to exclude low-wealth individuals from ownership.[38]

3. Hypothesized effects of share characteristics

Uncalled capital can be conceptualised as an open-ended put option.[39] This option can be exercised by creditors in the event that the assets of the firm are less than the total debts of the firm. Alternatively, the founding contracts of companies authorised directors to call up uncalled capital at will without the explicit permission of the shareholders. As

---

[35] This perception might have been formed during the Railway mania of the 1840s when speculators tended to concentrate on low-denomination stocks (Thomas, *Provincial Stock Exchanges,* p.37; Michie, *Money, Mania and Markets*, p.96). See also Rousseau, 'Share Liquidity', p.209, for a discussion on how high share denomination shielded shares from speculation in the United States, and Freedeman, *Joint-Stock Enterprise in France,* pp.107-9 on how high share denomination was used in France to repress speculation.

[36] Jefferys, 'Denomination', p.50.

[37] *Report from the Secret Committee on Joint Stock Banks* (P.P. 1836), qq. 2220, 2405. *Report from the Secret Committee on Joint Stock Banks* (P.P. 1837), qq. 2131, 3512, 4152, 4502-3.

[38] *Report from the Secret Committee on Joint Stock Banks* (P.P. 1836), q. 1571. *Report from the Secret Committee on Joint Stock Banks* (P.P. 1837), q. 2119. See also Hickson and Turner, 'Bagehot Hypothesis' and Newton, 'The Birth of Joint Stock Banking'.

[39] Grossman, 'New Indices', p.125. To model returns of stocks with uncalled capital using option pricing models is problematic for several reasons. First, in most cases the exercise date of the option is unknown as is the size of the call on shareholder's personal wealth. Second, the value of an option may vary for different investors depending on their personal circumstances. For example, some investors may have no wealth to pay a call, leaving other investors to pay more. Third, the shareholder could be the ultimate beneficiary when the option is exercised if the managers are calling up capital to take advantage of positive NPV investment projects. Fourth, some firms had both unlimited liability and uncalled capital. Fifth, individuals were still liable to face calls for up to one year after they had sold their shares.

shareholders effectively write this option, they need to be compensated for it, and we would therefore expect stocks with uncalled capital to have higher *ex post* returns.

In the case of the railways, which appear to have issued shares on an instalment plan, the uncalled capital could be conceptualised as a futures contract in that they had fixed amounts to pay at future dates. Shareholders did not have an option to not pay a call as, under the Companies Clauses Consolidation Act (1845), directors of railway companies had the right to sue shareholders for non-payment of calls two months after the call fell due.[40] Although *ex post* we may consider uncalled capital in the railways to be a futures contract, we cannot be sure if this is how railway investors viewed it *ex ante* (as the size and timing of calls was unspecified up front) or whether they viewed it as an open-ended put option. Consequently, in our empirical work, we have two sets of results – one which includes and one which excludes railways.

One possibility is that investors received no compensation for their uncalled capital as shareholders could have refused to pay calls or had no funds to pay calls. The latter was unlikely as directors of companies with uncalled capital vetted share transfers so as to ensure that shareholders had adequate wealth.[41] If a shareholder refused to pay calls made by the company, the directors could sue shareholders for non-payment (plus interest) or they could declare their shares forfeited. Shareholder attempts to evade paying calls made by creditors by dumping shares would have been rendered fruitless as under the common law and company legislation, shareholders were liable to pay calls for up to one year after they had sold their shares.[42]

---

[40] 8 & 9 Vict. c.16. See Francis, *History of the English Railway, II,* p.195.
[41] Hickson and Turner, 'Bagehot Hypothesis'.
[42] See Select *Committee on the Limited Liability Acts* (P.P. 1867), q.646.

Stocks with uncalled capital may also have had a higher return because such stocks may have been more illiquid.[43] Illiquidity could have arisen from the fact that shares carrying uncalled capital required prior approbation before they were transferred or sold.[44] Notably, there is some work which suggests that capital held beyond the company does not necessarily affect the marketability or liquidity of stocks.[45]

Uncalled capital was believed by contemporaries to result in superior governance.[46] First, as shareholders (and particularly directors who were usually required to own shares) stood to lose substantial proportions of their wealth in the event of firm failure, they had an incentive to participate actively in the governance of the company.[47] As this would have reduced the risk of managerial expropriation, shareholders may have required a lower return on their investment. Second, it was suggested that transferring shares with uncalled capital was extremely difficult, with the effect that the composition of shareholders and their interest in the company was relatively stable over time.[48] Whether this governance effect counterbalanced or dominated the option effect discussed above in terms of stock returns is ultimately an empirical matter.

The presence of high share denominations may have had a positive effect on stock returns for two reasons. First, investors in such stocks were being compensated for

---

[43] David Pochin (a Manchester merchant) in his evidence before the *Select Committee on the Limited Liability Acts* highlighted the poor marketability of such shares. See *Select Committee on the Limited Liability Acts* (P.P. 1867), q.2298.
[44] Pitts, 'Victorian share-pricing', p.35; Taylor, *Creating Capitalism*, p.194.
[45] Grossman, 'Market for Shares'; Acheson and Turner 'Secondary market', pp.146-7.
[46] Some contemporaries, enlightened by the crisis of 1866, suggested that high share denomination and unpaid capital "appealed to speculative rather than solid shareholders" (Taylor, *Creating Capitalism*, pp.191-96), and that these features ultimately resulted in the financial crisis of the mid-1860s.
[47] Hickson and Turner, 'Genesis'; Jefferys, *Business Organisation*, p.174.
[48] Jefferys, *Business Organisation*, p.175.

reduced liquidity associated with such shares.[49] Second, high share denominations in the nineteenth century may have severely restricted an investor's ability to diversify their portfolio across a variety of sectors. For example, the estimated total wealth of the average household head in England in 1858 was £527 whereas the average share denomination was £60.[50] Notably, Jefferys suggests that the demise of shares with high denomination was associated with the rise of middle class investors who were keen to own a diversified portfolio of readily marketable stocks.[51]

There is also the very real possibility that higher share denominations resulted in lower *ex post* returns due to such a feature being associated with better corporate governance. High share denomination usually meant that ownership was not diffused over a large number of owners. In addition, as investors could only afford to invest in several companies, they took a greater interest in the management of those companies.[52] Furthermore, high share denominations were said to result in a superior quality of shareholder in that only those from a mercantile background could afford such shares.[53] This superior governance associated with high share denominations could have potentially resulted in shareholders requiring lower returns as there was a lower risk of managerial expropriation.

---

[49] On the relationship between denomination and liquidity, see Copeland, 'Liquidity'; Han, 'Reverse'.
[50] Wealth estimate for 1858 from Lindert, 'Unequal English Wealth', p.1137.
[51] Jefferys, *Business Organisation*, p.209.
[52] Jefferys, *Business Organisation*, p.172.
[53] Jefferys, 'Denomination', p.50.

4. Effects of uncalled capital and high denomination on stock returns

4.1 Empirical methodology

The aim of this section it to determine the extent to which uncalled capital and share denomination affected *ex post* stock returns. To do this, we apply a portfolio approach and regression analysis to the monthly returns data for the 1,051 stocks issued by the 681 companies in our dataset. The number of securities is greater than the number of companies mainly because most railways issued several types of common equity securities, usually with different nominal values.[54] In order to ensure that this does not influence our findings, all our results are reported with and without the railways.

The following steps were taken in applying a portfolio approach to our data.[55] First, at December each year, the sample of 1,051 stocks is split into limited and unlimited liability stocks, and these two groups are then divided into portfolios according to the ranked value of uncalled capital or nominal value. Second, both the equally-weighted and value-weighted stock returns for each portfolio in the following 12 months are then calculated using a 12-month buy-and-hold method. Third, this process is repeated every year over the sample period to get a time series of returns for all the portfolios. Fourth, the average return of each portfolio is calculated to examine whether there exists any relationship between portfolio returns and the ranking variable. Fifth, as omitting delisting returns could bias the estimates of stock returns, we control for the delisting bias when comparing the returns from portfolios.[56]

---

[54] Several companies sometimes had "old" and "new" stock trading simultaneously, but the "new" stock was very quickly subsumed into the main issue.

[55] For its use in studies of cross-sectional stock returns, see Fama and French, 'Cross-section'; Grossman and Shore, 'Cross Section'; Liu, 'Liquidity-Augmented'.

[56] Shumway, 'Delisting Bias'. We make the following assumptions about delisting stocks for which we do not know the reason for delisting. First, we assume that all such stocks which delisted and had been listed for at least 36 months delisted due to bankruptcy. Second, these stocks are assumed to have a zero

As the portfolio approach may have some weaknesses, particularly with respect to drawing inferences on marginal effects, we also use the Fama and MacBeth methodology, which is to run a cross-sectional regression in every period.[57] For each period, the regression produces a set of coefficients related to all the stock characteristics, and the final coefficient is the time-series average of the coefficient over the entire sample period. The *t*-statistics of the time series values are used to test whether each stock characteristic has a significant impact on stock returns. To be more specific, for every month between January 1826 and December 1870, we run a cross-sectional regression with the following form:

$$R_{i,my} = \alpha_{0,my} + \alpha_{j,my} \sum_{j=1}^{n} c_{i,jy-1} + \alpha_{k,my} \sum_{j=1}^{n} x_{i,ky-1} + \varepsilon_{i,my}$$

where $R_{i,my}$ represents the monthly return for stock i at month m in year y; $c_{i,jy-1}$ represents the stock characteristic j (uncalled capital or share denomination) for stock i in year $y-1$; $\alpha_{j,my}$ represents the coefficient of stock characteristic j at month m in year y; $x_{i,ky-1}$ is a vector of control variables for stock characteristics k (beta, age, size, value, liability, and liquidity) for stock i in year $y-1$.[58] Since the Fama-MacBeth regression results are affected by outliers, the smallest and largest 0.5 per cent of the

stock-return observations are set equal to the next smallest or largest values respectively.[59]

In the regression analysis, share denomination is measured as the log of a stock's nominal and uncalled capital is measured as the log of the difference between a stock's nominal value and paid-up value.[60] In terms of the control variables, size is measured by the log of market capitalization and age is measured as the number of years which a stock has been listed in the *Course of the Exchange*. As we do not have accounting data on book value, we measure value using the dividend-price ratio.[61] To capture the impact of shareholder liability on returns, a binary variable is created which is equal to 1 if a stock has unlimited liability, 0 otherwise.[62] The liquidity of a stock is proxied by the proportion of months in the prior year with zero capital gain.[63] The beta for individual stocks is estimated using portfolios to reduce the errors-in-variable problem.[64]

Results

The portfolio performance figures reported in Tables 4 and 5 show that stocks with uncalled capital earn a higher return. This finding is robust to weighting method, liability

---

[59] Fama and French, 'Cross-section'.

[60] For the sake of robustness, we also tried alternative measures, but these did not change our findings. In the case of share denomination, we used the share price and in the case of uncalled capital, the ratio of paid-up to nominal value.

[61] Dimson *et al*, 'Capturing', Fama and French, 'Value', and Grossman and Shore, 'Cross Section' all use the dividend-price ratio as a proxy for value.

[62] Whether or not a company had unlimited liability depended on how (or if) the company was incorporated. See second section of paper.

[63] Bekaert *et al*, 'Liquidity' also use the zero returns to proxy liquidity, motivated by the empirical studies of Lesmond *et al*, 'New Estimate'.

[64] We construct sixteen portfolios based on rankings of market capitalization and dividend-price ratio. The unweighted capital gain for each portfolio is then calculated for the following 12 months. This process is repeated every December from 1826 to 1870. We then derive the 540-month return series for all sixteen portfolios, which we then use to estimate beta. The beta assigned to each stock each year is the beta of the portfolio in which this stock is assigned to in that particular year. See Fama and MacBeth, 'Risk' and Fama and French, 'Cross-section' on this.

partitioning, risk, and attrition adjustments. It also holds whenever railways are included or excluded from the portfolios. There are several possible explanations for this finding.

INSERT TABLES 4 & 5

One possibility is that the stocks in portfolios with more uncalled capital are more illiquid and hence earn a liquidity premium. However, as can be seen from Panel B in Tables 4 and 5, the portfolio of fully-paid limited liability stocks is actually less liquid than the portfolio of stocks with uncalled capital, suggesting that the higher returns on the uncalled capital portfolios is not necessarily due to a liquidity premium.

Another possibility is that the portfolios with uncalled capital contain small companies, and hence earn a small-firm premium. Although, as can be seen from Tables 4 and 5, this may be the case for the portfolios of limited stocks, there is little difference in the average size of companies in the portfolios of unlimited stocks. A final possibility is that the portfolios of uncalled capital stocks earn a higher return as investors required compensation for their open-ended put option.

The portfolio of fully-paid unlimited liability stocks earns a higher return than the portfolio of fully-paid limited liability stocks. However, the returns on the portfolios of unlimited liability stocks also suggest that there is a premium for uncalled capital. The possible reason for this is that whereas only creditors have a call on shareholder wealth under unlimited liability, the directors of the company can call up the unpaid portion at will. Hence shareholders need compensation for both of these open-ended put options.

Tables 6 and 7 report the characteristics and returns for the portfolios which have been sorted on price. In order to isolate the effect of denomination and remove the effect of uncalled capital, the portfolios are firstly sorted on the basis of whether they are fully

20

or partially paid. The portfolios are then sorted on whether a share price is above or below the median share price in that particular year.[65]

As can be seen from Tables 6 and 7, high denomination stocks earn a lower total return. The difference between high and low denomination stocks is more pronounced whenever the railways are excluded and when using unweighted rather than value-weighted returns.[66] This is not surprising given that, as can be seen from Tables 6 and 7, high denomination stocks were issued by larger companies. However, once adjustments are made for attrition and risk, the results are somewhat mixed with the adjusted returns on the fully-paid portfolios suggesting that high denomination portfolios earn higher returns and the adjusted returns on the partially-paid portfolios suggesting, on balance, the opposite. However, as we shall see below, the regression analysis will permit us to disentangle these various determinants.

As can be seen in Panel B of Table 6 and 7, there is little difference and no statistical difference between the liquidity of the portfolios of high and low denomination stocks. This suggests that differences in performance between the portfolios appears not to be explained by liquidity.

INSERT TABLES 6 & 7

The results of the Fama-MacBeth regressions are reported in Table 7. In order to capture the effects of uncalled capital and share denomination upon stock returns, we ran the Fama-MacBeth regressions for all stocks and then separately for fully-paid and

---

[65] In order to check that unlimited liability is not unduly affecting the portfolio returns, we ran the portfolios with and without such stocks. As this had little impact on our findings, we simply report the returns which include the unlimited liability stocks.
[66] As canals were an important sector in the first half of our period which had high share denominations and which performed poorly due to the arrival of the railways, we excluded them from the portfolios to see whether or not they were driving our findings. Excluding the canals reduces the gap between the unweighted returns on the low and high denomination portfolios.

partially-paid stocks. As the nature of uncalled capital in the railway sector may have differed from others, we also ran the Fama-MacBeth regressions on the sample of non-railway stocks. As can be seen from specifications 5 and 6 in Table 8, uncalled capital stocks earn a higher return than fully-paid stocks. However, once we look solely at partially paid stocks, the level of uncalled capital does not seem to matter. In other words, what the market appears to price is not the level of uncalled capital, but the fact that it exists. These findings are robust to various controls and the presence of an unlimited liability binary variable. It also holds when we omit the railways from the regression analysis. As liquidity is controlled for in the regressions, these results suggest that investors are rewarded for the risk of calls on their personal assets rather than the illiquidity that might be associated with such stocks. In terms of its economic meaning, the size of the coefficient in specifications 5 and 6 suggests that *ceteris paribus* a company which currently has £75 of uncalled capital per share would have an annual return which was 2.07 per cent greater than the equivalent company with fully-paid stock.

INSERT TABLE 8

The results in Table 8 suggest that the higher the share denomination, the lower the return on a stock. This finding is robust to the control variables being included in the regression and the uncalled capital and unlimited liability variables being introduced.   In specifications three and four, which is a sub-sample containing only partially-paid stocks, the *t*-statistic on the coefficient on the denomination variable falls outside the 10 per cent significance level, but in all other cases the coefficient is significant. In terms of its economic meaning, the size of the coefficient suggests that *ceteris paribus* a company with a current stock price of £100 would have an annual return which was 2.33 per cent

lower than a company with a stock price of £25. This finding is consistent with the hypothesis that higher denomination stocks were associated with better governance, resulting in investors receiving a lower *ex post* return on their stocks.

Table 9 reports the Fama-MacBeth regression results for the two halves of our sample period. In terms of the uncalled capital variable, the coefficient in specifications 5 to 8 are all positive in both time periods, but on several occasions the statistical significance of the coefficients just falls outside of the 10 per cent level. If anything, these results suggest that there was a greater premium on uncalled capital in the second half of our sample period, which could be attributed to investors' negative experiences with uncalled capital during the railway mania of 1845-7. The coefficients on the denomination variable are negative and statistically significant in both sub-periods. However, the coefficients suggest that the return on high denomination stocks was slightly lower post 1847.

INSERT TABLE 9

Overall, the results of both the portfolio analysis and Fama-MacBeth regressions suggest that investors were rewarded for having uncalled capital not because stocks with uncalled capital were more illiquid, but because of the open-ended put option associated with such stocks. In addition, our evidence suggests that investors were not compensated for the potential greater liquidity and diversification costs associated with high share denominations as such stocks earned lower returns. We suggest that this is consistent with the hypothesis that companies with such stocks were better governed.

5. Conclusions

This paper has examined the prevalence and effects of two distinctive characteristics of equity stocks in the nineteenth-century British capital market: uncalled capital and high share denominations. There are four main findings. First, although the average share denomination during the 1825-70 period was high, it drifted downwards quite substantially over the period. This fall continued after our sample period. Second, these high share denominations did not result in higher *ex post* returns for shareholders, which is consistent with the hypothesis that companies with such shares were better governed. Third, uncalled capital was commonplace throughout our sample period and into the 1880s. Indeed, we find that uncalled capital was still a common feature in the banking and insurance industries on the eve of the Great Depression. Fourth, stocks with uncalled capital had a higher return than other stocks and our evidence suggests that this premium was paid on these stocks because investors faced a risk of a call on their personal wealth.

The question naturally arises as to whether these two features of the nineteenth-century market raised the cost of capital to firms or hindered the growth of the capital market. Our evidence suggests that high share denominations rather than resulting in higher *ex post* returns, resulted in lower returns having to be paid on equity capital. As high share denominations limited the number of owners, our evidence is consistent with the view that high denomination shares resulted in superior corporate governance. Although shares with uncalled capital received a higher return, this does not necessarily imply that their cost of capital was higher. Indeed, one would anticipate that companies with uncalled capital may have been able to access debt finance more cheaply. It could also be argued that uncalled capital rather than hindering the development of the capital

24

market was actually an integral part of its growth. In an era when limited liability was viewed with suspicion, if not hostility, uncalled capital gave firms credibility in the marketplace amongst shareholders as well as customers and creditors. In addition, uncalled capital meant that companies (particularly banking, finance and insurance companies) did not have to call up large amounts of capital most of which would have a high opportunity cost as it would simply sit as idle capital.

The above raises a question as to why these two features disappeared from the British capital market.[67] One possibility is that these were temporary features which helped ease the transition in the minds of creditors and many of the political elite from an economy where unlimited liability was the norm towards one where limited liability dominated. A more likely possibility, however, is that the disappearance of high share denominations and uncalled capital were largely driven by demand for 'safe' equity investments from the growing and increasingly prosperous middle classes.[68]

Footnote references

Acheson, G. G. and Turner, J. D. "The Secondary Market for Bank Shares in Nineteenth-Century Britain." *Financial History Review* 15, no.2 (2008): 123-51.

Acheson, G. G., C. R. Hickson, J. D. Turner and Q. Ye. "Rule Britannia!: British Stock Market Returns, 1825-1870." *Journal of Economic History* 69, no.4 (2009): 1106-36.

Anderson, B. L. and Cottrell, P. L., "Another Victorian Capital Market: A Study of Banking and Bank Investors on Merseyside." *Economic History Review* 28, no.4 (1975): 600–15.

---

[67] A select committee convened after the 1866 financial crisis recommended that the government should legislate to enable companies to reduce their share denomination or uncalled capital. See *Select Committee on the Limited Liability Acts* (P.P. 1867). Subsequently, the 1867 Companies Act (1862) Amendment Bill (30 & 31 Vict. c.131) permitted companies to reduce their share denomination and uncalled capital without having to wind-up and reconstitute the company.

[68] The aftermath of the 1866 financial crisis and the substantial calls made on shareholders of failed companies appears to have resulted in changed investor attitudes towards uncalled capital. See *Report from the Select Committee on the Companies Acts, 1862 and 1867* (P.P. 1877), qq.1900, 2362-3.

Bartlett, T. *A Treatise on British Mining*. London: Effingham Wilson, 1850.

Bekaert, G., C. R. Harvey and C. T. Lundblad. "Liquidity and Expected Returns: Lessons from Emerging Markets." *Review of Financial Studies* 20, no.5 (2007): 1783-831.

Billings, M. and Capie, F. "Capital in British Banks, 1920-1970." *Business History* 49, no.2 (2007): 139-162.

Burke, G. and Richardson, P. "The Decline and Fall of the Cost Book System in the Cornish Tin Mining Industry, 1895-1914." *Business History* 23, no.1 (1981): 4-18.

Burt, R. and Kudo, N. "The Adaptability of the Cornish Cost Book System." *Business History* 25, no.1 (1983): 30-41.

Campbell, G. "Leveraging the British Railway Mania: Derivatives for the Individual Investor." *SSRN working paper* (2010).

Cooke, C.A. *Corporation Trust and Company: An Essay in Legal History*. Manchester: Manchester University Press, 1950.

Copeland, T. E. "Liquidity Changes Following Stock Splits." *Journal of Finance* 34, no.1 (1979): 115-141.

Course of the Exchange, various issues.

Davis, J. *Essays in the Earlier History of American Corporations, IV*. Cambridge: Cambridge University Press, 1917.

Dimson, E., S. Nagel and G. Quigley. "Capturing the Value Premium in the United Kingdom." *Financial Analysts Journal* 59, no.6 (2003): 35-45.

Edelstein, M. *Overseas Investment in the Age of High Imperialism: The United Kingdom, 1850-1914*. London: Methuen, 1982.

Falkus, M. E. "The British Gas Industry Before 1850." *The Economic History Review* 20, no. 3 (1967): 494-508.

Fama, E. F. and K. R. French. "The Cross-section of Expected Stock Returns." *Journal of Finance* 47, no.2 (1992): 427-65.

Fama, E. F. and K. R. French. "Value Versus Growth: The International Evidence." *Journal of Finance* 53, no.6 (1998): 1975-99.

Fama, E. F. and French, K. R. "Dissecting Anomalies." *Journal of Finance* 63, no.4 (2008): 1653-78.

Fama, E. F. and MacBeth, J. "Risk, Return and Equilibrium: Empirical Tests." *Journal of Political Economy* 81, no.3 (1973): 607-636.

Fohlin, C. *Finance Capitalism and Germany's Rise to Industrial Power.* Cambridge: Cambridge University Press, 2007.

Francis, J. *A History of the English Railway: Its Social Relations and Revelations 1820-1845.* Newtown Abbott: David and Charles, 2 volumes, 1851.

Freedeman, C.E. *Joint-Stock Enterprise in France 1807–1867: From Privileged Company to Modern Corporation.* Chapel Hill: University of North Carolina Press, 1979.

Grossman, P. Z. "The Market for Shares of Companies with Unlimited Liability: The Case of American Express." *Journal of Legal Studies* 24, no.1 (1995): 63-85.

Grossman, R. S. "New Indices of British Equity Prices, 1870-1913." *Journal of Economic History* 62, no. 1 (2002): 121-46.

Grossman, R. S. and Shore, S. H. "The Cross Section of Stock Returns Before World War I." *Journal of Financial and Quantitative Analysis* 41, no.2 (2006): 271-294.

Han, K. C. "The Effects of Reverse Stock Splits on the Liquidity of the Stock." *Journal of Financial and Quantitative Analysis* 30, no.1 (1995): 159-169.

Harris, R. *Industrializing English Law: Entrepreneurship and Business Organization.* Cambridge: Cambridge University Press, 2000.

Hautcoeur, P-C. "Efficiency, Competition and the Development of Life Insurance in France (1870-1939) Or: Should We Trust Pension Funds?" EHESS DELTA Working Paper, no.17 (2003).

Heaton, J. and Lucas, D. "The Importance of Investor Heterogeneity and Financial Market Imperfections for the Behavior of Asset Prices." *Carnegie-Rochester Conference Series on Public Policy* 42, (1995): 1-32.

Heaton, J. and Lucas, D. "Stock Prices and Fundamentals." *NBER Macroeconomics Annual* 14, (1999): 213-42.

Hickson, C. R. and Turner, J. D. "Trading in the Shares of Unlimited Liability Banks in Nineteenth Century Ireland: The Bagehot Hypothesis." *Journal of Economic History* 63, no.3 (2003): 931-58.

Hickson, C. R. and Turner, J. D. "The Genesis of Corporate Governance: Nineteenth-Century Irish Joint-Stock Banks." *Business History* 47, no.2 (2005): 174-89.

Investor's Monthly Manual, various issues.

Jefferys, J. B. "The Denomination and Character of Shares, 1855-1885." *Economic History Review* a16, no.1 (1946): 45-55.

Jefferys, J. B. *Business Organisation in Great Britain 1856-1914*. New York: Arno Press, 1977.

Kennedy, W. P. *Industrial Structure, Capital Markets and the Origins of British Economic Decline*. Cambridge: Cambridge University Press, 1987.

Kerr, W. G. "Scotland and the Texas Mortgage Business." *Economic History Review* 16, no.1 (1963): 91-103.

Kocherlakota, N. R. "The Equity Premium: It's Still a Puzzle." *Journal of Economic Literature* 34, no. 1 (1996): 42-71.

Lesmond, D., Ogden, J. and Trzcinka, C. "A New Estimate of Transaction Costs." *Review of Financial Studies* 12, no.5 (1999): 1113-41.

Levi, L. "The Reconstruction of Joint Stock Banks on the Principle of Limited Liability." *The Bankers' Magazine* 40, (1880): 468-79.

Lindert, P. H. "Unequal English Wealth Since 1670." *Journal of Political Economy* 94, no.6 (1986): 1127-62.

Liu, W. "A Liquidity-Augmented Capital Asset Pricing Model." *Journal of Financial Economics* 82, no.3 (2006): 631-71.

Macgillivray, E. J. and Browne, D. *Macgillivray on Insurance Law*. 2nd edition, London: Sweet and Maxwell, 1937.

Martel, Y. and Marco, P. "The Accounting Mirror of the Banking Business: The Bank of Barcelona (1845-1856)." *Spanish Journal of Accounting History* 7, (2007): 3-37.

McCloskey, D. N. "Did Victorian Britain Fail?" *Economic History Review* 23, no.3 (1970): 446-59.

Michie, R. C. *Money, Mania and Markets: Investment, Company Formation and the Stock Exchange in Nineteenth-Century Scotland*. Edinburgh: John Donald Publishers Ltd., 1981.

Michie, R. C. "The Finance of Innovation in Late Victorian and Edwardian Britain." *Journal of European Economic History* 17, no. 3 (1988): 491-530.

Michie, R. C. *The London Stock Exchange*. Oxford: Oxford University Press, 1999.

Nanjo, T. and Kasuya, M. "Part-Paid Stock, Corporate Finance, and Investment: Economic Consequences of the Part-Paid Stock System and Supplementary Installments in the Early 1930s of Japan." *Bank of Japan IMES Discussion Paper Series* 2009-E-22 (2009).

Newton, L. "The Birth of Joint-Stock Banking: England and New England Compared." *Business History Review* 84, no.1 (2010): 27-52.

Pearson, R., *Insuring the Industrial Revolution: Fire Insurance in Great Britain, 1700-1850*. Aldershot: Ashgate, 2004.

Pitts, M. V. "Victorian Share-Pricing – A Problem in Thin Trading." *Accounting, Business and Financial History* 8, no.1(1998): 33-52.

Polsi, A. "Financial institutions in nineteenth-century Italy. The rise of a banking system." *Financial History Review* 3, (1996):117-137

Raynes, H. E. *A History of British Insurance*. London: Pitman, 1948.

Roll, R. "A Critique of the Asset Pricing Theory's Tests: On Past and Potential Testability of Theory." *Journal of Financial Economics* 4, no.2 (1977): 129-76.

Rousseau, P. L., "Share Liquidity, Participation, and Growth of the Boston Market for Industrial Securities." *Explorations in Economic History* 46 (2009): 203-19.

Shannon, H. A., "The Coming of General Limited Liability." *Economic History* 2, no.6 (1931): 267-91.

Shumway, T. "The Delisting Bias in CRSP Data." *Journal of Finance* 52, no.1 (1997): 327-40.

Stephens, C. *The Law and Practise of Joint Stock Companies under the Canadian Acts*. Toronto: Carswell & Co., Law Publishers, 1881.

Supple, B. *The Royal Exchange Assurance: A History of British Insurance, 1720-1970*. Cambridge: Cambridge University Press, 1970.

Taylor, J. *Creating Capitalism: Joint-Stock Enterprise in British Politics and Culture, 1800-1870*. London: Royal Historical Society, 2006.

Thomas, W. *The Provincial Stock Exchanges*. Frank Cass: London, 1973.

Ward, J. R. *The Finance of Canal Building in Eighteenth-Century England*. Oxford: Oxford University Press, 1974.

Weld, W. C., Michaely, R., Thaler, R. H. and Benartzi, S. "The Nominal Share Price Puzzle." *Journal of Economic Perspectives* 23, no.2 (2009): 121-42.

Official publications

Report from the Secret Committee on Joint Stock Banks (P.P. 1836, IX).

Report from the Secret Committee on Joint Stock Banks (P.P. 1837, XIV).

Select Committee on the Limited Liability Acts (P.P. 1867, X).

Report from the Select Committee on the Companies Acts, 1862 and 1867 (P.P. 1877, VIII).
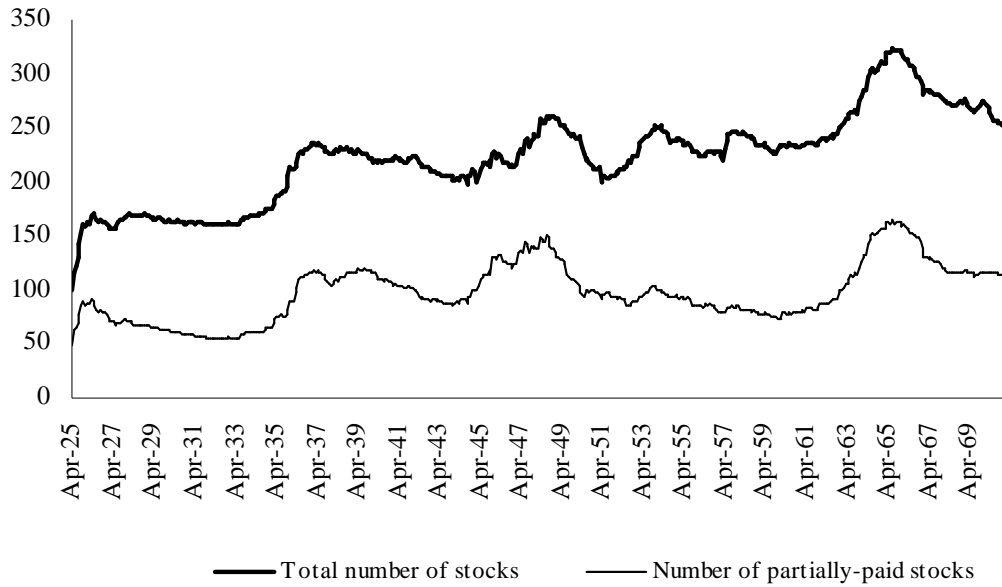
Source: Authors' calculations based on monthly data collected from the *Course of the Exchange*.

Figure 1. *Number of partially-paid stocks on London market, 1825-1870*
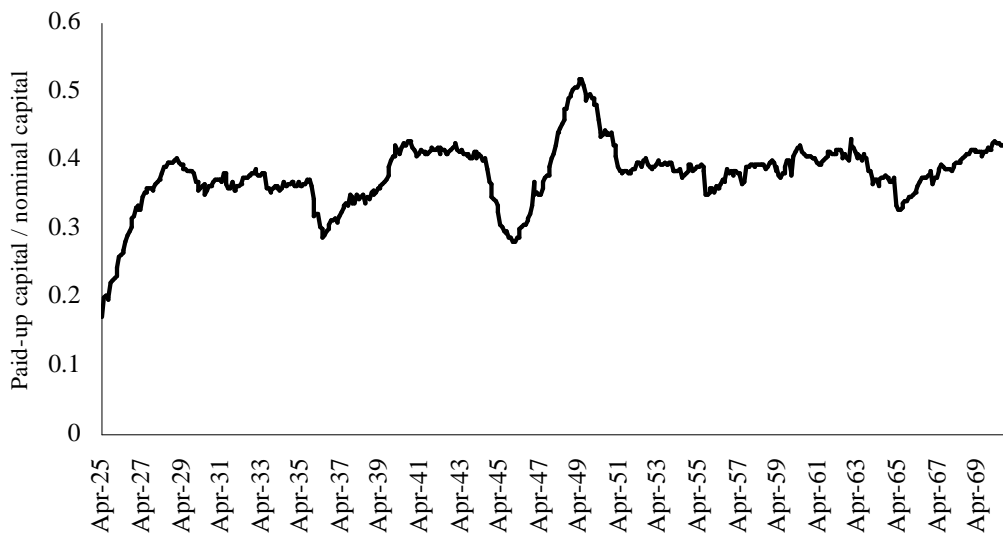
Source: Authors' calculations based on monthly data collected from the *Course of the Exchange*.

Figure 2. *Average proportion of capital paid up for partially-paid stocks, 1825-1870*

140

120

100

Mean denomination (£)

80

60

40

20

0

Apr-25 Apr-27 Apr-29 Apr-31 Apr-33 Apr-35 Apr-37 Apr-39 Apr-41 Apr-43 Apr-45 Apr-47 Apr-49 Apr-51 Apr-53 Apr-55 Apr-57 Apr-59 Apr-61 Apr-63 Apr-65 Apr-67 Apr-69

———————— 12-month moving average of mean nominal value for fully-paid stocks

━━━━━━━━ 12-month moving average of mean nominal value for partially-paid stocks

Source: Authors' calculations based on monthly data collected from the *Course of the Exchange*.

Figure 3. *Average nominal value of stocks on London market, 1825-1870*

Table 1. *Share denomination and unpaid capital, 1825, 1845 and 1865*

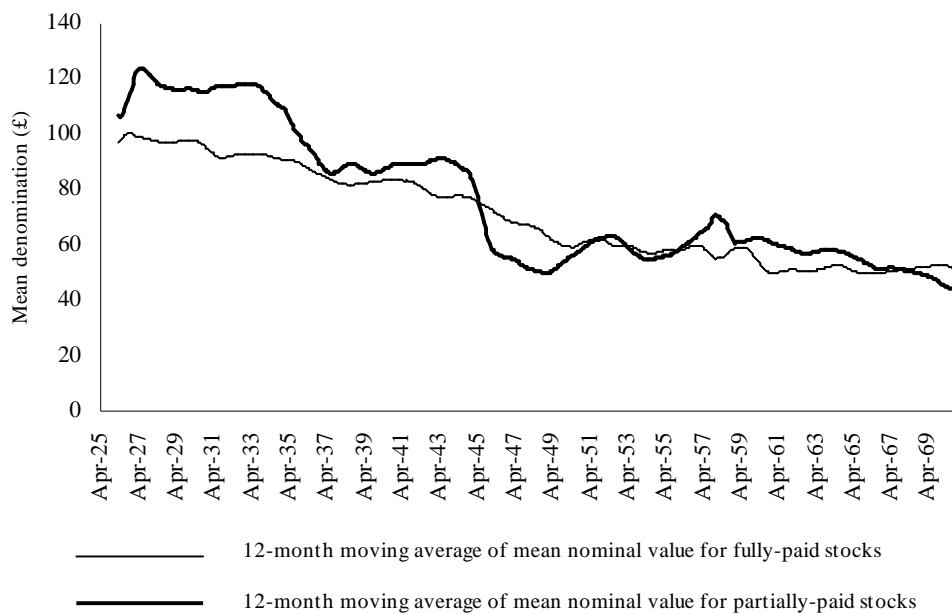|	No. companies	% of companies with uncalled capital	Average paid-up capital / nominal capital (%)	Average nominal value (£)	Average paid-up value (£)	Average share price (£)
1825						
Banks	2	100.0	6.0	75.0	5.5	3.8
Bridges	3	33.3	93.3	73.5	70.2	23.0
British Mines	6	83.3	37.3	42.8	7.9	4.7
Canals	47	6.4	98.9	108.0	107.1	271.9
Colonial & foreign mines	14	92.9	15.9	131.8	34.4	46.9
Docks	8	12.5	88.8	99.7	88.4	77.4
Gas, light & coke	20	70.0	59.7	51.3	24.3	24.8
Insurance	20	90.0	23.1	202.0	35.8	65.4
Miscellaneous	31	90.3	25.9	65.0	16.0	14.8
Waterworks	8	12.5	97.9	91.7	90.7	86.6
Railways	2	100.0	6.0	75.0	4.5	13.3
Overall Market	*161*	*54.7*	*58.1*	*101.3*	*55.4*	*106.5*
1845						
Banks	16	62.5	54.1	54.4	22.0	22.3
Bridges	3	0.0	100.0	77.9	77.9	11.9
British Mines	3	33.3	83.3	26.7	23.3	23.7
Canals	34	0.0	100.0	101.8	101.8	168.1
Colonial & foreign mines	5	40.0	87.3	25.6	22.5	10.8
Docks	6	0.0	100.0	91.7	91.7	81.1
Finance	2	50.0	92.5	100.0	92.5	99.8
Gas, light & coke	18	55.6	81.0	44.7	35.4	44.9
Insurance	29	86.2	24.5	95.7	17.2	34.4
Miscellaneous	4	100.0	59.0	60.0	24.1	27.6
Railways	101	76.2	42.0	42.8	21.6	37.4
Waterworks	6	16.7	97.2	73.1	71.7	104.2
Overall Market	*227*	*57.7*	*58.4*	*62.1*	*38.8*	*58.3*
1865						
Banks	71	76.1	47.4	53.5	19.4	31.4
British Mines	34	5.9	97.0	15.4	15.1	63.6
Canals	4	0.0	100.0	52.5	52.5	46.6
Colonial & foreign mines	11	45.5	82.6	12.7	11.3	11.8
Docks	5	20.0	90.0	84.0	82.0	78.8
Finance	21	76.2	40.0	50.5	27.8	28.1
Gas, light & coke	32	25.0	86.8	26.6	22.1	31.7
Insurance	36	94.4	20.1	79.4	16.2	46.4
Miscellaneous	45	64.4	66.8	31.1	20.4	18.9
Railways	50	10.0	95.6	83.5	82.8	73.8
Telegraph	6	0.0	100.0	66.0	66.0	85.3
Waterworks	4	25.0	90.0	61.3	58.8	65.2
Overall Market	*319*	*48.6*	*67.4*	*50.4*	*32.0*	*42.9*

Source: Authors' calculations from the *Course of the Exchange.*
Notes: The above figures are from the end of December.

Table 2. *Calls on uncalled capital, 1825-70*

Industry	No. of stocks	No. of calls		Did final call result in stock becoming fully-paid?		Fully-paid on final call
		Mean	*Median*	*Yes*	*No*	*%*
Panel A: All companies in our sample						
Banks, finance and insurance	132	2.9	2	30	102	22.7
Railways	217	5.6	4	137	80	63.1
Rest of market	154	4.4	3	68	86	44.2
Total	*503*	*4.5*	*3*	*235*	*268*	*46.7*
Panel B: Companies still in sample 24 months after final call						
Banks, finance and insurance	80	3.1	3	22	58	27.5
Railways	86	7.1	7	75	11	87.2
Rest of market	93	4.7	3	56	37	60.2
Total	*259*	*5.0*	*3*	*153*	*106*	*59.1*

Source: Authors' calculations from the *Course of the Exchange*.

Table 3. *Share denomination and unpaid capital (1885 and 1913)*

	No. companies	*% companies with uncalled capital*	*Average paid-up capital / nominal capital (%)*	*Average nominal value (£)*	*Average paid-up value (£)*	*Average share price (£)*
1885						
Banks	176	83.5	41.9	44.5	15.2	33.9
Finance	65	92.3	30.0	15.6	6.4	4.9
Insurance	101	89.1	28.3	47.0	14.6	35.7
Other sectors	737	32.0	89.7	27.9	25.9	30.5
Overall market	1,079	49.4	72.5	31.7	21.9	30.0
1913						
Banks	106	74.5	50.0	35.1	14.9	34.3
Finance	89	22.5	83.4	17.6	15.4	16.6
Insurance	69	81.2	35.7	19.0	7.2	17.1
Other sectors	970	5.4	98.1	16.3	16.1	17.0
Overall market	1,234	16.8	89.4	18.1	15.5	18.5

Source: Authors' calculations from the *Investor's Monthly Manual*.
Notes: The above figures are from the end of December.

Table 4. *Performance of paid-up capital and shareholder liability sorted portfolios (all firms), 1825-70*

	Limited liability		Unlimited liability	
	Partially paid	Fully paid	Partially paid	Fully paid
Panel A: Portfolio characteristics				
Average size of stocks in portfolio (£)	331,842	736,998	444,070	565,958
Average nominal value of share (£)	57	73	105	47
Minimum number of stocks in portfolio	29	61	25	1
Maximum number of stocks in portfolio	103	140	53	20
Delisting rate (%)	10.13	7.34	4.85	4.51
Beta for equally-weighted returns	1.59	1.14	0.79	1.12
Beta for value-weighted returns	1.83	0.96	0.77	0.86
Panel B: Liquidity				
Average illiquidity of stocks in portfolio (%)	45.67	56.88	60.43	55.26
Difference in means (*t*-statistic)	(-3.79)		(1.80)	
Panel C: Value-weighted returns				
Total return (%)	6.58	3.93	6.96	5.24
Std. dev of total return (%)	12.51	7.32	7.12	10.39
Attrition-adjusted returns (%)	4.99	2.33	6.10	3.58
Risk-adjusted returns	-2.59*	-3.56***	0.78	-2.20
t-value	(-1.77)	(-6.94)	(0.81)	(-1.54)
Panel D: Equally-weighted returns				
Total return (%)	8.63	4.78	7.79	5.53
Std. dev of total return (%)	13.62	6.78	6.40	9.19
Attrition-adjusted returns (%)	5.40	1.24	5.89	1.58
Risk-adjusted returns	-0.11	-1.35***	2.22***	-0.32
t-value	(-0.10)	(-2.90)	(3.27)	(-0.27)

Notes: * significant at 10 per cent level; ** significant at 5 per cent level; *** significant at 1 per cent level. The illiquidity of a stock is the proportion of months with no price changes in the prior year. Beta is the market risk of each portfolio. The risk-adjusted returns are calculated as the portfolio's return in excess of that justified by the portfolio's beta as per the CAPM. The delisting rate is the average percentage of shares delisted from the stock exchange during the 12-month buy-and-hold period. Several of the stocks in the unlimited liability portfolio had double rather than unlimited liability.

Table 5. Performance of paid-up capital and shareholder liability sorted portfolios
(excluding railways), 1825-70

	Limited liability		Unlimited liability	
	Partially paid	Fully paid	Partially paid	Fully paid
Portfolio characteristics				
Average size of stocks in portfolio (£)	238,799	365,111	444,070	565,958
Average nominal value of share (£)	62	71	105	47
Minimum number of stocks in portfolio	14	54	25	1
Maximum number of stocks in portfolio	98	104	53	20
Delisting rate (%)	7.70	5.76	4.85	4.51
Beta for equally-weighted returns	1.29	0.81	0.78	1.12
Beta for value-weighted returns	1.50	0.79	0.79	0.86
Panel B: Liquidity				
Average illiquidity of stocks in portfolio (%)	54.18	65.71	60.43	55.26
Difference in means (*t*-statistic)	(-4.01)		(1.80)	
Panel C: Value-weighted returns				
Total return (%)	5.71	3.47	6.96	5.24
Std. dev of total return (%)	11.05	5.78	7.12	10.39
Attrition-adjusted returns (%)	3.93	2.46	6.10	3.58
Risk-adjusted returns	-2.36	-2.83***	0.78	-2.20
t-value	(-1.66)	(-4.93)	(0.81)	(-1.54)
Panel D: Equally-weighted returns				
Total return (%)	6.82	4.27	7.79	5.53
Std. dev of total return (%)	11.63	5.67	6.40	9.19
Attrition-adjusted returns (%)	3.33	0.77	5.89	1.58
Risk-adjusted returns	-0.93	-1.36***	2.22***	-0.32
t-value	(-0.88)	(-3.22)	(3.27)	(-0.27)

Notes: * significant at 10 per cent level; ** significant at 5 per cent level; *** significant at 1 per cent level. The illiquidity of a stock is the proportion of months with no price changes in the prior year. Beta is the market risk of each portfolio. The risk-adjusted returns are calculated as the portfolio's return in excess of that justified by the portfolio's beta as per the CAPM. The delisting rate is the average percentage of shares delisted from the stock exchange during the 12-month buy-and-hold period. Several of the stocks in the unlimited liability portfolio had double rather than unlimited liability.

Table 6. *Performance of price-sorted portfolios (all firms), 1825-70*

	Fully paid		Partially paid	
	<median	*≥median*	*<median*	*≥median*
Panel A: Portfolio characteristics				
Average size of stocks in portfolio (£)	235,126	1,189,022	201,171	558,440
Average nominal value of share (£)	22	184	6	53
Minimum number of stocks in portfolio	31	31	27	27
Maximum number of stocks in portfolio	79	79	75	74
Delisting rate (%)	9.09	5.03	10.89	5.45
Beta for equally-weighted returns	1.26	1.10	1.55	1.10
Beta for value-weighted returns	1.30	0.61	1.76	0.95
Panel B: Liquidity				
Average illiquidity of stocks in portfolio (%)	58.43	55.05	53.55	50.18
Difference in means (*t*-statistic)	(0.98)		(1.51)	
Panel C: Value-weighted returns				
Total return (%)	4.30	3.94	6.59	6.60
Std. dev of total return (%)	9.33	7.02	11.70	8.88
Attrition-adjusted returns (%)	1.42	2.65	4.88	5.48
Risk-adjusted returns	-3.66***	-3.41***	-2.44*	-0.75%
t-value	(-3.69)	(-7.21)	(-1.91)	(-0.70)
Panel D: Equally-weighted returns				
Total return (%)	5.44	4.37	9.42	7.12
Std. dev of total return (%)	9.48	4.83	13.72	8.29
Attrition-adjusted returns (%)	0.74	1.91	5.79	5.37
Risk-adjusted returns	-1.73**	-0.72	0.90	0.99
t-value	(-2.43)	(-1.48)	(0.72)	(1.07)

Notes: * significant at 10 per cent level; ** significant at 5 per cent level; *** significant at 1 per cent level. The illiquidity of a stock is the proportion of months with no price changes in the prior year. Beta is the market risk of each portfolio. The risk-adjusted returns are calculated as the portfolio's return in excess of that justified by the portfolio's beta as per the CAPM. The delisting rate is the average percentage of shares delisted from the stock exchange during the 12-month buy-and-hold period. Several of the stocks in the unlimited liability portfolio had double rather than unlimited liability.

Table 7. *Performance of price-sorted portfolios (excluding railways), 1825-70*

	Fully paid		Partially paid	
	<median	*≥median*	*<median*	*≥median*
Panel A: Portfolio characteristics				
Average size of stocks in portfolio (£)	182,937	600,186	178,739	502,851
Average nominal value of share (£)	21	190	7	55
Minimum number of stocks in portfolio	31	31	24	25
Maximum number of stocks in portfolio	57	58	72	72
Delisting rate (%)	7.36	3.66	8.76	3.87
Beta for equally-weighted returns	1.18	0.79	1.13	0.86
Beta for value-weighted returns	1.16	0.46	1.24	0.85
Panel B: Liquidity				
Average illiquidity of stocks in portfolio (%)	63.69	64.90	59.34	55.61
Difference in means (*t*-statistic)	(-0.40)		(1.45)	
Panel C: Value-weighted returns				
Total return (%)	4.53	3.57	7.23	6.18
Std. dev of total return (%)	10.73	5.84	9.45	7.60
Attrition-adjusted returns (%)	2.52	2.79	5.31	5.20
Risk-adjusted returns	-3.13**	-2.64***	-0.24%	-0.30%
t-value	(-2.17)	(-4.16)	(-0.20)	(-0.29)
Panel D: Equally-weighted returns				
Total return (%)	5.28	3.77	8.03	6.70
Std. dev of total return (%)	8.61	4.40	9.93	7.44
Attrition-adjusted returns (%)	0.43	1.63	4.39	5.06
Risk-adjusted returns	-1.45**	-0.88	1.07	0.87
t-value	(-2.06)	(-1.61)	(1.10)	(1.04)

Notes: * significant at 10 per cent level; ** significant at 5 per cent level; *** significant at 1 per cent level. The illiquidity of a stock is the proportion of months with no price changes in the prior year. Beta is the market risk of each portfolio. The risk-adjusted returns are calculated as the portfolio's return in excess of that justified by the portfolio's beta as per the CAPM. The delisting rate is the average percentage of shares delisted from the stock exchange during the 12-month buy-and-hold period. Several of the stocks in the unlimited liability portfolio had double rather than unlimited liability.

Table 8. *Fama-MacBeth regressions, 1826-70*

	Fully-paid stocks		Partially-paid stocks		All stocks		Excluding railways	
	(1)	*(2)*	*(3)*	*(4)*	*(5)*	*(6)*	*(7)*	*(8)*
Denomination	-0.14***	-0.14***	-0.07	-0.06	-0.14***	-0.14***	-0.15***	-0.15***
	(-3.33)	*(-3.34)*	*(-1.39)*	*(-1.05)*	*(-4.40)*	*(-4.24)*	*(-4.81)*	*(-4.49)*
Uncalled capital			0.00	-0.02	0.04**	0.04**	0.04***	0.03
			(0.08)	*(-0.56)*	*(2.52)*	*(1.98)*	*(2.62)*	*(1.42)*
Unlimited liability		0.07		0.17		-0.02		0.09
		(0.66)		*(1.31)*		*(-0.26)*		*(1.12)*
Size	-0.01	-0.01	-0.13**	-0.14**	-0.04	-0.04	-0.02	-0.02
	(-0.29)	*(-0.35)*	*(-2.18)*	*(-2.26)*	*(-1.15)*	*(-1.14)*	*(-0.46)*	*(-0.68)*
Dividend/ Price	7.08***	7.20***	9.94***	9.84***	8.48***	8.42***	8.73***	8.76***
	(5.11)	*(5.21)*	*(5.54)*	*(5.55)*	*(7.78)*	*(7.84)*	*(6.89)*	*(6.94)*
Beta	-0.12	-0.11	0.43***	0.45***	0.17*	0.17*	0.11	0.13
	(-0.99)	*(-0.89)*	*(2.70)*	*(2.91)*	*(1.64)*	*(1.70)*	*(0.97)*	*(1.17)*
Liquidity	-0.06	-0.08	-0.30	-0.34	-0.13	-0.14	-0.07	-0.09
	(-0.35)	*(-0.44)*	*(-1.21)*	*(-1.40)*	*(-0.72)*	*(-0.81)*	*(-0.42)*	*(-0.58)*
Age	-0.01	-0.02	-0.13	-0.14	-0.08*	-0.09*	-0.08	-0.08
	(-0.49)	*(-0.95)*	*(-1.54)*	*(-1.58)*	*(-1.65)*	*(-1.69)*	*(-1.59)*	*(-1.63)*
Constant	0.72	0.75	2.28***	2.41***	1.17**	1.18**	0.81*	0.86*
	(1.32)	*(1.36)*	*(2.93)*	*(3.05)*	*(2.33)*	*(2.41)*	*(1.71)*	*(1.84)*
Observations	121	121	92	92	213	213	169	169
Adjusted R^2	0.056	0.057	0.055	0.058	0.042	0.045	0.036	0.038

Note: *t*-statistics in parentheses. * significant at 10 per cent level; ** significant at 5 per cent level; *** significant at 1 per cent level. The Fama-MacBeth regressions were run for the whole sample and for all stocks excluding the railways. *Denomination* is the log of a stock's price and *uncalled capital* is the log of the difference between a stock's nominal and paid-up value. *Unlimited liability* is a binary variable which is equal to 1 if a stock has unlimited (or extended) liability, 0 otherwise. *Size* is the log of market capitalization. *Dividend / price* ratio is a proxy for value. *Liquidity* is the proportion of months in the prior year with zero capital gain. *Beta* is the market risk of stocks and is estimated using portfolios. *Age* is the number of years that a stock has been listed in the *Course of the Exchange*.

Table 9. *Fama-MacBeth regressions for sub-periods*

	Fully-paid stocks		Partially-paid stocks		All stocks		Excluding railways	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Denomination								
1826 – 1848	-0.13***	-0.13***	-0.01	0.01	-0.08**	-0.08*	-0.12***	-0.11***
	(-2.75)	(-2.81)	(-0.14)	(0.11)	(-2.16)	(-1.92)	(-3.51)	(-3.01)
1848 – 1870	-0.15**	-0.15**	-0.14*	-0.13	-0.19***	-0.20***	-0.19***	-0.19***
	(-2.22)	(-2.19)	(-1.78)	(-1.63)	(-3.94)	(-3.95)	(-3.55)	(-3.46)
Uncalled capital								
1826 – 1848			-0.02	-0.05	0.03*	0.03	0.03	0.01
			(-0.37)	(-0.70)	(1.65)	(1.12)	(1.51)	(0.43)
1848 – 1870			0.03	0.00	0.04*	0.05	0.05**	0.04
			(0.64)	(0.02)	(1.86)	(1.60)	(1.99)	(1.36)
Unlimited liability								
1826 – 1848		0.05		0.19		0.01		0.12
		(0.35)		(1.01)		(0.04)		(1.01)
1848 – 1870		0.08		0.15		-0.04		0.08
		(0.60)		(0.92)		(-0.34)		(0.67)
Size								
1826 – 1848	-0.04	-0.05	-0.08	-0.10	-0.05	-0.06	-0.04	-0.05
	(-1.17)	(-1.22)	(-0.92)	(-1.08)	(-1.18)	(-1.31)	(-1.21)	(-1.51)
1848 – 1870	0.02	0.02	-0.19**	-0.19**	-0.03	-0.02	0.02	0.01
	(0.39)	(0.36)	(-2.26)	(-2.24)	(-0.52)	(-0.41)	(0.29)	(0.18)
Dividend/ Price								
1826 – 1848	9.74***	9.86***	11.92***	11.58***	9.98***	9.83***	10.37***	10.35***
	(4.59)	(4.72)	(3.96)	(3.93)	(5.43)	(5.46)	(5.54)	(5.59)
1848 – 1870	4.43**	4.55**	8.10***	8.23***	7.10***	7.15***	7.13***	7.23***
	(2.50)	(2.53)	(4.14)	(4.18)	(6.04)	(6.07)	(4.18)	(4.21)
Beta								
1826 – 1848	-0.16	-0.14	0.47*	0.50**	0.19	0.20	0.11	0.14
	(-0.99)	(-0.88)	(1.94)	(2.16)	(1.31)	(1.42)	(0.78)	(1.03)
1848 – 1870	-0.07	-0.06	0.39*	0.40**	0.15	0.15	0.11	0.12
	(-0.37)	(-0.32)	(1.94)	(1.99)	(1.09)	(1.08)	(0.63)	(0.72)
Liquidity								
1826 – 1848	-0.31	-0.33	-0.25	-0.34	-0.30	-0.34	-0.24	-0.28
	(-1.34)	(-1.39)	(-0.69)	(-1.00)	(-1.21)	(-1.48)	(-1.18)	(-1.39)
1848 – 1870	0.22	0.20	-0.35	-0.33	0.06	0.08	0.14	0.13
	(0.79)	(0.74)	(-1.00)	(-0.97)	(0.24)	(0.33)	(0.58)	(0.52)
Age								
1826 – 1848	-0.03	-0.05	-0.25	-0.27	-0.16*	-0.18*	-0.15	-0.16
	(-0.58)	(-1.05)	(-1.49)	(-1.53)	(-1.64)	(-1.68)	(-1.58)	(-1.62)
1848 – 1870	0.00	0.00	-0.01*	-0.01*	0.00	0.00	0.00	0.00
	(0.77)	(0.80)	(-1.65)	(-1.79)	(-0.47)	(-0.40)	(-0.57)	(-0.45)
Constant								
1826 – 1848	0.92	0.97	1.49	1.74	1.22*	1.32**	0.99*	1.04**
	(1.55)	(1.63)	(1.33)	(1.52)	(1.75)	(1.97)	(1.90)	(2.06)
1848 – 1870	0.50	0.50	3.13***	3.15***	1.12	1.05	0.53	0.58
	(0.54)	(0.54)	(2.88)	(2.89)	(1.55)	(1.49)	(0.67)	(0.74)
Observations								
1826 – 1848	102	102	85	85	187	187	159	159
1848 – 1870	140	140	100	100	239	239	179	179
Adjusted R²								
1826 – 1848	0.058	0.061	0.048	0.052	0.044	0.048	0.036	0.039
1848 – 1870	0.054	0.053	0.062	0.065	0.041	0.042	0.035	0.036

Note: *t*-statistics in parentheses. * significant at 10 per cent level; ** significant at 5 per cent level; *** significant at 1 per cent level. The Fama-MacBeth regressions were run for the whole sample and for all stocks excluding the railways. *Denomination* is the log of a stock's price and *uncalled capital* is the log of the difference between a stock's nominal and paid-up value. *Unlimited liability* is a binary variable which is equal to 1 if a stock has unlimited (or extended) liability, 0 otherwise. *Size* is the log of market capitalization. *Dividend / price* ratio is a proxy for value. *Liquidity* is the proportion of months in the prior year with zero capital gain. *Beta* is the market risk of stocks and is estimated using portfolios. *Age* is the number of years that a stock has been listed in the *Course of the Exchange*.