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ABSTRACT

This paper presents new monthly capital gain, dividend yield, and total return indices for common equities quoted on British exchanges during 1869-1929. I construct indices for 25 domestic sectors, calculate capital asset pricing model betas for each sector, and construct a 30-stock blue chip index. I splice the new broad market index to Turner *et al.*'s (2009) pre-1870 index to create a century-long (1825-1929) monthly equity index. I use the new indices to examine the timing of British business cycles and compare the returns on home and foreign UK investment during 1870-1929.

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1. Introduction

This paper presents new monthly capital gain, dividend yield, and total return indices for common equities quoted on British exchanges during 1869-1929. The data used to calculate these indices constitute the largest, most comprehensive monthly database ever compiled on British equity markets during the six decades prior to the onset of the Great Depression. Because of the substantial size of the database—more than 865,000 security-month observations on about 4000 securities representing nearly 3500 companies—I use the data to construct monthly indices for 25 domestic sectors (e.g., banks, insurance, railways, manufacturing), as well as a 30-stock blue chip index.

Stock market indices have been prominent features of the financial pages and academic journals for a long time. Among the earliest and most durable historical UK stock market indices are those of Bowley, Schwartz, and Smith (1931) and Smith and Horne (1934). These indices are still in use, even though they are based on small samples, exclude important sectors, employ problematic weighting schemes, and exclude dividends.¹ More recently, scholars have constructed higher quality annual and monthly stock market indices, both for the UK and other countries.²

The development of high quality long term stock market indices has benefitted economic historians and finance economists alike (Turner 2016). For economic historians, such data can help assess whether the UK capital market contributed to Victorian Britain's industrial decline by channeling investment overseas rather than toward domestic industry (Chabot and Kurz 2010; Edelstein 1976, 1982; Eichengreen 1982; Goetzmann and Ukhov 2006; Grossman 2015; Kennedy 1987), account for the rise and fall of various industrial sectors (Acheson, Coyle, and Turner 2015; Grossman 1999; and Mitchell, Chambers, and Crafts 2011), or assess the impact of shareholder liability rules (Grossman 1995; Grossman and Imai 2013; Hickson and Turner 2003). For financial economists, long run stock market data can help assess the equity risk premium (Dimson, Marsh, and Staunton 2007; Goetzmann and Ibbotson 2007), market

¹ Hills, Thomas, and Dimsdale (2015). Grossman (2002: 122-123) describes the shortcomings of Bowley, Schwartz, and Smith (1931) and Smith and Horne (1934).

² Acheson et al (2009), Annaert, Buelens, and De Ceuster (2012), Dimson, Marsh, and Staunton (2002), Edelstein (1976, 2010, undated), Frennberg and Hansson (1992), Grossman (2002, 2015, 2017), Le Bris and Hautcœur (2010), and Shiller (1989).

efficiency and asset pricing (Le Bris, Goetzmann, and Pouget 2014; Mirowski 1987; Ito, Noda, and Wada 2016), and asset bubbles (Shiller 1989, 2000; Frehen, Goetzmann, and Rouwenhorst 2013).

The data presented here show that UK equity market grew more rapidly during 1869-1929 than the British economy as a whole and became increasingly international in scope. Among domestic firms, railways declined as a share of the equity market, while the breweries and distilleries, chemicals, oil, and spinning and weaving sectors increased. Dividend yields were consistently between four and six percent, while capital gains were more volatile. Natural resource-based sectors, especially mining, experienced higher average returns, volatility, and CAPM betas. These sectors, along with finance, made the greatest use of contingent capital, although its use all but disappeared--except for banks, insurance companies, and trusts--by 1929. Considered in combination with Turner et al.'s (2009) pre-1870 figures, the data indicate that UK equity markets matured from a high-growth/high-volatility phase during the first two-thirds of the 19th century, to a mostly lower-growth/lower-volatility market during the six decades prior to the Great Depression.

A comparison of the blue chip index with the overall market indices and those of Bowley, Schwartz, and Smith (1931) and Smith and Horne (1934) shows that large capitalization indices underperformed the broader market, perhaps suggesting that investors paid a price for greater liquidity. Evidence presented below suggests that stock market indices—particularly the broader indices—may prove useful as an indicator of monthly changes in macroeconomic conditions. The data also illustrate more clearly than previous work the greater relative returns of foreign to domestic equity, which may cast doubt on market inefficiency as an explanation of British industrial decline.

The remainder of this paper is organized as follows. In the next section I describe the extent of the dataset, as well as the distribution of shares and capitalization among domestic firms and the market as a whole, as well as the evolution of industrial sub-sectors. Section 3 presents data on returns and volatility for the market as a whole and for each industrial sector and the results of Capital Asset Pricing Model regressions which generate estimated betas for each industrial sector. In section 4 I present more than a century of data on capital appreciation indices by splicing the new indices with those produced by Turner et al. (2009) covering the

period 1825-1870 and compare the two eras. In section 5 I present a new 30-stock blue chip index and compare the behavior of that index and the all-market index indices with those created by other authors. Section 6 presents data on the sectoral distribution of the use of contingent (i.e., uncalled) capital among sectors and its evolution over time. In section 7 I briefly explore the indices' usefulness in understanding the timing of British business cycles and in contributing to our understanding of the relative returns on home and foreign investment. Conclusions follow in section 8. Three appendices describe the data sources used to create the indices and some of the difficulties encountered in preparing them for analysis, the process used to classify securities by home country and industry, and the components of the blue chip index.

2. An Overview of the data³

The data set consists of approximately 865,000 security-month observations on ordinary (i.e., common) shares from January 1869 to December 1929 published in the *Investor's Monthly Manual (IMM)* and digitized by Yale University's International Center for Finance (ICF). No observations are available during the second half of 1914, when markets were closed around the outbreak of World War I. The data set spans a longer time period, employs higher frequency data, and contains a wider range of common equity securities than those employed by Bowley, Schwartz, and Smith (1931), Chabot and Kurz (2010), Edelstein (1976, 2010, undated), Grossman (2002, 2015), and Smith and Horne (1934).⁴ The number of monthly observations ranges from a high of 1390 in November 1901 to a low of 604 in July 1870. Figure 1 presents data on the aggregate numbers of equities and domestic equities in each month of the sample. Domestic securities constituted approximately 73 percent of total equity issues at the beginning of the sample and remained around 70 percent of the total during the 1870s. This figure dipped below 60 percent by the beginning of the 1890s, fell to roughly 50 percent by the beginning of World War I, and declined even more, to about 47 percent, by 1929.

[Figure 1 about here]

³ See Appendix 1 for a detailed description of data sources, methods, and difficulties in interpreting the data.

⁴ These datasets are described in Grossman (2015: 474).

Total market capitalization (Figure 2) rose nearly ten times during 1869-1929, from slightly more than £370 million in early 1869, or between a third and a half of UK gross national product, to more than £3 billion during 1929 (more than £3.6 billion at its peak in early 1929), or about 60 percent of UK nominal GNP.⁵ Domestic equity constituted close to 80 percent of total market capitalization for much of the 1870s, fell to about 70 percent in the 1880s and to between 50 and 55 percent in the years leading up to World War I, before reversing course and increasing to slightly greater than 60 percent by 1929. The substantial post-World War I boom/slump in equity prices is clearly visible, as market capitalization increased by 30 percent between the Armistice and January 1920, before declining by 30 percent by the time the market had bottomed out in October 1921. Market capitalization, for all equities and domestic equities, more than doubled between the October 1921 trough and the peak in the first half of 1929, in both nominal and real terms.

[Figure 2 about here]

Paid-up capitalization (Figure 3) increased steadily from about £385 million (nearly £300 million for UK firms) in 1869 to nearly £1.2 billion (£660 million for UK firms) by the outbreak of World War I. Following the post-World War I boom-bust, both total and UK paid-up capital continued to increase, reaching £1.6 billion (nearly £1 billion for UK firms) by 1929.⁶

[Figure 3 about here]

I divided securities into 25 economic sectors; I describe the procedure for doing this in Appendix 2.⁷ Due to space constraints, rather than replicating Figures 1, 2, and 3 for each sector, Tables 1-3 report the average number of securities, market capitalization, and paid-up capitalization of each sector for the years 1869, 1879, 1889, 1899, 1909, 1919, and 1929. These tables also report the proportion of the entire sample accounted for by UK firms and the share of each sector as a proportion of the UK total.

[Tables 1, 2, and 3 about here]

⁵ UK GNP data are from Mitchell (1978).

⁶ The sharp decline in paid up capital—of about £100 million—in January 1923 was a result of the post-war reorganization of the railways under the Railways Act of 1921.

⁷ A very small number of domestic firms could not be categorized. These represented approximately 0.13 percent of firms, 0.033 percent of market capitalization, and 0.032 percent of paid-up capitalization.

The composition of domestic equities changed dramatically between 1869 and 1929. Railways dominated the domestic market in 1869, accounting for more than half of domestic equity market capitalization, although only about one fifth of all securities issued. Banking (21.7 percent), insurance (6.1 percent), gas, light, and water (5.2 percent), canals (3.2 percent), telegraphs (2.3 percent), and shipping (2.1 percent) companies accounted for a substantial portion of equity market capitalization. Together, these sectors accounted for 94 percent of market capitalization and more than two thirds of the domestic securities issued.

By 1929, the above-mentioned sectors accounted for less than 40 percent of equity market capitalization and about one third of security issues. Domestic railroads, which had a peak market capitalization of approximately £420 million in 1897, declined to about £100 million—or less than 5 percent of domestic market capitalization—by 1929. Of the formerly large sectors, only gas, light, and water (6.4 percent) and insurance (11.8 percent) increased as a share of domestic market capitalization, joined by breweries and distilleries (5.0 percent), chemicals (10.1 percent), oil (4.9 percent), and spinning and weaving (5.2 percent), all of which increased from negligible levels. Domestic mining issues, largely copper and tin mines based in Devon and Cornwall, which had been numerous (7.9 percent of securities issued) but not highly capitalized (0.7 percent of market capitalization) in 1869, declined dramatically as a percentage of issues (to 1.2 percent) and of market capitalization (to about 0.1 percent) by 1929.

Table 4 presents data on the average market and paid-up capitalization of firms in different sectors at decadal dates. Railroads and banks were the largest firms in 1869, with average market capitalizations of £1.6 million and nearly £850,000, the only two sectors with average firm sizes substantially above the market average of £581,000 and the UK average of £639,000. By 1929, banks and railways are joined (and exceeded) by oil, food, chemicals, and insurance companies among the larger-than-average capitalization category.⁸

[Table 4 about here]

⁸ Only one firm is represented in the oil category, Shell Transport and Trading.

3. Returns and volatility

The return to holding equity i during month t ($R_{i,t}$) is:

$$R_{i,t} = (P_{i,t} - P_{i,t-1})/P_{i,t-1} + D_{i,t}/P_{i,t-1}, \quad (1)$$

where $P_{i,t}$ equals the price of security i at the end of month t and $D_{i,t}$ is the dividend accruing to security i during month t . The first term represents the capital gain accruing to share i in month t . The second term, the dividend paid during month t divided by the price at the end of the preceding month, represents the dividend yield in month t .

Calculating capital gains with the available data is relatively straightforward; calculating the monthly dividend yield is not (see Appendix 1). To the extent possible, I use a series from the *IMM* entitled “last two dividends yield investor at latest price” (sometimes labelled “last year’s dividend at latest price”). This series has several advantages over a series constructed from dividend payment information provided on individual securities. First, it is expressed in consistent units (percent of par), rather than a mixture of percent of par and currency (i.e., pounds, shillings, and pence), and so does not have to be converted into common units. Second, it was contemporaneously assembled and reported and therefore, was likely consistently constructed. A drawback of this series is that it does not always represent the most current dividend information. For example, if dividends were paid twice a year, as was often the case, the last two dividends might have been paid five and eleven months previously. Thus, the dividend series may not accurately represent current dividends and the temporal distance from the dividends that they do represent is not fixed. Therefore, the monthly dividend series—and the total return series that are based on them—must be taken as an approximation at best.

Table 5 presents data on the average and standard deviation of monthly capital gain and annual dividend yield for the decades 1869-78, 1879-88, 1889-98, 1899-1908, 1909-18, and 1919-28, as well as for the year 1929. The middle three columns present capital gains at an annual rate by compounding average monthly returns over 12 months. Panel A presents data for all equities; panel B presents data for all UK equities. Each panel employs three different weighting schemes: unweighted (i.e., equal-weighted), weighted by market capitalization, and weighted by paid-up capitalization. Each of these weighting schemes has advantages. The unweighted index will not be unduly affected by large movements in the prices of one or two

highly capitalized securities; however, because they are more numerous, it will more closely reflect the behavior of relatively smaller firms. Indices weighted by paid-up capital will give greater weight to larger firms, but because paid-up capital was not changed often, will have more stable weights.

Because the unweighted index more closely reflects the behavior of small firms, we would expect it to generate higher returns—and volatility--than the market capitalization-weighted index, which more closely represents the behavior of larger firms.⁹ The evidence in Table 5 contradicts this: over the entire sample and in each decade except 1909-1918, market capitalization-weighted capital gains exceed those of the unweighted index, suggesting that larger firms outperformed smaller ones. For UK equities, higher returns are typically accompanied by greater volatility, while for entire sample there is no clear cut relationship between returns and greater volatility. Capital gains—but not volatility--weighted by paid-up capitalization are typically lower than those that are either unweighted or weighted by market capitalization. Dividend yields typically range from 4 to 6 percent, slightly lower in the 1880s and 1890s, and are on average slightly lower for UK companies than the overall market. Capital gains are likewise slightly higher for the overall market than the UK, suggesting that investors required greater returns to risk their money on overseas ventures.

[Table 5 about here]

For both the UK and all-equities indices and for all weighting schemes, capital gains were typically strongest during the 1909-18 or 1919-28 decades; 1899-1908, the decade that included the 1907 financial crisis, was the worst performing decade. Capital losses during 1929 amounted to between 7.9 and 12.9 percent for all equities and between 9.0 and 13.1 percent for UK equities, depending on the weighting scheme used.

Unsurprisingly, dividend yields were far less volatile than capital gains, and ranged mostly between 4 percent and 6 percent for all indices and weighting schemes. Dividend yields were generally at the high end of the range during the first decade of the sample period (1869-1878), fell during the subsequent decade, and then rose to equal or slightly exceed the 1869-1878 level by the last two decades (1909-18 and 1919-28).

⁹ See Banz (1981) and a large subsequent literature on size effects.

Tables 6 (capital gains) and 7 (dividends) present the same decadal calculations and weighting schemes as in Table 5, however, the calculations shown in these tables focus on UK firms divided into 25 industrial sectors (see Appendix 2). With every weighting scheme, the highest and most volatile returns are in the mining sector. Other high-returning sectors have a strong natural resources component, such as chemicals and tea, coffee, and rubber. The highest yielding sectors included brewing, as well as retail and manufacturing. More mature, staid sectors, such as banks, railways, and canals, had relatively low capital gains and dividend yields.

[Table 6 about here]

[Table 7 about here]

Figure 4 presents separate capital appreciation indices for all equities and all UK equities, using each of the three weighting schemes (unweighted, weighted by market capitalization, and weighted by paid-up capitalization). Under each weighting scheme, UK equities lagged the overall market. As demonstrated in Table 5, for both UK returns and the overall market, the indices returns weighted by market capitalization typically outperform both unweighted indices and those weighted by paid-up capitalization.

The data reveal several substantial increases and decreases in capital appreciation indices.¹⁰ The largest percentage decline occurred following World War I, from early 1920 to early 1921, when indices fell by about 30 percent. From early 1929 through December 1929, indices fell by between 10 and 18 percent, although the December 1929 observation occurs before the full extent of the post-1929 crash is realized. Other substantial market declines took place following the Baring crisis of 1890 (4 to 11 percent), the City of Glasgow Bank crisis of 1878 (about 10 percent), and the crisis of 1907 (4 to 13 percent). The most dramatic market advances took place during the five years prior to the post-World War I decline (an increase of from 76 to 102 percent), the seven years prior to the 1929 crash, when market capitalization indices more than doubled, and the year following the City of Glasgow Bank crisis (17 to 25 percent).

[Figure 4 about here]

¹⁰ Ranges in this paragraph refer to unweighted and market capitalization-weighted capital appreciation for UK firms and the overall market.

Figures 5, 6, and 7 present capital appreciation indices weighted by market capitalization for several domestic sectors: Figure 5 presents data on transportation and communication; Figure 6 on a variety of industrial sectors; and Figure 7 on financial sectors (note that the vertical scales differ in each of the three figures). The World War I boom in shipping, trams, and wagons is clearly visible in Figure 5. These sectors—particularly shipping--suffered steep declines during the post-war recession. Trams and, to a lesser extent, wagons enjoyed substantial increases in value during the years leading up to 1929. Canals and telegraphs advanced somewhat during the 1920s, in contrast to railways, which experienced relatively little capital appreciation during the entire sample period.

Capital appreciation among industrial equities (Figure 6) was even more impressive than many of the highest flyers within the transportation sector. Both chemicals and manufacturing outperformed trams and shipping companies. Breweries and distilleries had neither the large run up nor decline following the post-World War I boom that characterized the shipping sector, but continued to rise strongly through 1929. Among financial firms (Figure 7), insurance companies were the star performer, with capital appreciating by about five times between 1869 and World War I, and again by five times by the 1929 peak. Banks and trusts, by contrast, enjoyed much weaker capital appreciation.

[Figure 5 about here]

[Figure 6 about here]

[Figure 7 about here]

I assess the performance of all 25 industrial sectors in a more systematic way by analyzing them within the framework of the Capital Asset Pricing Model (CAPM).¹¹ To do so, I run a regression of the following form:

$$R_{s,t} - R_{F,t} = \alpha + \beta(R_{M,t} - R_{F,t}), \quad (2)$$

¹¹ Sharpe (1964), Lintner (1965).

where $R_{s,t}$ is the capital gain on the portfolio of equities from sector s in month t , $R_{F,t}$ represents the risk-free rate in month t , using the closing UK consol rate as a proxy,¹² and $R_{M,t}$ is the monthly capital gain on the universe of common equities listed in the *IMM*, including both foreign and domestic issues. The coefficient β is interpreted as systematic risk, or the extent to which the excess capital gains returns (over the risk free rate) of the sectoral indices covary with those of a market benchmark, in this case the sample of all common equities listed in the *IMM*. As a benchmark for the sectoral results, I also run a CAPM regression on the all-UK equity index. The results, using all three weighting schemes, are presented in Table 8.

[Table 8 about here]

Not surprisingly, the results in Table 8 are consistent with the calculations presented in Table 6. The beta on the domestic index is statistically significantly less than one, suggesting that domestic equities were, on the whole, subject to less systematic risk than overseas equities. Among domestic industries, older, more established sectors, such as canals, banks, insurance, and warehouses exhibit betas near or below the domestic benchmark. Natural resource-based domestic sectors, such as mining, coal, iron, and steel, and oil, along with the (newer) manufacturing sector, exhibit betas above the domestic average.

4. A new long index, 1825-1929

I combine the new monthly indices presented here with the 1825-1870 indices constructed by Turner et al. (2009) to construct monthly stock market indices from May 1825 to December 1929 (Acheson et al. 2009). Although the two indices are similarly broad, because the underlying data come from different sources the indices are not completely comparable. The data in Turner et al. (2009) come from *Course of the Exchange*, which was regarded as the official price list of the London Stock Exchange; the *IMM* data employed here includes data from London, provincial, and some foreign stock exchanges. Because *Course of the Exchange* does include foreign firms traded on the London Stock Exchange, the *IMM* index consisting of

¹² Consol rate data are from Global Financial Data.

all firms is more comparable. Because price data are more straightforward to collect and report than dividend yield, I only compare capital appreciation.

Figure 8 presents data on total market capitalization and paid-up capitalization for the respective indices during the period of their overlap (January 1869-December 1870) and for several years before and after. During the overlap, both the paid-up and market capitalization of the Turner et al. (2009) series is between two thirds and three quarters of the capitalization of the *IMM* data. Correlation between the two series during the admittedly short overlap is high for market capitalization (0.85) and low for paid-up capitalization (-0.61). The spliced series are presented in Figure 9.

[Figure 8 about here]

[Figure 9 about here]

Table 9 presents data on average and standard deviation of capital appreciation indices from subsamples across both periods with each of the three weighting methods. The highest returns from the Turner et al. (2009) data are in the 1850s, which range between 7.7 and 8.5 percent; the 1840s, which was characterized by the railway mania, exhibited the greatest volatility of any decade during the 1825-1929 period. If the pre-1869 UK market was still in an emerging market phase, while the post-1869 market was more mature, we would expect the pre-1869 market to be characterized by higher returns and greater volatility than the post-1869 market. And, in fact, using the unweighted index or the index weighted by paid-up capitalization (but not market capitalization-weighted), average returns for the 1825-1869 period exceed those from 1869-1929. Volatility, by any weighting scheme, was larger in the earlier period, as expected.

[Table 9 about here]

5. A new blue chip index

The indices presented above consist of a large number of securities, many of which would have had a small free float, concentrated ownership, and illiquid shares, which would have made them unattractive and possibly unavailable to the typical investor (Acheson, Turner,

and Ye 2012). In order to assess returns to a portfolio of domestic equities that a typical investor would have been more likely to have owned, I use the *IMM* data to construct a blue chip index, consisting of the largest 30 companies by market capitalization, using the methodology described by Le Bris and Hautcœur (2010) and Campbell et al. (2016).

Because a number of firms issued more than one equity security, I calculate the equity market capitalization of each company by adding up the market capitalization of its multiple securities and selecting the 30 companies with the greatest total market capitalization.¹³ Because no sector ever constituted more than 18 of the 30 companies, it is not necessary to add companies from outside the largest 30 to broaden the index's diversity (Campbell et al. 2016). I use the security with the largest market capitalization from each company to represent the company. I recalculate weights each January and employ these weights for the remainder of the calendar year.¹⁴

Figure 10 presents the blue chip index, the broader capital appreciation index of UK companies (both unweighted and weighted by market capitalization), the Smith and Horne (1934) index for 1867-1914, and the Bowley, Schwartz, and Smith (1931) index for 1919-1930. A striking feature of Figure 10 is the much stronger return of the broader market indices, whether unweighted or weighted by market capitalization, than the blue chip index, suggesting that the investors may have paid for the blue chip's greater liquidity. By the outbreak of World War I, the broad market indices had risen to between 250 and 350 percent of its 1869 level, while the Smith and Horne and new blue chip indices rose between 160 and 175 percent. And from the reopening of the market in 1915 through the market top in 1929, the broader indices rose about twice as fast as the blue chip index. Although the earlier comparison between the weighted and unweighted broad indices suggests that large-capitalization equities outperformed their less highly capitalized counterparts, the blue chip index, which represents the largest of the large

¹³ I assume that rail line branches that issued distinct securities but shared a common name (e.g., North British Railway Co. Edinburgh Perth & Dundee, North British Railway Co. Edinburgh & Glasgow) were one company.

¹⁴ Missing prices were assumed to have remained unchanged. I construct three weighted indices from these data: (1) weighted by the market capitalization of the included company; (2) weighted by the market capitalization of the specific security; and (3) equally weighting all 30 securities. The different weighting schemes resulted in only slight differences among the indices (the correlation coefficient between (1) and (2) is 0.999; the other correlation coefficients are about 0.93), and so I report only the first of these. The constituent companies and their years of inclusion are listed in Appendix 3.

capitalization stocks, is outperformed by the weighted broad index, suggesting a non-linear relationship between market capitalization and equity return.

[Figure 10 about here]

The blue chip index is highly correlated with the Bowley, Schwartz, and Smith (1931) index during their overlap (1919-1929), with a correlation coefficient of 0.92, however, the Bowley, Schwartz, and Smith index suggests a much sharper boom/bust following World War I and a more dramatic increase in stock prices during the second half of the 1920s. The blue chip index is less highly correlated with the Smith and Horne (1934) index during their overlap (1869-1914), with a correlation coefficient of 0.76. The indices tell very different stories, however. Both rose substantially during 1869-1871, but from 1872 through 1900, the blue chip index increased more or less consistently, by slightly more than 1.5 percent per year. By contrast, the Smith and Horne index lost one third of its value during 1873-1879, increased by more than 30 percent in 1879, lost an equivalent amount from 1879 to 1887, and then rose by more than 60 percent during the subsequent decade. The indices subsequently follow similar paths, however, the decline in the Smith and Horne index is more than twice as steep (about 11.5 percent) in the year following the 1907 crisis as the decrease in the blue chip index (5.4 percent). The large differences in composition seem a likely explanation for the indices differing performance. The Smith and Horne index focuses on industrial securities and, as such, excludes banks, discount companies, and insurance companies, which were well represented in the blue chip index. Railways, a vital component of the blue chip (representing 18 of the 30 issues in 1881 and 1883), were excluded from the Smith and Horne index, despite the inclusion of several transportation companies, because of "their specialized character" (p. 2). The authors do not elaborate.

6. Uncalled liability

During the late nineteenth and early twentieth centuries shares were often issued with only a portion of their authorized “amount” paid in, leaving shareholders with contingent liability, which could be demanded by the firm at its discretion.¹⁵ Grossman and Imai (2013) find that British banks with higher levels of contingent liability during 1878-1912 undertook less risk than firms with less contingent liability and speculate that firms held higher contingent capital when they were highly leveraged or where capital was meager or inaccessible to creditors. Looking at non-UK firms, Grossman (2015: 488) confirms this speculation, showing that banking companies, land, mortgage, and financial companies, and raw materials companies held higher levels of uncalled capital than firms in transportation and other infrastructure sectors, where the fixed capital was more easily identified and secured.

Table 10 presents decadal data on the ratio of uncalled to paid-in capital by domestic firms, divided by sector and presented with three weighting schemes (i.e., unweighted, weighted by market capitalization, and weighted by paid-in capitalization). That is, if a firm’s share was issued with a nominal value of £100, of which £80 was paid in, the ratio of uncalled to paid-in capital would be 0.25 (£20/£80). Figure 11 illustrates the times series of the same ratio for all firms, UK firms, and an average of banks, insurance companies, and trusts.

[Table 10 about here]

[Figure 11 about here]

The data in Table 10 and Figure 11 present several noteworthy features. First, the ratio of uncalled to paid-in capital was highest in the financial sector: banks, insurance companies, land mortgage, and finance companies, and trusts. These are sectors in which firms may have high contingent liabilities (e.g., insurance) or leverage (e.g., banks, land, mortgage, and finance), or where the assets may be inaccessible to creditors or subject to large market fluctuations (e.g., trusts). This finding mirrors Grossman’s (2015) finding on non-UK equities. Uncalled capital was a minor component of the equity capital of other domestic sectors. Second, the average ratio of uncalled capital in domestic firms was higher than all firms, and therefore higher on average than foreign firms, which can be seen from the higher ratio of uncalled capital in UK firms

¹⁵ Acheson, Turner, and Ye (2012), Grossman and Imai (2013), Hickson and Turner (2003), Jefferys (1938).

relative to the overall market. At first glance, this might seem counterintuitive, since foreign firms were more likely to have geographically inaccessible assets than domestic firms. However, the higher domestic average can be accounted for by the fact that a relatively higher proportion of the domestic market was composed of financial firms, particularly banks and insurance companies, relative to foreign firms, where were more highly concentrated in raw materials.

Finally, the ratio of uncalled to paid-in capital declined across the board from the late nineteenth century onward, suggesting either that there were institutional changes that lessened the requirement for uncalled capital, or that the risks perceived as generating the need for holding uncalled capital declined during the period. This decline may have been the result of a reduction in “market capital” requirements (Berger, Herring, and Szegő 1995), which could have resulted from an improvement in information flows and, hence, an amelioration of the the information asymmetry that characterizes less mature financial systems.¹⁶

7. Two applications

Paul Samuelson is famously quoted as having said that “The stock market has correctly called nine of the last five recessions.”¹⁷ Can the stock market indices presented here be used to understand British macroeconomic fluctuations during the late 19th and early 20th centuries? Because it is composed exclusively of UK-centered firms, it could be argued that the historical indices are more appropriate for this purpose than, say, the current FTSE 100 index, which includes a variety of companies which operate primarily outside the UK.¹⁸

To test the ability of the indices to shed light on the timing of British business cycles, I use Chadha, Janssen, and Nolan’s (2000) catalogue of business cycle peaks and troughs and construct business cycle diagrams in the style of Burns and Mitchell (1946). To do this, I take the average monthly stock price change for each month in the two years prior to and following

¹⁶ Berger, Herring, and Szegő (1995: 402) illustrate the decline in the average capital-to-asset ratio of US banks during 1840-1993. See also Grossman (2010: 145-149).

¹⁷ Jeff Sommer, “An ugly forecast that has been right before,” *New York Times*, October 8, 2011.

<http://www.nytimes.com/2011/10/09/your-money/a-recession-forecast-that-has-been-reliable-before.html>

¹⁸ For example, the FTSE includes six mining companies which operate primarily outside the UK, including Chile’s Antofagasta plc, and South Africa’s Anglo-American plc.

business cycle peaks.¹⁹ I set the stock price index in the 25th month before the peak equal to 100 and calculate the change in the price index for the subsequent 49 months using the average monthly change of the broad index (both unweighted and weighted by market capitalization) and the blue chip index. I then reset the stock price index at the business cycle peak equal to 100 and calculate the relative value of the stock price indices in the months surrounding the business cycle peak. The results are presented in Figures 12.

The broad indices appear to offer a better predictor of macroeconomic behavior than the narrower blue chip index. During the two years prior to the business cycle peak, the broad indices increase by more than 10 percent; by contrast, the blue chip index reaches its peak a full nine months prior to the business cycle peak and does not begin to decline until a month prior to the business cycle peak. During the six months following the peak, all three indices exhibit similarly sized declines, about two percent. The broad unweighted index bottoms out a year and a half following the cyclical peak, losing just over 5 percent of its peak value; the other two indices bottom out between six months and a year and a half following the cyclical peak, losing about 3 percent of their peak value.

The new indices can also be used to compare the relative returns on British home and foreign investment. Because the performance of British securities markets is alleged to have played a part in Victorian Britain's industrial decline by channeling investment overseas rather than toward domestic industry (Chabot and Kurz 2010; Edelstein 1976, 1982; Eichengreen 1982; Goetzmann and Ukhov 2006; Grossman 2015; Kennedy 1987), such a calculation—in combination with data on capital flows—may help determine to what extent capital outflows were the result of differing returns on home and foreign investment, rather than inefficiencies in UK securities markets. Although a full-scale examination of the role of UK securities markets in Victorian decline is beyond the scope of this paper, I use the data developed here to replicate Edelstein's (1976) classic study of the returns of home and foreign investment and augment those results with fragmentary data on capital flows.

Edelstein calculates annual returns on a sample of 566 home and overseas equity, preference, and debenture securities drawn from the *Investors' Monthly Manual*. The equity

¹⁹ When business cycles overlap, I split the overlap evenly between “pre-peak” and “post-peak.”

component of Edelstein's database consists of 196 domestic and 130 foreign equities. Because the ICF data contains all securities listed in the *IMM*, I am able to replicate Edelstein's equity calculations with monthly data on a far greater number of equity securities.²⁰

Edelstein concludes that UK returns—both for his aggregate portfolios and for the equity component of those portfolios—outperformed overseas return during 1870-1876 (weakly), 1887-1896, and 1910-1913, while overseas equity outperformed during 1877-1886 and 1897-1909. To make comparable return data, I take the average monthly capital appreciation and add one twelfth of the average annual dividend yield.²¹ The results are presented in table 11. The top panels presents data by decade; the bottom half presents averages by Edelstein's time periods. The data show that the return on overseas equities was more than that on domestic equities (10.6 percent to 8.2 percent). The results largely agree with Edelstein's results, agreeing with his characterization from four of his five time periods. In my calculations, returns on home equity weakly exceed those on overseas equity during the periods 1870-1876 (12.1 percent to 11.8 percent) and 1910-1913 (9.3 percent to 4.0 percent), while overseas equity dominates during 1877-1886 (10.1 percent to 4.3 percent) and 1897-1909 (10.4 percent to 4.8 percent). The results disagree for the period 1887-1896, which Edelstein characterizes as a period of UK dominance, while my results suggest that the return on overseas equities exceeded those of UK equities by 10.5 percent to 8.4 percent.

Table 11 also includes calculations on the growth of market and paid-up capitalization by decade and by Edelstein's time periods. Overseas returns exceed domestic returns for the first four decades of the sample (1869-1878, 1879-1888, 1889-1898, and 1899-1908) and for 1929 and the entire sample period, while overseas equity capitalization grows more rapidly than domestic equity during those periods. UK returns exceed those of overseas equities during 1909-1918, as does the growth of market capitalization but not paid-up capitalization. Using Edelstein's time periods, non-UK capitalization growth exceeds that of UK growth in every period except 1910-1913, where domestic market capitalization growth exceeds overseas growth. The results, although far from conclusive, suggest that the relative growth of foreign and domestic capitalization may be related to relative returns on equity rather than inefficiencies in

²⁰ I do not gather data on preference or debenture issues, and so do not replicate Edelstein's work fully.

²¹ Note the potential shortcomings of the dividend data discussed in section 3. To maintain consistency with Edelstein, I use unweighted capital appreciation and dividend yield.

the UK capital market. Combining the data presented here with additional capital flow data may yield a more definitive answer to the question of the role of the stock market in Victorian industrial decline.

8. Conclusion

The data presented here suggest a rich agenda for future research in economic history and financial economics. The indices can be used to assess the relationship between equity market performance and real economic activity, in particular the consequences of the cost and availability of equity financing on individual industrial sectors. In conjunction with data on foreign firms listed both in the UK and on their home markets, the indices can be used to assess the extent and progress of market integration during the first era of globalization. The underlying firm-level data can be used in an event-study framework to assess how market participants reacted to political and economic events, such as wars or major economic legislation. The data can also be used to examine how firms decided how much uncalled capital to hold and the consequences of those decisions for firm risk-taking.

The *IMM* data, as gathered by the ICF, represents the largest accessible collection of data on securities traded on British markets during the late 19th and early 20th centuries. The data underlying the indices presented here dwarf in scale and scope those used to construct all other stock market indices for this period. The dataset contains more than 865,000 security-month observations on common equity from January 1869 to December 1929, spanning periods of war and peace, growth and recession, booms and crises. The data are rich enough to construct indices for 25 UK sectors.

Both the *IMM*'s raw data and the ICF's coding have problematic elements, many of which I have addressed. These extensive revisions have substantially improved the quality of the *IMM*-ICF data and the indices presented here represent the most complete and accurate monthly indices for late 19th and early 20th century British equity markets created to date. Despite these revisions, a number of issues remain unresolved and the indices presented here, particularly those for less populated sectors, should be used with caution. Further work with the periodicals

such as the *Stock Market Intelligence*, as well as archival sources, will only improve these indices.

Appendix 1. Data sources, methods, and problems

The data underlying the indices come from the *Investor's Monthly Manual (IMM)*, as collected and reported by the International Center for Finance (ICF) at Yale University.²² Both the *IMM* data and the ICF's collection methods present considerable challenges for the modern researcher. Because the *IMM* is a crucial data source for the study of late 19th and early 20th century UK securities markets and because the ICF's database is the most convenient means of accessing those data and thus likely to be used extensively by researchers for years to come, this appendix discusses the challenges presented by the data—and what has been done to mitigate them—in some detail.

The *IMM* published extensive data on many types of securities, primarily but not exclusively those traded on British exchanges.²³ The *IMM* did not provide separate tables for debt, equity, and other types of securities (e.g., rights, warrants)—or for different types of equity (e.g., common, preferred)—so an important step in constructing indices is to categorize securities by type.²⁴ The *IMM* did classify securities by economic sector (e.g., banks, mines, railroads), however, new categories were added and others dropped, limiting their usefulness for the current study. Furthermore, the nature of some companies' businesses changed during the period, making any sector categorization scheme problematic.

Although the amount and type of data presented by the *IMM* varied over time, the indices presented here rely on several key pieces of information that were, with few exceptions, always available: the security name; the number of shares or amount of stock outstanding; the authorized “amount”; “paid-in” (sometimes called “par”) amount; the security price; and dividends. Each of these requires some explanation.

²² <http://som.yale.edu/faculty-research/our-centers-initiatives/international-center-finance/data/historical-london> includes both the digitized data, as well as scanned versions of *IMM* issues.

²³ Although many of the securities quoted in the *IMM* were listed solely on the London Stock Exchange, others were listed on London, provincial, and/or foreign exchanges. The *IMM* did not claim to publish exhaustive listing for London or provincial exchanges; further, it is possible that the extent to which *IMM* listing were representative of the London exchange changed over time. Implying that the *IMM* data is representative of the London Stock Exchange (e.g., Grossman 2015) is incorrect.

²⁴ This paper focuses entirely on ordinary (i.e., common) equity, since preference (i.e., preferred) equity frequently carried with it a stated interest rate, suggesting that it combined characteristics of equity with those of a fixed-income security.

In addition to identifying the physical location of the issuing company's activities and its economic sector, the security's name can help classify it as debt, equity, or something else. For example, if the security name included a maturity date, it was typically some sort of debt; if the name included a stated interest rate, it was usually a bond or a preferred ("preference" in contemporary terminology) share.

Data in the "number of shares outstanding or amount of stock" column makes it possible to calculate the total market capitalization of a security issue. For shares, the total market capitalization is simply the number of shares multiplied by the market price. Thus, a security with 100,000 shares outstanding and a price of 90 would have had a market capitalization of £9,000,000. For equities that were classified as "stock," a common designation among older corporations such as railways, canals, and waterworks, the "amount of stock" indicates the total market capitalization of the issue at par, typically 100. Hence, the market capitalization of a "stock" with a quoted "amount of stock" equal to £100,000 and a market price of 90, was £90,000.²⁵ The *IMM* does not always clearly indicate which securities are stocks, making them difficult to distinguish. Often, although not always, a pound sign before the figure in the "number of shares or amount of stock" column indicates that the security is a stock; it is often possible to resolve ambiguities by looking forward and backward in the time series.²⁶

The authorized "amount" represents the maximum price that prospective shareholders could have been required to pay for a share at its original issue. The figure "paid-in" (sometimes called "par") represents the price actually paid at the initial offering, plus any subsequent changes. Shares listed in the *IMM* were often only partially "paid-in." For example, a share listed with an "amount" of £100, of which £60 was "paid-in" meant that investors would have paid £60 for the share when it was first offered. The share would have initially traded for about £60, although over time it could have increased or decreased in value. Purchasers of that share would have also acquired a £40 contingent liability, meaning that subsequent to their initial purchase, they—along with fellow shareholders--could be called upon by the firm to pay in an

²⁵ The assertion in Grossman (2002) that all securities listed as "stock" were debt is incorrect.

²⁶ I attempted to discover when stocks are misrepresented by *IMM* or *ICF* by checking for large month-to-month jumps in market capitalization. As noted above, stocks and shares with the same figures in the "number of shares or amount of stock" could have had wildly differing market capitalizations.

additional amount of as much as £40.²⁷ Any such payments would have increased the share's paid-in value and reduced the attached contingent liability. Capital calls arose when firms were successful and required additional funds for expansion, or when they were unsuccessful and in need of funds to stave off failure or satisfy creditor in bankruptcy proceedings.²⁸

The *IMM* reported a variety of monthly prices, including some or all of the following: opening, high, low, latest, and last business done, although these were not consistently reported throughout the sample. To the extent possible, I used end-of-month data. ICF coders did not input monthly closing price data for the years 1908-14, so the opening price from the subsequent month was used in its place during this period.²⁹

A number of prices in the *IMM* were reported with the suffix “d.” This could have represented pence, since d is the standard abbreviation of the British penny; however, for months in which high and low prices were reported with this suffix, the number preceding d in the low price typically exceed the number preceding it in the high price, suggesting that d represents a discount from par. The ICF data reports these numbers without suffixes, rendering them unusable without recalculation. Because of uncertainty surrounding this designation, I delete all observations with prices that had the suffix of “d,” “dis,” “pm,” and “p” (presumably representing premium over par).³⁰ Other anomalies in price data (e.g., those exhibiting large one-month price or market capitalization movements) were resolved by resorting to the scanned images of the *IMM* on the ICF website and consulting—when available—the high, low, opening, and closing price of the month in question and adjacent months.³¹

The *IMM* reported the last four dividends paid for each security, but the date of announcement and payment of these dividends is frequently unclear. Prior to 1880, the *IMM*

²⁷ The total amount of paid-in capital, often referred to as “paid-up capitalization,” consists of the par amount per share multiplied by the total number of shares outstanding. Because paid-up is both correlated with firm size and not often changed, it is sometimes used to weight stock market indices from this period. See Acheson et al (2009) and Grossman (2002, 2015).

²⁸ Grossman and Imai (2013), Hickson and Turner (2003), Jefferys (1938).

²⁹ I am grateful to Minhua Wan of the ICF for suggesting this. It is not clear how “last business done” differs from “latest” but it may represent the last trade, even if from a prior month.

³⁰ Because the ICF coders did not flag these entries as noteworthy, it is likely that some remain in the dataset.

³¹ For example, if a closing price was outside the high-low range for a given month, while the price designated as “last business done” was within the range, last business was used in preference to the closing price.

reported the last four dividends without attaching any specific date (e.g., 6 7 5 6)³²; subsequently, the dividend listing included a date along with the dividend (e.g., 8% Jun91).³³ Dividends were sometimes reported as a percent of par, other times in pounds, shillings, and pence. Starting in June 1879, the *IMM* added a column labelled “last two dividends as a percent of price current.” Because this contemporaneously reported series was both consistently reported and less ambiguous than reconstructing dividends from the four dividend columns, I use it in preference to other possible sources for dividends paid from June 1879.³⁴ Prior to the addition of this new series, I use data from the ICF’s web-based interface (see below) on the previous two dividends to recreate this series.

The *IMM* frequently appended x or xd to share prices to indicate that the share was “ex dividend.” Once a share “goes ex dividend,” its purchase price no longer includes the right to the next dividend payment, typically depressing its price. The ICF data do not include ex dividend dates and so it is impossible to definitively test whether ex dividend dates are clustered in certain months, leading to reduced capital gains in those months.³⁵

The ICF provides monthly *IMM* data on stocks, bonds, and other securities in two formats. The older format, accessible via a web-based interface, allows the researcher to select individual securities, a date range, and to choose from many of the variables reported in the *IMM*. The data accessed this way are difficult to use and not necessarily consistent across time and issuers, according to the ICF and personal experience. Although useful for checking individual entries or a small subset of securities over a limited period of time, these data are not suitable for accessing the entire data set. An updated, improved dataset was subsequently prepared by the ICF. Although this data set contains a more limited number of variables, the data are consistent across time and securities and much easier to use to calculate broad-based indices. Hence, I use the newer dataset—with the dividend exception noted above—to construct the indices.

³² A column in the *IMM* does indicate months in which dividends were typically paid (e.g., June, December), however, even this does not always resolve ambiguities.

³³ See Grossman (2002) for some of the difficulties in interpreting *IMM*-reported dividend information.

³⁴ Despite its advantages, the “last two dividends at latest price” series does not always precisely match the data in the columns listing the last four dividends individually.

³⁵ Regressing capital appreciation on 11 monthly dummies suggests that some months may exhibit lower capital appreciation. I plan to examine this topic in more detail in future work.

In addition to basic identifying information (security name, year and month of observation, ID number, and ID number used in the older, web-based interface), the newer data set includes information on the issuer's country, economic sector (e.g., banks, railways), the type of security (e.g., ordinary shares, preference shares), the currency in which the security is quoted, three price variables (open, high, and late), and, from 1879, the last two dividends as a percent of price. Unfortunately, the instructions given to the ICF coders are not available and so we know little about how a number of the coding choices were made. I made a number of corrections to rectify some of these deficiencies.

Much of the data from December 1894 are missing from the ICF data, presumably because the Yale library's copy (and the scanned version on the ICF web site) of the *IMM* is missing those pages. I entered the missing data by hand using the complete copy of the December 1894 volume in the Baker Library at Harvard Business School.

In examining the data, I discovered several hundred companies that were improperly categorized in terms of home country, industrial sector, and type of security. I revised these accordingly, and excluded all but common (i.e., "ordinary") equity from the sample. I created a new set of industrial sectors; details on the composition of these sectors--and on country categorization--is included in appendix 2. Because the *IMM* only began publishing dividend/price data in June of 1879, I used the ICF's web-accessible data to recreate the "last two dividends at current price series" for January 1869-May 1879.

I dropped observations if any component of a security's data was missing for a given month, with the exception of dividends, which were assumed zero if blank.³⁶ Because it complicates the calculation of capital gains and total returns, I exclude securities which underwent a change in par value from the return indices in the month in which the par change took place. Similarly, I omit entries marked by stock splits, new issues (whether or not related to a merger), and retirement of issues (for any reason) in the month that they occur for purposes of calculating return indices, although not for gauging the size of the market.³⁷ I exclude securities denominated in currencies other than sterling from the sample, in part because this may indicate

³⁶ Except for equities designated as "stock," since they typically had a par value of 100.

³⁷ If amount, par, type of security was found to be equal in month $t-1$ and $t+1$, however, it was assumed to be the same in month t .

that a substantial portion of the trading in these securities took place outside the UK and hence would present a misleading picture of British securities markets.³⁸ I also drop securities for which data existed in fewer than 12 months, following the methodology adopted by Acheson et al. (2009: 1110).

³⁸ See Grossman (2002: 124).

Appendix 2. Defining sectors and home countries

Sectors

Because of the many mistakes in the ICF's assignment of SIC codes, I reassigned companies into one of 25 sector categories. There were three main difficulties in making these assignments. First, many companies either no longer exist or exist under a new name, making it hard to determine the nature of their business. These were tracked down via newspaper and internet searches to the extent possible. Second, many companies straddled more than one sector. In some cases (e.g., iron and shipbuilding; tea, coffee, rubber, jute, sugar) this was resolved by creating a broader, more inclusive category. Third, some companies changed focus during the sample period. Companies in a sector were deemed to have remained in the sector for the duration of their appearance in the sample. This may reduce the accuracy of the sector assignments.

Banks. I use the *IMM* banks section, which remained consistent throughout the sample.

Breweries and Distilleries. I use the *IMM* breweries and distilleries section, which remained consistent throughout the sample.

Building was not an *IMM* category, and consists mostly of building supplies, including plate glass, asphalt, cement, linoleum, home furnishings and furniture.

Canals. The *IMM* category also includes canal navigation, docks, harbors, dock railways, tug boats, bridges, coastal shipping and transportation.

Chemicals was not an *IMM* category, and includes soda, alkali, pharmaceuticals, sulphur, nitrate, guano, phosphate, asbestos, fertilizers, animal feed, and salt.

Coal. This category consists of the *IMM*'s iron, coal, and steel category, plus shipbuilding firms, which sometimes combined shipbuilding with metal manufacturing (e.g., Palmer's Shipbuilding and Iron, Vickers). The *IMM* category sometimes contained a category called shipping and shipbuilding.

Food was not an *IMM* category, and includes dairies, mills, food—including tobacco--manufacturers, meat processors, restaurants, and ice.

Gas, light, water, electric was an *IMM* category, although it was changed by the addition of electricity. The category includes public utilities, irrigation companies, and those in the electrical industries, including the manufacture of cables.

Insurance. I use the *IMM* insurance section, which remained consistent throughout the sample.

Land, mortgage, and financial includes land, timber, and exploration companies. The vast majority of security-year observations are non-UK firms.

Manufacturing, which was not an *IMM* category, encompasses a wide variety of firms, including arms, engineering, tires, boots, shoes, china, coffins, dental supplies, watches, goldsmiths, silversmiths, sporting goods, luggage, rubber belting, leather, and matches.

Mines. Include everything from the *IMM*'s section devoted to mining, which remained consistent throughout the period. The category includes gold, silver, copper, diamonds, tin, and lead mining, but not coal mining (see above). The category does include the Anglo-Mexican Mint, a subsidiary of Anglo-Mexican Mining Company. The names of several of the companies indicate that they engaged in both mining and smelting.

Oil. The *IMM* oil category did not begin until 1910, but remained consistent subsequently. Oil companies that pre-date 1910 are included.

Paper and publishing was not an *IMM* category, and includes paper, printing, book and newspaper publishing and equipment (linotype machines, pens, stationary), ink, and photography.

Railways. The *IMM* railways section remained constant, although it was sometimes subdivided into British, Colonial, American, and Foreign, and includes metropolitan railways. French railways (e.g., Eastern of France, Paris and Orleans)—as well as the South Austrian & Lombard-Venetian Railway—which are not denominated in pounds sterling, are omitted. Although shares of the French railways were traded in both London and Paris, the market capitalization reported in the *IMM* appears to have included shares traded in both markets. It seems likely that the majority of these shares were traded in Paris and therefore including them would overstate their importance in the UK market.

Real Estate was not an *IMM* category, and includes hotels, commercial properties, residential properties, and cemeteries.

Retail was not an *IMM* category, and includes department stores.

Shipping includes ship owners and shipping lines. The *IMM* shipping category sometimes included shipbuilding.

Spinning and weaving. This *IMM* category also includes drapery, clothes, dying, spinning equipment, sewing machines, sacks, some warehouses that were also involved in spinning and weaving.

Tea, Coffee, Rubber includes jute, tobacco, and sugar estates. To the extent possible, this category includes plantations (e.g., Java United Plantations), trading companies (e.g., Henry Gardner), and investment trusts (e.g., Tobacco Securities Trust). The Ottoman Tobacco Company, which both grew tobacco and manufactured tobacco products, is included in this category.

Telephones and Telegraphs. The *IMM* telegraph section subsequently expanded to include telephones. It included firms that constructed, as well as operated, communications lines.

Trams. I use the *IMM* trams section, which remained consistent throughout the sample.

Trusts. These were investment companies formed to purchase certain types of securities (e.g., securities of firms in a particular industry or region of the world), although the type of security was frequently unclear. This category includes all securities in the *IMM*'s trust section, as well as a number of securities corporations, debenture corporations, or any type of non-specific financial trust.

Wagons. This *IMM* category was expanded to include automobiles and bicycles.

Warehouses was not an *IMM* category, and includes both warehouses and delivery companies.

Other includes movie production and distribution, advertising, and a very few companies for which the business activity was unclear.

Countries

Assigning a security to a particular country for purposes of distinguishing UK equities from foreign equities presents theoretical and practical problems. On a purely theoretical level, what determines whether a company is “British”? Being organized under British law? Having a UK headquarters and UK-based annual general meeting and/or share-holders? Or is it determined by where the majority of the firm's operations take place. The answers to the first two of these criteria are far more easily answerable than the third; nonetheless, I adopt the third definition. That is, firms are considered as having been domiciled within a country if their main activities took place largely within that country. Insurance companies and shipping companies, unless their operations were clearly focused outside the UK, were generally assumed to be UK companies; trusts that invested around the world were considered multinationals.

A second, more practical issue arises from the difficulty in assigning a firm to a particular country. The ICF's assignments were often flawed: firms with difficult-to-determine countries of residence seem to have been considered British by default. Other firms were assigned to countries based on a mistaken association with place name: for example, the Colorado Nitrate Company—located in Chile—was assumed to be located in the United States, presumably because of the association of the company's name with that of the US state of Colorado. Companies with San Francisco in the name were invariably—and often erroneously--assumed to be located in the United States, presumably San Francisco, California, rather than one of the many cities that bear that name throughout the Spanish-speaking world. A further practical difficulty arises when companies operated in more than one country. This was addressed by adopting regional definitions (Europe, Australia/New Zealand, Asia, etc.), wherever possible. I adopt the same methodology as Grossman (2015), although further refinements to have been made to the assignments of countries. Finally, all Irish companies are considered UK companies until 1921, after which only companies operating in Northern Ireland are considered British.

Appendix 3. Components of the blue chip index

Company Name	years included
Alliance Assurance Co. Ltd.	1906-1929
Anglo-American Telegraph Co. Ltd.	1874-1876
Armstrong (Sir W. G.) Whitworth & Co. Securities Ltd.	1897-1919
Armstrong (Sir W. G.) Mitchell & Co. Ltd.	1890, 1896
Artisans Labourers and General Dwellings Limited	1888-1890
Associated Newspapers Ltd.	1924-1929
Babcock and Wilcox Ltd.	1923-1929
Bank of Liverpool Ltd.	1922
Bank of Scotland	1869-1889, 1892-1896, 1909-1910
Barclay and Co., Ltd	1903-1929
Bleachers' Association Ltd.	1926
Bolckow Vaughan and Co. Ltd.	1874, 1880-1882
Boot's Pure Drug Co.	1927-1928
Bristol and Exeter Railway Ltd.	1876
British Linen Bank	1869-1872, 1876-1878, 1893-1913
British-American Tobacco Co.	1913-1929
Brunner Mond & Co. Ltd.	1893-1896, 1900-1927
Caledonian Railway Co. Inc.	1869-1916
Capital & Counties Ltd.	1902, 1905-1910
Carreras Ltd.	1927-1929
City of London Real Property Ltd.	1925-1927
Clydesdale Bank Ltd.	1877
Coats (J. & P.) Ltd.	1895-1929
Commercial Bank of Scotland	1869-1878
Commercial Union Assurance Fire Life & Marine Ltd.	1912-1929
Cory (William) & Son Co.	1920-1922
Courtauld	1916-1929
Crossley (John) & Sons Ltd.	1869-1873
Cunard Steamship Ltd.	1917, 1920
Distillers Co. Ltd.	1903-1905, 1923-1929
Dunlop Rubber Ltd.	1919-1923
East London Waterworks Ltd.	1880, 1882, 1885, 1887
Eastern Extension Australia & China Telegraph Ltd.	1894, 1896-1898, 1922-1924
Eastern Telegraph Co.	1873, 1879-1902, 1916-1918, 1921-1926, 1929
Electric and International Telegraph Co.	1869-1870
Fine Cotton Spinners and Doublers Association	1920, 1922-1928

Furness Railway Co.	1879, 1881-1883
Furness Withy & Co. Ltd.	1918-1920
Gas Light & Coke Co.	1899-1929
Glasgow and South-Western Railway	1869-1897
Great Eastern Railway Co.	1869-1917
Great Northern Railway Co.	1869-1922
Great Western Railway Co.	1869-1929
Guest Keen and Nettlefolds Co. Ltd.	1921-1929
Imperial Chemical Industries Ltd.	1928-1929
Imperial Gas Co.	1870-1876
Imperial Tobacco Co. Ltd. (Great Britain & Ireland)	1919-1929
Lancashire & Yorkshire Railway Co.	1869-1921
Liverpool & London & Globe Fire & Life Insurance Co.	1878-1920
Lloyds Bank Ltd.	1890-1929
London & County Banking Ltd.	1870-1975, 1877-1909
London & Lancashire Fire Insurance Co. Ltd.	1920-1929
London & Midland Bank Ltd.	1898
London & North-Eastern Railway	1923-1925
London & North-Western Railway	1869-1922
London & South-Western Railway	1869-1922
London & St Katharine Docks	1869-1881
London & Westminster Bank Ltd.	1869-1909
London Brighton & South Coast Railway	1869-1914
London Chatham & Dover Railway	1880-1881
London City & Midland Banking Co.	1899-1918
London County & Westminster Bank Ltd.	1910-1918
London County Westminster & Parr's Bank Ltd.	1919-1923
London Joint City and Midland Bank	1919-1923
London Joint Stock Bank	1869-1894
London Midland and Scottish Railway	1923-1929
Manchester & Liverpool District Banking Ltd.	1869, 1875-1879, 1881, 1883-1917
Manchester Sheffield & Lincolnshire Railway	1872-1880
Marconi's Wireless Telegraph Co.	1928-1929
Martin's Bank Ltd.	1929
Metropolitan Carriage Wagon and Finance Ltd.	1918-1919
Metropolitan Railways Co. Ltd.	1869-1900
Midland Bank Ltd.	1924-1929
Midland Railway Co.	1869-1922
Mitchells and Butlers Ltd.	1928
National Bank Ltd.	1869, 1871-1873, 1875-1879, 1882-1885

National Bank of Scotland Ltd.	1869-1878, 1900-1912
National Provincial Bank of England Ltd.	1869-1929
Nobel Industries Ltd.	1920, 1923-1927
Nobel's Explosives Co. Ltd.	1918
North British & Mercantile Fire & Life Insurance Co.	1886-1895, 1898-1899, 1922-1929
North British Railway Co.	1869-1892, 1896
North London Railway Co.	1878-1895, 1897-1898
North Staffordshire Railway Co.	1891-1892, 1894-1895
Parr's Bank Ltd.	1897-1908, 1910-1918
Peninsular & Oriental Steam Navigation Co.	1869-1872, 1874, 1880, 1882-1887
Phoenix Assurance Ltd.	1921-1929
Powell-Duffryn Steam Coal Co. Ltd.	1919, 1921
Prudential	1925-1929
Prudential Assurance Ltd.	1914-1917
Royal Bank of Scotland Ltd.	1869-1899, 1902
Royal Exchange Fire Life & Marine Insurance Co.	1879
Royal Insurance Co. Ltd.	1886-1919, 1921-1929
Rylands and Sons Ltd.	1897
Shell Transport and Trading Co.	1911-1929
South Metropolitan Gas Co.	1883-1915
South-Eastern Railway	1869-1901
Sun Life Assurance Society	1875
Taff Vale Railway Co.	1884-1886, 1889, 1891, 1893-1894
Tharsis Sulphur and Copper Ltd.	1873-1874, 1880-1884, 1888, 1899-1901
Turner & Newall Ltd.	1929
Union Bank of London Ltd.	1869-1879, 1881-1892
Union Bank of Scotland Ltd.	1869-1871, 1873-1874, 1877
Union of London & Smith's Bank Ltd.	1903-1916, 1918
United Steel Companies Ltd.	1919-1920
Vickers Ltd	1900-1921, 1923-1924
Westminster Bank Ltd.	1924-1929

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Table 1: Total number of issues and percent of UK issues, monthly averages of selected years							
	1869	1879	1889	1899	1909	1919	1929
All firms	636	827	1088	1309	1334	1243	1191
UK firms	465	578	678	754	740	619	565
UK as percent of total	73.1	69.8	62.3	57.6	55.5	49.8	47.5
Percent of UK firms							
Banks	16.3	16.1	16.1	10.8	7.4	5.1	5.6
Breweries and distilleries	0.4	0.7	3.7	7.7	7.2	8.5	9.1
Building	0.2	0.3	0.7	0.9	1.5	0.8	2.5
Canals	5.2	3.6	3.0	2.0	1.0	1.3	1.1
Chemicals	0.9	2.1	2.9	2.8	2.8	3.5	3.2
Coal, iron, and steel	4.0	9.7	9.9	11.2	15.4	14.0	12.6
Food	0.9	1.1	2.1	4.6	5.3	6.0	7.0
Gas, light, and water	13.4	7.4	7.7	8.3	9.7	9.3	11.2
Insurance	10.0	13.9	13.8	10.9	9.6	7.9	7.5
Land, mortgage, and finance	0.2	0.5	1.2	0.0	0.1	0.2	0.5
Manufacturing	1.1	1.2	2.0	3.0	3.8	5.2	5.5
Mines	7.9	5.2	3.0	1.0	0.5	0.8	1.2
Oil	0.4	0.6	0.8	0.7	0.5	0.7	0.2
Paper and publishing	0.2	0.3	1.3	2.3	1.8	2.0	2.8
Railways	20.6	12.2	8.3	8.6	8.3	9.5	2.5
Real estate	3.5	4.5	4.1	4.1	4.0	4.6	3.7
Retail	0.0	0.0	0.0	0.9	1.1	1.3	2.3
Shipping	2.8	3.9	4.5	3.3	3.0	2.7	2.8
Spinning and weaving	1.1	2.0	3.5	6.2	7.3	6.4	7.9
Tea, coffee, and rubber	0.0	0.0	0.2	0.7	0.7	0.6	1.4
Telegraphs	3.0	2.1	1.9	1.5	1.8	1.9	2.3
Trams	0.2	3.9	3.6	2.8	0.9	0.8	1.4
Trusts	1.5	1.9	1.6	1.8	1.9	2.4	2.6
Wagons	5.6	5.8	3.1	2.7	2.3	2.2	1.8
Warehouses	0.4	0.9	1.0	1.2	1.6	1.9	0.6
Source: See text.							

year	1869	1879	1889	1899	1909	1919	1929
All firms (£millions)	369.6	591.0	963.4	1466.0	1621.3	1996.1	3430.9
UK firms (£millions)	297.0	461.0	688.4	941.5	867.9	1171.5	2077.1
UK as percent of total	80.3	78.0	71.5	64.2	53.5	58.7	60.5
Percent of UK firms							
Banks	21.7	19.4	19.6	19.5	23.4	15.4	13.2
Breweries and distilleries	0.0	0.2	1.1	2.9	1.2	2.1	5.0
Building	0.1	0.1	0.1	0.3	0.3	0.3	1.2
Canals	3.2	3.0	1.6	1.0	0.4	0.2	0.2
Chemicals	0.1	1.0	1.3	1.6	2.3	5.1	10.1
Coal, iron, and steel	1.5	2.1	2.9	5.6	7.8	10.3	3.4
Food	0.1	0.2	0.5	2.0	1.7	8.5	20.4
Gas, light, and water	5.2	4.9	4.8	7.2	6.1	3.7	6.4
Insurance	6.1	9.7	9.5	7.1	7.9	9.9	11.8
Land, mortgage, and financ	0.0	0.0	0.2	0.0	0.0	0.0	0.1
Manufacturing	0.1	0.3	0.6	0.6	1.0	3.0	2.4
Mines	0.7	0.3	0.2	0.1	0.1	0.4	0.1
Oil	0.1	0.0	0.1	0.1	0.3	7.2	4.9
Paper and publishing	0.0	0.0	0.2	0.4	0.3	0.4	1.7
Railways	53.5	50.8	47.5	41.4	31.9	17.0	4.8
Real estate	0.5	0.7	2.3	1.2	0.9	0.8	1.0
Retail	0.0	0.0	0.0	0.3	0.6	0.6	1.2
Shipping	2.1	1.7	1.7	0.8	0.9	3.3	1.3
Spinning and weaving	0.8	0.8	0.9	4.1	8.7	7.5	5.2
Tea, coffee, and rubber	0.0	0.0	0.0	0.1	0.1	0.1	1.4
Telegraphs	2.3	2.2	2.3	1.9	2.1	2.1	1.8
Trams	0.1	1.1	1.0	0.6	0.2	0.3	0.7
Trusts	0.7	0.6	0.8	0.6	0.7	0.6	0.9
Wagons	0.9	0.6	0.4	0.5	1.0	1.0	0.4
Warehouses	0.1	0.3	0.2	0.2	0.1	0.2	0.2
Source: See text.							

year	1869	1879	1889	1899	1909	1919	1929
All firms (£millions)	382.2	522.0	638.7	883.3	1077.9	1264.9	1628.9
UK firms (£millions)	290.5	374.2	445.6	567.1	651.8	741.5	945.2
UK as percent of total	76.0	71.7	69.8	64.2	60.5	58.6	58.0
Percent of UK firms							
Banks	12.5	11.2	10.8	9.3	9.4	8.4	9.5
Breweries and distilleries	0.1	0.1	1.2	2.5	1.9	2.1	4.3
Building	0.0	0.5	0.3	0.2	0.7	0.5	1.2
Canals	4.1	3.9	3.4	2.3	1.1	0.7	0.5
Chemicals	0.4	1.0	1.2	1.8	2.0	3.5	9.2
Coal, iron, and steel	2.4	4.2	4.7	5.1	7.0	9.5	9.8
Food	0.1	0.2	0.4	1.8	1.8	4.1	9.9
Gas, light, and water	4.5	3.7	3.5	7.1	6.8	6.9	9.1
Insurance	4.3	4.1	3.9	2.8	2.2	1.6	2.0
Land, mortgage, and finance	0.0	0.3	0.3	0.0	0.0	0.0	0.1
Manufacturing	0.2	0.2	0.7	1.0	1.1	1.9	2.9
Mines	0.5	0.4	0.3	0.2	0.1	0.2	0.3
Oil	0.2	0.2	0.1	0.1	0.1	1.3	2.3
Paper and publishing	0.1	0.1	0.2	0.6	0.5	0.4	1.3
Railways	63.5	58.6	57.0	54.1	52.6	46.1	20.0
Real estate	1.0	1.2	1.4	1.4	1.4	1.3	1.9
Retail	0.0	0.0	0.0	0.3	0.3	0.4	1.5
Shipping	2.3	2.3	2.7	1.5	1.6	2.0	2.4
Spinning and weaving	0.6	1.3	1.4	2.2	3.9	3.6	6.5
Tea, coffee, and rubber	0.0	0.0	0.0	0.1	0.1	0.1	0.4
Telegraphs	1.6	3.6	3.2	2.7	2.7	2.0	1.6
Trams	0.2	1.0	1.3	0.8	0.6	1.1	1.4
Trusts	0.5	0.5	1.0	1.2	1.0	1.0	0.9
Wagons	0.9	0.9	0.5	0.5	0.7	0.8	0.7
Warehouses	0.2	0.3	0.2	0.3	0.3	0.3	0.2
Source: See text.							

Table 4A: Average market capitalization, by sector							
year	1869	1879	1889	1899	1909	1919	1929
All firms	£581,393	£714,446	£885,604	£1,119,840	£1,215,147	£1,606,322	£2,881,279
UK firms	£638,844	£798,224	£1,015,586	£1,248,725	£1,172,189	£1,892,236	£3,673,504
Banks	£848,500	£962,275	£1,235,716	£2,254,025	£3,689,596	£5,666,669	£8,600,101
Breweries and distilleries	£32,085	£203,900	£305,123	£466,851	£193,628	£457,308	£1,992,496
Building	£244,713	£321,795	£202,405	£377,786	£245,513	£797,806	£1,777,148
Canals	£385,286	£667,990	£552,428	£636,981	£436,220	£335,652	£700,916
Chemicals	£102,609	£363,069	£478,254	£736,431	£964,822	£2,780,975	£11,604,756
Coal, iron, and steel	£243,326	£174,840	£299,302	£626,642	£598,807	£1,383,335	£998,618
Food	£66,196	£155,108	£261,307	£557,438	£370,974	£2,649,908	£10,722,132
Gas, light, and water	£247,529	£522,759	£626,233	£1,075,410	£743,483	£760,698	£2,116,695
Insurance	£389,331	£556,213	£698,905	£810,683	£960,421	£2,366,084	£5,787,262
Land, mortgage, and finance	£61,760	£70,656	£215,417	n/a	£250,313	£211,167	£773,164
Manufacturing	£77,081	£173,812	£316,698	£239,840	£307,827	£1,075,830	£1,626,585
Mines	£58,107	£49,848	£69,575	£165,101	£211,263	£870,472	£366,616
Oil	£109,479	£70,893	£168,242	£101,490	£564,242	£18,855,624	£102,543,209
Paper and publishing	£115,719	£109,364	£169,737	£232,278	£197,497	£335,115	£2,181,718
Railways	£1,660,973	£3,320,187	£5,812,717	£6,038,672	£4,493,385	£3,385,059	£7,194,265
Real estate	£88,021	£118,467	£555,369	£364,238	£271,674	£309,774	£1,006,957
Retail	n/a	n/a	n/a	£414,694	£615,118	£944,116	£1,957,712
Shipping	£469,360	£349,304	£388,829	£298,271	£346,286	£2,378,145	£1,712,901
Spinning and weaving	£457,432	£309,710	£250,080	£822,300	£1,396,893	£2,208,568	£2,392,851
Tea, coffee, and rubber	n/a	n/a	£94,297	£157,226	£88,447	£187,859	£3,519,969
Telegraphs	£493,949	£833,517	£1,220,267	£1,507,651	£1,404,843	£2,153,385	£2,837,673
Trams	£338,389	£220,231	£288,059	£275,693	£190,082	£595,055	£1,837,038
Trusts	£298,864	£267,681	£531,448	£422,147	£460,420	£469,850	£1,334,805
Wagons	£102,277	£83,443	£115,526	£217,880	£488,124	£893,483	£739,591
Warehouses	£220,796	£262,863	£159,690	£215,064	£105,419	£203,951	£900,972

Table 4B: Average paid-up capitalization, by sector							
year	1869	1879	1889	1899	1909	1919	1929
All firms	£601,182	£631,003	£587,117	£674,724	£807,849	£1,017,931	£1,367,933
UK firms	£624,909	£647,806	£657,371	£752,068	£880,340	£1,197,694	£1,671,734
Banks	£477,188	£450,826	£440,165	£649,016	£1,112,314	£1,964,759	£2,817,102
Breweries and distilleries	£121,920	£136,443	£212,486	£242,184	£235,451	£289,172	£785,168
Building	£131,102	£909,051	£309,515	£198,278	£405,531	£736,573	£831,123
Canals	£493,054	£699,277	£747,080	£882,060	£936,134	£688,333	£724,427
Chemicals	£267,265	£308,510	£267,506	£503,035	£642,729	£1,199,499	£4,815,820
Coal	£374,249	£278,894	£315,545	£341,615	£400,367	£809,320	£1,304,966
Food	£43,706	£119,445	£142,268	£304,086	£302,566	£803,411	£2,369,924
Gas, light, and water	£211,168	£325,973	£294,566	£641,340	£619,621	£891,124	£1,358,714
Insurance	£266,547	£189,727	£185,878	£195,583	£203,934	£242,647	£454,246
Land, mortgage, and finance	£40,300	£388,845	£194,034	n/a	£225,000	£280,000	£466,215
Manufacturing	£114,877	£119,752	£237,556	£261,208	£247,442	£441,707	£872,964
Mines	£36,874	£50,942	£58,287	£172,157	£189,319	£340,921	£469,706
Oil	£250,000	£188,968	£122,142	£84,692	£129,513	£2,153,206	£21,603,125
Paper and publishing	£172,500	£135,546	£107,434	£177,642	£237,929	£253,035	£755,776
Railways	£1,927,538	£3,110,995	£4,513,750	£4,753,543	£5,566,606	£5,793,656	£13,510,161
Real estate	£184,216	£165,727	£222,299	£252,890	£298,136	£337,034	£854,967
Retail	n/a	n/a	n/a	£229,579	£268,995	£409,094	£1,046,794
Shipping	£499,710	£387,884	£396,056	£341,159	£456,991	£907,329	£1,400,866
Spinning and weaving	£337,153	£416,157	£262,705	£263,956	£469,862	£679,846	£1,367,306
Tea, coffee, and rubber	n/a	n/a	£134,688	£121,376	£184,207	£124,758	£506,911
Telegraphs	£329,384	£1,137,855	£1,135,586	£1,314,488	£1,338,459	£1,306,770	£1,166,582
Trams	£594,100	£164,457	£233,632	£226,576	£543,556	£1,659,927	£1,657,261
Trusts	£193,951	£172,445	£418,120	£477,384	£480,542	£502,950	£603,515
Wagons	£105,590	£106,022	£111,263	£129,407	£269,464	£407,692	£631,801
Warehouses	£221,266	£240,625	£155,189	£196,722	£173,039	£193,268	£474,645

Source: See text.

Table 5															
Panel A: Average and standard deviation of monthly capital gains and annual dividend yields, decadal and 1929--all equities															
	Capital gain (U)		Capital gain (M)		Capital gain (P)		Capital gain at annual rate			Dividend yield (U)		Dividend yield (M)		Dividend yield (P)	
	Average	SD	Average	SD	Average	SD	U	M	P	Average	SD	Average	SD	Average	SD
decade															
1869-1878	0.0031	0.0124	0.0036	0.0130	0.0021	0.0156	0.038	0.044	0.026	0.0550	0.0063	0.0524	0.0059	0.0447	0.0047
1879-1888	0.0031	0.0162	0.0045	0.0126	0.0032	0.0167	0.038	0.055	0.039	0.0395	0.0038	0.0447	0.0026	0.0389	0.0027
1889-1898	0.0032	0.0143	0.0043	0.0130	0.0022	0.0148	0.040	0.053	0.026	0.0472	0.0041	0.0426	0.0032	0.0380	0.0038
1899-1908	0.0007	0.0139	0.0021	0.0155	0.0006	0.0176	0.009	0.026	0.007	0.0532	0.0050	0.0450	0.0048	0.0418	0.0040
1909-1918	0.0050	0.0147	0.0041	0.0151	0.0027	0.0184	0.062	0.051	0.033	0.0595	0.0052	0.0550	0.0056	0.0505	0.0053
1919-1928	0.0037	0.0199	0.0055	0.0217	0.0018	0.0240	0.045	0.068	0.022	0.0609	0.0092	0.0574	0.0082	0.0563	0.0101
1929	-0.0115	0.0221	-0.0068	0.0208	-0.0091	0.0207	-0.129	-0.079	-0.104	0.0538	0.0027	0.0509	0.0029	0.0504	0.0027
1869-1929	0.0029	0.0156	0.0038	0.0156	0.0019	0.0181	0.035	0.047	0.023	0.0525	0.0093	0.0495	0.0077	0.0451	0.0086
Panel B: Average and standard deviation of monthly capital gains and annual dividend yields, decadal and 1929--UK equities															
	Capital gain (U)		Capital gain (M)		Capital gain (P)		Capital gain at annual rate			Dividend yield (U)		Dividend yield (M)		Dividend yield (P)	
	Average	SD	Average	SD	Average	SD	U	M	P	Average	SD	Average	SD	Average	SD
decade															
1869-1878	0.0027	0.0112	0.0033	0.0126	0.0023	0.0147	0.032	0.040	0.028	0.0555	0.0075	0.0497	0.0035	0.0437	0.0031
1879-1888	0.0020	0.0144	0.0028	0.0117	0.0018	0.0151	0.025	0.034	0.022	0.0385	0.0035	0.0437	0.0022	0.0381	0.0025
1889-1898	0.0029	0.0088	0.0031	0.0088	0.0023	0.0118	0.035	0.038	0.028	0.0450	0.0054	0.0399	0.0031	0.0363	0.0036
1899-1908	-0.0013	0.0084	0.0004	0.0116	-0.0012	0.0160	-0.015	0.005	-0.014	0.0531	0.0050	0.0445	0.0033	0.0413	0.0037
1909-1918	0.0056	0.0127	0.0035	0.0145	0.0029	0.0183	0.070	0.043	0.035	0.0576	0.0052	0.0535	0.0066	0.0502	0.0071
1919-1928	0.0034	0.0193	0.0054	0.0229	0.0011	0.0264	0.042	0.066	0.013	0.0599	0.0122	0.0558	0.0095	0.0567	0.0129
1929	-0.0117	0.0148	-0.0078	0.0213	-0.0086	0.0213	-0.131	-0.090	-0.099	0.0500	0.0028	0.0473	0.0028	0.0473	0.0025
1869-1929	0.0023	0.0133	0.0029	0.0146	0.0013	0.0177	0.028	0.035	0.016	0.0515	0.0102	0.0478	0.0077	0.0444	0.0096
Source: See text.															
U: unweighted; M: weighted by market capitalization; P: weighted by paid-up capitalization.															
Annual rate calculated as monthly rate compounded over 12 months: $(1+\text{monthly return})^{12}-1$															

Table 6

Panel A: Average and standard deviation of unweighted monthly capital gains, by sector and decade (UK firms)

	1869-1878		1879-1888		1889-1898		1899-1908		1909-1918		1919-1928		1929		1869-1929		Capital gain at annual rate
	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	
Banks	0.003	0.012	0.002	0.008	0.001	0.006	0.000	0.006	0.001	0.013	0.003	0.014	-0.006	0.010	0.001	0.010	0.017
Breweries and distilleries	0.008	0.057	0.003	0.020	0.005	0.017	-0.008	0.014	0.011	0.034	0.008	0.020	-0.015	0.018	0.004	0.031	0.051
Building	-0.009	0.047	0.002	0.036	0.002	0.053	-0.004	0.050	0.009	0.052	0.008	0.044	-0.009	0.021	0.001	0.047	0.016
Canals	0.003	0.012	-0.002	0.012	0.002	0.015	-0.001	0.018	-0.001	0.017	0.004	0.032	-0.015	0.015	0.001	0.019	0.007
Chemicals	0.002	0.033	0.005	0.040	-0.002	0.023	0.000	0.027	0.007	0.025	0.005	0.035	-0.015	0.034	0.002	0.031	0.030
Coal, iron, and steel	0.000	0.031	0.004	0.058	0.005	0.025	0.002	0.020	0.006	0.020	-0.006	0.033	-0.015	0.022	0.001	0.034	0.018
Food	0.000	0.021	-0.003	0.038	0.005	0.023	-0.004	0.016	0.007	0.025	0.006	0.024	-0.011	0.023	0.002	0.026	0.020
Gas, light, and water	0.002	0.015	0.004	0.014	0.004	0.010	-0.002	0.011	0.004	0.025	0.006	0.024	0.001	0.025	0.003	0.018	0.036
Insurance	0.011	0.039	0.003	0.014	0.003	0.011	0.002	0.009	0.006	0.018	0.007	0.029	-0.012	0.016	0.005	0.023	0.060
Land, mortgage, and finance	0.003	0.053	-0.006	0.072	-0.018	0.083	0.001	0.016	-0.005	0.022	0.011	0.074	0.002	0.104	-0.002	0.063	-0.023
Manufacturing	0.000	0.081	0.003	0.031	0.002	0.045	-0.003	0.029	0.009	0.022	0.001	0.030	-0.014	0.032	0.002	0.044	0.022
Mines	0.001	0.100	0.005	0.105	0.020	0.164	0.006	0.068	0.006	0.049	0.005	0.069	-0.009	0.034	0.007	0.099	0.087
Oil	-0.021	0.154	0.005	0.070	-0.005	0.120	0.013	0.056	0.001	0.048	-0.011	0.080	-0.015	0.069	-0.003	0.096	-0.037
Paper and publishing	-0.003	0.077	0.003	0.021	-0.001	0.025	-0.005	0.027	0.008	0.024	0.002	0.030	-0.016	0.026	0.000	0.039	0.004
Railways	0.005	0.014	0.003	0.020	0.003	0.015	-0.003	0.019	0.002	0.023	0.003	0.034	0.000	0.013	0.002	0.022	0.025
Real estate	0.004	0.019	-0.001	0.022	0.002	0.013	-0.004	0.013	0.003	0.025	0.010	0.022	-0.004	0.016	0.002	0.020	0.027
Retail	-0.004	0.008	-0.007	0.016	0.009	0.037	0.000	0.024	0.003	0.021	0.005	0.033	-0.019	0.027	0.003	0.029	0.037
Shipping	0.001	0.021	0.001	0.024	0.000	0.023	0.000	0.016	0.015	0.042	-0.002	0.046	-0.022	0.023	0.002	0.031	0.023
Spinning and weaving	-0.002	0.031	0.001	0.034	0.004	0.025	0.000	0.016	0.006	0.021	0.002	0.032	-0.022	0.026	0.001	0.028	0.017
Tea, coffee, and rubber	n/a	n/a	-0.020	0.071	0.004	0.058	-0.001	0.061	0.012	0.064	0.006	0.043	-0.026	0.042	0.002	0.058	0.030
Telegraphs	0.000	0.037	0.004	0.026	0.002	0.021	0.000	0.023	0.006	0.020	0.003	0.025	-0.006	0.023	0.002	0.026	0.030
Trams	0.009	0.053	-0.002	0.024	0.004	0.025	-0.009	0.031	0.012	0.069	0.005	0.058	-0.012	0.037	0.003	0.047	0.034
Trusts	0.002	0.043	0.004	0.059	0.001	0.032	0.002	0.017	0.002	0.018	0.006	0.025	-0.009	0.013	0.003	0.036	0.034
Wagons	-0.003	0.020	0.005	0.070	0.008	0.024	0.002	0.016	0.004	0.022	0.000	0.038	-0.012	0.026	0.002	0.037	0.029
Warehouses	0.000	0.050	-0.003	0.026	0.002	0.024	-0.005	0.019	0.005	0.020	0.003	0.031	-0.022	0.024	0.000	0.030	0.001
All firms	0.003	0.012	0.003	0.016	0.003	0.014	0.001	0.014	0.005	0.015	0.004	0.020	-0.011	0.022	0.003	0.016	0.035
UK firms	0.003	0.011	0.002	0.014	0.003	0.009	-0.001	0.008	0.006	0.013	0.003	0.019	-0.012	0.015	0.002	0.013	0.028

Panel B: Average and standard deviation of monthly capital gains weighted by market capitalization, by sector and decade (UK firms)

	1869-1878		1879-1888		1889-1898		1899-1908		1909-1918		1919-1928		1929		1869-1929		Capital gain at annual rate
	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	
Banks	0.002	0.013	0.003	0.013	0.002	0.007	0.000	0.007	0.001	0.018	0.003	0.018	-0.007	0.014	0.002	0.014	0.020
Breweries and distilleries	0.011	0.041	0.003	0.017	0.007	0.016	-0.006	0.015	0.009	0.031	0.010	0.027	-0.007	0.032	0.005	0.027	0.064
Building	-0.003	0.036	0.001	0.031	0.005	0.051	-0.001	0.022	0.013	0.055	0.009	0.051	-0.007	0.029	0.004	0.043	0.049
Canals	0.003	0.015	-0.001	0.015	0.004	0.022	0.004	0.028	-0.001	0.019	0.005	0.035	-0.012	0.021	0.002	0.023	0.026
Chemicals	0.006	0.045	0.008	0.042	0.002	0.027	0.005	0.035	0.008	0.032	0.014	0.050	-0.019	0.063	0.007	0.040	0.085
Coal, iron, and steel	0.003	0.032	0.008	0.047	0.007	0.021	0.003	0.025	0.005	0.021	-0.001	0.045	-0.008	0.032	0.004	0.034	0.048
Food	0.004	0.037	0.007	0.044	0.007	0.022	-0.001	0.016	0.006	0.025	0.007	0.038	-0.006	0.031	0.005	0.032	0.060
Gas, light, and water	0.003	0.011	0.005	0.014	0.003	0.012	0.000	0.011	0.000	0.014	0.006	0.026	0.001	0.031	0.003	0.016	0.036
Insurance	0.006	0.012	0.004	0.009	0.002	0.013	0.001	0.012	0.006	0.020	0.010	0.031	-0.011	0.022	0.004	0.018	0.054
Land, mortgage, and finance	0.002	0.049	0.000	0.052	-0.015	0.065	0.001	0.015	-0.005	0.022	0.010	0.073	0.007	0.078	0.000	0.054	-0.003
Manufacturing	0.006	0.041	0.005	0.028	0.009	0.046	0.001	0.021	0.010	0.029	0.008	0.046	-0.006	0.046	0.006	0.037	0.079
Mines	0.003	0.039	0.005	0.039	0.028	0.206	0.006	0.054	0.009	0.041	0.016	0.073	-0.008	0.040	0.011	0.096	0.137
Oil	-0.019	0.146	0.007	0.059	0.000	0.076	0.016	0.057	0.005	0.051	-0.002	0.067	-0.011	0.059	0.001	0.083	0.012
Paper and publishing	-0.005	0.072	0.004	0.019	0.004	0.020	-0.001	0.025	0.007	0.023	0.008	0.042	-0.016	0.068	0.002	0.039	0.029
Railways	0.003	0.019	0.002	0.016	0.003	0.013	-0.001	0.024	0.000	0.021	-0.001	0.042	0.005	0.035	0.001	0.024	0.014
Real estate	0.005	0.021	0.001	0.010	0.003	0.010	-0.003	0.011	0.003	0.015	0.010	0.027	-0.006	0.011	0.003	0.017	0.037
Retail	-0.002	0.006	-0.005	0.014	0.007	0.033	0.002	0.023	0.003	0.026	0.004	0.041	-0.013	0.024	0.003	0.031	0.042
Shipping	0.001	0.027	0.004	0.024	0.003	0.021	0.002	0.021	0.019	0.056	0.000	0.046	-0.018	0.033	0.004	0.035	0.055
Spinning and weaving	-0.006	0.016	0.004	0.025	0.010	0.027	0.003	0.031	0.005	0.030	0.003	0.037	-0.012	0.027	0.003	0.029	0.035
Tea, coffee, and rubber	n/a	n/a	-0.018	0.050	0.003	0.059	0.009	0.097	0.009	0.040	0.011	0.056	-0.019	0.058	0.005	0.066	0.065
Telegraphs	0.004	0.033	0.004	0.020	0.003	0.018	0.000	0.023	0.006	0.023	0.005	0.037	-0.010	0.027	0.003	0.027	0.043
Trams	0.010	0.043	0.001	0.019	0.002	0.023	-0.008	0.027	0.027	0.118	0.012	0.060	-0.013	0.022	0.007	0.059	0.085
Trusts	0.000	0.033	0.005	0.022	0.001	0.025	0.001	0.016	0.002	0.016	0.006	0.020	-0.009	0.010	0.002	0.022	0.029
Wagons	-0.001	0.017	0.005	0.035	0.008	0.019	0.003	0.013	0.005	0.036	0.006	0.040	-0.012	0.023	0.004	0.029	0.051
Warehouses	0.004	0.031	-0.002	0.026	0.002	0.016	-0.004	0.015	0.006	0.021	0.006	0.034	-0.013	0.017	0.002	0.025	0.021
All firms	0.004	0.013	0.004	0.013	0.004	0.013	0.002	0.015	0.004	0.015	0.005	0.022	-0.007	0.021	0.004	0.016	0.047
UK firms	0.003	0.013	0.003	0.012	0.003	0.009	0.000	0.012	0.004	0.014	0.005	0.023	-0.008	0.021	0.003	0.015	0.035

Panel C: Average and standard deviation of monthly capital gains weighted by paid-up capitalization, by sector and decade (UK firms)

	1869-1878		1879-1888		1889-1898		1899-1908		1909-1918		1919-1928		1929		1869-1929		Capital gain at annual rate
	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	
Banks	0.002	0.011	0.002	0.011	0.001	0.007	0.000	0.007	0.000	0.018	0.002	0.017	-0.007	0.013	0.001	0.013	0.012
Breweries and distilleries	0.002	0.070	0.001	0.016	0.005	0.022	-0.010	0.025	0.012	0.043	0.008	0.025	-0.008	0.027	0.003	0.038	0.032
Building	-0.002	0.024	0.003	0.055	0.002	0.096	-0.006	0.035	0.019	0.081	0.007	0.054	-0.007	0.030	0.004	0.062	0.043
Canals	0.003	0.019	-0.002	0.023	0.003	0.024	0.004	0.030	0.000	0.020	0.005	0.027	-0.017	0.017	0.002	0.024	0.021
Chemicals	0.003	0.037	0.005	0.044	-0.005	0.039	0.002	0.053	0.007	0.034	0.010	0.042	-0.018	0.058	0.004	0.042	0.043
Coal, iron, and steel	-0.001	0.034	0.005	0.064	0.004	0.030	0.002	0.026	0.005	0.022	-0.006	0.052	-0.019	0.036	0.001	0.041	0.014
Food	0.004	0.046	0.001	0.033	0.001	0.028	-0.002	0.019	0.007	0.025	0.005	0.034	-0.007	0.025	0.002	0.032	0.030
Gas, light, and water	0.002	0.010	0.004	0.014													

Table 7

Panel A: Average and standard deviation of unweighted dividend yields, by sector and decade (UK firms)

	1869-1878		1879-1888		1889-1898		1899-1908		1909-1918		1919-1928		1929		1869-1929	
	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD
Banks	0.058	0.004	0.046	0.004	0.044	0.002	0.043	0.002	0.053	0.006	0.054	0.006	0.050	0.002	0.050	0.007
Breweries and distilleries	0.043	0.039	0.049	0.012	0.057	0.011	0.063	0.009	0.075	0.014	0.083	0.018	0.066	0.003	0.062	0.024
Building	0.048	0.035	0.036	0.012	0.048	0.008	0.052	0.008	0.055	0.013	0.058	0.015	0.070	0.003	0.050	0.017
Canals	0.047	0.004	0.034	0.006	0.038	0.007	0.037	0.005	0.032	0.006	0.043	0.007	0.045	0.004	0.039	0.008
Chemicals	0.056	0.015	0.038	0.007	0.056	0.011	0.060	0.010	0.060	0.007	0.063	0.016	0.043	0.003	0.055	0.014
Coal, iron, and steel	0.062	0.018	0.035	0.008	0.055	0.016	0.067	0.016	0.063	0.013	0.053	0.023	0.028	0.002	0.055	0.020
Food	0.065	0.011	0.039	0.010	0.051	0.013	0.060	0.007	0.068	0.006	0.067	0.016	0.054	0.005	0.058	0.015
Gas, light, and water	0.045	0.004	0.037	0.003	0.040	0.004	0.046	0.006	0.051	0.005	0.061	0.008	0.052	0.001	0.047	0.009
Insurance	0.061	0.013	0.037	0.004	0.040	0.002	0.043	0.002	0.046	0.004	0.041	0.005	0.035	0.002	0.045	0.010
Land, mortgage, and finance	0.055	0.010	0.059	0.020	0.056	0.031	0.061	0.020	0.063	0.010	0.063	0.010	0.061	0.006	0.060	0.018
Manufacturing	0.081	0.174	0.041	0.013	0.052	0.013	0.061	0.010	0.066	0.004	0.060	0.018	0.054	0.006	0.060	0.073
Mines	0.079	0.062	0.026	0.009	0.040	0.020	0.084	0.043	0.060	0.026	0.048	0.028	0.069	0.007	0.056	0.041
Oil	0.029	0.022	0.039	0.016	0.035	0.026	0.071	0.131	0.048	0.019	0.044	0.017	0.053	0.001	0.044	0.058
Paper and publishing	0.059	0.027	0.049	0.011	0.057	0.009	0.055	0.006	0.062	0.011	0.075	0.022	0.064	0.007	0.060	0.018
Railways	0.040	0.008	0.025	0.002	0.025	0.002	0.031	0.005	0.044	0.009	0.056	0.013	0.052	0.001	0.037	0.014
Real estate	0.052	0.028	0.042	0.005	0.049	0.017	0.054	0.004	0.056	0.004	0.067	0.011	0.069	0.003	0.054	0.016
Retail	0.060	0.016	0.040	0.032	0.047	0.019	0.060	0.011	0.067	0.005	0.068	0.016	0.056	0.003	0.060	0.017
Shipping	0.060	0.010	0.041	0.009	0.048	0.016	0.055	0.010	0.054	0.012	0.050	0.014	0.047	0.005	0.051	0.013
Spinning and weaving	0.059	0.056	0.039	0.022	0.042	0.014	0.061	0.009	0.060	0.005	0.059	0.013	0.055	0.003	0.053	0.028
Tea, coffee, and rubber	n/a	n/a	0.071	0.050	0.057	0.030	0.056	0.011	0.058	0.028	0.069	0.021	0.048	0.005	0.061	0.027
Telegraphs	0.056	0.011	0.046	0.006	0.043	0.005	0.046	0.005	0.046	0.003	0.045	0.007	0.038	0.004	0.047	0.008
Trams	0.051	0.024	0.038	0.004	0.048	0.005	0.049	0.008	0.047	0.009	0.041	0.017	0.032	0.006	0.045	0.014
Trusts	0.062	0.018	0.041	0.012	0.057	0.014	0.059	0.004	0.066	0.007	0.067	0.013	0.053	0.005	0.059	0.015
Wagons	0.065	0.023	0.050	0.012	0.055	0.014	0.063	0.006	0.059	0.005	0.053	0.019	0.047	0.004	0.057	0.016
Warehouses	0.065	0.025	0.043	0.007	0.049	0.007	0.053	0.006	0.067	0.021	0.081	0.019	0.075	0.014	0.060	0.020
All firms	0.055	0.006	0.039	0.004	0.047	0.004	0.053	0.005	0.060	0.005	0.061	0.009	0.054	0.003	0.052	0.009
UK firms	0.056	0.007	0.039	0.003	0.045	0.005	0.053	0.005	0.058	0.005	0.060	0.012	0.050	0.003	0.052	0.010

Panel B: Average and standard deviation of dividend yields weighted by market capitalization, by sector and decade (UK firms)

	1869-1878		1879-1888		1889-1898		1899-1908		1909-1918		1919-1928		1929		1869-1929	
	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD
Banks	0.058	0.004	0.046	0.004	0.044	0.002	0.043	0.002	0.053	0.006	0.054	0.006	0.050	0.002	0.050	0.007
Breweries and distilleries	0.043	0.039	0.049	0.012	0.057	0.011	0.063	0.009	0.075	0.014	0.083	0.018	0.066	0.003	0.062	0.024
Building	0.048	0.035	0.036	0.012	0.048	0.008	0.052	0.008	0.055	0.013	0.058	0.015	0.070	0.003	0.050	0.017
Canals	0.047	0.004	0.034	0.006	0.038	0.007	0.037	0.005	0.032	0.006	0.043	0.007	0.045	0.004	0.039	0.008
Chemicals	0.056	0.015	0.038	0.007	0.056	0.011	0.060	0.010	0.060	0.007	0.063	0.016	0.043	0.003	0.055	0.014
Coal, iron, and steel	0.062	0.018	0.035	0.008	0.055	0.016	0.067	0.016	0.063	0.013	0.053	0.023	0.028	0.002	0.055	0.020
Food	0.065	0.011	0.039	0.010	0.051	0.013	0.060	0.007	0.068	0.006	0.067	0.016	0.054	0.005	0.058	0.015
Gas, light, and water	0.045	0.004	0.037	0.003	0.040	0.004	0.046	0.006	0.051	0.005	0.061	0.008	0.052	0.001	0.047	0.009
Insurance	0.061	0.013	0.037	0.004	0.040	0.002	0.043	0.002	0.046	0.004	0.041	0.005	0.035	0.002	0.045	0.010
Land, mortgage, and finance	0.055	0.010	0.059	0.020	0.056	0.031	0.061	0.020	0.063	0.010	0.063	0.010	0.061	0.006	0.060	0.018
Manufacturing	0.081	0.174	0.041	0.013	0.052	0.013	0.061	0.010	0.066	0.004	0.060	0.018	0.054	0.006	0.060	0.073
Mines	0.079	0.062	0.026	0.009	0.040	0.020	0.084	0.043	0.060	0.026	0.048	0.028	0.069	0.007	0.056	0.041
Oil	0.029	0.022	0.039	0.016	0.035	0.026	0.071	0.131	0.048	0.019	0.044	0.017	0.053	0.001	0.044	0.058
Paper and publishing	0.059	0.027	0.049	0.011	0.057	0.009	0.055	0.006	0.062	0.011	0.075	0.022	0.064	0.007	0.060	0.018
Railways	0.040	0.008	0.025	0.002	0.025	0.002	0.031	0.005	0.044	0.009	0.056	0.013	0.052	0.001	0.037	0.014
Real estate	0.052	0.028	0.042	0.005	0.049	0.017	0.054	0.004	0.056	0.004	0.067	0.011	0.069	0.003	0.054	0.016
Retail	0.060	0.016	0.040	0.032	0.047	0.019	0.060	0.011	0.067	0.005	0.068	0.016	0.056	0.003	0.060	0.017
Shipping	0.060	0.010	0.041	0.009	0.048	0.016	0.055	0.010	0.054	0.012	0.050	0.014	0.047	0.005	0.051	0.013
Spinning and weaving	0.059	0.056	0.039	0.022	0.042	0.014	0.061	0.009	0.060	0.005	0.059	0.013	0.055	0.003	0.053	0.028
Tea, coffee, and rubber	n/a	n/a	0.071	0.050	0.057	0.030	0.056	0.011	0.058	0.028	0.069	0.021	0.048	0.005	0.061	0.027
Telegraphs	0.056	0.011	0.046	0.006	0.043	0.005	0.046	0.005	0.046	0.003	0.045	0.007	0.038	0.004	0.047	0.008
Trams	0.051	0.024	0.038	0.004	0.048	0.005	0.049	0.008	0.047	0.009	0.041	0.017	0.032	0.006	0.045	0.014
Trusts	0.062	0.018	0.041	0.012	0.057	0.014	0.059	0.004	0.066	0.007	0.067	0.013	0.053	0.005	0.059	0.015
Wagons	0.065	0.023	0.050	0.012	0.055	0.014	0.063	0.006	0.059	0.005	0.053	0.019	0.047	0.004	0.057	0.016
Warehouses	0.065	0.025	0.043	0.007	0.049	0.007	0.053	0.006	0.067	0.021	0.081	0.019	0.075	0.014	0.060	0.020
All firms	0.055	0.006	0.039	0.004	0.047	0.004	0.053	0.005	0.060	0.005	0.061	0.009	0.054	0.003	0.052	0.009
UK firms	0.056	0.007	0.039	0.003	0.045	0.005	0.053	0.005	0.058	0.005	0.060	0.012	0.050	0.003	0.052	0.010

Panel C: Average and standard deviation of dividend yields weighted by paid-up capitalization, by sector and decade (UK firms)

	1869-1878		1879-1888		1889-1898		1899-1908		1909-1918		1919-1928		1929		1869-1929	
	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD	Average	SD
Banks	0.047	0.002	0.049	0.002	0.044	0.002	0.044	0.002	0.053	0.006	0.053	0.006	0.050	0.003	0.049	0.005
Breweries and distilleries	0.051	0.083	0.059	0.010	0.055	0.009	0.058	0.011	0.067	0.014	0.076	0.015	0.064	0.003	0.061	0.036
Building	0.012	0.016	0.021	0.006	0.037	0.013	0.047	0.010	0.034	0.016	0.054	0.021	0.065	0.003	0.035	0.020
Canals	0.047	0.004	0.039	0.008	0.038	0.005	0.035	0.008	0.030	0.009	0.044	0.009	0.050	0.006	0.039	0.009
Chemicals	0.061	0.024	0.048	0.009	0.058	0.019	0.048	0.015	0.053	0.012	0.051	0.015	0.041	0.005	0.053	0.017
Coal, iron, and steel	0.061	0.017	0.035	0.010	0.052	0.017	0.065	0.017	0.060	0.011	0.047	0.027	0.021	0.003	0.053	0.020
Food	0.081	0.013	0.048	0.008	0.048	0.016	0.061	0.009	0.065	0.006	0.056	0.012	0.045	0.002	0.059	0.016
Gas, light, and water	0.040	0.005	0.040	0.002	0.039	0.004	0.045	0.004	0.052	0.005	0.058	0.007	0.051	0.002	0.046	0.009
Insurance	0.061	0.020	0.041	0.003	0.037	0.002	0.042	0.002	0.049	0.004	0.042	0.006	0.036	0.004	0.045	0.012
Land, mortgage, and finance	0.011	0.020	0.042	0.030	0.046	0.043	0.061	0.020	0.063	0.010	0.064	0.010	0.062	0.006	0.047	0.031
Manufacturing	0.074	0.170	0.046	0.012	0.042	0.016	0.066	0.015	0.065	0.004	0.044	0.018	0.045	0.005	0.056	0.071
Mines	0.062															

Table 8

CAPM regressions, by sectors																		
	Unweighted monthly capital gains minus risk free rate						Monthly capital gains weighted by market capitalization minus risk free rate						Monthly capital gains weighted by paid-up capitalization minus risk free rate					
Sector	Beta	SE	Constant	SE	Obs	R-squared	Beta	SE	Constant	SE	Obs	R-squared	Beta	SE	Constant	SE	Obs	R-squared
Banks	0.946***	(0.00807)	-0.0165***	(0.00229)	724	0.950	0.959***	(0.00827)	-0.0135***	(0.00234)	724	0.949	0.934***	(0.00886)	-0.0192***	(0.00252)	724	0.939
Breweries and distilleries	0.923***	(0.0178)	-0.0201***	(0.00506)	717	0.789	0.929***	(0.0157)	-0.0181***	(0.00445)	721	0.829	0.892***	(0.0224)	-0.0293***	(0.00639)	724	0.687
Building	0.950***	(0.0268)	-0.0153**	(0.00761)	721	0.636	0.960***	(0.0240)	-0.0108	(0.00678)	723	0.690	0.941***	(0.0352)	-0.0147	(0.0100)	724	0.498
Canals	0.943***	(0.0124)	-0.0181***	(0.00352)	724	0.889	0.960***	(0.0140)	-0.0127***	(0.00397)	724	0.866	0.934***	(0.0146)	-0.0185***	(0.00416)	724	0.850
Chemicals	0.975***	(0.0158)	-0.00746*	(0.00448)	724	0.840	0.986***	(0.0204)	-0.000801	(0.00578)	724	0.763	0.956***	(0.0219)	-0.0106*	(0.00623)	724	0.725
Coal, iron, and steel	1.057***	(0.0159)	0.0144***	(0.00452)	724	0.859	1.042***	(0.0171)	0.0116**	(0.00483)	724	0.837	1.055***	(0.0202)	0.0144**	(0.00576)	724	0.790
Food	0.949***	(0.0138)	-0.0154***	(0.00393)	724	0.867	0.981***	(0.0176)	-0.00419	(0.00498)	724	0.811	0.938***	(0.0176)	-0.0167***	(0.00500)	724	0.798
Gas, light, and water	0.952***	(0.0106)	-0.0131***	(0.00299)	724	0.919	0.960***	(0.00938)	-0.0120***	(0.00265)	724	0.935	0.942***	(0.0102)	-0.0160***	(0.00292)	724	0.922
Insurance	0.963***	(0.0123)	-0.00810**	(0.00349)	724	0.895	0.948***	(0.00938)	-0.0139***	(0.00265)	724	0.934	0.927***	(0.00979)	-0.0190***	(0.00279)	724	0.925
Land, mortgage, and finance	0.895***	(0.0398)	-0.0350***	(0.0116)	609	0.454	0.899***	(0.0345)	-0.0331***	(0.0100)	621	0.523	0.890***	(0.0506)	-0.0337**	(0.0148)	627	0.331
Manufacturing	0.999***	(0.0243)	-0.00142	(0.00689)	724	0.701	1.004***	(0.0195)	0.00351	(0.00552)	724	0.786	1.021***	(0.0383)	0.00720	(0.0109)	724	0.497
Mines	1.159***	(0.0551)	0.0480***	(0.0156)	724	0.380	1.075***	(0.0552)	0.0275*	(0.0156)	724	0.344	1.051***	(0.0481)	0.0173	(0.0137)	724	0.398
Oil	1.095***	(0.0557)	0.0202	(0.0158)	718	0.350	1.041***	(0.0480)	0.00858	(0.0136)	723	0.395	1.005***	(0.0534)	-0.000767	(0.0152)	724	0.329
Paper and publishing	0.946***	(0.0229)	-0.0174***	(0.00650)	723	0.703	0.945***	(0.0231)	-0.0167**	(0.00652)	724	0.699	0.929***	(0.0252)	-0.0217***	(0.00719)	724	0.652
Railways	0.974***	(0.0113)	-0.00800**	(0.00320)	724	0.912	1.012***	(0.0116)	0.000537	(0.00328)	724	0.913	1.013***	(0.0106)	0.00255	(0.00301)	724	0.927
Real estate	0.915***	(0.0113)	-0.0242***	(0.00320)	724	0.901	0.924***	(0.0106)	-0.0218***	(0.00301)	724	0.913	0.917***	(0.0172)	-0.0229***	(0.00489)	724	0.798
Retail	0.995***	(0.0165)	-0.000903	(0.00491)	477	0.885	1.007***	(0.0174)	0.00178	(0.00515)	484	0.874	0.977***	(0.0148)	-0.00660	(0.00440)	504	0.896
Shipping	1.003***	(0.0161)	-0.000250	(0.00456)	724	0.843	1.015***	(0.0189)	0.00470	(0.00536)	724	0.799	1.009***	(0.0179)	0.00241	(0.00508)	724	0.816
Spinning and weaving	0.981***	(0.0151)	-0.00669	(0.00427)	724	0.854	1.011***	(0.0155)	0.00209	(0.00437)	724	0.856	0.983***	(0.0145)	-0.00508	(0.00414)	724	0.864
Tea, coffee, and rubber	0.950***	(0.0342)	-0.0148	(0.0100)	521	0.598	0.972***	(0.0389)	-0.00632	(0.0114)	525	0.544	0.941***	(0.0400)	-0.0150	(0.0118)	525	0.514
Telegraphs	0.979***	(0.0137)	-0.00632	(0.00387)	724	0.877	0.983***	(0.0137)	-0.00492	(0.00388)	724	0.876	0.979***	(0.0153)	-0.00504	(0.00435)	724	0.850
Trams	0.969***	(0.0258)	-0.00859	(0.00732)	724	0.661	0.947***	(0.0332)	-0.0116	(0.00938)	724	0.530	0.946***	(0.0323)	-0.0121	(0.00921)	724	0.542
Trusts	0.983***	(0.0195)	-0.00482	(0.00554)	724	0.778	0.973***	(0.0118)	-0.00896***	(0.00333)	724	0.904	0.997***	(0.0159)	-0.00185	(0.00454)	724	0.844
Wagons	1.001***	(0.0210)	-9.19e-05	(0.00596)	724	0.759	0.970***	(0.0168)	-0.00784*	(0.00474)	724	0.823	0.972***	(0.0202)	-0.00897	(0.00577)	724	0.762
Warehouses	0.949***	(0.0175)	-0.0171***	(0.00495)	724	0.803	0.932***	(0.0148)	-0.0209***	(0.00419)	724	0.845	0.917***	(0.0176)	-0.0246***	(0.00501)	724	0.790
All UK	0.975***	(0.00439)	-0.00752***	(0.00125)	724	0.986	0.982***	(0.00427)	-0.00601***	(0.00121)	724	0.987	0.989***	(0.00419)	-0.00356***	(0.00119)	724	0.987
Standard errors in parentheses																		
*** p<0.01, ** p<0.05, * p<0.1																		
Risk free rate is 1/12 of the closing annual consol rate																		

Table 9

Average and standard deviation of monthly capital gains, 1825-1929											
Capital gain (U)				Capital gain (M)				Capital gain (P)			
	Average	SD	Annual return		Average	SD	Annual return		Average	SD	Annual return
1825-1829	-0.0054	0.0200	-0.0630		-0.0018	0.0127	-0.0216		-0.0049	0.0147	-0.0569
1830-1839	0.0038	0.0139	0.0465		0.0033	0.0104	0.0401		0.0023	0.0126	0.0274
1840-1849	0.0041	0.0274	0.0507		0.0035	0.0261	0.0432		0.0010	0.0295	0.0124
1850-1859	0.0068	0.0209	0.0850		0.0065	0.0234	0.0806		0.0062	0.0304	0.0769
1860-1869	0.0053	0.0160	0.0652		0.0034	0.0134	0.0410		0.0021	0.0149	0.0252
1869-1878	0.0031	0.0124	0.0379		0.0036	0.0130	0.0436		0.0021	0.0156	0.0257
1879-1888	0.0031	0.0162	0.0376		0.0045	0.0126	0.0548		0.0032	0.0167	0.0391
1889-1898	0.0032	0.0143	0.0397		0.0043	0.0130	0.0526		0.0022	0.0148	0.0264
1899-1908	0.0007	0.0139	0.0088		0.0021	0.0155	0.0260		0.0006	0.0176	0.0070
1909-1918	0.0050	0.0147	0.0621		0.0041	0.0151	0.0507		0.0027	0.0184	0.0331
1919-1928	0.0037	0.0199	0.0454		0.0055	0.0217	0.0679		0.0018	0.0240	0.0223
1929	-0.0115	0.0221	-0.1293		-0.0068	0.0208	-0.0788		-0.0091	0.0207	-0.1039
1825-1870	0.0039	0.0204	0.0478		0.0035	0.0190	0.0432		0.0021	0.0227	0.0251
1869-1929	0.0029	0.0156	0.0352		0.0038	0.0156	0.0470		0.0019	0.0181	0.0232
Sources: Table 5 and Turner et al (2009).											
Averages of monthly returns from earliest month in start year to December in last year.											
Annual return is calculated as $(1 + \text{monthly return})^{12} - 1$											

Table 10

Ratio of uncalled capital to paid-in capital								
Panel A unweighted	1869-1878	1879-1888	1889-1898	1899-1908	1909-1918	1919-1928	1929	1869-1929
Banks	2.453	3.384	3.567	3.389	3.246	2.423	2.066	3.059
Breweries and distilleries	1.525	0.801	0.166	0.103	0.128	0.040	0.007	0.456
Building	0.000	0.000	0.057	0.004	0.000	0.000	0.000	0.010
Canals	0.008	0.008	0.028	0.000	0.000	0.000	0.000	0.007
Chemicals	0.179	0.203	0.125	0.096	0.017	0.000	0.000	0.102
Coal, iron, and steel	0.780	0.418	0.316	0.189	0.054	0.034	0.023	0.296
Food	0.015	0.086	0.049	0.022	0.010	0.005	0.000	0.031
Gas, light, and water	0.384	0.241	0.068	0.029	0.026	0.002	0.000	0.124
Insurance	7.448	6.301	6.481	5.955	5.029	3.423	2.939	5.732
Land, mortgage, and finance	4.085	3.908	1.519	0.000	0.000	0.000	0.000	1.747
Manufacturing	0.351	0.300	0.045	0.034	0.012	0.002	0.000	0.123
Mines	0.527	0.486	0.395	0.013	0.007	0.000	0.000	0.236
Oil	0.094	0.180	0.287	0.238	0.115	0.008	0.000	0.151
Paper and publishing	0.279	0.030	0.039	0.064	0.067	0.000	0.000	0.079
Railways	0.297	0.000	0.000	0.000	0.000	0.000	0.000	0.183
Real estate	1.135	0.736	0.591	0.279	0.271	0.175	0.000	0.524
Retail	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Shipping	0.777	0.489	0.264	0.168	0.064	0.009	0.022	0.293
Spinning and weaving	0.835	0.538	0.359	0.269	0.120	0.003	0.000	0.350
Tea, coffee, and rubber	n/a	0.000	0.000	0.000	0.000	0.112	0.000	0.025
Telegraphs	0.063	0.065	0.015	0.000	0.000	0.000	0.000	0.023
Trams	0.288	0.086	0.006	0.002	0.000	0.000	0.000	0.063
Trusts	2.421	2.033	1.971	2.134	1.779	1.103	0.563	1.886
Wagons	1.006	1.379	0.957	1.065	0.684	0.120	0.000	0.856
Warehouses	0.850	0.664	0.483	0.186	0.138	0.073	0.000	0.395
UK firms	2.333	1.998	1.776	1.216	0.902	0.486	0.377	1.439
All firms	1.897	1.708	1.428	0.920	0.636	0.344	0.274	1.145
Panel B weighted by market capitalization								
years	1869-1878	1879-1888	1889-1898	1899-1908	1909-1918	1919-1928	1929	1869-1929
Banks	1.685	3.020	3.462	3.148	3.282	2.525	2.323	2.841
Breweries and distilleries	1.094	0.338	0.088	0.052	0.033	0.012	0.001	0.264
Building	0.000	0.000	0.048	0.003	0.000	0.000	0.000	0.008
Canals	0.003	0.003	0.002	0.000	0.000	0.000	0.000	0.001
Chemicals	0.144	0.070	0.145	0.138	0.001	0.000	0.000	0.083
Coal, iron, and steel	0.621	0.260	0.152	0.084	0.046	0.017	0.006	0.195
Food	0.004	0.013	0.017	0.007	0.000	0.000	0.000	0.007
Gas, light, and water	0.081	0.026	0.008	0.002	0.001	0.000	0.000	0.020
Insurance	4.768	4.647	5.097	5.564	4.634	2.843	2.123	4.551
Land, mortgage, and finance	3.976	3.244	0.655	0.000	0.000	0.000	0.000	1.485
Manufacturing	0.310	0.134	0.032	0.020	0.008	0.000	0.000	0.083
Mines	0.133	0.147	0.038	0.000	0.000	0.000	0.000	0.053
Oil	0.096	0.129	0.171	0.186	0.032	0.000	0.000	0.101
Paper and publishing	0.261	0.026	0.046	0.056	0.061	0.000	0.000	0.074
Railways	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Real estate	0.665	0.360	0.212	0.204	0.130	0.049	0.000	0.267
Retail	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Shipping	0.396	0.450	0.268	0.104	0.013	0.001	0.008	0.204
Spinning and weaving	0.532	0.464	0.173	0.041	0.020	0.002	0.000	0.203
Tea, coffee, and rubber	n/a	0.000	0.000	0.000	0.000	0.170	0.000	0.039
Telegraphs	0.013	0.007	0.000	0.000	0.000	0.000	0.000	0.003
Trams	0.110	0.032	0.006	0.001	0.000	0.000	0.000	0.025
Trusts	3.158	2.294	1.951	1.569	1.321	0.761	0.397	1.823
Wagons	0.643	0.745	0.712	0.676	0.278	0.021	0.000	0.506
Warehouses	0.538	0.372	0.365	0.278	0.177	0.052	0.000	0.293
UK firms	0.700	0.917	0.915	0.741	0.632	0.470	0.380	0.973
All firms	0.769	1.088	1.173	1.118	1.039	0.695	0.563	0.724
Panel C weighted by paid-up capitalization								
years	1869-1878	1879-1888	1889-1898	1899-1908	1909-1918	1919-1928	1929	1869-1929
Banks	1.700	2.827	3.322	3.186	3.332	2.388	2.155	2.778
Breweries and distilleries	0.900	0.430	0.070	0.041	0.047	0.008	0.001	0.247
Building	0.000	0.000	0.038	0.003	0.000	0.000	0.000	0.007
Canals	0.001	0.003	0.002	0.000	0.000	0.000	0.000	0.001
Chemicals	0.117	0.074	0.050	0.043	0.002	0.000	0.000	0.047
Coal	0.459	0.238	0.164	0.100	0.053	0.019	0.012	0.170
Food	0.008	0.041	0.023	0.009	0.002	0.000	0.000	0.014
Gas, light, and water	0.051	0.032	0.017	0.006	0.005	0.000	0.000	0.018
Insurance	4.326	3.930	3.914	3.756	3.252	2.343	1.700	3.558
Land, mortgage, and finance	3.304	2.189	0.774	0.000	0.000	0.000	0.000	1.161
Manufacturing	0.276	0.170	0.023	0.015	0.006	0.001	0.000	0.081
Mines	0.038	0.062	0.108	0.001	0.000	0.000	0.000	0.035
Oil	0.153	0.107	0.175	0.188	0.039	0.001	0.000	0.109
Paper and publishing	0.288	0.019	0.039	0.036	0.038	0.000	0.000	0.069
Railways	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.001
Real estate	0.495	0.365	0.222	0.121	0.088	0.044	0.000	0.220
Retail	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Shipping	0.385	0.321	0.258	0.128	0.019	0.002	0.006	0.184
Spinning and weaving	0.522	0.423	0.197	0.064	0.030	0.001	0.000	0.204
Tea, coffee, and rubber	n/a	0.000	0.000	0.000	0.000	0.189	0.000	0.043
Telegraphs	0.023	0.003	0.000	0.000	0.000	0.000	0.000	0.004
Trams	0.104	0.042	0.007	0.002	0.000	0.000	0.000	0.025
Trusts	2.697	1.455	1.154	0.974	0.757	0.435	0.314	1.234
Wagons	0.546	0.702	0.659	0.558	0.237	0.022	0.000	0.448
Warehouses	0.504	0.352	0.397	0.255	0.212	0.081	0.000	0.296
UK firms	0.418	0.483	0.454	0.333	0.267	0.200	0.177	0.425
All firms	0.447	0.529	0.521	0.420	0.377	0.273	0.244	0.357

Sources: See text.

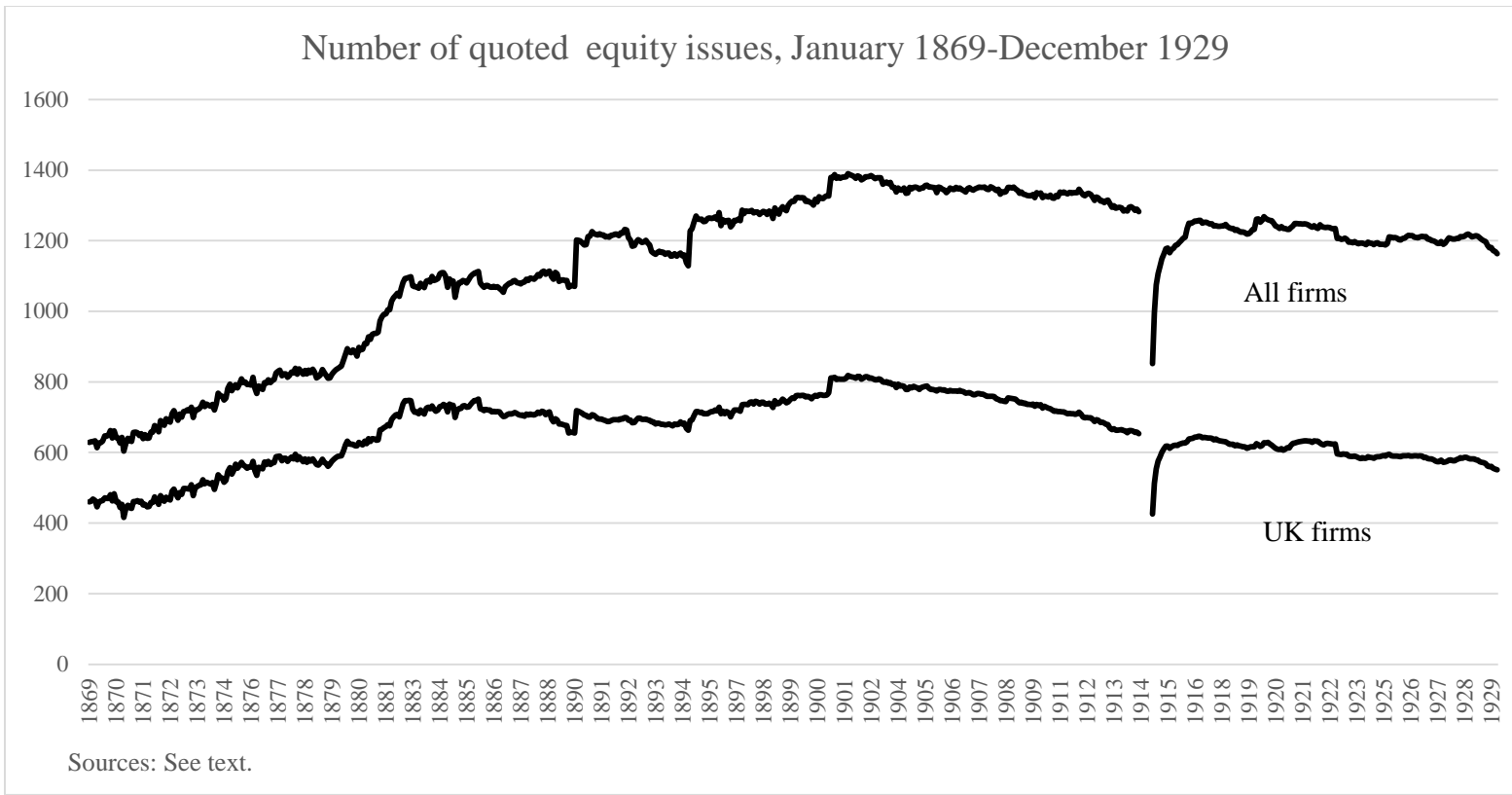


Figure 1

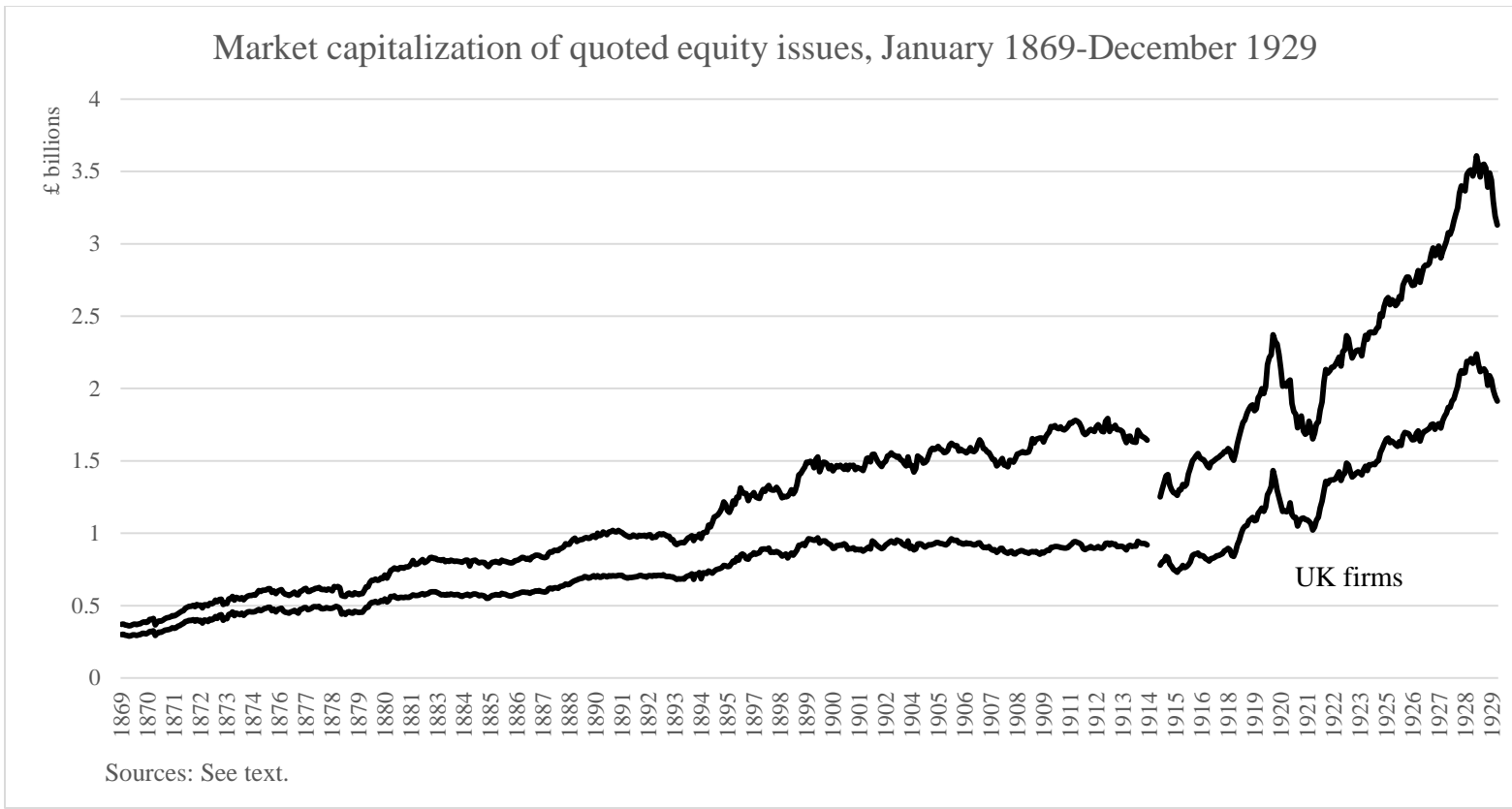


Figure 2

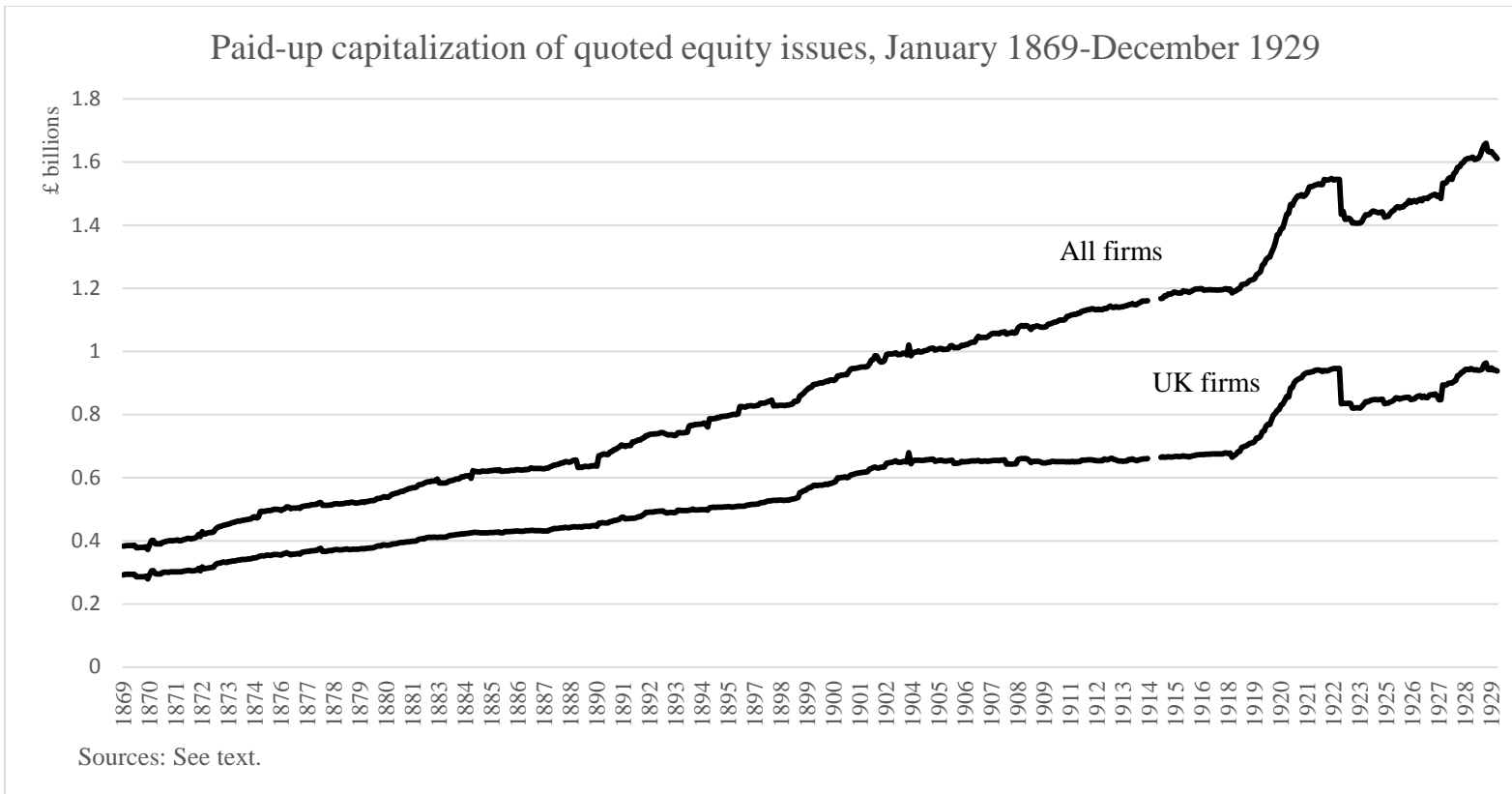


Figure 3

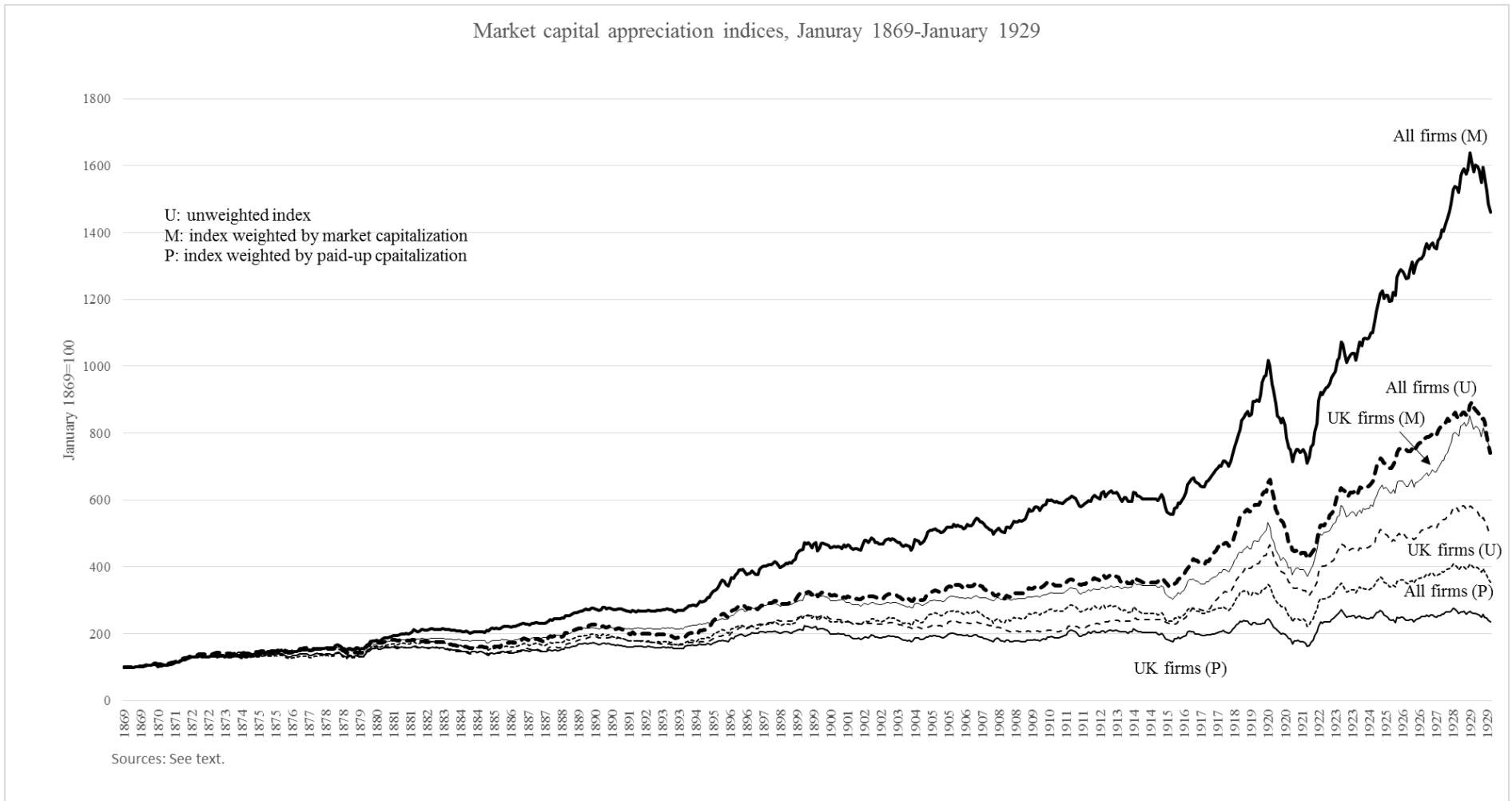


Figure 4

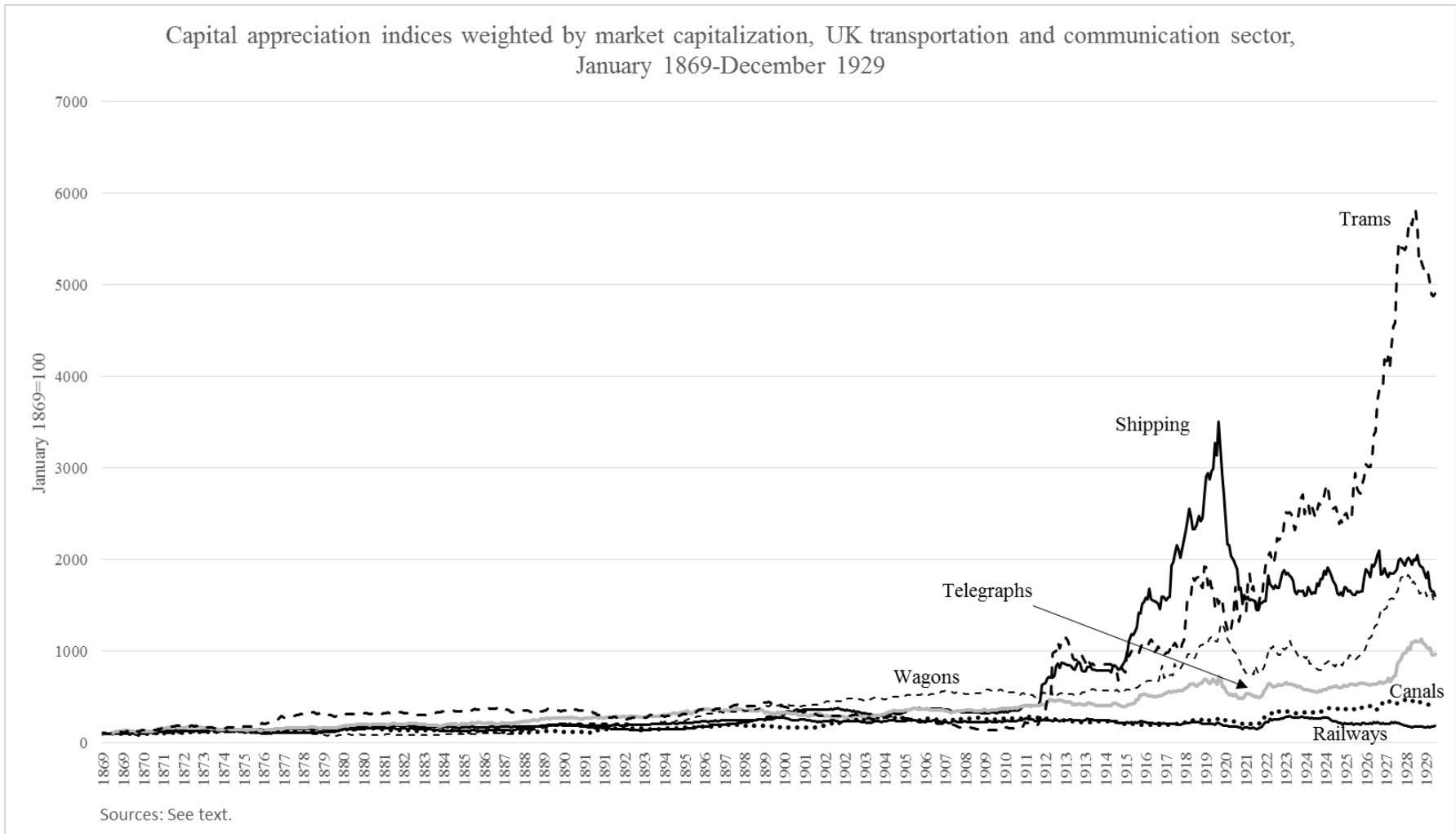


Figure 5

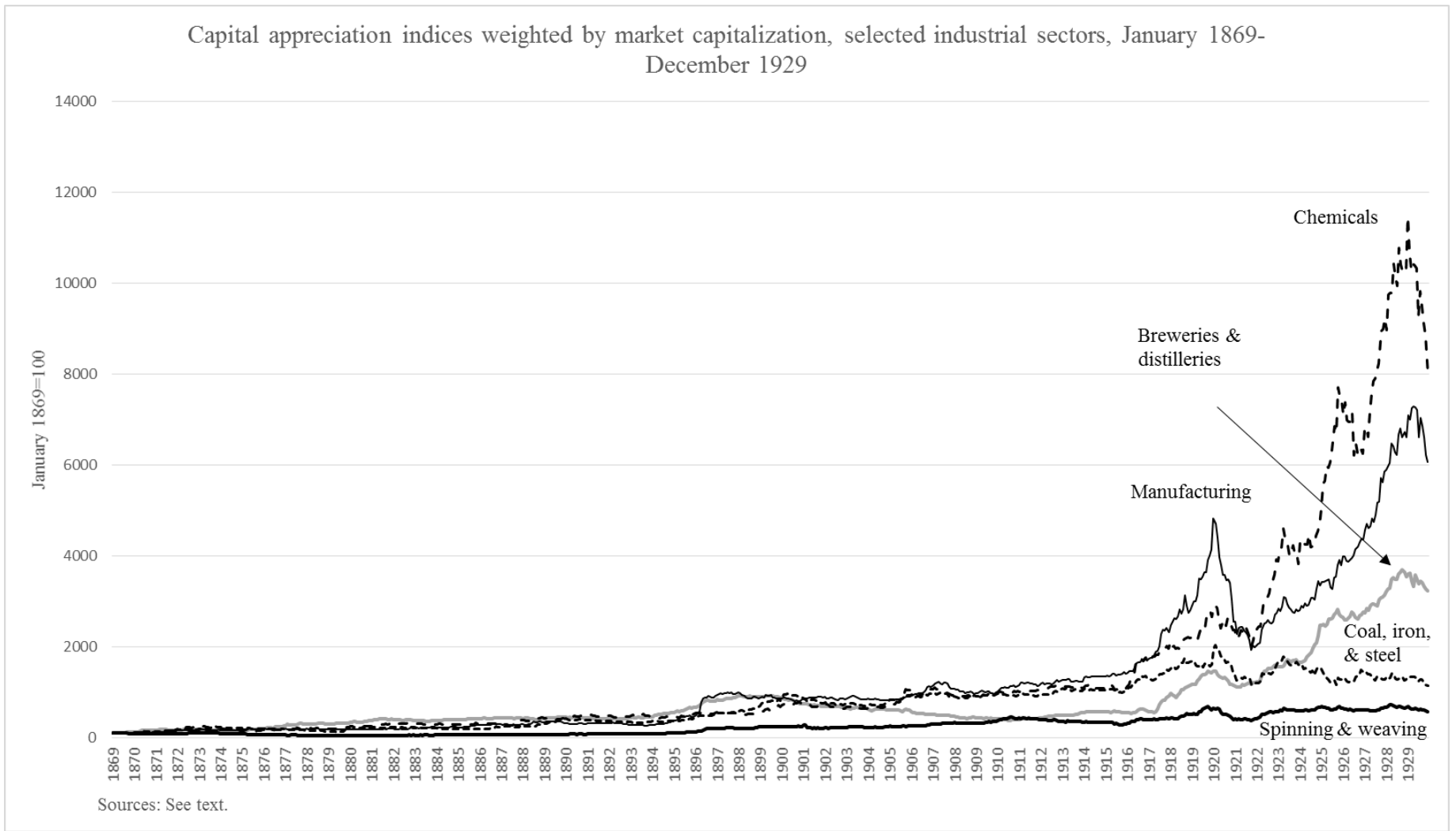


Figure 6

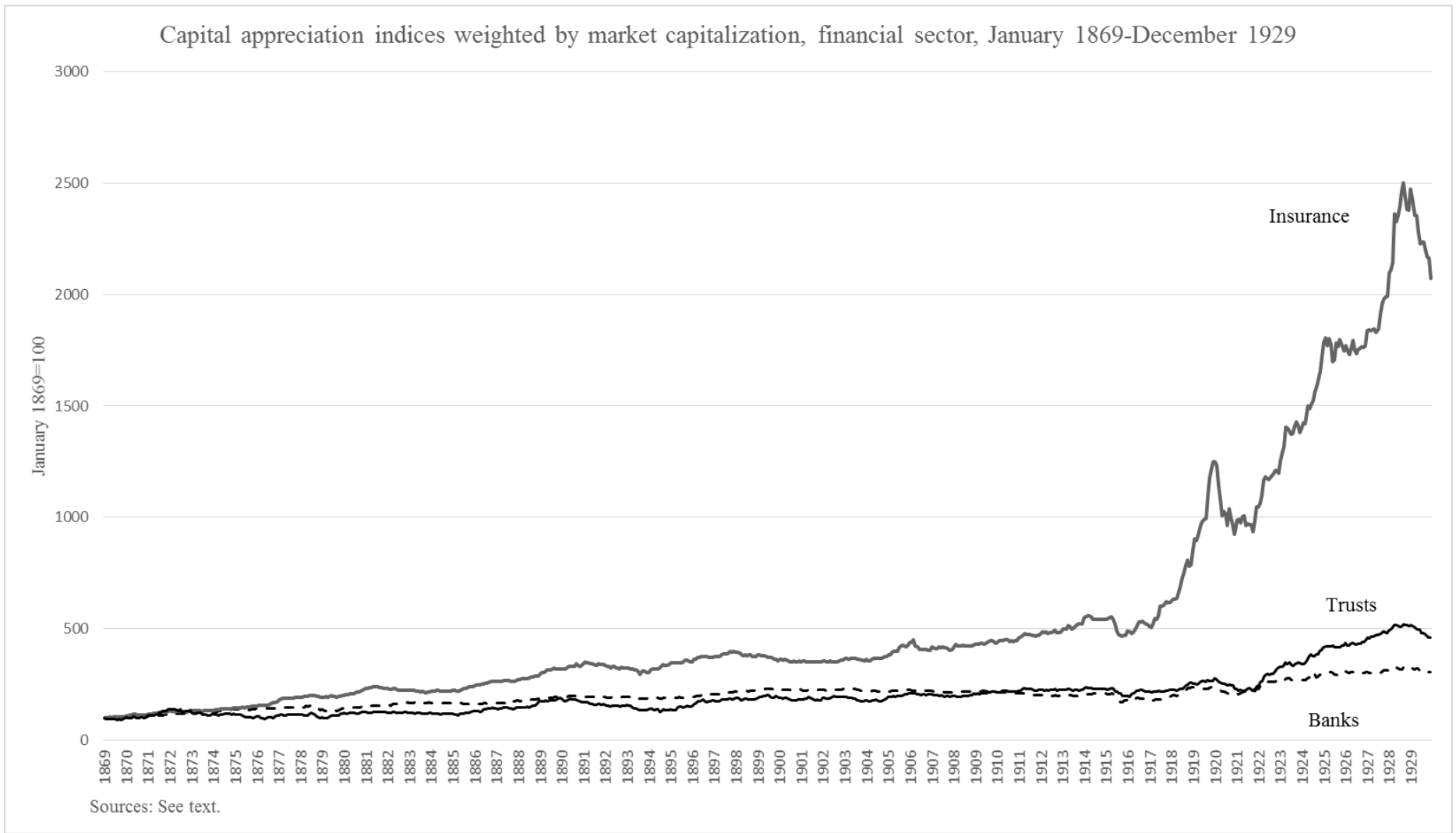


Figure 7

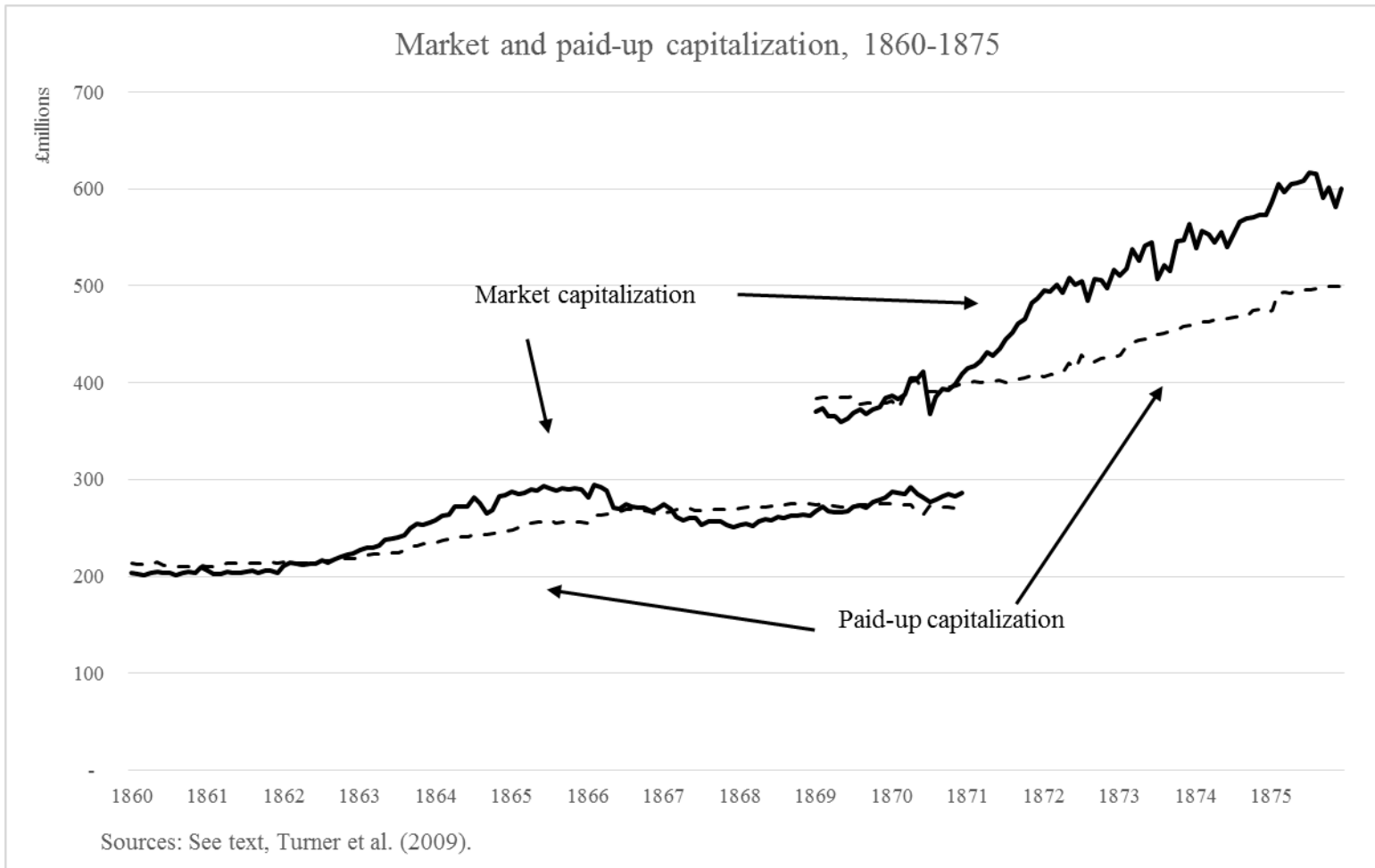


Figure 8

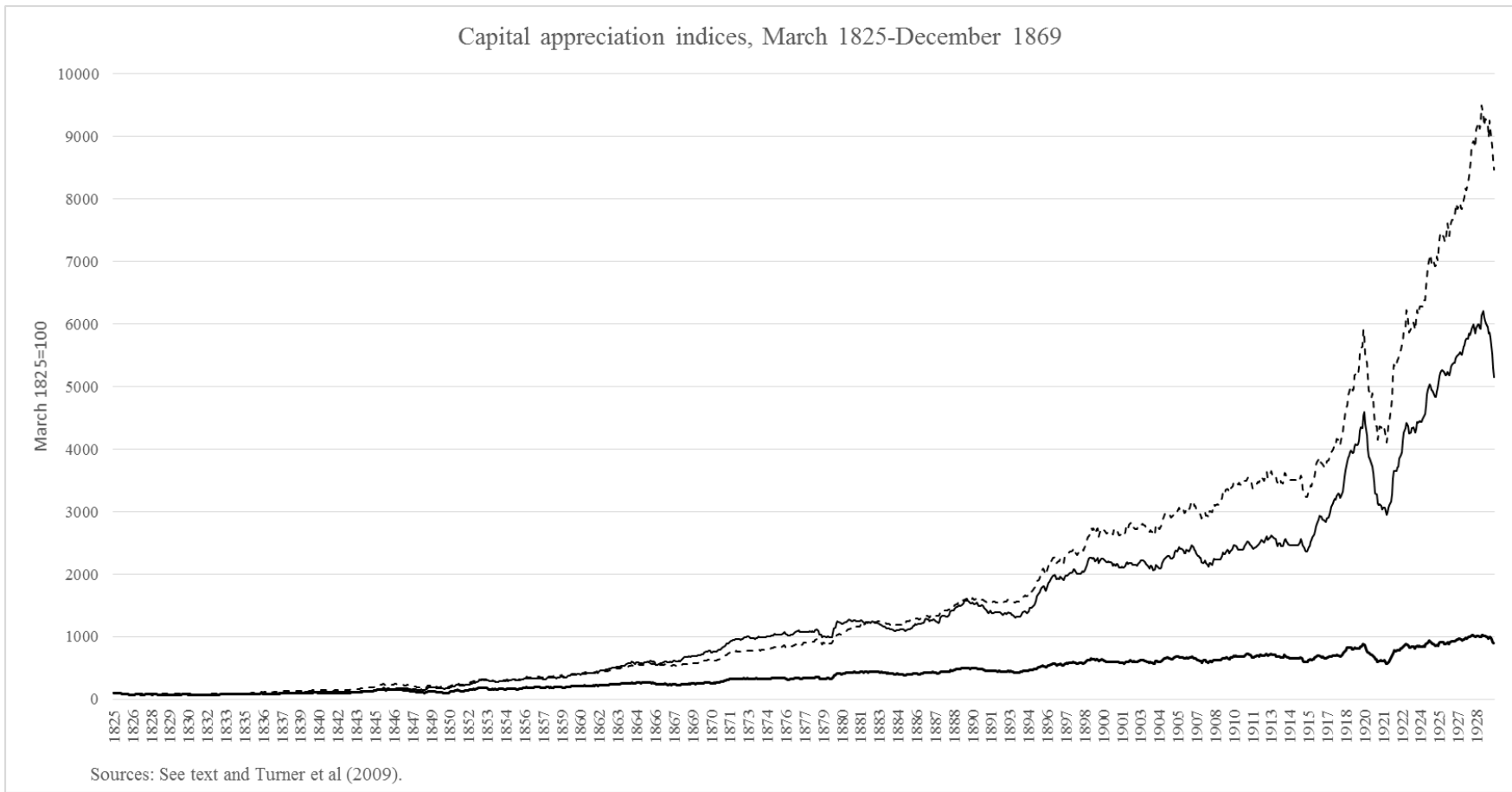


Figure 9

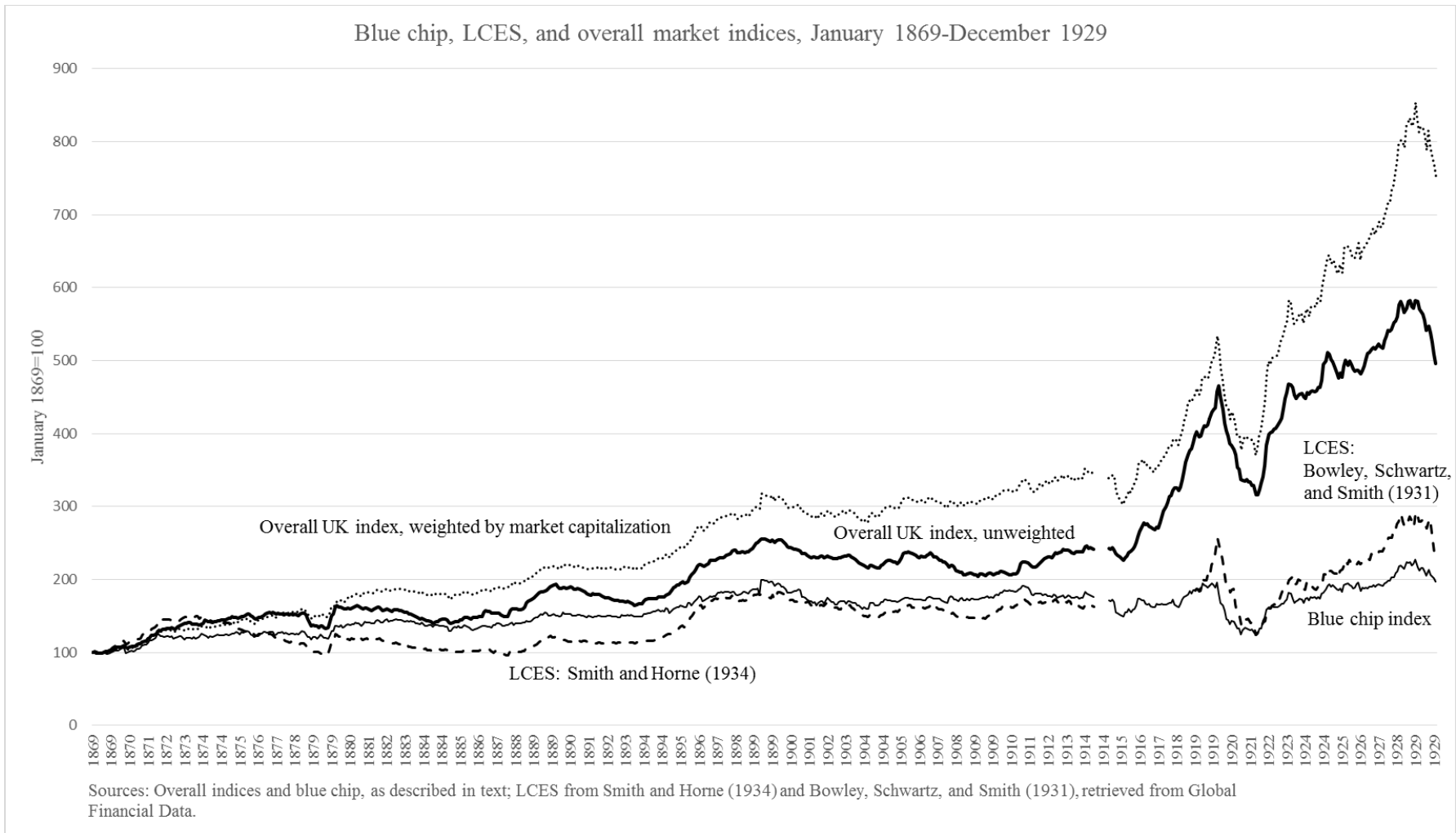


Figure 10

Figure 11

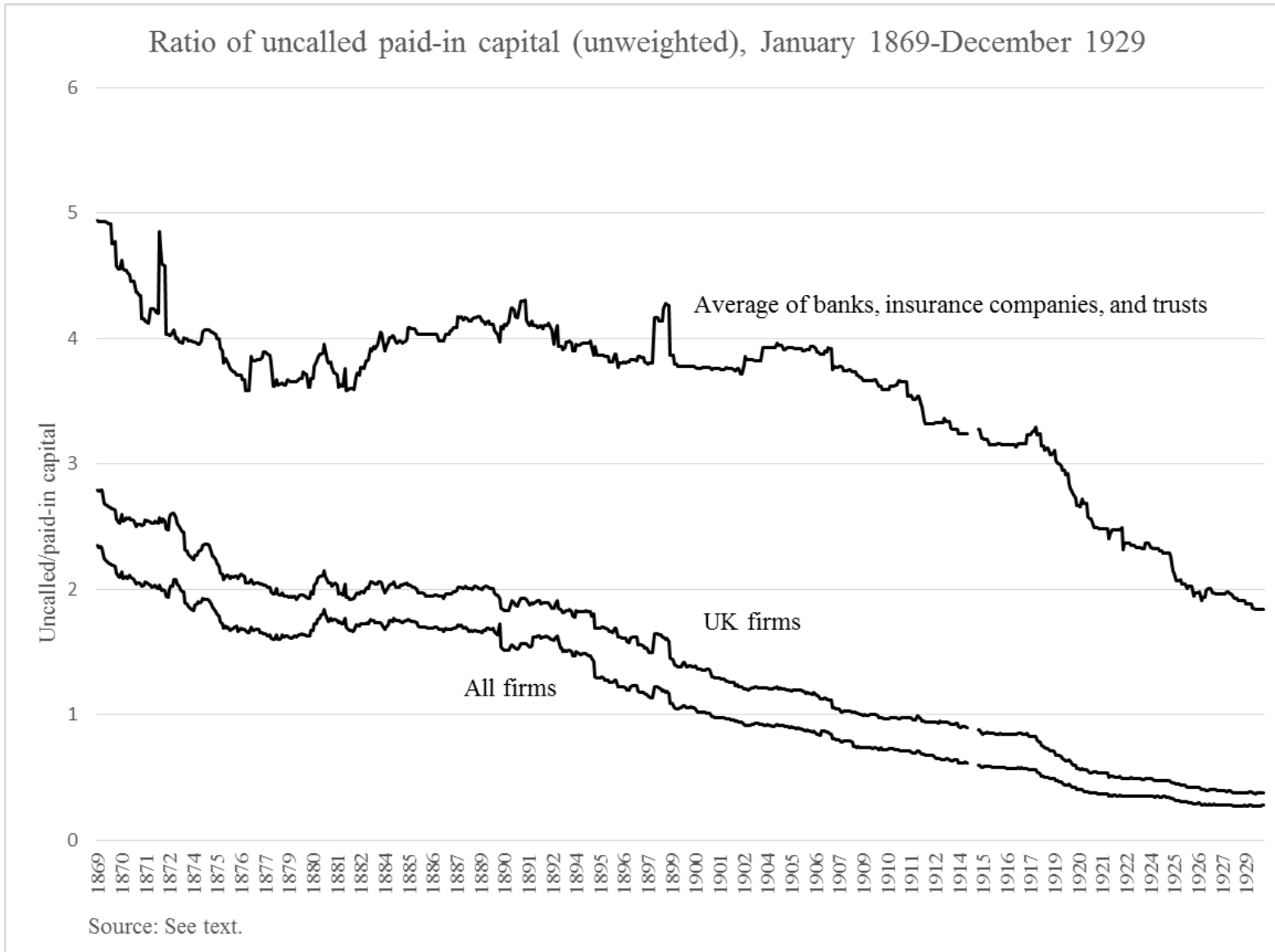


Figure 12

