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New issues, New Industries and Firm Survival in Interwar Britain

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Abstract

Was the London Stock Exchange (LSE) little more than a Dickensian den of speculation, or did it make a contribution to industrial development in interwar Britain? Drawing on a new database covering approximately 1400 IPOs on the London Stock Exchange between 1919 and 1938, I show that the new issues market made a material contribution to the financing of capital investment in manufacturing industry, and more than was typical of modern UK corporate finance. However, the new manufacturing industries financed little more of their capital investment from IPOs than did the rest of manufacturing in the interwar period. Since these industries had the most need of external equity finance and were the most vulnerable to asymmetric information problems, they were ultimately the most constrained by the weak disclosure, inadequate investor protection and ineffective underwriting which characterised the interwar period. This weak institutional environment also manifested itself in the disastrous IPO survival rates of the late 1920s. When issue activity rebounded strongly in the following decade, there was a dramatic improvement in survival. This was, at least in part, due to the LSE recognising the need to fill the regulatory vacuum. The 1930s represents an early example of the "light touch" self-regulatory approach for which the LSE has subsequently become renowned.

*The shares are a penny, and ever
so many are taken by
Rothschild and Baring,
And just as a few are allotted to
You, you wake with
a shudder despairing.*

W.S. Gilbert, *Iolanthe*, 1882, II

Judgements on the performance of the London Stock Exchange (LSE) in the interwar period have ranged between the disdain invited by the poor survival record of the 1928 new issues¹ and the Royal Mail scandal of 1931, on the one hand, and, the view that this institution did a reasonable job in channelling finance into domestic industry on the other.² Evidence of the latter is provided by the fact that such British blue chip firms as Boots, Morris Motors and Marks and Spencer began their lives as public companies on the LSE, and that Ford Motor listed its European business in this period. So which picture is correct?

I answer this question by analysing a new sample of interwar IPOs, and examining the degree to which the IPO market financed capital investment across industry and the quality of firms brought to market measured by firm survival. Although IPOs, and, by extension, new issues, financed a greater proportion of capital expenditure than in the period since 1970, surprisingly, those in the new manufacturing industries, for example, chemicals, electrical engineering, and motor vehicles, did not finance more of their investment than did the traditional manufacturing industries such as shipbuilding, heavy engineering and textiles. This was perhaps ultimately a reflection of the weak institutional environment surrounding the LSE. As for firm survival, learning lessons from the poor performance of the 1928 IPOs, the quality of IPOs improved dramatically when activity recovered in the mid-1930s. This is, at least in part, attributable to the recognition by the LSE of the need to vet applications more carefully in the regulatory vacuum created by ineffective accounting rules, inadequate investor protection and a lack of reputable underwriters and resulted in improved self-regulation through the 1930s. Thereafter, the LSE lent too far in favour of regulation shielding the public investor, and this stance was only reversed with the development of the USM in the 1980s and then AIM in the 1990s. As such the decade of the 1930s represents an early example of the “light touch”

¹ A new issue denotes either an initial public offering (IPO), or a further issue by a firm once listed, otherwise known as a seasoned equity offering (SEO).

² Thomas (1978), pp.34; Michie (1999), pp.285-286.

regulatory approach for which the LSE has more recently become known and occasionally criticised³.

The interwar new issues market is of particular interest in the history of corporate finance in Britain. Prior to 1914, domestic industry was typically small in scale and more than adequately financed from internal sources, and family and friends; thereafter, the substantial capital investment undertaken by such new manufacturing industries as electrical engineering, motor vehicles and aircraft, synthetic fibres and chemicals coupled with the cash flow difficulties facing more established industries escalated the need for external finance. The interwar stock market therefore had a particular role to play in providing risk capital because of the inability of the banks to meet these needs in full.⁴ Furthermore, the uncertainty enveloping global capital markets diminished the prospect of overseas investments crowding out domestic firms in the portfolios of British investors. In the pre-1914 era, domestic firms received their fair allocation of investors' portfolios according to Edelstein. Yet, before the introduction in 1915 of a Supplementary List of share prices, newly listed firms traded on the market would only have appeared in Edelstein's data set if they were subsequently given an Official Quotation, most were not due to their lack of trading liquidity.⁵ The data set employed here embraces the very type of risky industrial and commercial firm which is absent from the Edelstein sample, and also includes the many preference share issues which remained as popular in the interwar years as before WW1 and which were excluded from a study of the British equity market between 1870 and 1913⁶ concentrating exclusively on ordinary shares listed on the Official List.

Numbering among the interwar new listings were IPOs by firms in the new manufacturing industries. This type of firm suffered from the same asymmetric information problems which had plagued the late Victorian stock market, and, as Kennedy argued, had prevented their receiving adequate external finance. The extremely modest improvements in information disclosure and investor protection along with the absence of reputable bank capital from IPO underwriting meant that firms remained victims of these same problems in the interwar period.

The IPO sample described here is well distributed across the two interwar decades thanks to the strong recovery in new issue activity in London in the mid-1930s. This recovery was matched neither in New York nor Paris, understandably so, since both

³ The Chairman of the NYSE stated at this year's World Economic Forum in Davos that the LSE, and AIM in particular, "had to be careful not to damage its reputation by allowing in companies that are not well run". *Financial Times*, "NYSE chief says AIM must raise standards" Jan.27-28, 2007.

⁴ Ross (1996).

⁵ Michie (1999), pp.95-96.

⁶ Grossman (2002).

markets were victim to the extreme deflation gripping both economies. The sample therefore permits a detailed look at what sort of firms across the range of different industries were being financed across the whole of the interwar period.

In the next two sections, I discuss the background to the interwar stock market, and then describe the data sources. The following three sections examine the types of firm that went public and their reasons for so doing, provide estimates of the amount of new money raised from IPOs broken down by industry, and gauge the quality of these newly listed firms through the interwar years by undertaking survival analysis.

BACKGROUND TO THE STOCK MARKET IN INTERWAR BRITAIN

The interwar stock market faced two equally testing but very different challenges. The first involved the need to balance the competing objectives of growing its business by attracting new listings and of protecting its own reputation and the public investor from unscrupulous promoters and from fraudulent investment schemes.⁷ The second arose from the growing appetite of British industry in general and new manufacturing industries in particular for external finance.

The institutional environment surrounding the interwar stock market, by which I mean the quality of company accounts and prospectus disclosure, the strength of minority investor protection, and the extent of reputable bank involvement in underwriting, was extremely weak.⁸ The 1929 Companies Act, the major piece of legislation during this time, did relatively little to remedy this position. Despite requiring the prospectus to detail the last three years' audited profits and the issue proceeds to be raised by the company and their uses, the Act did little to prevent the continued manipulation of company accounts. It is therefore highly questionable whether the occurrence of the high-profile Royal Mail scandal would have been prevented.⁹ Substantial improvement in company accounts had to await the passage of the 1948 Companies Act,¹⁰ as did any strengthening of the rights of minority investors.¹¹ At the same time, the public investor was not well served by the banks, brokers and finance houses sponsoring new issues.¹² As the Macmillan Committee put it, "the public is

⁷ This is a theme which runs through Michie (1999), see for example, pp.96-97.

⁸ See Chambers and Dimson (2006) for a discussion of this institutional environment in the long-run context of the 20th century.

⁹ See Davies and Bourn (1972) for a detailed discussion of this scandal.

¹⁰ Arnold and Matthews (2002).

¹¹ Franks, Mayer and Rossi (2006).

¹² Thomas (1978), pp.47-50; Finnie (1934).

usually not guided by any institution whose name and reputation it knows".¹³ The most reputable banks, as defined by membership of the prestigious Accepting Houses Committee, did not begin to commit to equity underwriting until 1945 and only underwrote a handful of IPOs prior to that date.¹⁴

The LSE self-regulated the behaviour both of its members and of listed companies through the *Rules and Regulations of the Stock Exchange* (LSE Rules).¹⁵ Prior to WWI, the LSE Rules dealt only with firms seeking an Official Quotation; a substantial number of new issues occurred without a prospectus¹⁶; and brokers made a market in the shares without the recording and publication of any prices. The latter position was remedied in 1915, when the LSE began publication of a *Supplementary List* of the prices of those securities without an Official Quotation.¹⁷ Subsequently, at the end of the war, all IPOs were required to seek the LSE's "permission to deal" before share trading was authorised, and an advertised statement in lieu of a prospectus had to be placed in the press before permission was granted.¹⁸ However, this was the full extent of listing requirements demanded by the LSE Rules in the case of admissions to the Supplementary List before 1929. It was therefore no surprise that such characters as Clarence Hatry were able to pursue their fraudulent schemes so easily, and that the 1928 crop of new issues subsequently performed so poorly.¹⁹

The second major challenge of the interwar years was the rising demand of industry for external finance, a decisive change compared to the pre-1914 era, and arising from declining company profitability together with higher taxation restricting internally generated funds. Additionally, the capital investment needs of the new manufacturing industries propelled by the opportunity to commercialize the scientific advances of the Second Industrial Revolution were on the increase. The internal combustion engine, electricity and chemicals were the most important technologies of the early twentieth century²⁰ and spawned further developments in such products as rubber tyres as well as synthetic fibres. Radio was perhaps the most tangible embodiment of this new industrial world, and rapidly developed as a mass consumer product.²¹

¹³ Macmillan Committee, *Minutes of Evidence*, Q.1308.

¹⁴ Chambers (2006).

¹⁵ The first fully printed rule book dates from 1812. Subsequent editions were not numbered. Covering the period of this study, I located editions for 1918, 1922, 1926, 1927, 1928, 1929, and 1934.

¹⁶ Lavington (1921).

¹⁷ King, 1947, pp. 75-76

¹⁸ Michie (1999), pp. 265.

¹⁹ *Economic Journal* December, 1931; Harris (1933).

²⁰ Mowery and Rosenberg (2000), p.8.

²¹ Stromberg (2004).

US firms with newly-established research laboratories were the driving force behind the commercialization of these new technologies and pulled British industry along in their wake.²² Although the direct contribution of the new manufacturing industries to overall growth in British manufacturing output was almost 30% between 1924 and 1937 and over 40% in the immediate post-war period,²³ they did not appear to grow any faster. Indeed, the Aldcroft and Richardson thesis²⁴ that these industries exhibited higher productivity growth and were decisively important in the strong economic performance of the 1930s has been successfully challenged.²⁵ Nonetheless, the capital investment undertaken in motor vehicles, synthetic fibres, rubber (tyres) and electrical engineering was substantial and doubled the fixed asset base between 1920 and 1938; in contrast, capital investments in mature industries such as shipbuilding and engineering, and textiles was extremely modest, only amounting to 46% and 20% of the initial fixed asset base.²⁶ Radio and gramophone, rayon, and motor vehicle and aircraft IPOs featured prominently in the list of LSE IPOs of the interwar years. Bell-weather technology stocks such as Decca Gramophone and Ford Motor listed on the LSE in the last quarter of 1928, their share prices surging by 43% and 86% respectively on the first day of trading.

The new manufacturing industries were the most hungry for external equity finance. Corporate finance theory tells us that technology firms and young firms are particularly prone to information gaps between themselves and outside investors. Both types of firm possess distant cash flows and are relatively asset-poor, and are, therefore more dependent on external (equity) finance early in their life as a public company.²⁷ In a large cross-country study set in the 1980s, Rajan and Zingales (1998) showed that industries dependent on external finance in a more financially developed country found it easier to obtain both stock market and bank finance, and, hence, grew faster than those industries less in need of external finance; furthermore, this growth differential was greater the more financially developed was the country in question. Financial development was proxied by the quality of accounting standards and better accounting standards by minimising asymmetric information problems particularly benefited the development of the stock market over the traditional private credit market. Finally, they

²² Mowery and Rosenberg (1989); Edgerton and Horrocks (1994).

²³ Matthews, Feinstein and Odling-Smee (1982), p.257, Table 9.2. This estimate ignores any spillover effects on the growth in output of other parts of the economy.

²⁴ Aldcroft (1970); Richardson (1967).

²⁵ Dowie (1968). Broadberry (1986) showed there was little evidence of dispersion in output growth across industries in the period 1924-37, pp.10, Table 1.4.

²⁶ Feinstein (1965), Ch.3, pp. 45, Table 3.33.

²⁷ Rajan and Zingales (1998), pp.565 and. Figure 1 empirically tests the theory on recent US IPOs which raised all their equity finance within the first ten years of their life as a quoted company.

discovered that financial development benefited the economy by spawning a large number of young firms rather than growing the size of the average firm.

In a survey of British firms between 1949 and 1953, Tew and Henderson looked at the difference in the equity financing dependence of various industries partitioned by growth rates, and found that fast growing industries were the most dependent on external equity for the financing of their capital investment. However, growth as defined was not synonymous with technology,²⁸ and, this limits the usefulness of this result for this study, beyond their finding that, overall, manufacturing financed over a quarter of its capital investment in these five years through equity issues, both IPOs and SEOs, a much higher figure than has been seen recently. No study has been carried out of how industries financed themselves prior to Tew and Henderson.

In this paper, I attempt to do two things. Firstly, I estimate from firm-level data how important IPOs were in financing capital investment by new manufacturing industries relative to the rest of British industry and to traditional manufacturing industries in particular. If, as was argued above, the institutional environment of the interwar IPO market was poor, then I would expect new manufacturing industries to be able to finance no greater share of their investment projects through equity issues than could the more mature manufacturing industries. Secondly, I examine what explained the poor survival rates of the early and late 1920s, and what might explain the improvement that occurred after the 1930s.

DATA SOURCES

I have compiled a data set consisting of 1406 firms going public on the LSE where an issue of shares or debentures was accompanied by the publication of a prospectus, or advertisement, in *The Times Book of Prospectuses*, and after excluding certain types of IPO.²⁹ The details of each issue were cross-checked against the *Stock Exchange Official Intelligence and the Stock Exchange Year Books*, and, after their merger in 1932, the *Stock Exchange Official Year Books* (Year Books). New issues comprise both IPOs and further issues, or seasoned equity offerings (SEOs). *The Times Book of Prospectuses* appears to exclude a large number of SEOs most probably

²⁸ Tew and Henderson (1959), Table 5.11. Fast growers included electrical engineering, motor vehicles and chemicals but also shipbuilding and non-electrical engineering, and slow growers included clothing but also food and drink.

²⁹ Firms already listed on another stock exchange, investment trusts, introductions, and penny shares. Penny shares are those shares with an offer price of 2 shillings or less. Such issues were characteristic of speculative mining and rubber share counters. *The Economist*, 25 January 1930, p.180: "...the amazing appetite for gambling which sprung up in shilling, florin and other shares of small nominal value." See also Thomas (1978), p.37.

because these issues were frequently made directly to shareholders without publishing a prospectus in a national newspaper. For example, Ford Motor, having gone public in December 1928, successfully completed a further issue of £4.5million ordinary shares made to its existing shareholders in 1931 without publishing a prospectus.³⁰ I concentrate the discussion on IPOs in this paper.

I first collected data on firm characteristics. *The Times Book of Prospectuses* yielded information on the type and number of shares outstanding as well as the shares being offered to investors, their voting rights (VOTING RIGHTS), the age of the firm (AGE), the nature of its business, the number of years of past profits (PROFITS RECORD), whether the accounts were audited or valued by a third party (AUDIT), whether or not the IPO was underwritten by a third party (UNDERWRITTEN), the purposes of going public, and the cash raised by the firm itself (NEWMONEY) as opposed to selling shareholders as a proportion of gross proceeds. Firm size (MKTCAP) is estimated as the total number of shares outstanding post-IPO evaluated at the offer price.³¹ Firm age was estimated from the date of establishment of the business.

Appendix 1 lists all variables and their definitions.

The other type of data collected was that on firm survival. I define an IPO failure as any firm subsequently delisted from the exchange by the tenth anniversary of its going public due to being wound up, placed in receivership, or struck off the register and where shareholders received nothing. Each IPO was checked against the Year Books as to whether the firm had failed, been acquired or was still trading as a going concern after ten years; the *Stock Exchange Daily Official List* (SEDOL) and *The Times* were consulted to confirm whether the shares were still quoted after ten years in the relatively few cases where the Year Books were silent. Estimates of the length of survival time in months were also made and were right-censored at ten years. This survival time variable is employed in the analysis below. The Year Books distinguish between a voluntary and a compulsory winding up. In the former case, a firm may be wound up even though it is a going concern, because the owners wish to retire or because of acquisition by another firm.³² The Year Books make it clear when a firm has been wound up through being taken private, or through acquisition. These IPOs are treated as having survived.

Although there also existed a *Register of Defunct and Other Companies* covering those firms which disappeared from the Year Books, there are two problems with this data source. Firstly, these defunct companies were not restricted to those listed on the

³⁰ Michie (1999), pp.284; and *The Times*, 19 March, 1931, pp.21: "Company Meetings: Ford Motor Company."

³¹ Any securities issued but not quoted are valued at par.

³² Hudson (1989), p.111

London stock market.³³ Secondly, companies disappeared for reasons other than bankruptcy and the reason, other than change of name, is not made clear.

INTERWAR IPO CHARACTERISTICS

The annual time series of the number of firms going public and the gross proceeds raised in the interwar period is summarized in **Table 1**. The difference between the aggregate proceeds of this sample (£724 million) and the *Midland Bank Series* (£2,560 million) reflects the exclusion of SEOs mentioned above (**Appendix 2**). The gap while large increased considerably later on. For example, IPO proceeds represented less than 15% of total new issues between 1960 and 1975.³⁴ IPOs were therefore relatively more important in financing industry in this period.

Although ordinary shares had been widely used by firms raising external finance in the 1860s³⁵, debenture shares and preference shares became more popular up to 1914³⁶. In the interwar years, there were more than four times as many equity issues (1140) as debenture issues (266) (**Table 1**). However, firms raised almost equal amounts of money through equity issues, both ordinary and preference shares, as through debenture issues, reflecting the much larger issue size of debentures (£1,334,000) compared to shares (£324,000). Equity issues were more important in years of strong issue activity, a pattern broadly consistent with the picture described by the *Midland Bank Series* (**Appendix 2**). By the interwar period, debentures were issued by large, well-capitalised firms rich in assets available to be mortgaged. As a result, firms going public by issuing debentures were relatively safe investments and enjoyed a survival rate of close to 100%. I therefore focus on firms going public by issuing either ordinary or preference shares hereafter.

The equity IPO volume and the IPO proceeds series display pronounced cyclicity. Gross proceeds are decidedly more volatile than both stock market prices³⁷ and the economic cycle, described by *The Economist* index of business activity³⁸

³³ The 1939 *Year Book* contained entries by 9,400 companies issuing 19,000 securities of which slightly more than half were traded on the London Stock Exchange, the rest mainly being traded overseas, on the Provincial Stock Exchanges, or having no quote at all, Michie (1999), pp.283

³⁴ SEO, or rights issue, proceeds from Marsh (1977); IPO proceeds from Chambers (2006).

³⁵ Cottrell (1980), pp.86.

³⁶ Watson (1996).

³⁷ The equity price index is constructed from the London and Cambridge Economic Service index (monthly data to August 1921), the Scholles 20 ordinary share index (weekly from August 1921 to December 1926), the Bankers Magazine index (monthly during 1927 and 1928), the Annalist London 20 share index (weekly from January 1929 to December 1929), and daily from 1930 from the Financial News 30 share, the Financial Times 30 and the Financial Times All Share indexes.

³⁸ Capie and Collins (1983).

(Figure 1). The period is defined by intense bursts of IPO activity (1919-20, 1927-29 and 1934-38), interspersed with lulls (1921-26 and 1930-33), a pattern which is consistent with the narrative of Thomas (1978). I adopt this periodisation in the rest of the paper.

The surge of issues in 1919 and 1920 which greeted the ending of a moratorium on new issues during WW1, and was followed by a collapse in activity in 1921 and 1922, in part a response to the depth of the economic recession.³⁹ Firms again rushed to go public in 1927, 1928 and the first half of 1929 at a rate of almost one company per working day. The early years of the next decade were marked by a second collapse in activity in the wake of a 40% fall in London share prices and the widespread turmoil enveloping international capital and foreign exchange markets. However, the decline in business activity from peak (August 1929) to trough (August 1932) was a much more modest 18%. The mid-1930s then witnessed a marked recovery in the number of firms going public in sharp contrast to Wall Street,⁴⁰ where the delayed departure of the US dollar from the Gold Standard and the more devastating effects of systemic financial distress on US real economic activity took a heavy toll.

Why did firms go public? In all but a small number of cases it was possible to elicit the main reason from the prospectus (**Table 2**). Approximately half the time firms wanted to raise new money for capital expenditure, debt repayment, or working capital and “general purposes”. Relatively few firms (7%) were going public to merge with another firm. This contrasts with the post-1945 position when large numbers of IPOs were driven by mergers and acquisitions. Of the remainder, the sole reason given for the IPO was insiders wanting to sell down their stake either by directly disposing of shares (11%), or by “converting” an old-established firm into a newly listed firm (18%). In the latter case, the new firm issued shares for cash with which the established firm was then acquired. Although superficially the IPO appeared to be for cash, effectively, the cash ended up in the pockets of the insiders. A similar structure was adopted in a large number of cases with new shares being issued directly to the pre-IPO shareholders of the established firm and new shares being issued for cash to meet the capital investment plans and working capital of the new firm.

Firm risk, the level of prospectus disclosure, and ownership and control measures are summarised for the 1,140 equity IPOs in **Table 3**. Ignoring the small number of IPOs in 1930-33, there are several noticeable trends. There was no obvious

³⁹ *The Economist* index of business activity fell by 35% between July 1920 and June 1921. The fact that the share price index did not show a similar sharp fall at this time reflects the lack of a pure ordinary share index series prior to the *Financial News* 30.

⁴⁰ There were only 38 common stock IPOs between 1934 and 1938, Gompers and Lerner (2003), pp.1360, Table 1.

change in the riskiness of firms going public over the period; average firm size defined by total market capitalisation actually declined over time, whilst firm age followed more of a u-shaped pattern only dipping noticeably in the late 1920s. Prospectus disclosure generally improved across the period. On average, more years of past profits were disclosed, an audited asset valuation statement was more likely to be included, and the voting rights attaching to the securities in issue and the underwriting arrangements were more likely to be discussed adequately. The only exceptions to this trend again occurred in the late 1920s.

In the case of the ownership and control measures, firms typically sold more than 50% of their total market value to outside investors (PROPSOLD), more than is typical in the modern period.⁴¹ In addition, there is the lack of any trend in the propensity of firms to issue ordinary shares; as a proportion of total market capitalisation, this propensity started at 37% (1919-20) and ended at 35% (1934-38). This does not resonate with the view that the interwar years first saw the emergence of the cult of the equity among British investment institutions⁴². Whilst ordinary shares typically carried one vote per share, preference shares could or could not carry voting rights. Consequently, although Berle and Means first observed that the modern corporation in pursuit of scale and professional management increasingly witnessed the divorce of ownership from control, the variety of securities available to firms meant that interwar owners had some ability to resist this trend. A typical structure which minimised the degree of control relinquished when going public was a dual capitalisation issue.⁴³ Insiders were able to retain majority control of a firm whilst selling a much greater share of cash flow rights. Hence, on average 1919-20 firms sold 63% of the cash flow rights and only 50% of the votes, whilst 1934-38 firms sold 62% of cash flow rights and only 48% of the votes. There was of course considerable variability in these figures, and, in general, weaker firms were forced to sell more votes than cash flow rights in their need to attract outside investors.⁴⁴

Prospectuses also disclosed a firm's geographic locus and the nature of its business activities which enabled domestic firms to be distinguished from foreign firms. Two out of every three foreign IPOs were natural resource enterprises engaged in either non-ferrous metal mining, tea, coffee or rubber plantations, or oil exploration and development. Based on the 1948 UK Standard Industrial Classification, I allocate each domestic firm into the following sectors: new manufacturing, traditional manufacturing,

⁴¹ Chambers and Dimson (2006).

⁴² Scott (2002).

⁴³ This was the combination of a preference share carrying no voting rights offered at £1 per share primarily to public investors plus an ordinary or deferred share offered at 2 shillings per share a large proportion of which would be issued to the managers and other insiders.

⁴⁴ Thomas (1978), pp.30.

other manufacturing, finance and property, retail and distribution, (non-financial) services and other.⁴⁵ I choose to define the new manufacturing industries primarily by research-intensity and in the absence of any data on the distribution of research activity across industries, I assume that Britain mimicked the US. Mowery and Rosenberg's analysis of US industrial research-intensities clearly points to chemicals (including petroleum refining), electrical engineering and equipment, and rubber tyres as by far the most research-intensive during the interwar years; automobiles and aircraft lag do not enter this group until 1946, and scientific instruments and photographic equipment, and synthetic fibres are not separately identified in the industry classification employed.⁴⁶ However, I choose to include these latter three industries given the technologies they embraced. I was also able to glean from the prospectuses which firms, only 49 in all, were engaged in some sort of research and development activity and there was a high correlation with this industry group. Traditional manufacturing industries are defined as coal mining, shipbuilding and heavy engineering, and textiles excluding synthetic fibres; and other manufacturing covers mining other than coal or metals, metal manufacturing, food drink and tobacco, clothing, paper and printing, and leather products.

Breaking down equity IPO volume by domestic industry (**Table 4**), other manufacturing firms were the most numerous (370) followed by new manufacturing firms (185); the latter considerably exceeded traditional manufacturing IPOs (106). IPOs have a tendency to occur in waves, as investors become more familiar with a particular industry, or group of related industries, and firms, in turn, exploit such windows of opportunity. In the 1880s breweries dominated IPO activity; in the 1890s, it was the turn of bicycle firms. The interwar period exhibited the same pattern. The majority of new manufacturing IPOs were clustered into the late 1920s (69) and the mid-1930s (67), whilst foreign, mainly resource ventures, were concentrated in the years up to 1926. Traditional manufacturing IPOs, on the other hand, occurred evenly through the period, ignoring the early 1930s.

Summarising, firm risk was fairly stable, disclosure improved over the period, and the average firm sold around 60% of the firm but less than 50% of its votes. Raising new capital was the most common reason for undertaking a public issue and arms length acquisitions were relatively rare. The "conversion" structure adopted by many firms going public frequently made it difficult to understand the amount of new money being raised,

⁴⁵ SEDOL classifications are too crude and dominated by the "Commercial, Industrial, etc" sector in the interwar years.

⁴⁶ Mowery and Rosenberg (1998), ch.4 and Tables 4.2 to 4.5. Research intensity is defined as number of scientific personnel per 1000 wage earners. The industry classification was taken from the National Research Council survey.

THE INTERWAR IPO MARKET AND DOMESTIC MANUFACTURING INDUSTRY

Of the approximately £300 million in total proceeds raised from investors when domestic firms went public, I estimate that £120 million went to the companies themselves to finance their investment plans (**Table 4(i)**). In many cases and particularly in the case of those IPOs floated prior to the 1929 Companies Act which now required disclosure of the amount and uses of proceeds, it took a very careful reading of the prospectus in order to decipher what proportion of proceeds went to finance the company's operations as opposed to insiders and other selling shareholders. This was frequently because, as mentioned in the previous section, firms listed by converting their established business into a newly listed firm which then sold shares to the public for cash. For this reason, the existing capital issues series estimated by the Midland Bank and the Bank of England for the interwar years are likely to overestimate the cash raised by the corporate sector for capital investment and working capital needs.

Despite new manufacturing IPOs being more numerous, gross proceeds of new and traditional manufacturing IPOs were virtually the same at £55 million (**Table 5(i)**). This reflected the larger size of traditional manufacturing firms. For example, when Platt Brothers, the textile machinery manufacturer, went public in July 1922, its owners sold shares valued at close to £4 million, a figure ten times the average interwar IPO. Almost three-quarters of the proceeds raised by traditional manufacturing firms occurred in the first half of the 1920s, with £9 million being attributable to two shipbuilding firms, Harland and Wolff (July 1924) and Tankers (March 1920), and two textile firms, No 2 DR Cotton Mills (Sept-1926), a subsidiary of Dunlop Rubber, and Rylands and Sons (July 1920). More significantly, new manufacturing firms raised only slightly more new money (£22.8 million) than did traditional manufacturing IPOs (£21.4 million), with one-half of the new manufacturing total raised in the late 1920s (**Table 5(ii)**). This figure excludes Ford Motor which opted for a conversion with the parent company selling the various European businesses to the new company for cash.

The significance of the role played by the IPO market can be gauged in terms of its contribution to financing capital investment. Taking domestic manufacturing industry as a whole, IPOs raised new money of £83 million which financed 6.1% of gross domestic fixed capital formation (GDFCF) (**Table 6**). Whilst the magnitude of this contribution may appear modest relative to the contribution from internal funds and other sources, it is substantial in comparison with recent UK corporate finance experience. One study estimated that UK non-financial firms between 1970 and 1994 financed none

at all of their capital investment through equity issues (both IPOs and SEOs) due to the large number of new issues undertaken to fund acquisitions.⁴⁷ SEOs are omitted from these interwar new money estimates. Hence, the 6.1% figure is probably consistent with the findings of Tew and Henderson (1959) who estimated that new equity issues by UK quoted firms in manufacturing, building and distribution financed 28% of capital investment between 1949 and 1953.⁴⁸

In the spirit of the Rajan-Zingales thesis, firms in the new manufacturing industries being younger, less asset-rich and possessing more growth opportunities are more likely to be dependent on external equity finance, and to want to fund a larger proportion of their GDFCF from equity issues. In fact, in the interwar period, new manufacturing firms financed 6.9% of their GDFCF from IPO proceeds, a figure which modestly exceeded the 5.2% share of GDFCF financed by other manufacturing IPOs, but, not much different from the 6.8% figure for traditional manufacturing IPOs. There is of course considerable variation both across new manufacturing industries and across time. The financing contribution from IPOs ranged between 3.3% for chemicals and 15.9% for synthetic fibres; whilst the bulk of traditional manufacturing new money was raised in the early 1920s, the new manufacturing firms raised their money towards the end of that decade but raised relatively little new money when the IPO market re-opened for them in the mid-1930s (**Table 5**).

One implication of the Rajan and Zingales thesis is that a long-run relationship also exists across time between financial dependence and the degree of financial development for a single country, similar to that claimed for a cross-section of countries and industries. In the case of Britain, the lack of any gap between new manufacturing dependence on IPO finance and that of the rest of manufacturing is explained by the weak institutional environment of the interwar stock market which held back new manufacturing industries which were exactly those most dependent upon external equity finance.⁴⁹

FIRM SURVIVAL IN THE INTERWAR PERIOD

A combination of lax regulation and irrational exuberance can have unfortunate consequences for IPO investors. To the extent that IPOs launched during hot markets,

⁴⁷ Corbett and Jenkinson (1997), pp.82-83.

⁴⁸ Tew and Henderson (1959), pp.64-76. The two estimates although for different time periods appear sensible in that IPO proceeds represented 28% of the Midland Bank estimate of new issue proceeds as stated in the previous section and in Appendix 2.

⁴⁹ See Levine (1997) for a general overview, and Rajan and Zingales (1998).

as in 1919-20 and 1928, and IPOs with no track record and promising riches from exploiting new industrial technologies mask the worst-laid plans of unscrupulous entrepreneurs out to dupe investors, then such IPOs would not be expected to survive very long. Among those well-conceived ventures, intense product market competition will, of course, mean some IPOs do not make their projected returns to the obvious detriment of share price performance, but few would be expected to go out of business in such a short space of time.

A natural way to measure the post-IPO performance of firms is to look at the total returns including dividends and capitalisation changes after the first day of trading over the following three to five years. However, performance must be compared not simply to the overall market return but to the return of a peer group of seasoned quoted firms with similar characteristics.⁵⁰ Such benchmark data do not currently exist for the UK equity market. Even were such data to exist, the estimation of long-run performance is beset with measurement problems.⁵¹

The only studies of long-run IPO performance in interwar Britain examined the 1928 new issue cohort.⁵² The anonymous author concluded that the value of this portfolio of 283 new issues of ordinary shares, preference shares and debentures floated in 1928 had depreciated by 47% up to May 1931. Harris (1933) re-examined the performance of the same portfolio and estimated its depreciation at 47% over the period to April 1933. Harris partitioned the sample by firm age and by disclosure regarding past profits. The share prices of issues by established firms and firms disclosing a profits record fell by approximately 25%, a better performance than the overall market. The new ventures along with those “new” firms acquiring existing businesses with no past profits disclosed were disastrous, their share prices declining by 92% on average! However, given their small size, they represented only one-third of overall funds subscribed in 1928. Hence, I estimate that the entire 1928 IPO portfolio performed approximately 11% worse than the market in price only terms for the period to April 1933. Unfortunately, neither study looked at total returns, or compared IPO performance to a matched sample of seasoned firms. The latter are most likely to have done worse than the overall market given that the average IPO was only one-third the size of the average firm quoted on the Official List.

⁵⁰ A daily market index was only published in 1930 by the *Financial News*; similarly, the firm size and book value to price factors required to sort firms by their dominant risk characteristics have not yet been estimated. In the US where such benchmark data are readily available, long-run performance has been estimated for interwar IPOs. See Simon (1987) and Gompers and Lerner (2003).

⁵¹ See Gompers and Lerner (2003) for a discussion.

⁵² *Economic Journal*, December 1931. The sample included SEOs as well as IPOs, investment trust issues and “penny” share issues.

Given the benchmarking and measurement challenges of long-run performance estimation, I opt in the rest of this paper for the alternative measure of post-IPO performance, namely, firm survival. Survival is defined as the proportion of IPOs which maintain their listing on the stock market over the following ten years, excluding those firms acquired, or liquidated for value. Analogously, failure rates represent the proportion of firms which are delisted due to bankruptcy or being wound up without shareholders receiving any return on their investment. The survival rate is equivalent to one minus the failure rate. Although they ignore the upside of any successful IPO, survival rates do capture their downside risk. Investors in IPOs may be prepared to accept share price declines in after-market trading, but not a substantial portion of their IPO portfolio expiring valueless. Such a level of downside risk is characteristic of unquoted, early stage venture capital investment, not quoted security investment.⁵³

Andrews (1937) analysed the failure rates of newly-registered companies between 1919 and 1932 in Britain, where failure was defined in terms of a firm being wound up, or being struck off the Companies Register. His stratified sampling of the *Stock Exchange Official Intelligence* produced 481 observations, covering both quoted and unquoted firms and excluding mergers and acquisitions. The poor performance of the 1928 cohort is again apparent and equally applies to 1929 IPOs. In both cases, barely three out of five firms survive over the five years following their registration. Furthermore, the five-year survival rates in the case of two of the leading technology industries, “electrical, including wireless” and “motors”, were only 40% and 53%, respectively.⁵⁴

In contrast to Andrews, this study concentrates exclusively upon the survival of newly quoted firms. Compared to Harris, it includes all interwar IPOs, not only those of 1928. Survival rates of annual IPO cohorts between 1919 and 1938 over both five and ten years are graphed in **Figure 2**. I have defined survival rate as excluding those firms acquired or taken private from both the denominator and the numerator. Out of the sample of 1140 firms, 73 firms were acquired and 12 were taken private. I excluded penny shares from the sample (see footnote 24), since they were highly speculative investments. Most were floated in the active market of 1928 and early 1929, and I estimate that only 6 of the 56 penny ordinary share IPOs were still trading on the market by the end of 1934.

There are two striking features of **Figure 2**. Firstly, IPOs launched in 1919-20 and 1927-29 were particularly prone to failure. Ten-year survival rates were only a little

⁵³ Gompers and Lerner (1999), p.6. Only 25-30% of venture capital portfolios typically prosper to become quoted firms; the rest either fail, are acquired or become the “living dead”.

⁵⁴ Andrews (1937), Table VII, p.508. The sample sizes are very small, only 10 and 15 firms respectively.

above 60% in 1919-20 and fell to 50% in 1928. Secondly, performance was much improved in the 1930s when virtually all firms survived, most notably those floated when activity rebounded strongly in the mid-1930s.

In order to explain these poor survival episodes of the early and late 1920s, and to prompt the discussion which follows in the next section as to why matters improved in the following decade, I make use of survival time, or the length of time from going public to a firm failing rather than a simple survival dummy variable. This approach has the advantage of introducing a time dimension to the analysis of IPO survival. Survival or duration analysis has been widely employed in epidemiology and engineering. Kiefer (1988) has surveyed these models in the context of the duration of unemployment and Shumway (2001) has applied them to the study of corporate bankruptcy. Closer to the theme of this paper, Nicholas (2005) has used hazard regressions to analyse the survival of large quoted US firms post-1929.

I estimate the survival time for each IPO defined as the time to exit, equivalent to the number of months between the first month of trading and the month of failure, censored at 120 months in the case of those surviving IPOs. These survival times then provide estimates of IPO hazard rates when using the Cox (1972) proportional hazards model (see **Appendix 3**). Conceptually, a hazard rate is equivalent to an instantaneous IPO failure rate at time t conditional upon the firm surviving up to time t . I would expect the hazard rate to vary inversely with firm size, firm age, the level of disclosure and whether or not the issue was underwritten by a third party. Given that asymmetric information problems are particularly acute for IPOs, the implication of Leland and Pyle (1977) is that investors become more wary, the greater the share of the firm being offered to them, and, by extension, when they are offered “extra” votes in a firm. It is not clear what the prior should be on firms raising more new money as a proportion of IPO proceeds. Following the Leland and Pyle story, outside investors would be happier if managers were retaining their shares in the firm and only issuing new shares on behalf of the company; however, given the parlous state of investor protection and the opacity of company accounts, it is not clear why investors would be any the wiser if managers diverted any new money for their own private benefit. Finally, I assume that the greater uncertainty and risk surrounding the new manufacturing industries would push up hazard rates for these types of IPOs.

The hazard rates and their associated p-values from estimating the Cox proportional hazards model on the IPO sample between 1919 and 1929 are summarized

in **Table 7.**⁵⁵ I employ five kinds of explanatory variable: firm risk measures; disclosure and certification variables; ownership and control variables; and industry dummy variables. Beginning with firm risk (regression 1), the estimated hazard rates of firm size (MKTCAP) and age have the predicted effect on IPO failure and are both economically and statistically significantly. Hazard rates of less than one indicate that the instantaneous rate of IPO failure varies inversely with the explanatory variable, and those above one a direct relationship. For example, the estimated hazard rate, 0.943, associated with MKTCAP means that an IPO with an additional £100,000 of capitalisation is 5.7% less likely to fail over a very short period of time.⁵⁶ Similarly, a firm one year older is 2.8% less likely to fail. IPOs of firms which are £250,000 larger and 5 years older are approximately 13% less likely to fail.

The results regarding prospectus disclosure are mixed (regression 2). Recalling that the average number of years of past profits disclosed was less than three years, an extra year of profits reduced IPO failure by 23%. The inclusion of an audited net asset value or equivalent had an almost similar effect (19.4%) but the result lacked statistical significance. Contrary to expectations, disclosure of voting rights and having an IPO underwritten increased failure rates by 43% and 36% respectively.

Ownership and control variables had a significant influence on failure (regression 4). Consistent with Leland and Pyle (1977)'s claim that investors become more wary the greater the supposed riches they are being offered, every additional one percent share of cash flow rights (PROPSOLD) sold to outside investors pushed failure rates up by 1.5%, and, every additional one percent of voting rights sold above the share of cash flow rights (EXTRA VOTES SOLD) raised failure rates a further 2.3%. Furthermore, each additional one percent of proceeds raised as new money by the company increased the failure rate by 1.5%.

Finally, new manufacturing industrial IPOs even controlling for firm risk suffered higher failure rates (73%), whereas foreign IPOs were 35% less likely to fail than domestic IPOs (regression 3). Other industry classifications had no ability to explain IPO failure rates (results not reported). Inclusion of all the above explanatory variables (regression 5) yielded similar results, with only a modest loss in statistical significance.

The foregoing results suggest a simple investment rule which, admittedly with the benefit of hindsight, investors might have followed in 1928. Selecting only those IPOs with at least one year of past profits and not selling extra votes would have left investors

⁵⁵ The IPOs from 1930 to 1939 showed too little variation in survival times to make estimation on this sample worthwhile.

⁵⁶ More formally, the ratio of the hazard rate of a firm with a capitalisation of £(X+100,000) is 5.7% less than the rate of a firm with a capitalisation of only £X.

investing in 20 of the 198 IPOs floated in that year, all of which would have survived. These firms were at least 25 years old on average and raised virtually no new money, a fact equally true of the five new manufacturing IPOs, Phospherine, Beechams Pills, Decca Gramophone, Falk Stadelmann and Ford Motor. Survivors raising little or no new money is consistent with the results reported above, and may account for the distrust shown of new money IPOs in the mid-1930s when new money raised fell to only a quarter of proceeds, its lowest level of the period (**Table 5**).

As already noted, the 1919-20 and 1927-29 IPO cohorts experienced the lowest survival rates (**Figure 2**). Including dummy variables for these years in the full hazards model (regression 6) suggests that 1920 and 1928, and, to a lesser degree, 1919 were poor years even after controlling for the other influences on survival discussed above. In order to compare and contrast the influences on these two survival episodes I report results from running the same Cox proportional hazards model on these two sub-samples (regressions 7 and 8). Common influences were the lack of a profits record and membership of a new manufacturing industry lowering survival prospects. The main differences were: the decisively adverse effect of having an IPO underwritten in 1928; and the much higher failure rates arising from selling a share of voting rights in excess of cash flow rights, as well as from raising new money in 1928. The ineffectiveness of underwriting is not a surprise given the relative absence of reputable banks and brokers discussed earlier. The greater risk of failure from selling more votes is again consistent with the Leland and Pyle hypothesis, and the adverse effect on survival associated with raising new money may again point to the reluctance of investors to put up new money in the following decade.

What impact did the recessions of 1921 and 1930-33 have on survival rates? **Figure 1** graphed the movement in *The Economist* Index of Business Activity over the interwar period. The 35% decline in activity between July 1920 and June 1921 was considerably steeper than the 18% decline between October 1929 and July 1932.⁵⁷ IPO survival in 1928 should have been no worse and probably better than that of 1919-20 had the economic cycle played the decisive role. More rigorously, variables capturing the changes in business activity over first through the fifth year subsequent to each firm going public were also tested in the full regression model, but were not statistically significant in either case. Another possible exogenous influence on survival after 1929 was the increase in government spending on rearmament. Among the industries most

⁵⁷ GDP at constant prices declined only 5.8% between 1929 and 1931. This was far less than the 18.4% decline during the 1920-21 recession. Mitchell (1988), National Accounts Table 5A, p.836: Compromise Estimate of GDP at Factor Cost in constant price for the UK excluding Southern Ireland.

benefiting from the latter were aircraft and automobile manufacturing, in which 24 and 9 firms floated in the 1930s, out of a total of 397 IPOs in all. Hence, rearmament would have had some modest impact on the improvement in the overall survival rate.

FIRM SURVIVAL AFTER 1929

There was a dramatic improvement in firm survival post-1929 (**Figure 3**). This is not surprising in the case of the 39 firms floated in the early 1930s given the increased risk aversion of investors scarred by their experiences of a few years earlier. More interestingly, firm survival rates remained at a very high level (98%) when IPO activity recovered in the mid-1930s to the levels of the late 1920s, and despite firms not being larger or older. The average firm going public in 1934-38 was capitalized at £444,000 and had been in existence for almost 29 years compared to the £516,000 and 22 years of firms going public in 1927-29 (**Table 3**). Furthermore, virtually the same number and proportion of firms were floated in new manufacturing industries in the two periods (**Table 4(i)**). Better disclosure in the mid-1930s compared to 1927-29 contributed to improved IPO survival. The average firm now disclosed between three and four years of past profits compared to only two years, a direct consequence of the 1929 Companies Act,⁵⁸ and was 20% more likely to include an audited net asset value in its prospectus. Of course, the Royal Mail case illustrated the great need to legislate over the quality and content of company financials and not just over the quantity of data disclosed.

The lack of a statutory impetus to better disclosure and investor protection, combined with an absence of recognisably reputable underwriters still left IPO investors potentially vulnerable to the next IPO fad around the corner. In response, the LSE recognised the advice of the Macmillan Committee, “that you cannot prevent a fool from his folly is no reason why you cannot give a prudent man guidance”⁵⁹, and began to vet new issue applications more carefully. In 1934, therefore, its *Rules* were amended to require the disclosure of the last balance sheet, the last profit and loss account and a working capital statement. Furthermore, it chose to provide “guidance” on the wording of its Rules. Hence, the Committee announced that it would in future scrutinise applications more closely on a number of occasions in the early to mid-1930s.⁶⁰ An example of a firm

⁵⁸ The Act required the auditors’ report in a prospectus to detail the last 3 years profits of an issuing firm and of an acquisition where contemplated, the amount of issue proceeds the firm intended to raise, and their intended use (4th Schedule, Part II, para.1).

⁵⁹ Macmillan Report.

⁶⁰ In particular, applications from subsidiaries the parent of which had yet to publish a set of accounts, from companies whose IPO preliminary expenses constituted an unduly large proportion of its issued capital and

falling foul of this tougher scrutiny is *Silver and Steelcrafts*. Its application for permission to deal in the preference and ordinary shares which had been offered to investors in November 1935 was rejected the following month. The Committee was dissatisfied with the content of the accountant's report included in the prospectus, and subsequently instigated and cooperated with an inquiry by the professional accountancy body, the ICAEW.⁶¹

This more careful scrutiny of applications for permission to deal considerably tightened after WW II. Henceforth, in normal circumstances, any firm seeking a listing had to have a minimum ten year profits record, a requirement which was codified in the 1951 edition of the *Rules*.⁶² This tougher stance culminated in the Committee providing guidance in 1956 to the effect that applications from established firms would be preferred to those from start-up firms.⁶³ Consequently, the average age of firms going public and the length of profits record disclosed rose sharply after 1945 until the early 1970s (**Figure 5**). Not surprisingly, this led to IPOs experiencing little or no risk of failure.⁶⁴ Unfortunately, this better survival record was bought at the cost of denying younger firms early access to the stock market. Whilst 131 start-up firms went public in the interwar years, only one did so between 1945 and 1979. This is evidence that, contrary to Rajan and Zingales, not all financial development as proxied by improvements in regulation and disclosure is of benefit to financially dependent firms and to the growth of young firms.

Having achieved a judicious balance in the 1930s between the dual objectives of protecting investors and its own reputation, on the one hand, and growing the number of its listings, on the other, the Committee lurched too far towards protecting investors after 1945. Consequently, the IPO market was moribund by the mid to late 1970s and was only rescued by the establishment of the USM in 1980, subsequently replaced by AIM in 1995. Both these innovations shifted outwards the supply curve of equity funding provided by investors to IPOs on the LSE in a fashion similar to that in the US when NASDAQ had started up in the early 1970s⁶⁵. Consequently, a better balance was restored through the 1980s and 1990s, but the question still remained as to whether the steady relaxation of listing requirements would invite a deterioration in firm survival the next time there was a surge in IPO activity. This question was all the more relevant given

from companies whose major asset was a patent. *The Economist*, 16 August 1930, p.323-4, "The Stock Exchange Committee and the Investor". See also Michie (1999), pp.266, footnotes 82 and 83.

⁶¹ LSE, Minutes Committee for General Purposes, 6 January 1936 and 9 March 1936.

⁶² Rule 159 App.34 Sch.II Pt.A.

⁶³ Michie (1999), pp.416.

⁶⁴ For example, survival rates for 1946, 1947 and 1948 were 100%.

⁶⁵ Fama and French (2004).

that the similarity between listing requirements on the LSE in the interwar years and AIM in the late 1990s.⁶⁶ In terms of survival rates at least, the LSE achieved a considerably better result during 1999-2000 than in 1928, when four out of five of the 228 IPOs launched on AIM survived despite the frenzy created by the emergence of the internet, and one reminiscent of the late 1920s.

CONCLUSION

The IPO market whilst volatile was extremely active in the interwar years. Moreover, in contrast to other major stock markets around the world, particularly the US, IPO activity recovered very strongly in the mid-1930s. Relative to the modern period, interwar IPOs, and, by extrapolation, new issues, financed a material portion of capital investment. However, new manufacturing industries did not finance a greater proportion of their investments than did the rest of manufacturing industry, a result which is evidence of the weak institutional environment underlying the interwar IPO market.

The poor survival experience of 1919-20 and the 1928 IPOs is further evidence of the weak institutional environment. Survival time analysis based on a Cox proportional hazards model indicated that whilst past profits disclosure helped to raise a 1928 IPO's chances of survival, other forms of disclosure were ineffective and as was the underwriting of an IPO. In addition, firms selling a disproportionately large share of voting rights and those raising new money were vulnerable to failure. The latter experience may well have soured the appetite of IPO investors to fund new projects in the following decade.

The ineffectiveness of disclosure and certification left investors casting around for help, and, to its credit, the LSE responded. Any stock exchange has to balance the desire to grow by attracting new listings business with the need to protect investors and its own reputation by properly vetting applications, or as in the case of today's LSE getting the investment banks to do most of it for them. The much improved IPO survival record of the 1930s reflected the LSE more carefully scrutinising listing applications, and thereby achieving a better balance. Unfortunately, thereafter, LSE regulation became too heavy-handed to the detriment of young, entrepreneurial firms wishing to access the stock market. This episode suggests that not all regulatory improvement is beneficial for financially dependent firms. Remedied in the 1980s and 1990s, the IPO survival rate was

⁶⁶ The significant main difference was the obligation and ongoing responsibility placed on the bank or broker advising the issuing firm in the modern period.

much improved compared to that of 1928 come the next surge in IPO activity during the dotcom bubble of 1999-2000.

Appendix 1: Variable definitions

CATEGORY	VARIABLE	DEFINITION
FIRM RISK	MKTCAP	total market capitalisation at offer price or par value in the case of non-listed securities
	FIRM AGE	no. of years since establishment of firm
DISCLOSURE	PROFITS RECORD	no. of years of past profits disclosed in prospectus
	AUDIT	audited net asset value or professional property valuation disclosed in prospectus
	VOTING RIGHTS	votes attaching to each security disclosed in prospectus
	UNDERWRITTEN	IPO underwritten by a third party
INDUSTRY (SIC 1948)	NEW MANUFACTURING	chemicals; electrical engineering, motors, aircraft; synthetic fibres; precision instr.; rubber
	TRADITIONAL MFG.	coal mining; shipbuilding; heavy engineering; textiles
	OTHER MANUFACTURING	other mining, metal manufacture; food drink & tobacco; clothing; paper & printing; leather
	FINANCE & PROPERTY	insurance, banking and finance (including property)
	RETAIL & DISTRIBUTION	distributive trades
	SERVICES	professional instruments; miscellaneous services
	OTHER FOREIGN	agriculture, forestry and fishing; transport and communication; gas electricity and water locus of business outside Britain
OWNERSHIP & CONTROL	PROPSOLD	IPO proceeds as a %age of total market capitalisation
	VOTES SOLD	votes sold at IPO as a %age of total votes outstanding
	EXTRA VOTES SOLD	difference between PROPSOLD and VOTES SOLD
	NEW MONEY	new money raised as a %age of IPO proceeds
	ORD SHARES SOLD	IPO proceeds from sale of ordinary shares as a %age of total market capitalisation
	ORD SHARE MKTCAP	ordinary share capitalisation at offer price as a %age of total market capitalisation
SURVIVAL	SURVIVAL RATE	proportion of firms still listed on the LSE ten years after going public
	SURVIVAL TIME	number of months from IPO to delisting or being wound up (investors receive nothing)

Appendix 2: Comparison with Midland Bank Series

	THIS DATA SET			MIDLAND BANK SERIES			A/B
	TOTAL PROCEEDS £M (A)	SHARES PROCEEDS%	DEBENTURES PROCEEDS%	TOTAL PROCEEDS £M(B)	SHARES PROCEEDS%	DEBENTURES PROCEEDS%	
1919	28.1	92%	8%	220.0	90%	10%	13%
1920	63.5	80%	20%	307.7	85%	15%	21%
1921	6.2	59%	41%	90.1	53%	47%	7%
1922	21.1	43%	57%	98.6	51%	50%	21%
1923	25.0	30%	70%	90.5	51%	49%	28%
1924	24.8	57%	43%	100.0	62%	38%	25%
1925	42.3	46%	54%	132.3	66%	34%	32%
1926	37.9	61%	39%	140.8	65%	35%	27%
1927	47.8	69%	31%	178.9	72%	28%	27%
1928	66.3	77%	23%	251.5	74%	26%	26%
1929	29.4	77%	23%	198.6	78%	23%	15%
1930	64.9	1%	99%	77.9	56%	44%	83%
1931	19.0	7%	93%	41.3	44%	56%	46%
1932	2.2	88%	12%	38.8	56%	44%	6%
1933	60.7	16%	84%	61.7	50%	51%	98%
1934	38.3	46%	54%	100.6	65%	35%	38%
1935	45.6	41%	59%	116.1	65%	35%	39%
1936	52.1	62%	38%	128.8	70%	30%	40%
1937	43.3	56%	44%	111.5	70%	30%	39%
1938	5.7	50%	50%	74.4	55%	45%	8%
	724.1	51%	42%	2,560.1	64%	36%	28%

Appendix 3: Cox proportional hazards regressions.

The actual survival time of an IPO, t , is the realisation of a random variable, T , and is used to estimate the IPO hazard rate, $h(t)$, defined as:

$$h(t) = \lim_{\Delta t} \frac{\Pr[t < T < t + \Delta t \mid T > t]}{\Delta t}$$

It is a rate and not a probability, and can vary between zero and infinity. A common model of hazard rates is the Cox (1972) proportional hazards model of the form:

$$h(t) = h_0(t) \exp(\beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k)$$

or, in natural logarithmic form,

$$\ln[h(t)] = \ln[h_0(t)] + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_k X_k$$

where X_i represents the explanatory variables, $i=1, \dots, k$, and $h_0(t)$ is the baseline hazard rate. Explanatory variables include firm size, firm age, and historic profits record as well as dummy variables for underwriting, audited accounts, and industry, all observed at $t=0$, the time of IPO. The baseline hazard refers to the situation in which all explanatory variables take the value zero.⁶⁷ Intuitively, this makes more sense if the continuous explanatory variables are re-centred on their minimum values. The Cox regression estimates the baseline hazard rate non-parametrically and the coefficients, β_i , by the maximum likelihood method.

A critical assumption of this model is the proportionality of hazards for IPO sub-groups over time, or, in other words, that the effect of the explanatory variables on the hazard of IPO exit is the same across each sub-group at each time t . For this reason, I report regressions for the 1919-20 and 1928 IPO cohorts separately from the whole sample.

See Hamilton (2006), ch. 11, for a fuller discussion.

⁶⁷ Intuitively, this makes more sense if the continuous explanatory variables are re-centred on their minimum values.

REFERENCES

- Aldcroft, D.H. (1970). *The Interwar Economy: Britain 1919-1930*.
- Andrews, P. W. S. (1937). "Post-war public companies: A study in investment and enterprise." *Economic Journal* 187(47): 500-510.
- Arnold, A. and D. Matthews (2002). "Corporate financial disclosures in the UK, 1920–50: the effects of legislative change and managerial discretion" *Accounting and Business Research* 32: 3–16.
- Berle, A.A. and G.C. Means (1932). *The Modern Corporation and Private Property*.
- Broadberry, S.N. (1986). *The British Economy between the Wars: A Macroeconomic Survey*. Basil Blackwell..
- Buxton, N.K. and D.H. Aldcroft (1979). *British Industry between the Wars: Instability and Industrial Investment 1919-39*. Scolar Press, London.
- Capie, F. and M. Collins (1983). *The Interwar British Economy: A Statistical Abstract*. Manchester University Press.
- Chambers, D. (2006). "Gentlemanly capitalism revisited: a case study of underpricing of initial public offerings on the London Stock Exchange, 1946–1986", *Working paper, Department of Economics, Oxford University*.
- Chambers, D. and E. Dimson (2006), "IPO Underpricing over the Very Long-run" *Working Paper available at SSRN* <http://ssrn.com/abstract=889542>.
- Corbett, J. and T. Jenkinson (1997). "How is Investment Financed? A Study of Germany, Japan, the United Kingdom and the United States?" *Manchester School* pp.69-93.
- Cottrell, P. (1980). *Industrial Finance 1830-1914. The Finance and Organisation of English Manufacturing Industry*.
- Davies, P.N. and A.M. Bourn (1972). "Lord Kysant and the Royal Mail." *Business History* 14(2): 103-123.
- Dowie, J.A. (1968). "Growth in the interwar period: some more arithmetic." *Economic History Review* 21(1): 93-112.
- Edelstein, M. (1982). *Overseas Investment in the Age of High Imperialism: The United Kingdom, 1850-1914*.
- Edgerton D. and Horrocks S. (1994). "British industrial research and development before 1945." *Economic History Review* 67 2: 213-38.
- Fama, E.F. and K.R. French (2004). "New lists: fundamentals and survival rates." *Journal of Financial Economics* 73(2): 229-270.
- Feinstein, C.H. (1965). *Domestic Capital Formation in the UK 1920-38*. Cambridge Universtiy Press.
- Finnie, D. (1934). *Capital Underwriting*, Pitman & Sons.
- Foreman-Peck, J.S. (1985). "Seed-corn or chaff? New firm formation and the performance of the interwar economy." *Economic History Review* 38(3): 402-422.
- Franks, J., C. Mayer and S. Rossi (2005). "Ownership: evolution and regulation." *London Business School, Institute of Finance and Accounting, Working Paper 401*.
- Gompers, P. and J. Lerner (1999). *The Venture Capital Cycle*. The MIT Press, Cambridge, MA.
- Gompers, P. and J. Lerner (2003), "The really long-run performance of initial public offerings: the pre-Nasdaq evidence." *Journal of Finance* 58(4): 1355-1392.
- Grossman, R. (2002). "New Indices of British Equity Prices, 1870-1913." *Journal of Economic History* 62:121-146.

- Hamilton, L.C. (2006). *Statistics with Stata*. Brooks/Cole.
- Harris, R.A. (1933). "A re-analysis of the 1928 new issue boom." *Economic Journal* 43(171): 453–459.
- Hudson, J. (1989). "The Birth and Death of Firms in England and Wales during the Interwar Years." *Business History* 31(3): 102-121.
- Kennedy, W. (1987). *Industrial Structure, Capital Markets, and the Origins of British Industrial Decline*. Cambridge Univ. Press.
- Kiefer, N.M. (1988). "Econometric duration and hazard functions." *Journal of Economic Literature* 26(2): 646-679.
- King, W.T.C. (1947). *The Stock Exchange*. George Allen and Unwin, London.
- Lavington, F. (1921). *The English Capital Market*. Methuen.
- Leland, H.E. and D.H. Pyle (1977). "Informational Asymmetries, Financial Structure, and Financial Intermediation." *Journal of Finance* 32: 371–387.
- Levine, R. (1997). "Financial Development and Economic Growth: Views and Agenda." *Journal of Economic Literature* 35(2):688-720.
- Macmillan Report (1931). *Committee on Finance and Industry*. HMSO, Cmnd 3897.
- Marsh, P. (1977). *Analysis of equity rights issues on the London Stock Exchange*. PhD thesis, London Business School.
- Matthews, R. C. O., C. H. Feinstein and J.C. Odling-Smee (1982). *British Economic Growth*. Clarendon Press, Oxford.
- Michie R. (1999). *The London Stock Exchange: A History*. Oxford University Press.
- Mowery D. and Rosenberg N. (1994). *Technology and the Pursuit of Economic Growth*. Cambridge University Press.
- Rajan, R.G. and L. Zingales (1998). "Financial Dependence and Growth." *American Economic Review* 88(3): 559-586.
- Richardson, H.W. (1967). *Economic Recovery in Britain 1932-39*.
- Ross, D. (1996). "Commercial banking in a market-oriented financial system: Britain between the wars." *Economic History Review* 49(2): 314-335.
- Scott, P. (2002). "Towards the 'cult of the equity'? Insurance companies and the interwar capital market." *Economic History Review* 55: 78–104.
- Shumway, T. (2001). "Forecasting bankruptcy more accurately: a simple hazard model." *Journal of Business* 74(1): 101-124.
- Simon, C.J. (1989). "The effect of the 1933 Securities Act on investor information and the performance of new issues." *American Economic Review* 79(3): 295-318.
- Stromberg, D. (2004). "Radio's impact on public spending." *Quarterly Journal of Economics* 119(1): 189-221.
- Tew, B. and R.F. Henderson (1959). *Studies in Company Finance*. Cambridge University Press.
- Thomas, W.A. (1973). *The Provincial Stock Exchanges*. Frank Cass.
- Watson, K. (1996). "Banks and industrial finance: the experience of brewers, 1880-1913." *Economic History Review* 69 (1): 58-81.

Table1: Total IPO Volume and Gross Proceeds

	TOTAL No IPOs	EQUITY No IPOs	DEBENTURES No IPOs	TOTAL PROCEEDS £M	EQUITY PROCEEDS %	DEBENTURES PROCEEDS %	EQUITY MEAN PROCEEDS £000	DEBENTURES MEAN PROCEEDS £000
1919	89	81	8	28.1	92%	8%	320	273
1920	137	118	19	63.5	80%	20%	429	676
1921	20	10	10	6.2	59%	41%	363	256
1922	33	13	20	21.1	43%	57%	700	599
1923	51	27	24	25.0	30%	70%	281	728
1924	38	21	17	24.8	57%	43%	672	626
1925	84	67	17	42.3	46%	54%	293	1,331
1926	71	58	13	37.9	61%	39%	398	1,142
1927	114	97	17	47.8	69%	31%	342	860
1928	198	175	23	66.3	77%	23%	290	674
1929	89	76	13	29.4	77%	23%	299	517
1930	23	3	20	64.9	1%	99%	256	3,207
1931	14	5	9	19.0	7%	93%	270	1,964
1932	10	6	4	2.2	88%	12%	322	69
1933	38	25	13	60.7	16%	84%	384	3,929
1934	74	67	7	38.3	46%	54%	263	2,957
1935	102	92	10	45.6	41%	59%	201	2,703
1936	131	117	14	52.1	62%	38%	276	1,414
1937	72	66	6	43.3	56%	44%	365	3,206
1938	18	16	2	5.7	50%	50%	180	1,434
TOTAL	1,406	1,140	266	724.1	51%	49%	324	1,334

Table 2: Reasons for going public

	Unstated	New money	Merger	Vendor sale	Conversion	Other	Total
ALL IPOs	5%	49%	7%	11%	18%	10%	100%
NEW MFG	3%	66%	3%	27%	1%	0%	100%
OLD MFG	5%	42%	12%	20%	19%	3%	100%

Table 3: Equity IPO Characteristics 1919-38

Mean values equally weighted by number of equity IPOs in each period. See Appendix 1 for definitions.

	1919-20	1921-26	1927-29	1930-33	1934-38	1928
FIRM RISK:						
MKTCAP (£100,000)	720	814	516	136	444	465
AGE (YRS)	27.7	26.7	22.1	23.3	28.8	19.2
DISCLOSURE:						
PROFITS RECORD (YRS)	2.6	3.4	2.1	3.6	3.9	2.1
AUDIT (%IPOs)	62%	67%	64%	85%	85%	69%
VOTING RIGHTS (%IPOs)	46%	59%	69%	92%	94%	78%
UNDERWRITTEN (%IPOs)	68%	73%	84%	82%	92%	88%
OWNERSHIP&CONTROL						
PROPSOLD (%)	63%	61%	53%	57%	62%	69%
ORD SHARES SOLD (%TOTAL MKTCAP)	37%	30%	34%	26%	35%	61%
VOTES SOLD (%TOTAL VOTES)	50%	42%	49%	51%	48%	53%

Table 4: Equity IPO Volume by Sector

	TOTAL	FOREIGN	NEWMFG	TRADMFG	OTHERMFG	FIN&PROP	RETAIL&DISTN	SVCS	OTHER
No. IPOs									
1919-20	199	35	19	26	58	28	10	8	15
1921-26	196	76	25	23	44	3	16	4	5
1927-29	348	44	69	22	120	13	43	34	3
1930-33	39	4	5	4	15	4	6	0	1
1934-38	358	49	67	33	133	16	34	18	8
ALL	1140	208	185	108	370	64	109	64	32
%TOTAL									
1919-20	100%	18%	10%	13%	29%	14%	5%	4%	8%
1921-26	100%	39%	13%	12%	22%	2%	8%	2%	3%
1927-29	100%	13%	20%	6%	34%	4%	12%	10%	1%
1930-33	100%	10%	13%	10%	38%	10%	15%	0%	3%
1934-38	100%	14%	19%	9%	37%	4%	9%	5%	2%
ALL	100%	18%	16%	9%	32%	6%	10%	6%	3%

Table 5: Equity IPO Proceeds and New Money by Sector**(i) IPO gross proceeds (current prices, £M)**

	TOTAL	FOREIGN	NEW MFG	TRAD MFG	OTHER MFG	FIN&PROP	RETAIL&DISTN	SVCS	OTHER
1919-20	76.1	8.4	6.1	17.7	22.9	10.9	2.6	2.9	4.5
1921-26	77.1	23.0	9.5	18.6	16.3	1.7	6.2	0.6	1.1
1927-29	106.6	17.1	21.5	7.8	29.4	4.5	15.7	7.9	2.7
1930-33	19.1	0.6	1.1	0.7	7.8	1.4	2.1	0.0	0.2
1934-38	88.8	15.1	15.8	10.6	38.6	3.1	6.3	5.2	2.4
ALL	367.8	64.2	54.2	55.4	115.1	21.6	32.9	16.6	10.9

(ii) New money raised (current prices, £M)

	TOTAL	FOREIGN	NEW MFG	TRAD MFG	OTHER MFG	FIN&PROP	RETAIL&DISTN	SVCS	OTHER
1919-20	47.4	5.9	4.3	6.5	14.7	10.0	1.5	1.7	2.8
1921-26	30.2	8.9	2.9	9.0	3.5	1.6	3.0	0.3	1.0
1927-29	49.9	10.6	11.6	3.8	12.6	2.7	4.8	3.7	0.1
1930-33	3.7	0.4	0.4	0.2	1.9	0.3	0.3	0.0	0.2
1934-38	24.1	7.6	3.7	1.9	6.3	1.1	2.0	0.9	0.5
ALL	155.3	33.5	22.9	21.4	38.9	15.7	11.7	6.6	4.5

(iii) New money raised (% gross proceeds)

	TOTAL	FOREIGN	NEW MFG	TRAD MFG	OTHER MFG	FIN&PROP	RETAIL&DISTN	SVCS	OTHER
1919-20	62%	70%	70%	37%	64%	92%	57%	59%	62%
1921-26	39%	39%	31%	48%	21%	95%	49%	46%	87%
1927-29	47%	62%	54%	49%	43%	60%	31%	46%	2%
1930-33	27%	71%	41%	29%	24%	23%	16%	-	100%
1934-38	25%	56%	21%	23%	16%	33%	32%	18%	21%
ALL	42%	53%	41%	40%	34%	73%	36%	40%	42%

Table 6: New Money Raised as % Gross Domestic Fixed Capital Formation

	FIXED ASSETS*	GDFCF	%	NEW MONEY	%
	(A)	(B)	(B/A)	(C)	(C/B)
NEW MANUFACTURING	357	327	91.6%	22.5	6.9%
CHEMICALS	227	138	60.8%	4.5	3.3%
ELECTRICAL ENGINEERING	74	67	90.5%	4.6	6.9%
MOTOR VEHICLES	33	73	221.2%	5.0	6.8%
SYNTHETIC FIBRES	23	49	213.0%	7.8	15.9%
TRADITIONAL MANUFACTURING	976	274	28.1%	18.6**	6.8%
SHIPBUILDING&ENGINEERING	311	143	46.0%	7.2	5.0%
TEXTILES	665	131	19.7%	11.5	8.7%
OTHER MANUFACTURING	1256	744	59.2%	38.9	5.2%
ALL MANUFACTURING	2618	1374	52.5%	83.2	6.1%

Source: Feinstein (1965), Ch.3, pp.45, Table 3.33

* Fixed Assets in 1920

** excludes coal mining for which Fixed Asset and GDFCF figures were not available.

Table 7: Hazard ratios of IPOs 1919-29

Hazard rates are estimated from a Cox Proportional Hazards Model. P-values are shown in brackets. See text.

Regression no.	1	2	3	4	5	6	7	8
Period	1919-29	1919-29	1919-29	1919-29	1919-29	1919-29	1919-20	1928
MKTCAP (£100,000)	0.943 (.001)	0.951 (.002)	0.948 (.002)	0.942 (.001)	0.953 (.007)	0.953 (.006)	0.961 (.162)	0.881 (.007)
AGE (YRS)	0.972 (.000)	0.989 (.001)	0.982 (.000)	0.971 (.001)	0.991 (.027)	0.991 (.038)	0.993 (.178)	0.987 (.136)
PROFITS RECORD (YRS)		0.771 (.000)			0.781 (.000)	0.788 (.000)	0.722 (.000)	0.855 (.068)
AUDIT DUMMY		0.806 (.175)			0.988 (.943)	0.89 (.489)	0.941 (.868)	1.121 (.661)
VOTING DISCLOSURE DUMMY		1.433 (.014)			1.314 (.085)	1.236 (.195)	1.219 (.486)	1.215 (.491)
UW DUMMY		1.360 (.072)			1.273 (.169)	1.218 (.267)	0.786 (.401)	2.437 (.045)
PROPSOLD (%)			2.468 (.005)		1.482 (.263)	1.588 (.209)	0.906 (.871)	3.238 (.138)
EXTRA VOTES SOLD (%)			3.295 (.001)		3.814 (.002)	3.474 (.006)	2.616 (.229)	16.628 (.001)
NEW MONEY (%PROCEEDS)			2.469 (.000)		1.692 (.031)	1.695 (.037)	0.562 (.224)	2.543 (.028)
NEW MFG DUMMY				1.726 (.001)	1.771 (.001)	1.688 (.004)	3.123 (.025)	1.598 (.079)
FOREIGN DUMMY				0.652 (.021)	0.600 (.005)	0.688 (.087)	0.339 (.009)	2.212 (.038)
1919 DUMMY						1.586 (.114)		
1920 DUMMY						2.188 (.003)		
1927 DUMMY						1.107 (.743)		
1928 DUMMY						2.424 (.000)		
1929 DUMMY						1.396 (.264)		
No IPOs	669	652	669	669	652	652	179	164
No failures	213	208	213	213	208	208	63	79
Log-likelihood	-1293.7	-1232.3	-1278.9	-1283.4	-1212.4	-1201.0	-274.5	-337.8

Figure 1: IPO Volume and Equity Prices on the LSE 1919-38

Business Activity is *The Economist* Index, Jan.1920-Dec.1938 (1924 ave.=100), source: Capie and Wood (1983).

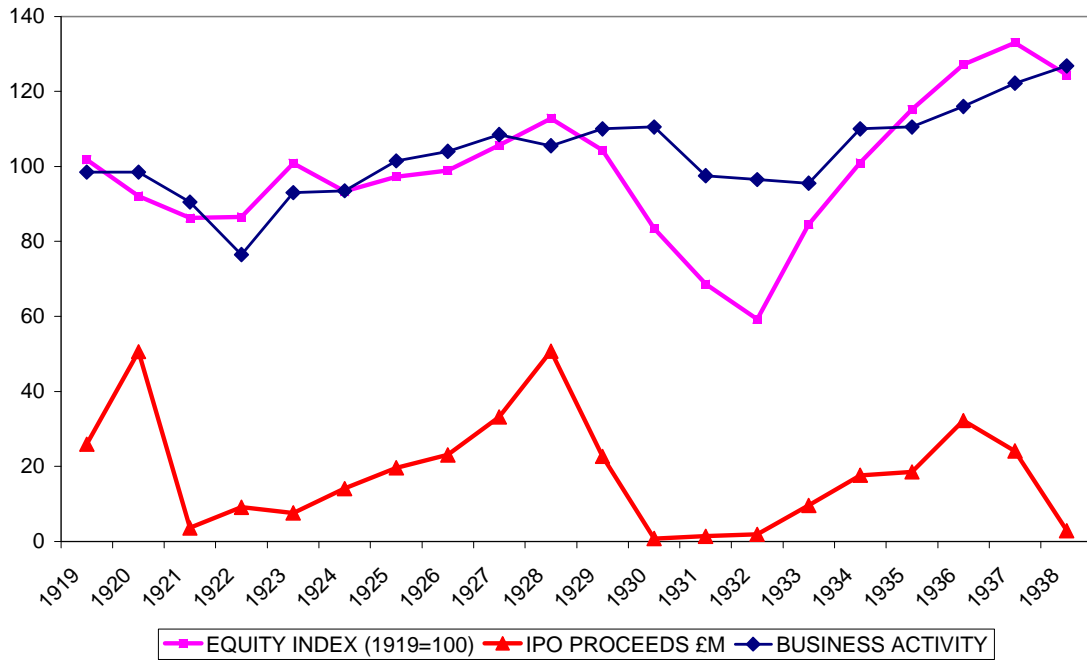


Figure 2: IPO Survival Rates

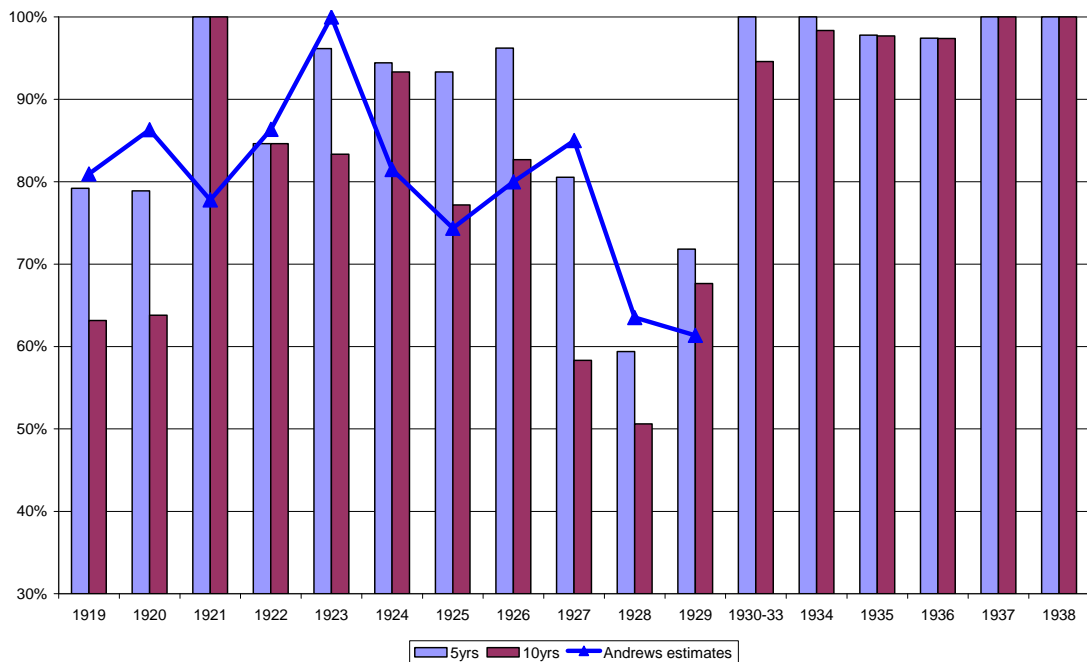


Figure 3: Firm Age and Profits Record of IPOs on LSE 1919-79

