THESIS SUBMITTED FOR THE DEGREE OF PhD

HOW WELL DID THE STOCK MARKET TREAT INDUSTRY?

EVIDENCE FROM INITIAL PUBLIC OFFERINGS ON THE LONDON STOCK EXCHANGE OVER THE TWENTIETH CENTURY

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ABSTRACT

The IPO market provides owners of firms and entrepreneurs with an exit for their equity investments and the opportunity to raise new capital. One empirical measure of how good a job the stock market has done for issuing firms over time is IPO underpricing. Yet, nothing is known about underpricing in Britain, nor, with one exception, about underpricing anywhere else before 1959. This thesis presents a new long-run IPO data set and analyses the change in underpricing over time. Contrary to my prior expectation and despite improvements in the regulation, disclosure, investor protection and underwriting of IPOs, underpricing rises in the second half of the century compared to the interwar years. This rise cannot be explained by any composition effect in the IPO sample or change in issue method.

Plausible explanations for this puzzle include the rise of issuing house monopsonistic power, provincial competition, the exacerbation of a winner's curse and the resort to underpricing as an anti-takeover strategy in the second half of the last century. The thesis looks at the first of these possibilities and concludes that whilst reputable issuing houses appeared to neither lower nor exacerbate underpricing, they collectively failed to recommend the highly effective method of the tender offer to their corporate clients. The remaining hypotheses are to be researched in post-doctoral work.

The thesis also examines how IPO underpricing and survival behaved during the two episodes of investor exuberance about technology stocks in Britain in the last century, the 1920s and 1990s. The jump in underpricing of "technology" IPOs in 1928-29 was as nothing to that witnessed in 1999-2000. On the other hand, survival of the 1999-2000 IPOs was much improved compared to the earlier period.

Whilst the underpricing findings suggest that industry was not at all badly treated by the London stock market in the interwar years and was leaving small amounts of "money on the table" compared to thereafter, the survival evidence indicates the opposite to be true. A market such as that in 1928-29 where IPOs had less than a 50% chance of surviving to their fifth birthday as a quoted company was unacceptable.

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Above all else, I owe an enormous debt to my wife for allowing me to "give up the day job" and indulge my interest in financial history.

Prior to beginning my research, I worked for twenty years in investment banking in London, Tokyo, Boston and Los Angeles. My research is motivated by a desire to consider the extent to which financiers, in their multiple guises, make a difference to the performance of their clients and, ultimately, to industrial and economic performance.

In April, 2005, I presented chapter 4 of this thesis as a paper at the Economic History Society Annual Conference and was awarded a New Researcher Prize. I am grateful to the Society for the encouragement this gave me in my endeavours.

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Abbreviations:

AHC: Accepting Houses Committee

BVP: Book value to offer price

IPO: initial public offering

ICAEW: Institute of Chartered Accountants in England and Wales

IHA: Issuing Houses Association

IHYB: Issuing Houses Year Book

LSE: London Stock Exchange

LSE Rules: Rules and Regulations of the London Stock Exchange

NASDAQ: National Association of Securities Dealers

NAV: net asset value

PSE: Provincial Stock Exchange

SEO: Secondary Equity Offering

SXYB: Stock Exchange Year Book

USM: Unlisted Securities Market

Glossary:

Book-building: the process of managing an IPO prior to actual issue which allows the investment bank considerable discretion in deciding both the issue price and the allocation of shares to investors, in particular, to informed and regular buyers of IPOs.

Book value: Post-IPO pro forma net tangible assets attributable to voting shareholders.

Hot IPO market: a period during which IPO initial returns rise above the long-term average.

IPO cycle: the excess volatility in IPO volume after controlling for the corporate sector's demand for equity finance as determined by the business cycle.

Long-run underperformance: this is the return on an IPO from the closing price on the first day over the following 3 to 5 years having corrected for the market return and for other systematic risk factors such as firm size and book-value-to-price (BVP).

Marketability: the number of shares offered at IPO as a proportion of the total number of shares outstanding post-IPO.

New money: money raised by the sale of primary shares issued by the company.

*Offer (*or *issue) price*: the fixed price at which shares are offered to investors as published in the prospectus prior to trading.

Offer for Sale: the offer of shares to the public by way of prospectus at a fixed price by an issuing house or broker who has first bought the shares from the issuing firm.

Public Issues: an issue of shares by prospectus directly by the issuing company to the public at a fixed price sponsored by an issuing house or broker. The issue is usually underwritten.

Placing: an issue whereby a firm first issues shares to an issuing house or broker and those shares are then placed with a restricted number of investors on condition of a listing being approved by the Stock Exchange and prior to the shares beginning trading in the market. Sometimes placings are on a "best efforts" basis in which case the issuing house or broker does not first buy the shares from the issuing firm and there is no commitment of capital to "underwriting" the IPO.

Primary shares: new shares issued by the firm and sold at IPO.

R&D intensity: the ratio of research and development to sales

Share-pushing: a small group of investors attempt to create a false market in a share by controlling its ownership and trading in order to push up its price and to realise a quick gain.

Spinning: the practice of an investment bank securing the agreement of a CEO to their handling of his firm's IPO and to their underpricing it in return for the bank offering shares in subsequent underpriced IPOs to the CEO.

Stagging: the making of multiple applications for and the subscription of shares in an IPO with the sole intention of securing short-term profits by selling out as soon as the shares begin trading.

Strike Price: the price at which shares in a tender offer are sold to investors who have successfully tendered for the shares offered.

Survival rates: the proportion of IPOs in a given year which are not delisted from the stock market for reasons, other than merger or acquisition, in the 5 to 10 years following the IPO.

Survival time: the number of months a firm remains listed over the 5 or 10 years following the IPO.

Tender offers: investors are invited to bid for the amount of shares they wish to buy and to indicate the price at which they will purchase above a minimum price set by the issuing house; the issuing house then decides the strike price at the close of the bidding process which clears all the shares offered.

Tombstone announcement: is an announcement usually placed in a newspaper of the details of a forthcoming IPO which includes a listing of the investment bankers underwriting the issue. See Carter and Manaster (1990), p.1054.

*Underpricing (*or *First-day returns)*: the percentage change between the offer price and the closing price on the first day of trading. On average this change is positive across all IPOs and is indicative of a firm being undervalued at the offer price relative to the valuation placed on it by the stock market.

Underwriting: is the contractual obligation entered into by an issuing house or stock broker to buy at an agreed price, usually the offer price less an underwriting commission, any shares not subscribed by investors in the IPO. I have extended the definition to include placings where the issuing house or broker is effectively committing its capital to the transaction by first purchasing shares from the issuing firm.

Under/Oversubscription: if the number of shares subscribed for by investors exceeds the number offered, the IPO is "oversubscribed"; if the number subscribed is less than the number offered, the IPO is "undersubscribed".

Vendor shares: existing shares sold by pre-IPO shareholders at IPO.

CHAPTER 1: LITERATURE REVIEW

An Initial Public Offering (IPO) constitutes an important event in the life of a firm when it obtains a listing on a stock exchange by selling its shares to outside investors.[1] The stock market plays a vital role in providing both risk capital and an exit for entrepreneurs and family owners as well as in facilitating an efficient takeover market to discipline underperforming firms. The latter function has received substantial attention in the empirical literature.[2] This thesis deals with the terms on which risk capital could be raised and an exit provided for private owners when firms chose to go public on the London Stock Exchange (LSE) over the majority of the last century. It is not in itself intended as a history of the LSE.[3]

Relative to GDP, Britain possessed the next most important stock market in the world at the beginning the 20th century.[4] It has been estimated that the paid-up value of securities listed on the LSE in 1914 was £10.7 billion, or approximately one-third of the global total.[5] Britain is also one of only 11 national stock markets out of 39 around the world which operated continually through the 20th century free from disruption caused by wars or political crises.[6] I consider how firms were treated by the British stock market by assembling a new data set of IPOs of ordinary shares on the LSE over the 20th century. I evaluate the market's informational efficiency by first and foremost using the empirical measure of IPO underpricing and secondarily by looking at IPO survival. Underpricing refers to the positive return of an IPO defined by the rise in share price at the end of the first day of trading over the offer price. The greater is this return, the more money issuing firms have "left on the table". IPO survival is measured by the proportion of newly listed firms which are still

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[1] "IPO" is originally US terminology which has become standard. "New issue" has traditionally been used in Britain. employ the term IPO most of the time.

[2] See Morris (1998) for a summary of the evidence for and against the efficiency of takeovers and Hannah (1974) for a commentary on the interwar takeover market.

[3] Among the various histories of the LSE, the most comprehensive and up to date is Michie (2001), which gives a detailed account of the development of the LSE from its origins up to the present. Neal (1990) provides a more quantitative historical account of the development of the market for securities in London from the late 17th century up until the early 19th century in comparison with the Amsterdam market.

[4] Rajan and Zingales (2003), p.15, Table 3. On this measure the British stock market was more than two and a half times as significant as the US. The most important was Cuba!

[5] Davis and Neal (1998), p.40

[6] Jorion and Goetzmann (1999), p. 962-963, Table I. The stock returns date from the 1920s and do not cover the whole of the last century.

trading on the market 5 or 10 years later, or alternatively, the length of time a firm survives within a similar period of time.

IPO underpricing in Britain averaged 29.1% between 1991 and 2002 and reached 88.7% during the internet-related IPO bubble of 1999.[7] From 1959 until 2001 it has averaged 17.4%.[8] The first question my thesis addresses is what happened to underpricing before 1959. In the early part of the last century in Britain, audited accounts were of little informational value to shareholders, investors were largely unprotected, IPOs were not underwritten by reputable banks and management and their advisers could shelter behind the principle of *caveat emptor*. This situation began to improve thanks to statutory legislation beginning with the 1948 Companies Act and to both the LSE strengthening its *Rules and Regulations* ("LSE Rules") and the London merchant banks committing themselves to IPO underwriting in the second half of the century. Therefore, the second question addressed by my thesis is whether firms seeking a listing should have benefited from improvements in disclosure, regulation, investor protection and in the underwriting process. If this is indeed the case, I would expect underpricing to decline over the second half of the last century other things being equal. Alternatively, it is possible that despite these improvements, other institutional developments in the stock market have prevented firms from fully benefiting to the extent expected.

I am also interested in the stock market's treatment of technology or innovative firms, given their importance to long-run industrial performance. Innovation is defined by either research and development (R&D) or patent-intensity. Given their short track record, lack of near-term cash flows and of tangible asset collateral, R&D-intensive firms find it difficult to raise external debt finance and as a consequence are dependent upon raising external equity once their own financial resources are exhausted.[9] Given that early twentieth century Britain had already committed itself to a stock market-based financial system, a well-functioning IPO market was vital to the success of R&D-intensive firms. However, IPOs of R&D-intensive firms are particularly vulnerable to asymmetric information problems between a firm's managers and outside shareholders. Hence, a third question I examine is how well the IPO market

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[7] Ljungqvist (2003), Table 1, p.38
[8] Ritter (2003), Table 1, p.423-4
[9] Shleifer and Vishny (1997), p.765, refers to firms with "intangible assets"; Goodacre and Tonks (1995)

handled these types of firms during the technology bubbles of the 1920s and 1990s, both in terms of underpricing and survival.

Even less is known about survival rates or long-run performance in Britain than underpricing, outside of a handful of studies in the 1920s and in the 1980s. Given the enormous data gathering effort required for IPO survival as well as underpricing analysis, I have chosen to concentrate largely on the underpricing question. However, I do examine IPO survival during the 1920s and the 1990s as well as in the first half of the last century. The ability to price IPOs as accurately as possible is important in providing the correct incentives to managers, entrepreneurs and family owners looking to sell equity in their firms. It is also important that outside investors are presented with firms which at the time of IPO have reasonable prospects of surviving as a viable public company and not being delisted within a few years. A record of only 1 in 2 IPOs making it to their fifth birthday as a public company, as was the case in 1928-29, may be acceptable to an experienced venture capital investor with board representation and full access to financials but it is unacceptable to quoted equity investors.

Mayer (1988) has argued that equity issues, both IPOs and SEOs[10], are not that important a component of the financing needs of industry. His international study of corporate finance between 1970 and 1987 concluded that the stock market was distinctly unimportant in the financing of industrial investment between 1970 and 1987.[11] In aggregate, industry was able to finance itself fully through retentions. Such a view fails to acknowledge that equity finance is important for firms operating in R&D-intensive and fast-moving industries.[12] In addition, the stock market is more than just a capital raising vehicle. It has importance as a market for corporate control. A consequence of achieving the status of a public company is that the takeover mechanism acts as a discipline on poorly performing managers, albeit an imperfect one. A listing also enables owners and entrepreneurs to realise and diversify the wealth locked up in their business. Franks, Mayer and Rossi (2004) have documented the decline of the family business and the spread of ownership and

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[10] I use "Seasoned Equity Offering" (SEO) when referring to follow-on equity issues by a listed firm. In Britain such issues were called "further issues" and then became known as "rights issues" after 1945 when pre-emption rights were established.

[11] Mayer (1988), Figure 2, "Net financing of private physical investment by enterprises in France, Germany, Japan, the UK and the USA".

[12] Carlin and Mayer (2003)

control in Britain over the last century. If the costs of going public, including underpricing, are unattractive, fewer firms will take that important first step.

This study addresses two important gaps in the literature. Firstly, this thesis contributes a long-run study of stock market efficiency as benchmarked by IPO underpricing in the second major stock market of the last century after the US. Previous long-run empirical studies of the IPO market are US-centric. With a single exception, empirical studies of underpricing only go back to 1959.

Secondly, this thesis is intended to contribute to the capital market failure debate in British economic history of the last century. Ever since the publication of the Macmillan Report in 1931 banks have received varying amounts of criticism over their inability to provide sufficient risk capital to industry. Kennedy (1987) and Bowden and Higgins (2004) claimed that by the early twentieth century Britain was already a stock market-oriented system but the institutions underlying this system were as yet insufficiently developed. According to the latter authors, detailed research on the "links between stock markets and individual companies are a sadly neglected research area".[13] The data set itself and the accompanying analysis of the performance of the IPO market are contributions to this need. My analysis of the IPO market enables me to take a fresh look at certain aspects of capital market failure, specifically, whether there was a lack of support from the City's most reputable issuing houses, and whether there was a specific problem with the financing of innovative firms.

In the rest of this introductory chapter, I first review the empirical finance literature on IPOs and then the historiography of British capital market failure. Before doing so, a word of explanation about the choice of end and start dates is required. The start date of 1915 is determined by the lack of published share price information on IPOs before this date. The end date of 1986 is chosen to reflect the impact of "Big Bang" on the IPO market and applies to the majority of the analysis which follows.[14] Big Bang which occurred on October 27th represented a major deregulation of the LSE and comprised four main elements, the ending of fixed brokerage commissions, the opening up of LSE membership to foreign firms, the removal of "dual capacity" or the distinction

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[13] Bowden and Higgins (2004), p.401. This quotation refers to the authors' desire that more research be undertaken on the role of institutional investors in the governance of quoted companies. IPOs are but the first step down this road for a firm going public.

[14] The exception is chapter 6, which analyses underpricing and survival between 1995 and 2000.

between stock broking and stock jobbing, and the introduction of computerised share trading.[15] Deregulation on this scale injected a long overdue dose of competition into securities business in the Square Mile including the handling of IPOs.

1.1 IPO stylised facts

(i) Empirical Studies

The empirical finance literature has concentrated on three stylised facts or alleged anomalies relating to IPOs, namely, underpricing, long-run underperformance and the IPO cycle.[16] Whilst underpricing points to firms "leaving money on the table" at the time of listing, long-run underperformance refers to IPOs on average having a share price performance significantly worse than that of a peer group over the 3 to 5 years following the IPO. The IPO cycle is defined as the fluctuation in IPO volume in excess of that explained by the business cycle. I do not deal with the IPO cycle further in my thesis. The empirical work on both underpricing and long-run underperformance and survival is very US-centric.

Underpricing is usually defined in modern empirical studies as the percentage change in price between the offer price as published in the prospectus and the first day's closing price. I use underpricing and (positive) first-day returns interchangeably. The return period can be longer in less liquid markets where excess returns can persist beyond the first day. For underpricing periods longer than one day, adjustment is made for the market movement. The underpricing implies that the owners of the listing firm have offered equity to outside investors at below its fair value. Long-run underperformance is the total share price return of an IPO after the first-day over the subsequent 3, 4, or 5 years. It can be expressed as a raw return, as the return relative to that on the market, or as the return relative to a matched sample of firms with similar risk attributes, primarily firm size and valuation. Survival rate is defined as the proportion of IPOs which are not delisted from a

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[15] *Investors Chronicle*, 13 June 1986, p.16-17, "Glossary of Big Bang Speak".

[16] Jenkinson and Ljungqvist (2001), Ritter and Welch (2002) and Ljungqvist (2004) give excellent and concise overviews of the literature.

stock market for poor performance, as opposed to merger, within a defined period of up to 10 years. Survival time is similarly the length of time in days or months up to the event of delisting with censoring taking place at 5 or 10 years after IPO.

Empirical evidence conclusively points to the persistence of underpricing over time and across countries. The existence of underpricing has been confirmed in over 30 countries varying from low single digits to over 200% in the case of an emerging market such as China.[17] The US IPO market has exhibited a similar level of average underpricing (18.4%) between 1960 and 2001 to that of Britain over the same period.[18] In both countries, this average surged at the very end of the century to over 60% during the dotcom bubble of 1999-2000.[19] With the exception of two small German IPO studies of the pre-1914 period which both uncovered underpricing[20], there has been no study anywhere prior to 1959. "Hot" IPO markets, defined by periods of above average underpricing, have been identified by Ibbotson and Jaffe (1975), Ritter (1984) and by the recent studies of the late 1990s.[21]

Long-run underperformance is the most hotly disputed of the three stylised facts. A number of empirical studies did not find any long-run underperformance.[22] Loughran and Ritter (1995) estimated the long-run underperformance of US IPOs between 1970 and 1990 over 3 to 5 year periods post-IPO at 20 to 30% below the market return. This result has been challenged by Brav and Gompers (1997) who claim that such underperformance disappears when judged relative to a quoted peer group matched on market capitalisation and book value to offer price (BVP). Gompers and Lerner (2001) also found that US IPOs between 1935 and 1972 did not suffer any underperformance when similarly estimated.

The estimation of long-run performance is dependent upon the availability of a Fama-French factor model for the British stock market in the first half of the last century as well as considerable data collection on capital and dividend

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[17] Jenkinson and Ljungqvist (2001) Table 2.1, p.38.
[18] Ritter (2003), Table 1, p.423-24. It is not clear where his data for the 1990s come from.
[19] Ljungqvist (2003); Loughran and Ritter (2004).
[20] Schlag and Wodrich (2000); Fohlin (2000).
[21] For example, Ljungqvist and Wilhelm (2003) and Ofek and Richardson (2001).
[22] Jenkinson and Ljungqvist (2001) Table 2.2, p.55. If the Brav and Gompers (1997) and the Gompers and Lerner (2001) studies are included the figure rises to 9.

payment histories of quoted firms post-IPO.[23] Whilst survival rates do not give the full picture, they do give a sense of the downside of investing in IPOs and their estimation is less demanding in terms of data requirements. Fama and French (2004) have produced the only major long-run study of survival rates over a 10 year period for US IPOs and SEOs between 1973 and 2001. They found that IPO survival rates in contrast to SEO survival rates fell sharply through the period.

There have been relatively few empirical studies of British IPOs compared with the US. Table 1-1 provides a summary of the main studies. The vast majority of studies looked at underpricing. All of them cover relatively short time periods. Underpricing was confirmed by all the studies listed. There have been very few studies of long-run underperformance or survival in Britain. Harris (1933), following an earlier anonymous article in the *Economic Journal*,[24] examined the long-run underperformance of the 1928 IPO cohort over a period to April 1933 and estimated a fall of 47%. This estimated return excluded dividends and other capital changes, was not relative to any benchmark and only included the 1928 IPO cohort. Andrews (1937) looked at IPO survival rates between 1919 and 1932 and found that they deteriorated markedly towards the end of the 1920s. The most carefully conducted study to date is by Levis (1993) and claimed long-run underperformance between 1980 and 1988 over a 3 year holding period of between 8 and 23% depending upon the chosen UK equity benchmark.

Summarising, underpricing is a widely encountered phenomenon in stock markets around the world, including Britain. With one exception nothing is known about underpricing before 1959. Long-run underperformance is disputed in the literature on US IPOs. Relatively little has been written about IPO survival which will be a secondary focus of this thesis after underpricing. I next discuss the literature on underpricing theory.

(ii) Underpricing theories

Explanations for IPO underpricing can be grouped into those based on asymmetric information theory, on agency problems and on "institutional"

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[23] Any estimation of long-run IPO performance needs to control for these factors.
[24] *Economic Journal* No.164 vol. 41, p.577-83, "The results of the 1928 new issue boom".

explanations.[25] Asymmetric information exists when participants in the IPO market do not possess the same information. Agency problems arise when the interests of participants are not aligned and the resulting behaviour leads to second best outcomes. Asymmetric information theories of underpricing include those relating to the winner's curse, *ex ante* uncertainty, certification, signalling, and information revelation. Theories based on agency problems include the realignment of incentives hypothesis between inside and outside shareholders and the ownership and control hypothesis. Institutional explanations of underpricing are the legal liability hypothesis and the price support hypothesis.

Information gaps can exist between the issuing firm and investors, between informed and uninformed investors, and between the investment bank and the issuing firm. Informed investors are assumed to have some ability to analyse and assess the fair value of an issuing firm more accurately than uninformed investors. Investor heterogeneity describes the existence of information gaps between informed and uninformed investors. Rock (1986) analysed this particular information asymmetry in the case of IPOs. His "winner's curse" hypothesis stated that informed investors have the analytical ability to pick underpriced IPOs and earn excess profits. On the other hand, uninformed investors cannot recognise a good quality IPO and are squeezed out of these underpriced issues, whilst their applications for the poor quality or overpriced issues are met in full. Consequently, average underpricing across the universe of IPOs is necessary for uninformed investors to be able to break even and prevent them withdrawing from the IPO market.[26]

The ability to test empirically Rock's hypothesis is crucially dependent upon the availability of detailed share allocation data and the identification of informed versus uninformed investors at the time of IPO. There have been several empirical studies confirming Rock's hypothesis, among them Koh and Walter (1989), Levis (1990) and Keloharju (1993). Levis (1993) studied British IPOs between 1985 and 1988 and concluded that the winner's curse partially

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[25] Jenkinson and Ljungqvist (2001), ch. 3-5.

[26] In fact, as Ljungqvist (2004), p.11 footnote 3, points out, it is not necessary to assume that the market participation of uninformed investors must at all costs be maintained in order to obtain this result. A situation in which the uninformed are driven out by the informed is not a stable equilibrium since there will be incentives in such circumstances for investors to free ride. Similarly, a position where only the uninformed participate is equally unstable since the returns to those possessing private information will be considerable.

accounted for underpricing. Whilst data on shareholdings and shareholder identities just after an IPO are available from shareholder registers, a test of the winner's curse involves another substantial data collection exercise and, as such, is beyond the scope of this thesis.

Both Ritter (1984) and Beatty and Ritter (1986) extended Rock's original hypothesis to test whether there was a positive relationship between IPOs characterised by higher risk, defined as *ex ante* uncertainty, and greater underpricing. This theory focuses on the information gaps between both types of investor and the issuing firm. The greater the *ex ante* uncertainty of a firm, or, in other words, the riskier it is, the more difficulty outside investors have in judging whether or not it is a "lemon". Even informed investors have greater difficulty in assessing the intrinsic value of an IPO the more risky it is. Rather like an option, the more risky or volatile is an underlying asset, the more valuable is the option. In this case, the opportunity or option to apply for IPO shares becomes more valuable, the riskier is the firm seeking the listing and the more worthwhile therefore it is for informed investors to do research.[27] These investors then require higher underpricing as compensation for the extra research effort expended and, accordingly, uninformed investors require higher average underpricing in order to cope with the larger winner's curse which results.

An important source of *ex ante* uncertainty is firm risk that can be proxied by firm age, firm size, and firm valuation. Empirical tests by Ritter (1984) and Beatty and Ritter (1986) have lent support to this hypothesis. R&D-intensity can be seen as another dimension of firm risk. A further source of *ex ante* uncertainty is industry risk. IPOs in natural resource and technology industries that possess uncertain cash flows and few tangible assets are inherently more risky than IPOs in mature industries with plenty of asset-backing and stable cash flows. The latter type of firm should exhibit lower underpricing on average other things being equal. Technology IPOs in the US have exhibited higher underpricing since 1980 than the rest of the US IPO market, particularly in 1999-2000.[28]

One solution to the problem of *ex ante* uncertainty is certification. An issuing firm can minimise underpricing by hiring the services of an investment

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[27] Ljungqvist (2003), p.15.
[28] Loughran and Ritter (2004).

bank as underwriter in order to "certify" their quality to potential investors. The better the reputation of the investment bank the greater the desired effect on underpricing. Empirical evidence in this area is again US-centric. An important study by Carter and Manaster (1990) concluded that high quality issuing firms choose "prestige" underwriters and that underpricing is more evident in IPOs underwritten by "fringe" banks. There have been a few British studies in this area but none of this type. Merrett, Howe and Newbould (1967) found that there was a considerable variation in both the mean and dispersion of underpricing across advisers on IPOs between 1959 and 1963.[29] The authors did not test the significance of these differences across some measure of adviser reputation.

Certification can also be achieved by employing reputable accountants.[30] At least as important as accountant reputation are the listing requirements of a stock exchange which help investors to judge the quality of an issuing firm by imposing minimum levels of financial and business disclosure. In a study by Affleck-Graves, Hegde, Miller, and Reilly (1993), underpricing was found to be significantly lower on those US exchanges imposing stricter disclosure requirements on newly listed firms. Simon (1989) also reported a favourable impact of tighter disclosure laws on long-run performance of US IPOs on regional US stock exchanges after the 1933 Securities Act. The impact on underpricing was not examined. In the UK, Buckland and Davis (1989) found that prospectus disclosure had a significant effect on the underpricing of Unlisted Securities Market (USM) IPOs in the early 1980s.[31]

Another solution to the problem of information gaps between firms and investors is for a firm going public to signal its quality to outside investors. Signalling theories of IPO underpricing are based on the same underlying assumption that a firm knows its fair value better than outside investors.[32] The central claim is that high quality issuing firms have a better idea than the market of their intrinsic value and are happy to signal that quality to the investment community by underpricing their IPOs because they have plenty of subsequent opportunity when the investment community becomes better informed about

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[29] Merrett, Howe and Newbould (1967), ch.9.
[30] Titman and Trueman (1986).
[31] The authors consider two variables, "precise profits history" and "definite forecast" in Table 6, p.217.
[32] Allen and Faulhaber (1989), Grinblatt and Hwang (1989) and Welch (1989) have each put forward a signalling model for IPOs.

their true value to make further issues (SEOs) at valuations closer to fair value. Low quality firms cannot afford to follow this strategy. In general, the empirical evidence has not been favourable for the predictions of signalling theory.[33] The proportion of IPO firms that returned to the equity market for follow-on financing within a few years was not that large. Additionally, these firms did not experience higher underpricing than those that did not return to the market. Jenkinson (1990) found little support for signalling in Britain. Only 9% of IPOs between 1985 and 1988 in Britain returned to the market to make further issues and these firms had been underpriced at IPO by only 8% compared to 12% for the whole sample.

Last among our list of explanations of IPO underpricing based on information gaps are information revelation theories which assume a book-building method of issue. Whilst this theory is not directly relevant to the fixed offer price regime of twentieth century Britain, it does offer an informative contrast. Under a book-building process, the investment bank first indicates an offer price range and then pre-markets the IPO to investors. Based on investor feedback, the issue price and share allocations are then decided and knowledgeable investors with large applications and well-established clients receive preferential allocations. Beneviste and Spindt (1989) revised Rock's model to take account of the dynamics of this information gathering process. The ability of the underwriter to reward informed investors with higher allocations of high quality IPOs in return for revealing their private information about the prospects for a forthcoming IPO should lower underpricing.

The advent of book-building, first in the US and then globally, including the UK, has spawned a large volume of research on the subject.[34] In one of the few international empirical studies, Ljungqvist, Jenkinson and Wilhelm (2003) estimated that by 1999 80% of non-US IPOs were launched by book-building and found empirical evidence of lower underpricing in cases of book-building across 61 non-US markets in the 1990s. This result was dependent upon the role played by US investment banks whose participation fulfils two necessary pre-conditions for book-building to be beneficial to issuers. One is access to informed US investors possessing private information valuable to the issuing

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[33] Jenkinson and Ljungqvist (2001), p.82-86.
[34] ibid., Table 3.6, p.100-103.

firm and the second was a strong IPO deal flow giving the investment bank the flexibility to reward those investors who reveal their information.

A fixed offer price regime, on the other hand, gives the issuing firm's advisers no flexibility to vary either the offer price or the number of shares offered in reaction to any investor feedback. At its core lies the belief that these advisers are sufficiently skilled and experienced to ascertain what the broader investment community is willing to pay for the shares. Until Big Bang in October 1986, public issues and offers were made at fixed prices in Britain. The tender offer, which allows some of the flexibility and information production of book-building, was used at various times but never threatened the dominance of the fixed offer price method. I take up this point again in chapter 5. Whilst the fixed offer price regime is less theoretically rich than that of book-building, its dominance of the UK market over the majority of the last century does assist me in making a comparison of underpricing across such a large expanse of time with relatively few explanatory variables and with little or no endogeneity problem.[35]

Turning our attention to agency theory, problems occur between investment banks and issuing firms when the former are assumed to be more informed about the fair value of an IPO than the firm. In this situation, the issuing firm relies heavily on the investment bank in setting the offer price to get the IPO away successfully. Baron (1982) hypothesised that underwriting investment banks are incentivised to underprice IPOs in order to minimise the effort required to make sure all the shares are placed and avoid being left with stock. This incentive is larger, the more uncertain is the value of the firm and is the demand of investors for shares in the IPO. Some doubt was thrown on this explanation when Muscarella and Vetsuypens (1989) discovered a similar degree of underpricing in the self-underwritten IPOs of investment banks as in those of their clients. If investment banks are endowed with informational advantages they ought to be able to put them to use in pricing their own IPOs. However, Jenkinson and Ljungqvist (2001) have been more cautious about

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[35] The advent of bookbuilding allows the issuer a choice between incurring higher direct IPO costs of bookbuilding led by a US bank in order to minimise underpricing, and the low cost option of a fixed price offer, or, indeed, something in-between. In this situation, endogeneity arises between the level of underpricing and the choice of method. A potentially highly underpriced issuer is likely to select the bookbuilding option by a US bank. (Ljungqvist, Jenkinson and Wilhelm (2003), p.91-93) I deal with the question of endogeneity in regard to the impact of reputable underwriters on underpricing in chapter 5.

accepting this view. The Muscarella and Vetsuypens result is based on a sample of only 38 self-underwritten bank IPOs. Furthermore, the idea that the underwriting market can become concentrated at certain times, giving the leading underwriters monopsonistic power, has intuitive appeal and has received empirical support from Ritter (1984). In the latter case, the 1980 US hot market was explained by the power of a few underwriters to underprice natural resource IPOs. Similarly, some of the IPO behaviour observed in the recent US dotcom bubble would appear to be consistent with the increased power of investment banks and their ability to underprice IPOs in order to secure other streams of security business and to "spin" IPOs among industry CEOs.[36]

Agency problems also arise between the management of issuing firms and outside shareholders. The realignment of incentives hypothesis stresses the importance of the proportion of the firm being sold at IPO and particularly the proportion of new or "primary" versus existing or "vendor" shares being sold. The more vendor shares sold, the less underpricing other things being equal.[37] Ljungqvist and Wilhelm (2003) have claimed that the increase in US IPO underpricing in the latter half of the 1990s can, in part, be attributed to managers not caring about underpricing because they sold fewer of their own shares and held smaller percentage stakes in listing firms compared to earlier periods. Loughran and Ritter (2004) counter-argued that it was not so much fractional ownership that incentivised managers to care about underpricing as the market value of the shares they held and sold.

An alternative agency problem between management and outside shareholders concerns the control of the firm post-IPO. There are two competing theories of ownership and control as applied to underpricing. Each makes a different underlying assumption about managerial motivation.[38] Brennan and Franks (1997) assume that management is better off if they can secure for themselves more discretion in running the firm free from the monitoring of outside shareholders. Their claim is that the purpose of the IPO is to spread share ownership as widely as possible among outside investors in order to leave management with a large element of control over the firm for a

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[36] Loughran and Ritter (2004).
[37] Habib and Ljungqvist (2001).
[38] Jenkinson and Ljungqvist (2001), p136.

given level of shareholding. Underpricing in this case can be seen as a deliberate ploy by management to secure control. In contrast, Stoughton and Zechner (1998) assume that it might actually be in the economic interests of managers owning shares in the firm to be seen to limit their managerial discretion by encouraging the emergence of a large outside shareholder. In this case, the size of the stake is larger from the potential investor's viewpoint than they would otherwise wish and they have to be enticed with higher underpricing. The presence of a large outside shareholder will, other things being equal, raise the market valuation of the firm to the economic benefit of management. The Stoughton and Zechner view of the world is premised on the flexibility of a book-building approach. The fixed offer price system characteristic of British IPOs during my period of study is more applicable to the Brennan and Franks view.

The legal liability theory of underpricing refers to the desire of investment banks and issuing firms to avoid the risk of legal action from investors who believe that poor long-run IPO performance is due to misrepresentations by either or both of the former. Underpricing in this case is a means of "buying off" investors in advance, or, in other words, acts as an implicit form of insurance for the underwriter and issuing firm. Tinic (1988) tested this hypothesis on US IPO data straddling the 1933 Securities Act. This Act toughened the due diligence and disclosure rules governing IPOs, exposing investment banks to greater litigation risk and therefore increasing the need for the implicit insurance of higher underpricing. Tinic concluded that first-day returns rose significantly post-1933 compared to pre-1933. Drake and Vetsuypens (1993) challenged the Tinic results by producing empirical evidence that underpricing an IPO does not reduce the likelihood of the insiders being sued by disgruntled investors. In addition, the authors found that the average financial settlement was only about 17% of issue proceeds and therefore that the typical level of underpricing seemed to represent a very expensive form of insurance. It is likely that legal liability explanations do not therefore account for more than a small portion of observed underpricing. More importantly for the purposes of this study, the British legal system is far less protective of the interests of investors in IPOs.[39] The resulting risk to underwriters and issuers is far less.

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[39] Jenkinson (1990), p.446.

Price support is another institutional explanation for underpricing which is best regarded as part of a menu of services offered by an underwriter to the issuing firm.[40] If a proportion of IPOs have their share prices supported once they begin trading on the market in order to prevent them falling below the offer price, then this can create underpricing on average by truncating the left tail of the distribution of IPO returns and creating a positively skewed distribution of first-day returns. Again virtually all the empirical evidence is from the US.

Concluding this section on the empirical literature on underpricing, there are many competing and complementary hypotheses, only some of which are relevant to the British experience and amenable to testing due to data limitations within the constraints of this thesis. Further consideration of which hypotheses are most relevant to explaining underpricing behaviour in Britain over the last century is left to chapter 4 once I have examined the institutional environment of the IPO market in the next chapter.

(iii) IPO Survival

Since long-run underperformance is hotly disputed, it is not yet clear that there is any anomaly requiring explanation. Indeed, Schultz (2003) has argued that long-run underperformance is both theoretically possible and no indication of market inefficiency. The only major study of IPO survival by Fama and French (2004) concluded that there was a surge of new IPOs brought about by the decline in information and trading costs after the establishment of NASDAQ in the early 1970s. This fall in costs effectively pushed down the supply curve for IPOs and lowered their cost of equity. No such decline was observed for SEOs. Compared to pre-NASDAQ, a greater proportion of these IPOs turned out to be weak firms *ex post* and were delisted. There was no expectation of such poor survival rates *ex ante*. Pricing at the time of the IPO was rational. The Fama and French view contrasts with that of Loughran and Ritter (1995) who argued that the poor long-run performance of IPOs is due to irrational exuberance by investors pushing down the cost of equity for IPOs. I do not attempt to distinguish between these hypotheses in this thesis. In chapter 6, I examine IPO survival during two episodes of investor exuberance about

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[40] Jenkinson and Ljungqvist (2001), p.122-126.

technology in the last century. In so doing I may lean towards the Loughran and Ritter view.

1.2 Capital market failures

Considerable disagreement exists over the explanations for Britain's relative economic decline through the twentieth century and over the contribution of the capital markets to this decline. Some scholars believe that there was little that British industry could have done to resist being overtaken by the US in the productivity race.[41] British managers facing inferior natural resource endowments and a smaller, less homogeneous home market reached rational decisions in selecting a skilled labour-intensive and less capital-intensive production process. In this version of events, capital markets are exonerated since British industry in the early twentieth century did not need to adopt the scale production and distribution technologies widely applied in US industry and so did not require large amounts of risk capital. Michie (1988), Collins (1991) and Capie and Collins (1992) have argued that since industrialists showed no evidence of an unsatisfied demand for risk capital, financial institutions can be absolved from the charge of failing to supply adequate long-term risk capital prior to 1939.

Elbaum and Lazonick (1986) have been the most vocal critics of this position. They claim that "institutional rigidities" in industrial organisation, labour markets, the education system and the financial system were a substantial obstacle to industrial performance. The principal failings of financial institutions comprised the inadequate provision of long-term risk capital to industry and an inability to involve themselves more deeply in the strategic management and restructuring of their corporate clients. Much of the criticism has been aimed at the banking system. The joint stock banks had become inherently conservative institutions by the early twentieth century. Following a series of crises culminating in the 1878 Bank of Glasgow crisis, the industry chose to pursue financial stability over the expansion of long-term industrial lending under the guidance of the Bank of England.[42] Massive banking consolidation pre-1913 led to the severance of strong connections with provincial industry. The legacy

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[41] McCloskey (1970); Broadberry (1997).
[42] Collins (1991); Kennedy (1987), p120.

of the banks' pursuit of financial stability and consolidation in the late nineteenth century was a lack of involvement in the rationalisation of their mature industrial client base during the inter-war period.[43] Furthermore, the hesitation of the joint stock banks in committing a larger portion of their balance sheet to industrial lending from the late nineteenth century onwards increasingly left industry turning to the stock market for its future long-term financing needs. Britain had opted for a stock market-based financial system. If this view holds water, then there remains the need for more detailed research on the role that the stock market played in industrial finance in the first half of the twentieth century.

A related debate concerns the question as to the adequacy or otherwise of the pace of industrial structural shift out of traditional and into "new" industries in interwar Britain. Richardson (1961, 1962) and Aldcroft (1967) have argued that Britain put in a relatively good industrial performance in the interwar period thanks to the shift of resources into these new industries primarily in the 1930s. The presumption has always been that "new" was synonymous with the technologies of the Second Industrial Revolution, such as electricity and motor vehicles, and that the other end of the industrial continuum comprised the "old" mature industries of iron and steel, shipbuilding, textiles and mining. Both Dowie (1968) and Buxton (1975) challenged this "new industry" hypothesis on the grounds of the imprecision of industry definitions. I locate this debate in the literature on the financing of innovation discussed below.

The literature on the British stock market in the twentieth century has levelled the following allegations of capital market failure: domestic investor bias before 1913; "short-termism"; problems in financing innovation; and specific criticisms relating to the Macmillan gap and the high costs of new issues. I briefly review each, beginning with the last.

(i) Criticisms of the IPO Market

The stock market histories by Lavington (1921), Grant (1967), and Thomas (1978) along with the studies of the IPO market by Harris (1933), Andrews (1937), Henderson (1951) and Merrett, Howe and Newbould (1967) made specific criticisms about the operation of the IPO or new issues market as it was

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[43] Best and Humphries (1986).

called at that time, namely, IPO costs, the lack of reputable underwriting, and the inadequate finance provided to small firms.

Stock market historians generally have thought only in terms of direct costs when lamenting the expense of IPOs. Direct costs include underwriting commissions, brokerage, advisers' fees, accounting and legal expenses and other administrative expenses. Lavington drew attention to the high level of issue expenses, particularly for small firms.[44] Before the 1929 Companies Act there was no limit on the amount of underwriting commission payable. There were cases of issuing firms being charged 25% or 50% of the nominal value of the shares issued for underwriting alone.[45] By the late 1920s most IPOs were underwritten at 4% of the offer price plus a 1% over-riding commission and by 1937 the figure had fallen to 3% plus 1% over-riding.[46] Henderson estimated that total direct costs were 11.2% of gross issue size, including vendors' proceeds, for IPOs in 1937 and were 11.8% for IPOs in 1945-47.[47] The 1937 sample included placings which typically were less expensive but the 1945-47 one did not. The author did not give a break down of costs by method and, hence, I can only surmise that there was a decline in the direct costs of public issues and offers over the intervening decade.

Merrett, Howe and Newbould (1967) discovered a considerable scale effect in direct IPO costs. The authors estimated that the direct costs of IPOs between 1959 and 1963 varied indirectly with issue size between 5.9% and 9.25% for public issues and offers and between 3.5% and 6.25% for placings on issues of £300,000 and over.[48] These figures indicate a further fall in direct costs of public offers compared to the Henderson sample. Within this total, underwriting expenses in particular had fallen to 2% of the issue price by the early 1960s from the 3% level of the thirties. Thereafter, total direct costs appear not to have come down much more. Jenkinson and Trundle (1990) estimated average direct costs of 8.8% for public issues and offers between 1985 and 1989. A considerable scale effect was again evident. The range extended from 17.3% for offers below £3m to 4.7% for offers over £10m. The

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[44] Lavington (1921), p218-9.
[45] Thomas (1978), p.40.
[46] ibid., p.41.
[47] Henderson (1951), Table 13, p.19.
[48] Merrett, Howe and Newbould (1967), Table 5.8, p.114. These figures are adjusted according to the formula in footnote 1, p.102, to enable a comparison with Henderson.

average cost of placings appeared to have risen to 9.3%.[49] Furthermore, there was no fall in the 3 years after Big Bang and the costs of small IPOs actually rose.

The overall implication is that after the early 1960s there was little or no decline in direct costs and the market was already quite competitive in this regard. Average total underwriting commissions have risen fairly steadily through the 1990s from the 3% level in the early years to over 7% in 2001-02, a rise which reflects the greater incentivisation provided to banks to minimise underpricing.[50] This postulated inverse relationship between underpricing and underwriting costs did not generally exist before 1986.

Although *The Economist* had pointed out as early as 1929 the need for issuing firms to maximise their issue proceeds[51], it was only with the publication of the Merrett, Howe and Newbould study in 1967 that underpricing received serious consideration for the first time as an additional and larger cost to be met by any issuer (Table 1-2). In June 1961, *The Economist* commented on the high premia over the issue price demonstrated by recent IPOs when reviewing the decision of the LSE to allow a tender issue for a non-water company for the first time.[52] *The Times* similarly commented on a "bad case of underpricing" in 1967 when referring to the IPO by O.C. Summers which surged 68% on its first day of trading.[53] This was the first occasion that the newspaper made reference to underpricing according to a search of the *Times Digital Archive*. Similar to Merrett Howe and Newbould, the estimates provided by Jenkinson and Trundle (1990) of the relative size of underpricing and direct costs in the 1980s pointed to underpricing being larger on average. In short, since the 1960s underpricing has come to be recognised by the financial press and financial economists as the more significant problem for issuing firms.

Two further criticisms of the new issue market were made by the Macmillan Report (1931).[54] The Macmillan gap refers to the criticism in the

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[49] Jenkinson and Trundle (1990), Table F, p249 These IPOs were approximately 5 times larger than those in the Merrett, Howe and Newbould sample in constant prices.
[50] Ljungqvist (2003). Commission fees are quoted in Table 2, p.39.
[51] *The Economist*, 27 July 1929, p.175-6: "The most advantageous mode of capital issue, in any particular instance, is obviously that calculated to provide the company, or other borrower, with a maximum of new working resources against a minimum subscription by the public investor." The article lamented the tendency of new issues by way of placing to seriously undervalue a firm to the detriment of the proceeds raised.
[52] *The Economist*, 3 June 1961, p.1030 "Issues by Tender".
[53] *The Times*, 2 Nov. 1967, p.29.
[54] Report of the Committee on Finance and Industry (1931), para.386-404.

report of the stock market along with the banking system failing to provide sufficient long-term risk capital to small and medium-sized firms.[55] This criticism became a recurring theme in subsequent government enquiries into the workings of the British financial system through the twentieth century. The Radcliffe Report (1959) concluded that "the (new issues) market was now far better organised to meet the needs of British industry".[56] The Bolton Report (1971) which was specifically tasked with examining the financing of small firms concluded that the Macmillan gap had largely been closed. The Wilson Report (1980), on the other hand, concluded that there was a problem in the provision of capital for small, high-risk venture firms and that the costs of going public and maintaining a listing were discouraging small firms from undertaking an IPO.[57] In 1991, the National Westminster Bank commissioned an investigation into the financing of small firms, both equity and debt, and found that the establishment of the USM and the development of venture capital had further improved the availability of risk capital for small firms.[58] In summary, the Macmillan gap was only really addressed in the 1980s upon the establishment of junior markets to address the needs of small companies seeking a listing, and through the growth of venture capital (VC) investment which helped to nurture young, small companies through their pre-IPO stage of growth.[59] The gap has been extensively examined and, although not a primary concern of my study, the relationship between firm size of IPOs and underpricing is discussed and estimated in chapter 4.

A second criticism made by the Macmillan Committee concerned the inadequacy of underwriting arrangements. This has received little attention in the literature. The Report alleged that the merchant banks had sponsored only a very few domestic industrial IPOs in the 1920s and as such bore some responsibility for the over-exuberance of the 1928-29 stock market.[60] This criticism and the subsequent performance of reputable underwriters has not been subject to any rigorous analysis. As will be discussed in the next section, the application of reputable capital to IPO underwriting is critically important in

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[55] ibid., para.397-403.
[56] Report of the Committee on the Working of the Monetary System (1959), para.934 and 948.
[57] Report of the Committee to Review the Functioning of Financial Institutions (1980), ch.27, p.1408.
[58] Stanworth and Gray (1991), ch.6.
[59] Hughes (1994), p.223-224.
[60] Report of the Committee on Finance and Industry (1931), para.386.

reducing investor concerns about the quality of IPOs. If a Barings or a Rothschilds were to put their name to and their capital behind an industrial IPO, investors would feel less apprehensive about subscribing for shares. The problem was that most industrial issues were not underwritten by such banks in early twentieth century Britain and opportunistic company promoters filled the resulting vacuum.[61] The merchant banks moved only very slowly into underwriting industrial issues in the inter-war period and it was not until after WW2 that they committed themselves wholeheartedly to the IPO market. This commitment was symbolised by the establishment of the Issuing Houses Association (IHA) in 1945. Both the Radcliffe Report (1959) and the Bolton Report (1971) felt able to absolve the merchant banks from further criticism.[62] The Wilson Report (1980) was less forgiving, although it did offer an excuse, namely, that the low level of new issues in the 1970s prevented underwriters developing any real industrial expertise with the exception of the North Sea oil and gas sector.[63]

Notwithstanding the sanguine view of the Radcliffe Report (1959), the damage had perhaps already been done by the time this Committee had met. The virtual absence of reputable merchant banks from the IPO market pre-1939 was crucial in an era when poor disclosure and a lack of investor protection most required their presence. In contrast, the US investment banks in the early twentieth century exemplified the value of certification to their industrial clients. According to Navin and Sears (1955) these banks contributed significantly to the emergence of an active market for industrial stocks. By taking substantial minority equity stakes themselves and seeking board representation, they certified the quality of their corporate clients and secured sufficient equity finance for them to implement massive scale expansion in production and distribution. J.P. Morgan played a pre-eminent role during this period. De Long (1991) has estimated that the Morgan premium added as much as 30% to the stock market valuations of their clients.[64] Ramirez (1995) concluded that these clients also had a financial liquidity advantage. Notwithstanding the breakdown of the certification process in late 1920s when many banks were drawn into

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[61] Lavington (1921), p.212-213.
[62] Report of the Committee of Inquiry on Small Firms (1971) para.19.13.
[63] Report of the Committee to Review the Functioning of Financial Institutions (1980), para.758 and 762.
[64] Cantillo Simon (1998) challenged De Long's estimate of the Morgan premium and came up with a smaller, but nonetheless positive, figure.

making a fast underwriting buck at the expense of their reputational capital, the investment banks up to that date had made a considerable contribution to securing the necessary risk capital to finance US industrial expansion.

In the British case, one symptom of this absence of reputable underwriters in the early part of the last century was the low survival rates exhibited by IPOs in the late 1920s. Harris (1933), Andrews (1937) and Grant (1967) were all highly critical of the new issue excesses of the 1928-29 new issue boom. Low IPO survival rates were also symptomatic of lax regulation by the LSE. Michie (2001) reserves his harshest criticisms for the willingness of the LSE to grant a listing to any company that applied, particularly before 1929 and argues that the LSE only began to raise its regulatory standards thereafter.[65]

Summarising this section, we know that the direct costs of IPOs declined from the 1920s up to the modern period but at the same time know nothing about underpricing. Similarly the Macmillan gap has been extensively analysed but the role of underwriters has been largely ignored.

(ii) Domestic investor bias and information gaps

The debate over whether domestic investors neglected domestic industrial securities in favour of foreign securities has been a long running one. Utilising a data set of security returns on 566 British quoted debentures, preference shares and ordinary shares between 1870 and 1913, Edelstein (1982) has rejected the hypothesis of domestic investor bias on the basis that risk-adjusted returns for foreign assets exceeded those on domestic assets.[66] Goetzmann and Ukhov (2005) making use of the same data set concludes that domestic investors were both aware of the benefits of portfolio diversification and fully rational in allocating a significant portion of their portfolio into overseas assets.

Although this debate relates to investment activity before 1914, it has equal relevance to the interwar period because of what Kennedy had to say about the particular problems faced by the "new" industries of electrical engineering, chemicals and automobiles in raising capital on the stock market.[67] His central claim is that asymmetric information problems faced by British

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[65] Michie (2001), p.268.
[66] Edelstein (1982), ch.5.
[67] Kennedy (1987), especially ch.5.

investors, combined with their risk-averse nature and the disinterest of London merchant bankers, severely restricted the supply of equity finance to firms in these new industries to the detriment of Britain's long-term industrial structure. Thus, for example, bouts of speculation in electrical equipment IPOs in the late nineteenth century soured investor appetite for these types of risky investment and led to long periods of new issue inactivity. As a result, insufficient capital was made available when electricity-related final product demand grew rapidly between 1896 and 1904 and foreign firms filled the void in Britain. Kennedy claimed that in all three representative technology industries British firms were unable to adequately exploit the huge growth opportunity, consequent upon the technology breakthrough, because of a lack of risk capital at the crucial time. In a later paper, Kennedy and Delargy (2000) provided further evidence of a marked aversion among British investors to technology firms, such as Brunner Mond, in preference to railway stocks, despite their generally poor financial performance after the 1870s, or to mining shares, despite their highly speculative nature and susceptibility to managerial fraud. The implication of his argument is that certain domestic securities were riskier than they might otherwise have been, had, for example, British merchant bankers played a more pro-active role in representing these investments to domestic investors.

Michie (1988) has challenged Kennedy's view and claimed that new industries did not want for risk capital before 1913. Rather, regulation was the primary constraint on their growth since the government wished to protect its substantial economic interests in the incumbent technologies of gas lighting and the telegraph respectively. Both Saul (1962) and Lewchuk (1985, 1990) have concluded that outdated engineering and commercial attitudes played a more significant role in explaining the poor relative performance of the British motor industry pre-1939 than did the stock market.[68]

My data set currently starts in 1915 due to a lack of published share price data on IPOs prior to that date. I cannot therefore directly address the pre-1914 Edelstein-Kennedy debate at present. Nonetheless, Kennedy's focus on the information gaps faced by British investors in evaluating risky industrial shares has relevance to any examination of how well the stock market performed in handling IPOs in the interwar years.

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[68] Lewchuk (1985) includes an analysis of automobile IPOs.

(iii) Short-termism

The belief that institutional investors were too preoccupied with current earnings and dividends to the detriment of management's ability to invest for the long-term became a popular explanation for Britain's continued poor relative industrial performance in the post 1945 period.[69] Institutional investors, so the argument goes, turned over their portfolios too frequently and never developed long-term relationships with their investee companies. Moreover, it was alleged that the institutions were too ready and willing to sell out at the first sign of a premium over the current price in any takeover bid for one of their portfolio companies without giving full consideration to the longer-term prospects of the acquired as an independent firm.

Marsh (1990) demolished the short-termism case on three counts. Firstly, empirical financial studies have found little evidence of analysts or fund managers overemphasising short-term news at the expense of the evaluation of a company's long-term earnings, cash flows or prospects.[70] Secondly, share prices themselves have shown no tendency to overvalue the short-term at the expense of the long-term because the market is "broadly efficient" despite the existence of certain anomalies.[71] Finally, in dismissing the charges against the stock market he pointed an accusatory finger in the direction of managers wishing to divert attention from supply-side problems in the British economy.[72]

Despite Marsh's persuasive rebuttal there remains the suspicion that the rise to prominence of the institutional investor has not always delivered better outcomes for issuing firms. The resulting increase in investor heterogeneity through the second half of the last century has perhaps had important consequences for IPO underpricing over time.

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[69] Marsh (1990), p.1-3. The criticisms arose mostly from the press and from a report by the Innovation Advisory Board (1990) *Innovation: City Attitudes and Practices.* See also Stapledon (1996), p.212-213.
[70] Marsh (1990), p.13-14.
[71] ibid., p.18.
[72] ibid., p.43-49.

(iv) The financing of innovation

Marsh did concede one important instance of short-termism, namely, that under asymmetric information firms with "commercially sensitive information", such as R&D projects and new product innovations, did suffer a persistent under-valuation problem.[73] This is an acknowledgement of the original Myers and Majluf (1984) problem of high quality firms under asymmetric information foregoing raising new equity and cancelling profitable projects. Marsh's view resonates with the previously discussed arguments of Kennedy and with more recent contributions in the finance literature on the problems of financing innovation. Goodacre and Tonks (1995) provided a concise summary of the problems of financing R&D projects. Chan and his co-authors (1990, 2001) have looked at how the US stock market values R&D-intensive firms. Whilst the 1990 study brought the good news that share prices react positively to announcements of R&D increases, the 2001 study highlighted the problem of the greater return volatility of R&D-intensive firms suggesting that investors have trouble evaluating their prospects. Nicholas (2005) has argued that, far from being over-exuberant, investors may have underestimated the value of patents held by US listed firms in the late 1990s. Stapledon (1996) has noted that quoted firms cut R&D during the recession of the early 1990s, something which he attributes to the lack of long-term commitment of British shareholders to such firms.[74]

All these authors have highlighted problems faced by the stock market in adequately financing innovative firms whether firms in the new industries of the early 20th century or the R&D-intensive firms of the later 20th century. There is some disagreement about how innovation should be measured and the relative merits in this regard of patents versus R&D expenditure.[75] I make use of both variable types where available.

Summarising this section on the capital market failure literature, there remain allegations regarding the role of the stock market that have not been adequately addressed by the literature. They are the questionable performance

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[73] ibid., p.97-100.
[74] Stapledon (1996), p.225-226.
[75] See Griliches (1990) for a review of this question.

of reputable underwriters and the problems in the financing of innovation. Most importantly, when considering the costs of going public, IPO underpricing in the first half of the last century has been completely ignored.

1.3 Summary

My thesis seeks to make a contribution to both the economic history and the empirical finance literature regarding the role of the British stock market. The debate on capital market failure in Britain has largely focussed on the role of banks. Yet, given the course of financial development taken by Britain over the 19th century, the stock market has more of a case to answer and its role in explaining British industrial performance has been subjected to limited quantitative analysis to date. In contrast, the empirical finance literature has provided us with an abundance of detailed quantitative analysis on the modern stock market, much of it concentrating on the US, in an attempt to discover lacunae in the efficient market hypothesis.

I address three main gaps in our knowledge. Firstly, I employ a new data set of IPOs on the London Stock Exchange to present the first long-run study of IPO underpricing and in so doing shed light on how well the British stock market served the interests of industry over the last century. How efficiently were new entrants to the stock market priced earlier in the last century compared to the recent past? Did improvements in IPO regulation and financial disclosure have a desirable effect on underpricing and on survival? Secondly, I apply this data set to the consideration of old questions about British capital market failure, specifically, the absence of reputable underwriters of company flotations and the problems associated with the financing of innovation. How effective a role did the merchant banks play in IPO underwriting? How well did the market finance innovative firms during the technology bubbles of the 1920s and 1990s? Thirdly, this is a long-run British case study to place alongside the many studies which have been conducted on the US capital markets.

The main conclusions of this thesis are threefold. Firstly and surprisingly, underpricing was significantly lower in the interwar years than from the mid-fifties onwards having controlled for changes in the risk composition of the IPO sample, variation in equity market conditions and issue method, and despite stronger regulation of IPOs in the second half of the last century (chapter 4).

Secondly, the emergence of underwriting by reputable issuing houses appeared not to minimise underpricing at all (chapter 5). Furthermore, the collective failure of these banks to adopt the more efficient tender offer method is symptomatic of the lack of competition among underwriters ahead of Big Bang. Finally, a comparison of the technology IPOs during the two bubbles of the late 1920s and 1990s suggests that whilst underpricing was far worse, survival was much improved (chapter 6). Subject to further examination of a number of underpricing hypotheses, the implication of the initial underpricing results from this long-run study of a single stock market is that, contrary to the conclusion reached by the cross-sectional studies of La Porta, Lopez-de-Silanes, Shleifer and Vishny (1997, 1998), law possibly did not matter for finance in this instance. This result would chime with that of Franks, Mayer and Rossi (2004). On the other hand, the preliminary results from the IPO survival analysis point to both regulatory and underwriting improvements since the 1920s having probably made a difference on this particular measure.

The rest of the thesis is laid out as follows. The next chapter describes the institutional environment surrounding the IPO market. The new IPO data set is introduced in chapter 3. Both are preparatory to the univariate and multivariate analysis of IPO underpricing behaviour between 1915 and 1986 in chapter 4. The crucial role of underwriters in the IPO process and the question as to whether the tender offer should have been adopted more widely is considered in chapter 5. A comparison of the financing of innovation, underpricing and IPO survival in the late 1920s and late 1990s is the subject of chapter 6. A summary and discussion of my main findings and their implications for my future research are presented in the final chapter.

Table 1-1: Previous Empirical Studies of British IPOs

Study	No. IPOs	Period	Focus of study
Harris (1933)	277	1928-33	long-run performance of 1928 IPOs
Andrews (1937)	481	1919-33	5 year survival rates
Henderson (1951)	64,158	1937,1945-47	direct costs of IPOs
Merrett, Howe & Newbould (1967)	507	1959-63	survey of total IPO costs including underpricing
Davis & Yeomans (1975)	275	4/65 - 3/71	scale effect in listing costs including underpricing
Vaughan, Grinyer & Birley (1977)	497	1966-74	underpricing, direct costs, reasons for going public
Dimson (1979)	268	1970-78	underpricing; underwriting
Buckland, Herbert & Yeomans (1981)	297	4/65 - 3/75	underpricing
Buckland and Davies (1989,1990)	331	1/80-3/85	USM impact on access and costs of listing including underpricing; impact of prospectus disclosure on underpricing
Jackson (1986)	260	1/83-3/86	survey of total IPO costs including underpricing
Jenkinson & Trundle (1990)	227	1/85 - 12/89	survey of total IPO costs including underpricing
Levis (1990)	123	1/85 – 12/88	underpricing and test of winner's curse
Levis (1993)	712	1/80 - 12/88	long-run performance; underpricing
Ljungqvist (2003)	1108	1/91-12/02	underpricing, agency conflicts and underwriter compensation

Table 1-2: Comparison of Direct Costs and Underpricing of British IPOs 1959-63

Direct costs include underwriting, brokerage, legal and other administrative costs of making an IPO. All costs are expressed as a percentage of gross IPO proceeds and are equally-weighted means across the 149 offers and 193 placings. I have excluded the figures on the relatively few public issues and tender offers.

IPO method	Total costs %	Direct costs %	Underpricing %
Offers	32.4	15.2	17.2
Placings	40.1	15.1	25.0

Source: Merrett, Howe and Newbould (1967), p.113 Table 5-7, p.140 Table 6.2, p.144 Table 6.5, and p.181 Tables 8.1 and 8.2.

CHAPTER 2: THE INSTITUTIONAL ENVIRONMENT 1915-86

Preparatory to my analysis of IPO underpricing and survival rates in the following chapters I consider next those elements of the institutional environment surrounding the IPO market over the last century which I expect to influence the behaviour of underpricing and survival rates over the 20th century. I am concerned with issue methods employed (section 2.1), the effects of the rise of institutional investors (section 2.2), the development of the underwriting market which is of central importance to certifying the quality of an IPO (section 2.3), and lastly, the pace and nature of regulatory change as it affected IPOs (section 2.4). Consideration must also be given to competition provided by the Provincial Stock Exchanges to the London Stock Exchange (LSE) until their merger in 1973 (section 2.5). Section 2.6 summarises. I return to consider the underwriting market in detail in chapter 5.

2.1 Issue methods

Any firm issuing shares to the public has the choice of a fixed offer price issue or an auction. Auctions take the form of either a tender issue or what is today known as "book-building." In either case the offer price is fixed after applications or bids for shares have been received from interested investors. Tender offers were first employed by gas and water utilities when issuing debentures and preference stocks around the beginning of the last century. In the 1960s, industrial companies experimented with tender offers of ordinary shares for the first time but this method was only used in relatively few cases after its inception in 1961. I discuss this method in chapter 5.

Although it is difficult to be precise about the timing, the book-building method began to make inroads into UK IPOs in the UK after Big Bang in late 1986.[76] Prior to that date, the vast majority of IPOs were conducted under a fixed price method. Fixed offer price IPOs are of three main types: public

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[76] Ljungqvist (2003), p24 and footnote 25, implies that IPOs were book built by the start of his study in 1991. It is difficult to quantify this proportion given that formal offer price ranges typical of the bookbuilding approach were filed in only 30% of IPOs and indicative price ranges were very often privately given.

issues, offers for sale and placings.[77] Public Issues involve an offer of shares by prospectus by the issuing company directly to the public at a fixed price and underwritten by an issuing house or broker. Offers for Sale are very similar, the only difference being that an issuing house or broker buys the shares from the company or its selling shareholders and then offers them to the public.

A placing consists of an issue or sale of shares through an issuing house or broker to a small number of their investment clients conditional on obtaining a listing on the LSE. This method was often chosen by smaller firms seeking to minimise the costs of a listing. Until the 1970s placings lacked fairness and transparency. Shares were placed with a select group of investors at a price very often considerably below the level at which they began trading on the market. The sponsoring issuing house or broker had little or no intention of securing a fair price for the issuing firm.

A variation on the placing method is the introduction, also extremely prone to price manipulation at the expense of the outside investor. In an introduction, share ownership ahead of a listing is judged sufficiently well dispersed to allow permission to deal in a company's shares without any issue taking place. Shares would therefore simply be made available to the market at the start of dealing. Some introductions were made by firms already listed on a Provincial Stock Exchange or other foreign market and seeking a secondary listing.

The main characteristics of fixed offer price IPOs are (i) that they were frequently underwritten, (ii) that, excepting placings, share allocations were made to investors on a *pro rata* basis in the event of oversubscription of an issue, and (iii) that the offer price was fixed and no subsequent attempt was made to revise either it or, usually, the number of shares to be issued in the light of contact with investors during the marketing period. The latter represents the significant difference in comparison to the modern book-building approach.

The key events in a typical timetable of a public offer would be the fixing of the offer price by the issuing firm and its advisers, the publication of a prospectus disclosing the terms of the offer and other information on the issuing firm required by the LSE and by statutory legislation, the closing of application lists and finally the start of dealings in the company's shares on the LSE.[78]

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[77] Thomas (1978), p.38-43, and Dimson (1979), p.26-31, give summaries of the various issue methods.

[78] Dimson (1979), p.36-40 and Table 2.4, p.59.

Generally speaking, by the 1960s and 1970s IPO terms were fixed around 14 days, the prospectus published 10 days and application lists closed 7 days, respectively, before the start of dealings. Any underwriter of an IPO would be at risk over the period between price-fixing and applications closing. Public issues and offers in the interwar years also appeared to follow this timetable.[79] The timetable for a placing was usually shorter than that for an offer and the underwriting broker or issuing house would be at risk for a shorter period, perhaps as little as 1 or 2 days.

The foregoing discussion has several implications for the analysis of the following chapters. Firstly, fixed price IPOs dominated until the late 1980s. Their characteristic features were a fixed offer price and a *pro rata* share allocation both of which contribute to a higher level of underpricing, other things being equal, than do tender offers or IPOs by the book-building method. Secondly, placings (and introductions) were a feature of the IPO market over the last century and they had a tendency to higher underpricing than public offers. Lastly, the market experimented with tender issues during the 1960s but they never gained in popularity. It is not at all clear why.

2.2 Institutional investors

The involvement of financial institutions in equity investment dates from the interwar years.[80] Yet, private investors still accounted for around 80% of LSE trading volume at the end of the interwar period.[81] Institutional share ownership began its rise in the 1950s and surpassed the holdings of private individuals in 1975.[82]

The rise of institutional investors has at least three potentially beneficial effects on the IPO process, namely, the pressure for better disclosure, the certification role played by specialist venture capital investors and the emergence of an organised underwriting market. There is one alleged adverse effect, namely, a bias against small quoted firms due to share liquidity concerns.

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[79] The data discussed in the next chapter do record the length of the period between prospectus publication and the start of dealings.
[80] Scott (2002).
[81] Michie (2001), p.178.
[82] Stapledon (1996), Table 2.1, p.20. Financial institutions are defined as banks, insurance companies, pension funds, unit trusts and other institutions.

Franks, Mayer and Rossi (2004) have argued that a steady transfer of share ownership occurred in Britain over the last century from inside investors, directors and family owners, to outside investors, mainly institutional investors. As ownership transfers from insiders to outsiders, effective monitoring of firms by outside shareholders is essential to minimise agency problems. Individual investors do not have the resources to undertake monitoring adequately and even if they did there is a free-riding problem. The larger institutions are, the more resources they possess to monitor management and the easier it is to overcome the free-riding problem. US empirical studies provide support for the effective monitoring role of large financial shareholders.[83] Nickell, Nicolitsas and Dryden (1997) have presented UK evidence in favour of dominant institutional shareholders being important for the avoidance of managerial slack and for the encouragement of better firm performance in the absence of strong competitive product markets. Stapledon (1996) in a British study found that institutional investors have been effective in influencing the LSE's regulation of quoted companies. For example, in the late 1970s investment institutions successfully lobbied for any acquisition materially altering the nature of a quoted firm's business to require shareholder approval.[84]

Large institutional investors might be expected to exert greater pressure on both issuing firms and their advisers, demanding a higher standard of disclosure in the IPO process over time. The difficulty lies in assessing when this pressure began to be applied. The rise of equity ownership by financial institutions started in the interwar period and gathered momentum post 1945. However, the increasing importance of institutional investors did not reverse the decline in share ownership concentration until the 1980s, as exemplified by the mean number of shareholders required to attain 25% voting control of British firms only beginning to reverse its rise after 1980.[85] Similarly, the aggregate holdings of the largest three outside shareholders as a proportion of shares outstanding (C3o) did not rise substantially above the 1910 level until 1990.[86] The general implication is that institutional investors probably did not have a strong influence on the behaviour of quoted firms, absent any takeover or threat of takeover, until the last two decades of the last century.

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[83] McConnell and Servaes (1990), Zeckhauser and Pound (1990)
[84] Stapledon (1996), p.60. Such transactions became known as "super class 1 transactions."
[85] Franks, Mayer and Rossi (2004), Table 3, Panel A.
[86] ibid., Table 4, Panel A

Empirical evidence from the US indicates that the emergence of specialist venture capital (VC) investors has benefited the IPO market substantially.[87] The intensive monitoring role and the large equity stakes characteristic of VC investors give other institutional investors and investment banks confidence when one of their investee firms lists on the public markets. Both these characteristics are similar to those of large, active shareholders identified in the corporate governance literature and crucially distinguish the modern venture capitalist from the company promoter of a century ago. Although British venture capital appeared to get off to an early start with the establishment of the ICFC in 1945, much of its financing was in the form of debt not equity and a passive "hands-off" approach was adopted with investee companies.[88] Not until the 1980s did VC activity start to make an impact. Even then equity investments by VC investors did not surpass £1 billion until 1988.[89] Hence, for the period under study VC investment only had real relevance to the performance of the British IPO market in the last decade of the 20th century.

Other than attracting a reputable VC investor onto the shareholder register pre-IPO, the main way an issuing firm could choose to certify its quality to the market was to hire a reputable and prestigious merchant bank as its underwriter. Institutional investors maintained increasingly close contact with the merchant banks and brokers and played an important part in this process by acting as sub-underwriters as well as investors in IPOs.

One negative impact of rising institutional investor power is their desire for liquidity in share trading. Gompers and Metrick (2001) have drawn attention to the increasing importance in the US of the 1980s and 1990s of large institutional investors and how this has led to a noticeably lower demand for small capitalisation stocks. In the absence of direct empirical evidence, it is likely that the UK experience is similar. In the UK, Michie (2001) has commented on the difficulty of small firms after 1945 in obtaining a listing right up until the establishment of the USM in 1980.[90] As recently as the mid-1990s and despite the existence of the USM, the LSE is still claimed to have a bias

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[87] Barry, Muscarella, Peavy and Vetsuypen (1990); and Megginson and Weiss (1991).
[88] The reference to "hands off" style is on p.116.
[89] Beechcroft (1994), p.197.
[90] Michie (2001), p.412 and p.477.

against small capitalisation firms due to scale economies in the IPO process and illiquidity in post-IPO share trading.[91]

2.3 IPO underwriting

The important development in the underwriting market over the middle part of the last century was the application of reputable capital to the underwriting of ordinary share IPOs. Empirical evidence has shown that the commitment of reputable capital to the underwriting process is important for the performance of the IPO market. Prior to 1929 underwriting was conducted by an assortment of company promoters, syndicates, company directors themselves, stockbrokers and a new breed of industrial trust. Some brokers and trusts were highly reputable and had a sound underwriting record, for example, Cazenove and Gresham Trust.[92] However, there were considerable doubts about the capital backing of underwriters, especially when such information was not made public.[93] As the fallout from the 1928 issue boom well illustrated, there were too many underwriters without sufficient capital and lacking the desire to build a reputation for the long-term.

In 1945, the Issuing House Association (IHA) was founded to represent the interests of underwriters to the Bank of England, the LSE and the Capital Issues Committee. From this point on the underwriting process became highly organised as reputable merchant banks committed themselves to this new line of business. The key question raised by this section and to be considered in chapter 5 is whether the better organisation of IPO underwriting after 1945 led to lower underpricing.

2.4 Regulation of the IPO market

Regulation is "preventive" in requiring adequate disclosure of IPOs by way of a published prospectus and in affording minority investors protection from

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[91] Davis (1995), p.138
[92] Kynaston (1991); Kinross (1982)
[93] Thomas (1978), p.39; Finnie (1934) p.137-60; *The Economist*, 5 Jul. 1924, p.13 Finnie in particular documents a number of dubious practices which were carried on by underwriters in the1920s.

controlling investors. It is also "punitive" in allowing any investor redress under the law. Common law, company legislation and the *Rules and Regulations of the Stock Exchange* (the LSE Rules) work together to regulate the IPO market. La Porta, Lopez-de-Silanes, Shleifer and Vishny [LLSV] (1997, 1998) provided empirical support for the importance both of the law in upholding shareholder rights, in promoting well-developed equity (and debt) markets and in dispersing share ownership. I shall briefly discuss their measure of investor protection before focusing the majority of my attention on disclosure requirements for IPOs.

In Britain, common law has afforded the investor very little protection since the case of *Foss vs. Harbottle* in 1843.[94] The courts thereafter continued to define fraud committed by directors very narrowly[95] and a leading company law academic has confirmed the difficulty that shareholders have faced in obtaining justice from the courts up to the modern period[96]. LLSV (1998) have attempted to capture the essential elements of investor protection in their "anti-director rights index".[97] Table 2-1 describes the progress of investor protection in Britain. Investor protection was weak until the mid-twentieth century, and certainly no better than that afforded by other European countries. Improvements came through legislation and not through the courts, with the two major periods of improvement being in 1948 and the early 1980s. Franks, Mayer and Rossi (2004) argue for an additional measure to be added to the LLSV index. They ask whether there were rules affording minority shareholders protection in particular instances, such as allowing a minority of 25% of shareholders to block a merger in certain circumstances. This protection was introduced in Britain in 1967.

Additionally, the liability of directors for untrue statements, regardless of whether or not there was negligence, did not come about until the 1948

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[94] Franks, Mayer and Rossi (2004), p.2.
[95] Samuel (1933), p.23 Neither did the 1929 Companies Act substantially improve the investor's lot, p.29.
[96] Sealy (1984), p.53.
[97] La Porta, Lopez-de-Silanes, Shleifer and Vishny (1998). The index scores 1 for each of the following conditions which hold: (i) shareholder proxy voting is allowed; (ii) shareholders cannot be blocked from voting at a general meeting by for example requiring them to deposit their shares beforehand; (iii) cumulative voting and proportional representation of minority shareholders is allowed; (iv) minority investors can seek redress when oppressed by a majority shareholder; (v) the minimum percentage of votes required by shareholders to call an Extraordinary General Meeting is 10% or less; and (vi) shareholders enjoy pre-emptive rights over equity issues.

Companies Act[98] This, together with the evidence on anti-director rights of shareholders, adds to the strong impression of a progressive strengthening of investor protection in the second half of the last century with little or nothing happening before that.

The pace of improvement in financial disclosure follows a similar story to that in investor protection. Disclosure is required both of the financial affairs of an issuing company and of its non-financial and business affairs, such as share issue particulars, material contracts, directors' interests and service contracts, and pending litigation for example. Up until the work of the Cohen Committee (1943-45), the thrust of much enquiry and regulatory effort went on ensuring that there was full disclosure about share issue particulars. The latter included, for example, the number of shares issued, the rights attaching to them, and the number of vendor shares being issued. This was felt necessary to prevent the fraudulent share-pushing schemes practised by such company promoters as Clarence Hatry.[99]

Once an investor knows that the share issue particulars being put in front of him can be relied upon, he is then most concerned with the financial information disclosed by the issuing company. It is possible to identify two main periods of improvement in financial disclosure from the accounting history literature. These two periods occurred in the mid- to late 1940s and again in the 1970s. After a lag, the Institute of Chartered Accountants of England and Wales (ICAEW) shifted its stance in favour of more disclosure and greater comparability in company accounts following the Royal Mail case, as evidenced by its active involvement in the Cohen Committee, the Company Law Amendment Committee which met between 1943 and 1945.[100] This culminated in the passage of the1948 Companies Act. Secondly, in the early 1970s the accounting profession laid down the first Statements of Standard Accounting Practice (SSAPs).

Prior to 1948, there was little or no improvement in company accounts either due to company legislation or due to self-regulation by the accounting profession. The Companies Acts of 1900, 1907, 1908 and 1917 did little to improve disclosure. Indeed, the Wrenbury Committee, appointed in 1918 to

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[98] Franks, Mayer and Rossi (2004), Table 1, Panels C and D.
[99] Morgan and Thomas (1962), p.208 describes the chaos visited upon shareholder registers by Hatry's schemes in 1929.
[100] Edwards (1989), p.207-209.

consider company law reform, reported back that none was necessary.[101] Arnold (1997) analysed a sample of 30 large quoted companies between 1900 and 1924 and concluded that the both the quantity and quality of disclosure in company accounts actually declined over the period. Both Edwards (1989) and Arnold (1997) are dismissive of the attempts made by the Company Acts prior to 1928 to improve this situation. The 1928 Act was at least a little bolder in its intentions. For example, it required the publication of a profit and loss statement rather than simply a balance sheet. However, when Arnold and Matthews (2002) compared another sample of 50 company accounts between 1920 and 1950, they concluded that this Act made no significant impact on financial disclosure when comparing the detail of company accounts in 1935 with 1920. Company legislation had failed to address such significant problem areas as a lack of consolidated accounts, the use and abuse of secret reserves, the non-disclosure of depreciation charges allowing further manipulation of disclosed profits and the aggregation of fixed asset items in the balance sheet with the consequent loss of financial detail.

As a result, company accounts were vulnerable to flagrant manipulation. This was exemplified in the infamous case of the Royal Mail, whose chairman fabricated profits through the 1920s by drawing upon a substantial and secret tax reserve and was ultimately found guilty of fraud in 1931. Thus the 1926 profit of £478,000 as shown in the accounts was in reality a loss of £272,000 once the transfer from reserves was deducted.[102] The accounting profession was subjected to considerable judicial and public criticism following the revelation of the Royal Mail scandal.[103] Up to that point, the profession had resisted any calls for greater disclosure on the grounds that it would undermine both the competitive position of the firm in question and its market valuation. Investors seemed happy to accept this view. Both Bircher (1988) and Arnold and Matthews (2002) concur that, although the Royal Mail scandal provoked a recognition that secret reserves did not constitute best accounting practice, there was little actual implementation of best practice other than in a few high profile cases.

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[101] Samuel (1933), p.1
[102] Davies and Bourn (1972), p.118
[103] Edwards (1989), p.269

Accounting historians have concluded that the 1948 Companies Act, into which the Institute of Chartered Accountants in England and Wales (ICAEW) provided considerable input, was crucial in delivering the significant improvements in the presentation of company accounts.[104] The level of disclosure as measured by the notes to accounts and the percentage of firms disclosing the depreciation charge, tax provision and prior year comparative figures jumped from 50% to almost 100%.[105] Hidden reserves were prohibited. Consolidated accounts became mandatory and a set of accounts including a profit and loss statement had to be audited by a member of a professional accountancy body recognised by the Board of Trade. These were significant changes which mark the 1948 Act as the major improvement in financial disclosure in the first half of the twentieth century. Thereafter, the 1967, 1976 and 1980 Companies Acts as well as the SSAPs introduced by the accounting profession in the 1970s built on this solid foundation. The 1967 Act greatly expanded the information on directors' interests and market values of investments and property in the Directors Reports and Notes included in the accounts.[106] The 1981 Companies Act was an important piece of consolidating legislation, standardising formats and adopting disclosures first required by the SSAPs.[107]

Complementary to the protection afforded to shareholders by company law and accounting standards, the Committee for General Purposes of the LSE has regulated disclosure of firms seeking a listing both by publishing its listing requirements in the form of the *Rules and Regulations of the Stock Exchange* ("the LSE Rules"). The first fully printed rule book dates from 1812 and the first listing requirement from 1824.[108] In 1844, the "Quotation of Price" rule stated that the price of any security was not to be included in the (Official) List until approval of dealings was granted by the LSE.[109] The LSE also provided guidance and scrutinised listing applications beyond the letter of the written requirements. Indeed, the LSE aimed to be ahead of company law in setting its

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[104] Arnold and Matthews (2002).
[105] Arnold and Matthews (2002), Table 4.
[106] Nobes and Parker (1979), p.202.
[107] Bartlett and Jones (1997), p63.
[108] Neal (2005), p.6; and p.10-11, this requirement was made by the Foreign Stock Exchange, a competitor of the LSE which merged itself into the latter in 1828.
[109] ibid., p.13.

own listing requirements.[110] Up until 1973 the latter were laid down in the LSE Rules, principally Rule 159 and Appendix 34. Thereafter they were issued as the *Admission of Securities to Listing* (the "Yellow Book"). In 1918 the relevant sections of the LSE Rules amounted to no more than 4 pages in total. By 1979, there were over 100 pages of the Yellow Book dealing with listing requirements and procedures. The major innovations in the listing requirements of the LSE Rules are set out in Table 2-2. Unfortunately, there is no indication in the successive editions of the LSE Rules before 1973 when rule changes occurred, nor any record of how the LSE provided guidance on those rules.[111] The whole apparatus of LSE regulation of IPOs remained self-regulatory up until the enactment of the Financial Services Act in 1986, when both the LSE itself and its rule book were brought under European and English law.

In the early twentieth century the LSE was content to allow the market to deal in almost any new issue provided there was no blatant price manipulation and only those securities for which an Official Quotation was sought required a prospectus and an application to the LSE before permission to deal was granted. This was perhaps understandable, given that new listings generated new commissions, if a little short-sighted. Hence, according to Lavington (1921), on the eve of WW1 a high proportion of new issues occurred without a prospectus.[112] Although the *Rules and Regulations of the Stock Exchange* dealt with firms seeking an Official Quotation, there was new issue activity both on and off the LSE which escaped any regulation whatsoever. In 1915, the government finally required the LSE to publish a Supplementary List of the prices of those shares being traded without an Official Quotation.[113] At the end of WW1, the LSE required that all firms contemplating an IPO seek its permission before dealing was authorised and a requirement that an advertised statement in lieu of a prospectus should be placed in the press before permission to deal was granted.[114] However, disclosure requirements

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[110] Michie (2001), p.416, cites a quotation from LSE Council minutes in 1956; The Stock Exchange (1979), para.55.

[111] Furthermore, the Yellow Book was loose-leaf, the intention being that users simply replaced the old rules with the newly published ones. This has made it difficult for libraries to keep track of rule changes subsequent to 1973 also.

[112] Lavington (1921), p.202.

[113] Paish (1951), p.4; and King (1947), p.75-76.

[114] Michie (2001), p.265 and footnote 80. A written rule (Rule 159 and Appendix 34) governing "new issues", other than Official Quotations, did not appear until the 1922 Rule Book was published.

concentrated on such matters as specimen certificates of incorporation, specimen allotment letters, a letter stating the number of shares for which permission to deal was sought and a copy of the prospectus and articles of association among other matters.[115] No financial disclosure of any kind was mandated by the LSE Rules. Neither was there any requirement similar to that applicable to Official Quotations that two-thirds of an issue be placed in the hands of public investors. Despite the 1929 Companies Act having little impact on the content of company accounts, it did require the auditors' report in a prospectus to detail the last 3 years profits of an issuing firm and of an acquisition where contemplated (4th Schedule, Part II, para.1). The amount of issue proceeds the firm intended to raise and the use to which they would be put also had to be clearly stated. Unusually, company legislation was ahead of LSE regulation in this instance. The opposite was more common. In 1964, the LSE went further than the Jenkins Committee's recommendations and required new listings as well as seasoned firms to produce interim accounts, an analysis of trading results where a company has a broad spread of activities and disclosure on major interests in associated companies.[116] Again in 1966 the LSE mandated disclosure of turnover by listed firms ahead of the Companies Act of the following year.

Editions of the *Rules and Regulations of the Stock Exchange* exist for 1915, 1918, 1922, 1926, 1927, 1928, 1929, 1934, 1946, 1951, 1968 and 1969 in the Guildhall and the LSE Libraries. [117] My reading of these rule books together with comment from *The Economist* strongly suggests that there was little material change to the Rules prior to 1929. Michie's own analysis supports this conclusion.[118] The 1928 new issue boom and the subsequent market crash did cause the LSE to reflect more carefully on the importance of vetting new issue applications in order to protect investors from the worst excesses of share promotion and share-pushing. In 1934, the Rules were amended to require the disclosure of both the last balance sheet, the last profit and loss account and a working capital statement. Furthermore, the LSE looked to tighten regulation as

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[115] Morgan and Thomas (1962), p.152-3; *Rules and Regulations of the Stock Exchange 1922*, Appendix 34A.
[116] *The Economist* 29/8/1964, p.846, "Squeezing out the secrets"
[117] The minutes of the Sub-Committee on Rules and Regulations of the LSE in the Guildhall Library make reference to the preparation of a new edition in 1939. In 1973 the first "Yellow Book" was published.
[118] Michie (2001), ch.5, especially p.265-66

much by the way it provided "guidance" on the wording of its Rules as by introducing new Rules themselves. In August 1930, the Committee published a memorandum indicating that it would scrutinise certain types of applications very critically. [119] The latter referred specifically to applications from companies whose major asset was a patent, from subsidiaries the parent of which had yet to publish a set of accounts, and from companies whose IPO preliminary expenses constituted an unduly large proportion of its issued capital. A further example is provided by the guidance on placings. In late 1935, the Committee reacted to the resurgence of share-pushing by publishing a notice announcing its intention to adopt a much tougher stance on placings in the future and preferring as a matter of principle that either a prospectus issue or an offer for sale be used.[120] A final example around this same time is the increased scrutiny of individual cases by the Sub-Committee on New Issues and Official Quotations. In one case, it instigated and then cooperated with an inquiry by the ICAEW into the accountant's report on historic profits included in the IPO prospectus of Silver and Steelcrafts.[121]

Placings remained a particular target of LSE regulation. Disclosure requirements with regard to placings were formally brought up to those of public issues and offers in the 1947 LSE Rules, although actual practice had virtually eliminated many differences prior to that date.[122] In 1958, a change to the Rules requiring 25% of the outstanding shares of a listing firm be made available to outside investors ("marketability") was aimed directly at reducing the number of placings and improving the transparency of the LSE's share dealings.

Any stock exchange has the responsibility of providing ready access to the market in order to underwrite its long-term growth on the one hand and of being careful to regulate applications for new listings in order to protect investors from fraudulent and poor quality investment schemes on the other.[123] In the 1950s and 1960s the LSE took the latter responsibility increasingly seriously. In the eyes of the LSE, a crucial determinant of suitability to list was the length of a company's trading record. In 1951, auditor's reports were now required to include 10 years of historic profits where the firm had been in existence that

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[119] *The Economist*, 16 August 1930, p.323-4, "The Stock Exchange Committee and the Investor"
[120] LSE, Minutes Committee for General Purposes, 9 December 1935.
[121] LSE, Minutes Committee for General Purposes, 6 January 1936 and 9 March 1936.
[122] *The Economist*, 10 May 1947, p.729.
[123] Farrar and Hannigan (1998), p.542, quotation from ch.9 of the LSE Listing Rules.

long. Whilst not a mandatory requirement, it indicated the direction in which the LSE was moving and, in the late 1950s, the LSE was reluctant to list any company without a trading record.[124] The LSE also raised the bar for the minimum firm size of IPOs in 1964 to £250,000 and in 1971 to twice that amount[125]. As a consequence, small, young companies were increasingly being excluded from launching an early IPO. By 1970 the LSE required a minimum trading history of at least 5 years and an issuing firm would most likely not be allowed to raise funds for new investment according to Michie (2001).[126]

Michie (2001) draws attention to the LSE's growing dilemma between creating an expanding market for securities to the benefit of its member brokers and providing some level of protection for the ordinary investor from the worst speculative and fraudulent practices in the market. Protecting the ordinary investor demanded tighter regulation of applications for a listing. However, in the absence of the government conferring a monopoly in share dealing upon the LSE, the great fear was that tougher regulation would drive share and IPO business away. Such a dilemma slowed the pace at which necessary Rule changes governing disclosure were introduced. Despite acting more speedily than statutory law, the LSE still tended to react to events rather than anticipate them.

Recognising the success of NASDAQ in attracting young firms into going public in the US and how moribund the domestic IPO market had become, the establishment of the Unlisted Securities Market (USM) in 1980 marked a distinct relaxation in the LSE's tougher regulatory stance. Firms listing on the USM now only required a 3 year profits record and marketability of 10% as against 5 years and 25% on the Official List. Furthermore, the LSE took the decision to admit to the Official List firms such as Eurotunnel and biotechnology start-ups that did not have the requisite 3 years' profits history.

Summarising this section, LSE regulation and company legislation in respect of disclosure as well as investor protection were weak during the interwar years. All the significant improvements fell into the second half of the last century. LSE regulation improved after 1945 and financial disclosure and investor protection after 1948.

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[124] Michie (2001), p.416
[125] ibid., p.533
[126] ibid., p.533

2.5 London and the Provincial Stock Exchanges

In 1973 the LSE merged with the Provincial Stock Exchanges (PSE's) and brought to a close the competition for both investor and new issue business that these exchanges had provided since the early 19th century. In the mid-1960s there had been 14 exchanges in England, 4 in Scotland and 1 each in Dublin and Belfast.[127]

Thomas's study of the PSE's gives some indication of their importance and activity prior to that date. At the peak of the railway boom in the mid-19th century, Liverpool had attracted more railway listings than London and Manchester was not far behind. There were also active markets in Sheffield, Birmingham, Bristol and Leeds.[128] The period from the late nineteenth century until 1914 witnessed these same exchanges attracting IPO business. Birmingham specialised in IPOs in bicycle and automobile shares, Manchester (and Oldham) in textiles and Sheffield in iron and steel.[129] The PSE's were also very active in the 1920s. During the peak years of the new issue boom between 1926 and 1929, Manchester handled 172 issues, Birmingham 123, Liverpool 99, Bristol 86 and 9 other PSE's 160.[130] These figures include issues of preference shares and debentures as well as ordinary shares. There were by comparison 525 IPOs on the LSE, excluding debenture issues, based on my own estimates. Whilst I estimate approximately 10% of the latter also simultaneously attained a listing in the Provinces, I do not know what proportion of the Provincial listings quoted by Thomas also listed in London.

Although there is no reliable and comprehensive source of Provincial IPO activity, the late 1920s probably represented the peak in their importance relative to the LSE. Even so, in the interwar period firms seeking a listing were "too frequently compelled to go to London"[131] and Liverpool and Manchester

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[127] Murphy and Prussmann (1967), p.169.
[128] Thomas (1973), p.33
[129] ibid., p.114
[130] *Issuing House Year Book* 1934 and Thomas (1973), p.249
[131] Thomas (1973), p.256

both recognised that London "possesses the only true and the only ultimate market in stocks and shares"[132].

After WW2, Provincial IPO activity declined sharply. Ghandi (1964) was able to trace only 379 IPOs of mainly ordinary shares between 1951 and 1960, of which 109 were placings and 243 were introductions. This figure compares to 736 IPOs launched on the LSE according to my own data over the same period. Given that the average proceeds of Provincial IPOs were lower than those raised in London, these IPO volume figures overstate the relative importance of the PSE's.

How seriously did the PSE's compete with the LSE for IPO business? Issue expenses were significantly lower in the case of placings but not necessarily in the case of offers for sale.[133] Exchanges could also compete for IPO business on listing requirements. The strong impression given by Thomas (1973) is that IPOs on the PSE's before 1914 were unregulated. Towards the end of the interwar years the main PSE's moved rapidly towards adopting the listing requirements of the LSE, whilst the smaller exchanges were slower to assimilate.[134] In the absence of a detailed comparison of the listing requirements of each exchange it is difficult to be precise as to when the PSE's fell into line with the LSE. Although, formally speaking, the PSE's did not assimilate their requirements with London until 1965, when they established the Federation of Stock Exchanges in Great Britain and Ireland, there were probably few material differences by 1945 in the case of the main exchanges such as Birmingham Liverpool and Manchester. As a consequence, the English PSE's, particularly the latter three exchanges, would appear to have offered competition to London for IPO business both in terms of direct costs and more flexible listing requirements during the interwar years. There were of course also important stock exchanges in Scotland and Ireland but little or nothing is known about IPO activity on these exchanges.

Did the PSE's do a better job for issuers than the LSE? In terms of explicit issue expenses, as already pointed out, they were cheaper for small firms considering a placing. More importantly, Lavington (1921) has argued that

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[132] ibid., p.220, footnote 31, quotation taken from the Minutes of the Liverpool and Manchester Stock Exchanges on 19th and 17th May 1922, respectively.
[133] Ghandi (1964), p.254, Table X. Controlling for issue size, PSE placings cost around 10% or proceeds whereas LSE placings were twice that between 1945 and 1947.
[134] Thomas (1973), p.215. The main PSE's are taken to be Liverpool, Manchester and Birmingham.

"local knowledge on the part of the investor ensured that securities were sold at prices fairly near their investment values" (p.208). Franks, Mayer and Rossi (2004) claim that this greater level of trust as well as the smaller information gaps between issuers, local brokers and investors oiled the new issue machinery in the early 20th century despite a weak regulatory environment. The implication is that, other things being equal, the PSE's allowed firms to raise equity on better terms than did the LSE.

2.6 Summary

There are several important developments in the institutional environment for IPOs through the last century. Firstly, differences in issue methods must be taken into account in any study of IPO underpricing. The fixed offer price method dominated the market and tender issues were relatively few despite their attractions to issuing firms. Placings were likely to be more underpriced than public offers and issues. Secondly, although the process of investment institutionalisation most likely assisted the development of the IPO market through better shareholder monitoring and specialist VC investors, these benefits did not materialise until the 1980s at the earliest. The underwriting market witnessed the entry of reputable capital after 1945. The relevant question is whether this contributed to a more efficient IPO market or whether the benefits were internalised. I take this question up in chapter 5.

Regulation of both investor protection and financial disclosure was relatively weak in the first half of the last century. 1948 stands out as a major event on both counts. Whilst there was a noticeable hardening in the stance of the LSE during the 1930s, the financials disclosed were only as good as the accounting principles used to draw them up. As such, the 1948 Companies Act injected some backbone into accounting practice and introduced the important principle of a "true and fair view" as well as offering substantial additional protection to minority shareholders. Thereafter, there were important innovations such as the introduction of the first SSAPs in the early 1970s and a further strengthening of investor protection a decade later. A case might also be made for 1929 as a regulatory watershed. Prior to that date the LSE subscribed to the *caveat emptor* principle and left the buyers of IPOs to their

own devices. However, ultimately the case for 1929 is let down by the continued lack of transparency in the accounts presented to shareholders. The major occurrences of regulatory progress were crowded into the second half of the last century.

Lastly, notwithstanding London's dominance, the Provincial Stock Exchanges played an active role in the British IPO market in the first half of the last century and posed an alternative for some firms contemplating a listing. It is also possible that they enjoyed greater trust and lower information gaps between issuers and investors.

Table 2-1: Investor Protection as measured by LLSV anti-director rights index

The index, developed by LLSV (1998) and adapted by Franks, Mayer and Rossi (2004) to the British case, scores 1 for each of the following conditions which hold: (i) shareholder proxy voting is allowed; (ii) shareholders cannot be blocked from voting at a general meeting by for example requiring them to deposit their shares beforehand; (iii) cumulative voting and proportional representation of minority shareholders is allowed; (iv) minority investors can seek redress when oppressed by a majority shareholder; (v) the minimum percentage of votes required by shareholders to call an Extraordinary General Meeting is 10% or less; and (vi) shareholders enjoy pre-emptive rights over equity issues. The index ranges from 0 to 6.

Score	Period	Description of anti-director rights provision
1	1843-1947	Shares cannot be blocked (always been in place)
3	1948-1979	1948 Companies Act (s.136 and s.132 respectively) allowed proxy voting and a minimum of 10% of voting shares to call an EGM
4	1980-1984	1980 Companies Act (s.17) recognised pre-emptive rights of shareholders to new issues
5	1985-today	1985 Companies Act (s.459) recognised oppressed minorities mechanism

Source: Franks, Mayer and Rossi (2004), p37, Table 1 Panel B; LLSV (1998), p.1123

Table 2-2: LSE Rules and Guidance regarding IPOs 1915-86

Year		Source	Description	Financial disclosure
Pre-1915	Rule 151, App.36	Rule Book	Rules only covered firms seeking a quotation in the Official List (OL) including prospectus requirements	
1915	Government guidance	See text p.48	Establishment of Supplementary List to cover those shares traded but without an Official Quotation	
1918-19	Rule 159	Rule Book	New issues require grant of "permission to deal" by LSE Committee.	
1919	LSE guidance	Michie, p265	Advertisement or statement to be placed in press before permission to deal was granted if no prospectus.	
1922	Rule 159 App.34A-D	Rule Book	Obtaining permission to deal in "new issues". Less stringent than an application for Official Quotation.	
1922	Rule 163	Rule Book	Broker to give full information re issue. Previously applied to OL quotations; now extended to all applications.	
1929	Rule 159 App.34A	Rule Book	Guidance given re. "all material conditions relating to the formation of the Company and to the flotation of the issue". Material conditions include: all rights attaching to each security: amounts and dates of securities previously issued; underwriting and other commissions paid and issue expenses to be paid; details of "Vendor" transactions; directors particulars and interests; details of all material contracts; shares under option.	
	Rule 159 App.34B	Rule Book		Dividends paid on each share class for each of last 3 years. No other requirement as to financial disclosure; no a dividend forecast required.
1934	Rule 159 App.34A-B	Rule Book		Prospectus or statement to include: a copy of last audited balance sheet and profit & loss account; working capital statement. No other requirement as to financial disclosure; no dividend forecast required.
1934	LSE guidance	Michie p266		last 3 years profits
1939	LSE guidance	*The Economist*, 25 Feb 1939, p.401-402		Holding companies to issue consolidated accounts
1951	Rule 159 App.34 Sch.II Pt.A	Rule Book		Auditors' report disclosing: last 10 years' profits or less where earlier incorporation; group accounts; trading statement; use of proceeds statement; qualified accountants' report on any acquisition

Table 2-2: LSE Rules and Guidance regarding IPOs 1915-86 (continued)

Year		Source	Description	Financial disclosure
1956	LSE guidance	Michie p416	LSE favoured established firms rather than start-ups	
1958	LSE guidance	Michie p412	25% of shares outstanding to be made available to market at time of placing ("marketability")	
1963	Rule 159 App.34	Rule Book		Memo giving further guidance on content and form of accountants reports; and Memo re. prospectuses issued by property firms including independent valuation of properties and full disclosure of basis of valuation
1964	Rule 159 App.34	Michie p476;LSE Council Minutes 9 Mar 194	Min. market capitalisation of £250,000	
1966	Rule 159 App.34	Michie p476; LSE Council Minutes 10 Jan 1966	Min. issue size of £100,000	turnover for last 3 years incl. breakdown between important trading activities
1970	Rule or guidance?	Michie p476; LSE Council Minutes 19 Jan 1970	35% of shares outstanding to be made available at time of listing whether issue or placing	
1970	Rule or guidance?	Michie p533		5 year trading record required
1971	Rule or guidance?	Michie p533	Min. market capitalisation of £500,000	
1980	USM	LSE	10% marketability	5 year trading record required

Sources: *Rules and Regulations of the Stock Exchange*; LSE Minutes, Manuscripts Section, Guildhall Library; Michie (2002).

CHAPTER 3: A NEW IPO DATA SET 1915-79

The assembly of a long run data set on IPOs on the London Stock Exchange (LSE) is in itself intended as an important contribution of my thesis. Previous empirical studies of IPO underpricing in Britain (Table 1-1, chapter 1) have assembled data spanning no more than a single decade and all fall into the period after 1959. I have been unable to access data employed in other studies between 1959 and 1979 and have collected the necessary data myself. This chapter will describe the primary sources and the construction of the data set. I then use this data to illustrate how some of the main developments in the institutional environment discussed in the previous chapter, namely, changes in issue methods, in underwriting practice and in financial disclosure by issuing firms have influenced the characteristics of IPOs. This analysis is preparatory to the discussions of underpricing, underwriting and survival which follow in the next three chapters.

In this chapter, I discuss my primary and secondary data sources (3.1 and 3.2), describe the combined data set (3.3) and analyse certain features of the interwar capital market (3.4). I then examine the time series of IPO volume (3.5), the relative importance of the offer and placing methods (3.6), the importance of IPO certification (3.7) and the characteristics of the IPOs in my data set (3.8) before summarising (3.9).

3.1 Primary Data Sources

My primary data source on IPOs is the *Times Book of Prospectuses* (the Times Books) which were published annually between 1890 and 1969 and continued as the *Extel Book of New Issues* (the Extel Books) after 1970. Data for the period 1970 to 1979 were supplemented from "New Equity Issue Statistics" published by *Singer and Friedlander*. Public issues and offers required the publication of a prospectus under the 1908 Companies Act. Having said that, 596 public companies were formed without a prospectus

between 1911 and 1913 compared to 378 formed with one.[135] Beginning in November 1919 any firm seeking permission for its securities to be dealt on the LSE had to publish in a national newspaper a prospectus or, if not a prospectus, then at least a statement.[136] I have called the latter "information only" statements because these entries were conspicuous by the wording: "this statement is for information only and not an invitation to subscribe for shares". These statements in the Times Books failed to distinguish between placings and introductions. In the interwar years and particularly during the 1920s, these volumes also include corporate notices about mergers, reorganizations, capitalization issues, proposed issues requiring shareholder approval and other corporate actions. There are therefore many more entries in the Times Books than issues that took place. On occasions, the prospectus as published in the newspaper was abridged and I needed to consult the original prospectus.[137] The Times Books include preference shares, debentures and other fixed interest securities as well as issues of ordinary shares. SEOs are covered as well as IPOs. Issuers include sovereign and municipal borrowers as well as corporations, both domestic and foreign.

Information on IPOs is also found in the *Issuing House Year Books* (IHYB) which were first published in 1929 and gave brief particulars on all issues. This source did not distinguish between placings and introductions before 1939.

I am interested only in the prospectuses or statements relating to IPOs of ordinary shares carrying voting rights. In the post 1945 period the vast majority of equity issues whether IPOs or SEOs have been of this type. In the interwar years issues of preference shares and debentures were as common as those of ordinary shares (see section 3.4 below). Entries in The Times Books numbered over 6000 in total between 1915 and 1939 comprising corporate notices as well as prospectuses. Only 1441 entries were ordinary share IPO prospectus or information statements. After 1945, the Times

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[135] Lavington (1921), p.202
[136] Michie (2001), p.265
[137] These are found in the *Loan and New Company Prospectuses* in the Guildhall Library. There were only 2 IPOs with an abridged prospectus for which the full prospectus was unavailable.

Books give a clearer classification between IPOs and other types of issues such as rights issues, capitalisation and bonus issues, and reorganisations.

I collected the following data items from the prospectuses and information only statements: the number of shares offered, the security type, the date of publication of the prospectus, the offer or placing price, the number of shares outstanding, the method of issue, whether the IPO was underwritten or not, the proportion of the issue accounted for by new ("primary") versus existing ("vendor") shares where these figures were disclosed, whether the accounts were audited or not, the historic profits record and the net asset valuation of the listing firm and the identity of the underwriter. Data on number of shares offered, the offer price and the number of shares outstanding is verified against the new firm's entry in the *Stock Exchange Year Books* (SXYB), the *Issuing House Year Books* (IHYB) and published reports in *The Times* and *The Financial Times*.[138] This process provides a check as to whether the proposed issue actually went ahead and as to the number and offer price of the shares issued. It also enables me to distinguish an IPO from an SEO in those instances where the prospectus does not make this clear as was often the case in the days before rights issues became common practice in Britain. I verified the number of shares offered and the offer price of all interwar IPOs. The offer price never changed and there were only 20 IPOs out of 588 where the number of shares offered differed from that advertised in the prospectus, 18 of which involved a downward revision. From 1946 to 1969 I sampled the IPOs on a 1 in 4 basis and verified their details. None of these differed from the prospectus terms. Information on IPOs in the 1970s and 1980s was sourced from *Singer & Friedlander* and Buckland and Davies (1989) whose accuracy is assumed.

Share prices are collected from the *Stock Exchange Daily Official List* (SEDOL) published by the LSE. I have been unable to find share prices on IPOs before January 1915. Almost without exception IPOs began their new life on the Supplementary List rather than the Official List of the Stock

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[138] The Guildhall Library only maintains indexed files on firms applying for a listing before 1939. The UK Listing Authority only has records for the most recent 6 years. Electronic sources such as *Perfect Information* allow access to the *Regulatory News Service* of the LSE but only from the early 1980s.

Exchange.[139] The Official List carried prices of securities, including shares, which had been granted an Official Quotation by the LSE. The Supplementary List dates from January 1915 and was appended as a supplement to the Official List in the SEDOL until 1947 at which point the two Lists were merged. Prior to 1915 the SEDOL only carried price quotations of stocks on the Official List. There was no list of stocks dealt off the Official List. My analysis of the IPOs of ordinary shares for 1912 and 1913 indicated that approximately 10% of these appeared for the first time on the Official List after a lag of approximately 6 months following the IPO. I have yet to find any other source for pre-1915 IPO share prices. This finding is in itself indicative of the extremely lax regulation of the LSE at the beginning of the last century.

I collected share prices for the first day on which a share appeared in the SEDOL and the last day of the first month of trading. Bid-ask prices for IPOs were only published from 1931. All IPOs, with or without a bid-ask, spread did possess a string of price quotations, or "marks", although these were not time-ordered. A mark refers to the marking slip completed by a broker giving details of the transaction in the said security. Completion of a slip was not compulsory. Being unable to obtain the closing price on the first day of trading I collected all marks on the first day of trading and calculated the simple average for IPOs up to 1939. After 1939, most IPOs were quoted in bid-ask form from the first day and I took the mid-market price.[140] Where the bid-ask price was not available, I again collected all the marks and calculated the mean. Further discussion of share prices and IPO return calculations is reserved until the next chapter on underpricing.

An important feature of the pre-1939 stock market was the partly-paid share. In such a case, the investor was required to pay only a proportion of the issue price upon application and at the time of share allotment. The balance of the issue price, known as the call, was then payable at a single date or series of dates after the issue. In some cases the date of the call is not fixed at the time of issue and is at the discretion of the company. This call feature was common to IPOs up until 1939 but disappeared after 1945.

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[139] Only 3 IPOs in my data set listed directly on the Official List.
[140] In the 1930s only 3 in 10 IPOs were quoted with a bid-ask spread on the first day. After 1939 this rose to 3 in 4 IPOs.

Whilst it made sense for a company to call funds when it needed them and not before, in practice the investor was then contractually committed to paying the future call when declared due by the company. In an effort to minimise agency problems any investor would prefer that the company issue fully-paid shares to meet its estimated medium-term financing needs at the time of IPO and then return to the market again at a later date for any additional financing. Hence, the call feature has disappeared in the modern period as institutional investors have grown in influence. The existence of a call feature has implications for the calculation of IPO returns which are discussed in the next chapter.

There were a small number of IPOs conducted by way of an offer for sale by tender. Although a prospectus is published and the IPO underwritten in the same way as an offer for sale, the important difference is that investors are invited to tender for shares at or above a minimum price. The results of these tenders, namely, the price at which the shares were fixed ("strike price") and whether or not the issue was oversubscribed, were extracted from reports in *The Times* and *Financial Times.* Tender IPOs are analysed in detail in chapter 5 along with developments in the underwriting market.

IPO survival rates are calculated by reference to both the SXYB and SEDOL to ascertain whether an IPO was subsequently delisted from the market, was acquired, or was still trading on the LSE within a fixed period, 5 years, for example. Survival times, defined by the number of months an IPO continues as a listed company, are estimated in a similar way. Detailed discussion of survival rates and survival times is deferred to chapter 6.

3.2 Secondary Data Sources

I bring my analysis up to the end of 1986 to coincide with the timing of Big Bang, which marked the beginning of the end of the fixed price offer method in this country. Data on IPOs between January 1980 and March 1985 were sourced from the Buckland and Davies (1989) data set deposited with the ESRC Data Archive. This includes both Official List and Unlisted Securities Market (USM) IPOs. I have excluded introductions, transfers from

another exchange, and privatisation issues. The inclusion of the latter is likely to bias any results given their size and the different objectives of the government compared to any other issuer.[141]

I therefore supplement my earlier data with 447 IPOs up to the end of 1986. This figure comprises 276 IPOs listed on the USM and 72 on the Official List taken from Buckland and Davies (1989) covering the period up to March 1985, along with a further 99 IPOs on the Official List from January 1980 to December 1986 which I have sourced myself. I do not currently have data on the 73 USM listings between April 1985 and December 1986. I have reconciled and supplemented any missing data on the Official List IPOs in the Buckland and Davies (1989) data set with my own data. I collected data on firm age, underwriting details, and pro forma net asset valuation although Buckland and Davies have data on some balance sheet items which enable an approximation to be made. These same variables are missing for the 276 USM listings.

3.3 Data description

Table 3-1 summarises the annual time series for 5110 IPOs comprising 4518 ordinary share IPOs between 1915 and 1979 plus 592 IPOs between 1980 and 1986 including the 447 IPOs mentioned in the previous section. Included in this total are 164 "dual" share IPOs, 187 "penny" ordinary share IPOs, 418 placings which did not disclose the placing price, 646 introductions, 222 ordinary share IPOs for which share prices could not be found in SEDOL,[142] 452 IPOs listed exclusively on a Provincial Stock Exchange for which a share price could not therefore be found in SEDOL, and 351 investment trust IPOs. The 452 Provincial IPOs were advertised in the Times Books from 1946 until their merger with the LSE in 1973. This source captures none of the considerable Provincial IPO activity in the interwar years

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[141] See Jenkinson and Mayer (1994). Table 14.2 lists all privatisations between 1979 and 1991 including the 7 offers for sale and 2 tender offers between 1980 and 1986.

[142] The vast majority of these companies had an entry in the *Stock Exchange Year Book*. In some cases they were small IPOs or IPOs which had been scaled back presumably due to lack of demand. 83 of these IPOs occurred in 1919-20.

discussed in the previous chapter. Included in these figures are 326 IPOs simultaneously listed in both the Provinces and London.

I make a number of exclusions following the practice of previous studies, namely, any firm already listed on another exchange and applying for a secondary listing as well as any firm transferring its listing from another market, investment trust shares and penny shares. An investment trust is a company set up to invest in a diversified portfolio of securities without taking on any management role in the investee firms. Information gaps faced by investors can either be much larger, as they were before 1939 when their managements gave out virtually no information regarding investment policy, or much smaller than the average industrial company when full disclosure of investment policy applies. Furthermore, underpricing can be regarded as another means by which the sponsoring issuing house or broker extract fees from the end investor. I propose therefore to treat investment trusts separately and research them outside this thesis.

Both penny ordinary share and dual share IPOs are excluded from my analysis of underpricing and survival rates given that they were prone to share price manipulation.[143] Penny shares are defined as those shares with an offer price of 2 shillings or less. Such issues were characteristic of speculative mining and rubber share counters. Dual share IPOs involved the offer of preference shares together with ordinary shares, where the investor was obliged to subscribe for both together. The preference share usually carried an issue price of between 5 and 20 shillings, the ordinary share a 1 or 2 shilling issue price. These issues were also susceptible to price manipulation. Insiders took most of the lower-priced ordinary shares in issue as consideration for overvalued assets injected into the newly listed company thereby guaranteeing a small float and a strong initial after-market price performance.[144] Not surprisingly, the annual time-series of IPO volume

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[143] Thomas (1973), p250, footnote 19: "florin shares were used in pre-war rubber boom and proved very effective in attracting public subscriptions". *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.

[144] Thomas (1973), p250: "the widespread use of the shilling share...was closely linked with the deliberate restriction of the amount of ordinary capital".

confirms that penny and dual share IPOs were features of the late 1920s stock market and virtually disappeared thereafter (Table 3-1).

After these exclusions there remain 2103 ordinary share IPOs between 1915 and 1979 for which I possess both share price and IPO details (column (2), Table 3-1).[145] I add the 447 IPOs between 1980 and 1986 to this figure so that the analysis in the remainder of this chapter is based on these 2550 IPOs where I have the data. Otherwise, the characteristics analysis is conducted on a sample of 2274 excluding the 276 USM IPOs for which I do not currently have data on firm age and underwriting arrangements. In the following chapter on underpricing, my sample size is 2170 IPOs further excluding the tender offers which are separately analysed in chapter 5.

3.4 The interwar capital market

Ordinary shares became the dominant form of corporate security in issue in Britain after 1945[146], but how important were ordinary share issues and especially IPOs in the interwar years? How important were issues by domestic as opposed to foreign companies and how does my primary data source, *The Times Books*, compare with other published series such as *The Economist*? I deal with each of these questions in this section.

Tables 3-2 and 3-3 summarise all new issues included in *The Times Book of Prospectuses* for two representative years, 1927 and 1935. Both years displayed moderately heavy issuance without exhibiting the "excesses" of the boom years of 1928-29 and the share-pushing years of 1936-37. For each year, I have estimated the volume of issues in terms of both gross issue proceeds, calculated at fully-paid offer or placing prices, and of the number of issues on the LSE by all issuers, domestic or foreign, corporate, sovereign or

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[145] There were no IPOs in 1930 and so I included 5 SEOs by small and medium-sized companies; a sixth by Unilever was excluded on grounds of size. Underpricing of SEOs has also been well-documented in the empirical literature.

[146] Tew and Henderson (1959) surveyed between 1949 and 1953 2549 quoted companies which in total made 359 ordinary share issues and 116 preference issues, p.17, Table 1.12. In 1960 the market value of all ordinary shares issued by industrial and commercial companies was £20.1 billion as compared to £1.7 billion for each of preference shares and debentures; by 1975 these market values had become £47.1 billion, £0.6 billion and £4.5 billion respectively, *Bank of England Quarterly Bulletin* vol.16 no.2 June 1976, "The cost of capital, finance and investment", p.196, Table B, columns (1)-(3).

local government and public authority. UK government and conversion debt issues are excluded. All gross proceeds are expressed in current prices.

Several interesting features stand out from a comparison of these two tables. Firstly, companies issued more debt than equity in 1927. Equity issues, both ordinary and preference shares, amounted to £56.2m whilst corporate debt issues totalled £112.5m. Secondly, whilst ordinary shares, both IPOs and SEOs, accounted for 43% of all issues advertised in *The Times*, preference share and dual share issues were also widely used. Thirdly, non-voting share issuance was common. Whilst all ordinary shares carried voting rights, usually on a 1 for 1 basis, only 2 out of every 5 preference issues and 1 out of every 2 dual share issues did so. In 1935, the issuance picture is a little different. The total size of share issues (£50.0m) overhauls corporate debt issues (£48.7m). Preference share issues increased in importance relative to ordinary share issues accounting for 55% of the total. It would appear that ordinary share issuance still had to recover fully from the sharp decline in the stock market in 1929. the incidence of preference shares carrying voting rights declined sharply to represent barely 1 in 10 preference and dual issues combined.

SEOs numbered only 20 in 1927 and 10 in 1935 representing 23% and 6% respectively of equity issue proceeds. This estimate is likely to understate the true position because firms did not require a prospectus or information statement to be published in a national newspaper. Placings as opposed to issues by prospectus were relatively unimportant. Of the 15 share placings in 1927, only 3 issues disclosed sufficient information to enable the estimation of gross proceeds. Placings became more popular in 1935 when there were 42 share placings representing 20% of the total share issues by value. Sovereign debt issuance declined substantially in the wake of the collapsing gold standard and international capital flows.

The overall impression given by these data is that ordinary share issues were substantial but preference share and debt issues were as, if not more, important as a source of funds to domestic companies in the interwar years. Post 1945, the preference share has virtually disappeared as the voting

ordinary share claimed investor portfolios.[147] The issuance pattern of these two sample years is consistent with the view expressed by Scott (2002) that the interwar period was witnessing only the beginning of the rise of the cult of the equity. The other contrast with the modern period is the predominance of non-voting shares. This reflects a pre-hostile takeover state of the world where outside shareholders attached little if any value to being able to exercise "voice" in their dealings with corporate managements.

Table 3-4 provides a comparison of capital issues made on the LSE by domestic as against foreign companies. Investment Trust issues are separately disclosed given that they are likely to be investing in both domestic and foreign firms. Domestic corporate issues are defined by the locus of the firm's operations, as disclosed by the prospectus, and not by place of incorporation. It was not uncommon for firms in industries such as natural resources to be incorporated in Britain but to have all their operations overseas. In the vast majority of cases in the interwar period, despite there being no disclosure of the geographic breakdown of turnover or assets, it was possible to determine the locus of operations from the prospectus. This was undoubtedly helped by the absence among the IPO population of multi-divisional and diversified holding companies which grew to populate the corporate landscape of the fifties and sixties. Whilst 60% of equity and debt issues were on behalf of foreign firms in 1927, domestic corporate issues rose to represent 77% of all corporate issues by 1935, reflecting the Treasury restrictions placed on foreign issues in 1934. Foreign issues of equity and debt declined from £104m in 1927 to slightly below £10m in 1935. For similar reasons there was also a dramatic decline in sovereign issues or issues by foreign governments from £151m to £12m. The latter led directly to the decision made by reputable underwriters to focus henceforth their attention on industrial issuers. This is discussed further in chapter 5.

How do these figures compare with other published statistics? There are three statistical series covering capital issues in the interwar years, published by the *Midland Bank,* the *Bank of England* and *The Economist.* It is a massive task to try and reconcile my IPO data with these series, not least

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[147] See chapter 2, section 2.2.

because I have concentrated upon ordinary share issuance to the exclusion of preference share and debenture issuance. All I can achieve here is to make a selective comparison for the two sample years. A detailed comparison of these three series particularly as regards the question of how much money was raised by the British capital market for domestic industry can be found in Henderson (1951), Appendix A, pp.155-161.

The series most comparable to my primary source, *The Times Book of Prospectuses*, is that of *The Economist* since it covered only issues on the LSE and only corporate issues, whether industrial, trading or financial. The "Home" issues component excludes British, Empire and Foreign government and local government issues, and foreign railway, mining finance and exploration, rubber and oil issues. However, those manufacturing and trading companies operating abroad but having a listing in London are included. Neither series excludes issues raising funds to be paid to vendors. *The Economist* estimates that domestic firms raised £134m and £184m in 1927 and 1935, respectively.[148] Even when following *The Economist* definition and including Investment Trusts among domestic firms, the figures of £71m and £98m generated from *The Times Book of Prospectuses* are considerably smaller (Table 3-4). Part of the explanation for this discrepancy may be that issues to shareholders, both SEOs and secondary offerings of debt securities, are included in *The Stock Exchange Year Book*, the source of *The Economist* series, but are missing from *The Times Book of Prospectuses*.

In summary, the interwar London capital market was very diversified. Ordinary share issuance accounted for about 30-40% of total equity funds raised based on the two sample years. By the 1930s a clearer distinction between ordinary shares carrying voting rights and non-voting preference shares was emerging and domestic issuers were becoming more dominant as foreign issues fell into decline under the weight of capital restrictions and a collapse in international capital flows. Such reconciliation with other published series of capital issues as is possible indicates that the Times Books may underestimate the total volume of issues, most especially, of secondary issues.

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[148] Henderson (1951), p.160, Table A3, columns 2 and 3, and p.161, Table A.

3.5 Annual Time Series of IPO Volume

Figure 3-1 graphs the annual time series of ordinary share IPOs based on the underlying data in column (2) of Table 3-2 supplemented with data from Levis (1990), Jenkinson and Trundle (1990) and Ljungqvist (2003). There were no IPOs in 1915 and 1916. During both WW1 and WW2 the capital markets were heavily restricted. In January 1915, responsibility for new issues of any kind passed to the Treasury which was primarily interested in channelling investment funds into British government debt.[149] The position was very similar in September 1939, when the Treasury again took control of new issues.[150] On both occasions, in 1919 and in 1946, there was a surge in IPO volume following the relaxation of issue restrictions.

Outside of these unusual periods, the annual time series clearly illustrates the existence of a cycle in IPO volume which generally fluctuates with real equity prices.[151] 1928 witnessed a boom in IPO volume. This was followed by a collapse between 1930 and 1933. Activity then recovered in the mid-thirties. After a period of catch-up in the late 1940s following the end of wartime restrictions, IPO volume was depressed for most of the 1950s. Activity was then sustained at high levels through the sixties and into the early seventies before the 1974 stock market crash led to a collapse in volume similar to that seen in the early 1930s. The establishment of the USM rejuvenated IPO activity in the 1980s. The build up in IPO volume in the late 1990s, following the replacement of the USM by the Alternative Investment Market (AIM), culminated in the heaviest period of ordinary share issuance witnessed by the market at the very end of the century.

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[149] Michie (2001), p.167.
[150] ibid., p.291.
[151] The equity price series is taken from the CSFB Equity-Gilt Study (2003) and is deflated by a UK cost of living index. I have not tested the relationship between IPO volume and the equity index.

3.6 Issue methods

The striking feature of Figure 3-2 is the decline in the proportion of IPOs undertaken by public issue and offer for sale ("public issues, offers") and the corresponding rise in importance of placings and introductions. Before 1939, disclosure in the Times Books makes it difficult to distinguish between the latter two. The total sample covering the period to 1986 comprises 3734 ordinary share IPOs, including the 2550 IPOs discussed above plus those placings that did not disclose placing terms and introductions. The first placing appears in my data set in November 1919 following a change in the LSE Rules that required issuing firms to advertise a statement in lieu of a prospectus in a national newspaper.

Taken together, placings and introductions assumed growing importance, accounting for 29% and 52% of all ordinary share IPOs in the period to 1929 and the 1930s respectively. These figures are comparable to *The Economist's* own estimate of 35% between January 1926 and September 1933.[152] By the 1950s the share of placings and introductions had soared to 83%. This trend was attributable not only to the desire of small firms to minimise issue costs but also to the more lax listing requirements governing placings. These were not brought fully into line with those of public offers and issues until 1963.[153] The subsequent decline in the relative importance of placings reflects the desire for greater transparency and the stricter regulatory stance of the LSE in the 1960s and 1970s as discussed in the previous chapter. Following the establishment of the USM and a realisation by the market that this method was not to be misused, there was a resurgence in the use of the placing method given its suitability for small firms at which this new market was primarily aimed.

The other feature of Figure 3-2 is the small share of the tender offer method in the 1960s and again in the 1980s. There were 67 such issues in the 1960s, only 1 in the following decade and 46 between 1980 and 1986. Thereafter the tender offer disappeared. I will return to the question of tender offers in chapter 5.

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[152] *The Economist*, 14 October 1933, p.723. This estimate covered both IPOs and SEOs and probably included preference as well as ordinary shares.
[153] See Chapter 2, Table 2-4.

3.7 IPO Certification

If an IPO is underwritten, this assures the issuing firm that they will receive the gross proceeds of the issue less the underwriting commission and other issue expenses. I define underwriting to include either the actual underwriting of a public issue, the purchase of shares from the issuing firm before offering them on to investors as under an offer for sale, and the placing of shares with investors where the issuing house or broker has committed to take any shares not so placed. The latter is to be distinguished from a placing on a best efforts basis where the placing agent enters into no commitment to purchase any shares not taken up. When underwriting an IPO, the issuing house or broker commits their capital, both financial and reputational, to the transaction. It is also important from the standpoint of prospective investors in an IPO that the underwriter be a third party unconnected with the issuing firm and not a director, a controlling shareholder, or a vendor of existing businesses or assets to the issuing firm.

In the early days of the IPO market, it was not always the case that IPOs were underwritten by independent third parties. Figure 3-3 graphs the rising propensity to underwrite IPOs over the entire period. Before 1930, 30% of IPOs were not underwritten. The proportion underwritten then rises in the following decade and in the 1960s and 1970s reaches almost 100%. The dip in the 1950s is probably attributable to the large number of placings, a portion of which were done on a best efforts basis.

It is also informative to look at how often the issuing house or broker sat on the board of directors of the issuing company as indicated by the prospectus. My prior expectation is that this would be a fairly rare occurrence given the extensive commentary on the lack of "involvement" of City institutions in industrial firms in the early 20th century. Whilst this is indeed the case, interwar underwriters did show a greater predilection to involve themselves in the affairs of their corporate clients than in the post 1945 era (Figure 3-4). In approximately 1 in 6 IPOs, the underwriter had board representation. This proportion however fell away to 1 in 20 in the 1950s and 1960s.

Certification can be carried out by auditors as well as underwriting banks and brokers. The propensity of issuing firms to signal their quality to the market by including an audited or professional asset valuation in their prospectus or

statement was very low before 1929 but rose sharply in the following decade (Figure 3-5). Thereafter, all IPOs disclosed audited financials.[154] An issuing firm can also choose to have their IPO underwritten by a prestigious bank or broker and their financial statements prepared by a reputable firm of accountants in order to signal further their quality to investors in expectation of raising equity on better terms both today and in the future. The role of prestigious underwriters is considered in chapter 5, whilst that of auditors is not dealt with by my thesis.

3.8 IPO characteristics

Firm age is based on the number of years difference between a firm's founding date as disclosed in the Times Books or the SXYB and the year of the IPO. An attempt has been made to ascertain the original date of establishment of a business, where it pre-dates the date of incorporation of the firm seeking a listing. Determining the age of IPOs prior to 1929 is sometimes problematic due to poor disclosure. This often occurs where shares are issued by a new company of substantially the same name in order to take over the assets of an existing business, where shareholder and board control remain with the original management. In such cases, only the date of incorporation of the new company is disclosed in the prospectus and the prospectus remains silent on both the history and the financial performance of the "acquired" business. In this case, I have taken the date of incorporation as the founding date. Where there is no date of incorporation but a profits history is disclosed, I have taken the length of this track record as indicating firm age. Figure 3-6 charts the rise in the mean age of IPOs over the first half of the last century. Before 1929, mean firm age was only 12.4 years but this increased to 25.2 years in the 1930s and then to slightly over 50 years in the 1940s and 1950s, before subsequently declining modestly to around 40 years in the following two decades.

There are two possible explanations for this aging of the IPO sample. The first is that investors became more risk averse in the aftermath of the 1929 collapse in the stock markets in London and New York. This would explain the greater maturity profile of IPOs in the 1930s but surely not thereafter. An

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[154] Any dip below 100% reflects IPOs with missing prospectuses.

alternative explanation is provided by tighter LSE regulation, which had a direct influence on firm age.

As discussed in the previous chapter, the LSE introduced minimum listing requirements such as a minimum number of years of historic profits (track record). There was no such minimum until 1934, when 3 years of historic profits had to be disclosed (Chapter 2, Table 2-2). From 1951, 10 years of profits were required until the 1970s when 5 years were sufficient. However, this requirement appeared not to be mandatory, as evidenced by the fact that 15% of IPOs between 1934 and 1979 did not meet this minimum (Table 3-5). The LSE exercised an element of discretion in considering applications to list. Nonetheless, the overall effect was to raise the mean length of track record from below 2 years in the 1920s to around 10 years in the 1940s and 1950s, followed by only a modest decline in the following two decades. This had the effect of pushing up firm age.

Further evidence of the impact of tighter LSE regulation is reflected in the sharp decline in the proportion of start-up IPOs and new money raised (Figure 3-7). A start-up is defined as a genuinely newly-established business, where the majority of the IPO proceeds are raised by the sale of primary shares issued by the company for cash and are to be spent on capital expenditure and/or developing the new business.[155] "New money" is therefore defined as the proportion of new or primary shares issued for cash out of the total shares issued, including shares issued in kind to vendors in consideration for assets and businesses acquired. The inadequacy of disclosure as to which shares were primary and which vendor prevented an estimation of the start-up and new money proportions before 1929.

As mentioned above, it was common before 1929 for a newly established firm ("newco") to acquire the assets or business of an existing firm ("oldco") where both shareholder and board control remained essentially unchanged. The vendors of oldco received shares in newco as consideration for selling that business and these shares were then offered or placed with investors as well as being listed. No new money is being raised in this situation. There were also instances where newco was established and sought a listing on the basis of acquiring, on an arm's length basis, an existing asset or business for cash paid

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[155] New property firms acquiring an existing portfolio of assets are excluded.

out of the proceeds of the IPO of newco. This is still not a start-up but in this case there is a change of ownership and management and new money has been raised as opposed to the IPO proceeds going straight to the vendors. Before 1929 disclosure regarding directors' interests was poor and it was not therefore possible to establish when an acquisition occurred on an arm's length basis. For this reason also, it was problematic to estimate the new money raised for all IPOs before 1929.

The proportion of start-ups proceeded to decline sharply from 8% in the 1930s and to nothing after 1945 (Figure 3-7). This was most likely attributable to a mix of greater investor risk aversion, tighter regulation and higher taxation on both companies and wealthy individuals through rising death duties. Following the establishment of the USM there was a minor reappearance of start-up IPOs, numbering 12 in all and only one of which occurred on the Official List. Although the USM minimum track record was set at 5 years along with the Official List, the LSE was prepared to make exceptions in certain circumstances. However, the role of the USM was not to provide early stage venture capital finance, something which the pre-1929 stock market had undertaken as much by chance as by design.

Accompanying the decline in the importance of start-ups is a sharp fall in the amount of new money raised by IPOs out of total gross proceeds from over one-third in the 1930s to less than 10% by the 1950s. This proportion did rise progressively through the sixties and seventies and averaged 50% in the period 1980-86.

Marketability, defined as the proportion of total ordinary shares outstanding which are offered or sold at IPO whether those shares are primary or vendor shares, is another IPO characteristic which has shown significant change over time. This proportion also declined through the interwar years into the fifties and then flattened out at around the 30% level (Figure 3-8).[156] As discussed in the previous chapter, LSE Rules first required a minimum of 25% marketability for placings in 1958. This figure then rose to 35% on both offers and placings in 1970 (Chapter 2, Table 2-2). Whilst the average marketability for offers came close to this figure, that on placings did not.

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[156] It is possible that the interwar estimate is overstated given that preference shares were more common at this time and may have been viewed by investors as part of the firm's equity despite frequently not carrying voting rights.

Does the tightening of disclosure and regulation from the mid-century onwards show up in IPO characteristics? Better disclosure should affect the level of detail disclosed in balance sheets or asset valuations of issuing firm's over time (Figure 3-9). A simple count of the number of items excluding aggregated figures provides an indication of the level of disclosure. The mean number of balance sheet items disclosed by IPOs increased steadily from low single digits in the 1920s, to an average of 10 through the 1930s before approaching a level of 20 items just before the 1948 Act was introduced. In the 10 years following the 1948 Act, the number of items shows no further increase.

Broadly, this result agrees with the findings of a study of the change in financial disclosure of 50 large British firms between 1920 and 1950. Arnold and Matthews (2002) found that the average number of items disclosed in the balance sheet increased hardly at all between 1920 (36.2 items) and 1935 (38.7 items) but had increased dramatically (57.2 items) by 1950. There are two differences however in comparison with my results. Firstly, the average number of items disclosed by IPO prospectuses is far fewer than that of the Arnold and Matthews' sample, even after 1945 when they reach their peak. This is almost certainly attributable to the much smaller size of the IPO firms compared to the large British companies of the Arnold and Matthews' sample. Secondly, there is a marked improvement in the number of items disclosed by IPOs before the introduction of the new Companies Act in July 1948 but not thereafter. The rise in the number of items is consistent with more disclosure being urged by a combination of the accounting profession in the wake of the Royal Mail scandal, and the LSE tightening its listing requirements. This finding cannot be tested against the Arnold and Matthews sample given the lack of a continuous sample. In addition, the simple measure of disclosure employed here does not capture the way in which the 1948 Act was crucial to improving the quality of financial statements.

The tighter scrutiny by the LSE of applications to list by way of a placing manifests itself in two ways. Firstly, between 70% and 80% of the placings in my data set during the interwar years did not disclose the placing price. By the fifties and sixties, non-disclosure of the placing price had dropped to almost 10%. Secondly, there was a decline in the average size of firms conducting their IPO by way of a placing from the 1940s onwards (Figure 3-11). As the LSE applied its guidance more strictly, the firm size of IPOs by placing fell to

less than half that of the interwar years (Figure 3-10). In contrast, firms undertaking public issues and offers were becoming much larger from the 1950s onwards. These figures exclude the privatisations of the 1980s.

Firm risk is proxied by firm age and firm size, both of which increased between 1945 and 1979, suggesting IPOs were becoming less risky. A third proxy is firm valuation. Fig 3-11 graphs firm valuation measured by book value to offer price (BVP), where book value is pro forma net asset value per share attributable to voting shareholders.[157] After a sharp increase in the 1950s, valuations decline over the next two and a half decades. This initial increase is perhaps due to the improved disclosure of asset values prompted by the 1948 Act.

An industry breakdown of IPOs is less than satisfactory (Table 3-6). Classifications by the LSE were somewhat crude over the majority of this period of study. Only in the 1980s did the LSE develop a richer industry classification. As a result, 80% of the 2274 IPOs fell into the "Commercial, Industrial, etc" sector. The next most important sector was Property with a 6% share. The three natural resource sectors (Mines, Oil, and Tea Coffee and Rubber Plantations) accounted for 7% of IPOs in the data set. Following Edelstein (1982), who defined foreign securities by their sector classification, the natural resource sectors represent foreign IPOs. All but 20 of these 157 IPOs occurred in the interwar years. Hence, on this somewhat crude measure, whilst almost 1 in 4 interwar IPOs were foreign firms, only 1% of post-1945 IPOs were.

Finally, there were 161 IPOs undertaking R&D activity as indicated by the prospectus, amounting to 7% of all IPOs in my data set. There was no disclosure of amounts actually spent on R&D until the IPO by Standard Telephones and Cables in June 1979. Such disclosure was not required until the introduction of an accounting standard on R&D in 1977. I consider how R&D firms were treated by the IPO market in chapter 6.

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[157] Where the prospectus disclosed a market valuation of any asset by professional valuers or by directors, any surplus over book costs was included in the net asset value calculation.

3.9 Summary

I have described the data set in detail and provided quantitative evidence to illustrate some of the main developments in the environment surrounding the IPO market which were analysed in the previous chapter.

The interwar capital market was quite diverse. Preference and debenture issues by companies both domestic and foreign were as common as ordinary share issues. Nevertheless, there were early signs that ordinary shares were displacing voting preference shares as the chosen equity instrument.

Changes in the characteristics of the IPO data set over time reflect the improvements in regulation and disclosure. There was a sharp rise in the proportion of IPOs with audited accounts from only 25% before 1929 to 100% by the 1940s and also in the number of balance sheet items disclosed. Although these measures showed substantial improvement ahead of the 1948 Act, neither is able to capture the improvement in the quality of financial disclosure consequent upon the enactment of this legislation. The LSE toughened up its scrutiny of IPOs, leading to a sharp rise in the mean firm age and mean track record after 1929 to around 50 years and 10 years, respectively, in the 1940s and 1950s. These averages declined only modestly thereafter. In the 1980s, the establishment of the USM led to a noticeable fall in the track record and a rise in new money raised, substantiating claims that this new market rejuvenated IPO activity by attracting younger, expansionary firms.

Together with the disclosure of audited accounts in the IPO prospectus, the underwriting of IPOs became the norm. Whereas 3 out of every 10 IPOs were not underwritten in the 1920s, virtually all IPOs were underwritten from the 1960s onwards. In general, underwriters chose not to be represented on the board of directors of issuing firms.

Firm size increased along with firm age. Firms undertaking placings became smaller, reflecting the desire by the LSE to eliminate instances of the abuse of this method and to limit its use to small firms wishing to minimise IPO expenses. Firm valuations rose from the 1960s onwards. Based on age and size, firms seeking a listing were becoming less risky; based on valuation, they appeared more risky.

In the next chapter, I consider the behaviour of IPO underpricing and how it was influenced by changes in variables such as firm size, age, valuation and marketability along with the changes in disclosure, regulation and underwriting practice. The impact of these same factors on IPO survival is considered in chapter 6.

Table 3-1: Total Volume of Ordinary Share IPOs 1915-86

My data cover the period up to 1979. Data for 1980-86 were taken principally from the data set of Buckland and Davies (1989). Provincial IPOs are listed on a Provincial Stock Exchange only. Columns (2) to (8) exclude Investment Trusts (IT's). Penny share IPOs have offer prices equal to or less than 2 shillings. Dual share IPOs are combined offers of ordinary share and voting preference shares. "Placings, no price" are IPOs which did not disclose the placing price. "Not quoted" indicates where a share price could not be found in SEDOL. Column (1) is the sum of columns (2) to (9). The number of introductions for 1985 and 1986 exclude those on the USM.

	(1) Total IPOs	(2) Ordinary Share	(3) Dual share	(4) Penny share	(5) Placings no price	(6) Intro-ductions	(7) Ordinary not quoted	(8) Provincial	(9) Investment Trusts
1915-86	5,110	2,550	164	187	418	766	222	452	351
1915-79	4,518	2,103	164	187	418	646	222	452	326
1915	2	0	0	0	0	na	2		0
1916	0	0	0	0	0	na	0		0
1917	4	1	0	0	0	na	3		0
1918	4	3	0	0	0	na	1		0
1919	82	43	4	1	0	na	33		1
1920	135	62	6	11	4	na	50		2
1921	13	3	4	2	0	na	4		0
1922	20	5	5	0	7	na	3		0
1923	30	13	4	7	2	na	2		2
1924	41	8	4	2	15	na	5		7
1925	89	39	6	20	12	na	4		8
1926	51	20	5	3	8	na	8		7
1927	89	38	21	1	11	na	5		13
1928	219	75	67	33	14	na	4		26
1929	100	45	9	20	8	na	7		11
1930	6	5	1	0	0	na	0		0
1931	5	3	2	0	0	na	0		0
1932	6	5	1	0	0	na	0		0
1933	35	10	2	3	15	na	4		1
1934	81	36	5	6	27	na	7		0
1935	101	49	7	4	36	na	4		1
1936	136	65	6	3	58	na	3		1
1937	94	48	4	0	28	na	4		10
1938	18	9	0	1	7	na	0		1
1939	11	3	1	3	3	na	1		0
1940	3	1	0	0	0	na	2		0
1941	6	1	0	0	1	na	4		0
1942	5	1	0	0	2	na	2		0
1943	3	1	0	0	1	na	1		0
1944	8	4	0	0	3	na	1		0
1945	20	8	0	0	11	na	0		1
1946	168	60	0	2	29	44	22	5	6
1947	190	96	0	4	19	20	28	19	4
1948	140	64	0	2	29	32	6	7	0
1949	64	36	0	4	1	15	1	7	0
1950	61	28	0	2	3	16	0	11	1
1951	77	38	0	4	1	18	0	15	1
1952	50	19	0	5	2	13	0	11	0
1953	75	32	0	11	0	16	0	16	0
1954	72	40	0	8	10	13	0	0	1
1955	85	39	0	8	1	15	0	21	1

Table 3-1: Total Volume of Ordinary Share IPOs 1915-86 (cont.)

	(1) Total IPOs	(2) Ordinary share	(3) Dual share	(4) Penny share	(5) Placings, no price	(6) Intro-ductions	(7) Ordinary not quoted	(8) Provincial	(9) Investment Trusts
1956	57	15	0	8	1	20	0	11	2
1957	50	23	0	1	1	21	0	0	4
1958	65	36	0	1	3	20	0	0	5
1959	135	80	0	2	15	10	0	20	8
1960	149	93	0	1	3	12	0	28	12
1961	102	60	0	2	2	13	0	17	8
1962	121	68	0	1	2	12	0	23	15
1963	162	63	0	0	4	21	0	40	34
1964	200	76	0	0	3	24	0	71	26
1965	148	58	0	0	3	24	0	55	8
1966	82	31	0	0	8	21	0	13	9
1967	78	30	0	0	3	22	0	18	5
1968	156	81	0	0	2	41	1	24	7
1969	108	56	0	0	0	38	0	6	8
1970	58	53	0	0	0	0	0	5	0
1971	76	59	0	1	0	5	0	7	4
1972	152	88	0	0	0	16	0	0	48
1973	104	43	0	0	0	45	0	2	14
1974	14	1	0	0	0	13	0	-	0
1975	16	2	0	0	0	13	0	-	1
1976	17	5	0	0	0	11	0	-	1
1977	18	6	0	0	0	12	0	-	0
1978	24	11	0	0	0	13	0	-	0
1979	27	9	0	0	0	17	0	-	1
1980	31	14	0	0	0	15	0	-	2
1981	76	52	0	0	0	20	0	-	4
1982	82	57	0	0	0	22	0	-	3
1983	127	103	0	0	0	20	0	-	4
1984	144	109	0	0	0	34	0	-	1
1985	66	56	0	0	0	4	0	-	6
1986	66	56	0	0	0	5	0	-	5

Table 3-2: New Issues Advertised in *The Times Book of Prospectuses* 1927

Amounts (£000) represent gross proceeds estimated at issue or placing prices in current prices. Percentage figures are expressed with respect to total share and total debt issues respectively. New issues are classified by type of security (shares versus debentures), by issue method (prospectus issues versus placings) and by stage of issue (IPO versus SEO). "Dual" share issues are issues of ordinary and preference shares where the investor must subscribe for both shares in fixed proportion. Preference shares were issued with or without voting rights either by themselves as a component of dual share issues. All ordinary share issues in 1927 carried voting rights. Debt issues include debentures, bonds, notes and other debt securities. UK Treasury debt issues are excluded as are conversion issues.

(i) Shares	Total £000	%	No.	Prospectus IPO £000	%	No.	Prospectus SEO £000	%	No.	Placings £000	%	No.
Ordinary	23,982	43%	54	22,087	39%	48	1,894	3%	6		0%	
including:												
Investment Trusts	5,050	9%	8	5,050	9%	8	0	0%	0		0%	
Preference	19,123	34%	37	11,509	20%	27	6,627	12%	7	987	2%	3
Voting	6,739	11%	16	4,925	8%	11	827	1%	2	987	2%	3
Non-voting	12,384	21%	21	6,584	11%	16	5,800	10%	5		0%	
Dual	13,052	23%	41	8,588	15%	34	4,464	8%	7		0%	
Voting	6,286	11%	22	3,971	7%	20	2,315	4%	2		0%	
Non-voting	6,766	12%	19	4,617	8%	14	2,149	4%	5		0%	
Total	56,157	100%	132	42,185	75%	109	12,985	23%	20	987	2%	3

(ii) Debt	Total £000	%	No.	All Offers £000	%	No.	Placings £000	%	No.
Corporate	112,546	37%	60	94,721	31%	48	17,825	6%	12
Sovereign	151,469	50%	27	151,469	50%	27			
local governments and public authorities	37,871	13%	30	37,386	12%	29	485	0%	1
Total	300,886	100%	117	283,577	93%	104	18,310	7%	13

Table 3-3: New Issues Advertised in *The Times Book of Prospectuses* 1935

Amounts (£000) represent gross proceeds estimated at issue or placing prices in current prices. See comments in Table 3-2.

(i) Shares	Total £000	%	No.	Prospectus IPO £000	%	No.	Prospectus SEO £000	%	No.	Placings £000	%	No.
Ordinary	14,968	30%	78	9,614	19%	50	1,543	3%	6	3,811	8%	22
including:												
Investment Trusts	0	0%	0	750	2%	1	0	0%	0	0	0%	0
Preference	27,498	55%	71	20,188	40%	49	1,185	2%	3	6,124	12%	19
Voting	1,551	3%	11	710	1%	7	713	1%	2	129	0%	2
Non-voting	25,946	40%	60	19,478	39%	42	473	1%	1	5,996	12%	17
Dual	7,513	15%	26	7,053	14%	24	300	1%	1	160	0%	1
Voting	1,322	3%	7	1,022	2%	6	300	1%	1	0	0%	0
Non-voting	6,031	12%	19	6,031	12%	18	0	0%	0	160	0%	1
Total	49,979	100%	175	36,855	74%	123	3,028	6%	10	10,095	20%	42

(ii) Debt	Total £000	%	No.	All Offers £000	%	No.				Placings £000	%	No.
Corporate	48,664	45%	77	39,303	36%	37				9,361	9%	40
Sovereign	12,287	11%	4	11,794	11%	3				493	0%	1
local governments and public authorities	47,630	44%	26	44,891	41%	21				2,740	3%	5
Total	108,581	100%	107	95,987	88%	61				12,594	12%	46

Table 3-4: Corporate New Issues Advertised in *The Times Book of Prospectuses* 1927 and 1935

Equities are both ordinary and preference shares. Amounts (£000) represent gross proceeds estimated at issue or placing prices in current prices. See text for definitions of domestic and foreign.

(i) 1927

	total £000	%	domestic £000	%	Inv. Trusts £000	%	foreign £000	%
equities	56,157	32%	34,743	20%	6,4900	4%	21,414	12%
debt	112,546	64%	27,394	16%	2,158	1%	82,995	47%
total	175,193	100%	62,137	35%	8,648	5%	104,409	60%

(ii) 1935

	total £000	%	domestic £000	%	Inv. Trusts £000	%	foreign £000	%
equities	49,979	46%	42,373	39%	2,800	3%	4,806	4%
debt	58,026	54%	41,181	38%	11,882	11%	4,963	5%
total	108,004	100%	83,555	77%	14,682	14%	9,768	9%

Table 3-5: IPOs with less than the minimum Track Record 1935-79

"Track Record" is the number of years of historic profits which are disclosed in the prospectus or statement. "Minimum" refers to the minimum number of years profits required by the LSE. There are 2 missing observations.

	IPOs with Track<3yrs	IPOs with Track<10yrs	IPOs with Track<5yrs	%IPOs< min.Track	N Obs.
1935	19			39%	49
1936	15			23%	65
1937	7			15%	48
1938	2			22%	9
1939	0			0%	3
1940	0			0%	1
1941	0			0%	1
1942	0			0%	1
1943	0			0%	1
1944	0			0%	4
1945	1			13%	8
1946	0			0%	60
1947	1			1%	96
1948	0			0%	64
1949	0			0%	36
1950	0			0%	28
1951		2		5%	38
1952		1		5%	19
1953		3		9%	32
1954		5		13%	40
1955		5		13%	39
1956		3		21%	14
1957		2		8%	24
1958		10		28%	36
1959		26		33%	80
1960		17		18%	92
1961		14		24%	59
1962		17		25%	69
1963		9		15%	61
1964		13		18%	74
1965		8		15%	55
1966		8		26%	31
1967		5		17%	30
1968		20		27%	73
1969		17		30%	56
1970			4	7%	55
1971			3	5%	61
1972			6	7%	89
1973			3	7%	45
1974			0	0%	1
1975			0	0%	2
1976			0	0%	5
1977			1	17%	6
1978			0	0%	11
1979			0	0%	9
Total				15%	1681

Figure 3-6: SEDOL Classification of IPOs 1917-86

N=2274 excluding USM listings. Transport combines "Shipping" and "Tramways"; and Utilities combines "Gas" and "Electrical Lighting & Power".

SEDOL SECTOR	N	%
TEA, COFFEE & RUBBER	50	2.2%
MINING	75	3.3%
OIL	32	1.4%
PROPERTY	139	6.1%
BANKS	21	0.9%
FINANCIAL TRUSTS	40	1.8%
INSURANCE	36	1.6%
BREWERIES & DISTILLERIES	19	0.8%
TRANSPORT	18	0.8%
UTILITIES	6	0.3%
IRON COAL & STEEL	28	1.2%
COMMERCIAL, INDUSTRIAL, ETC	1810	79.6%
	2274	100.0%

Figure 3-1: Annual Time Series of IPO Volume 1917-2002

The underlying data for 1917 to 1986 are taken from column (2) in Table 3-1. 1987 and 1988 estimates from Levis (1990); 1989 estimate from Jenkinson & Trundle (1990); and 1991-2002 from Ljungqvist (2003). 1990 is my own estimate which excludes USM IPOs as does the Jenkinson & Trundle estimate for 1989. The UK Equity Index is taken from the CSFB/Barclays Capital Equity-Gilt Study and is expressed in 2004 prices.

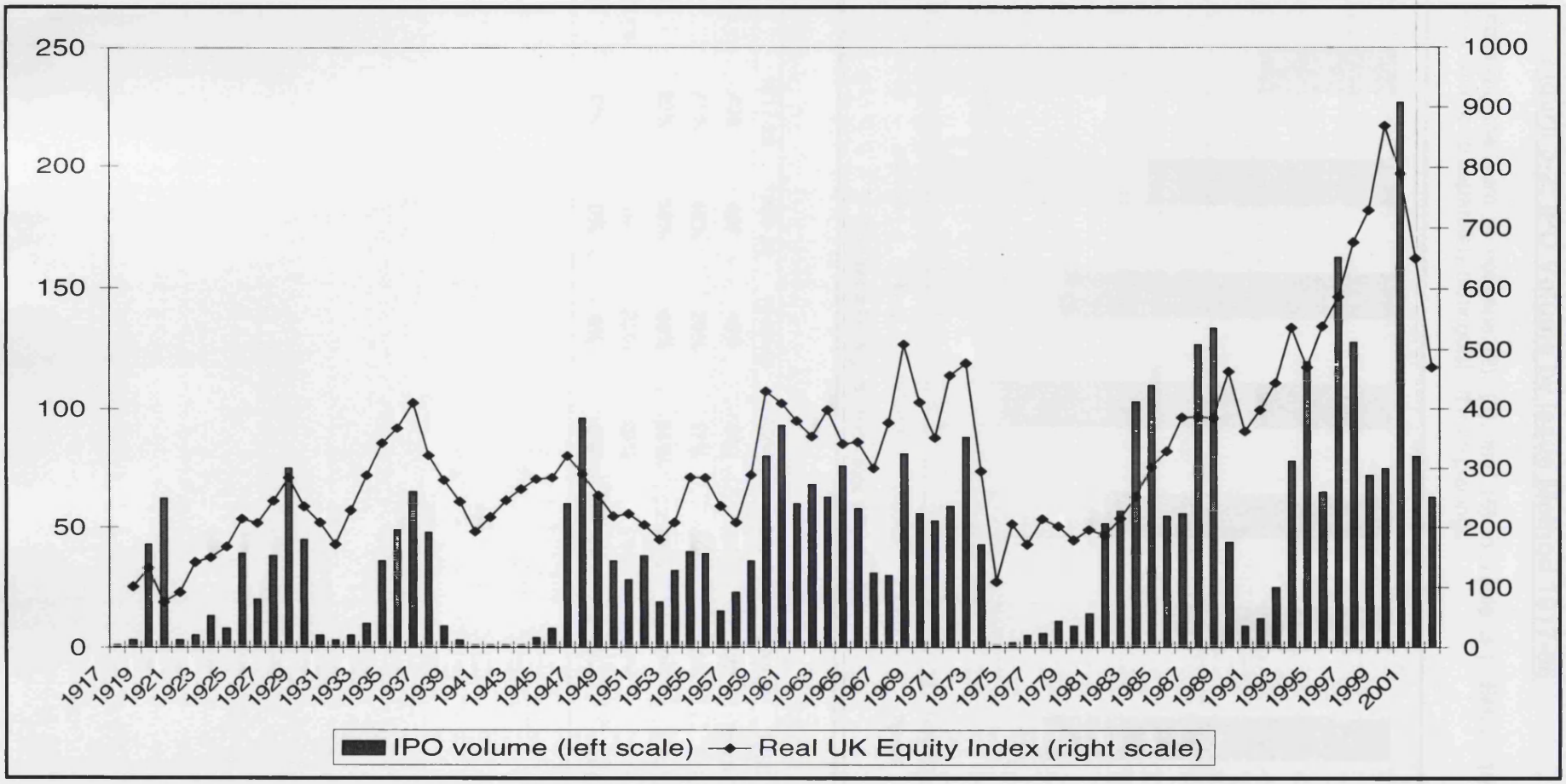
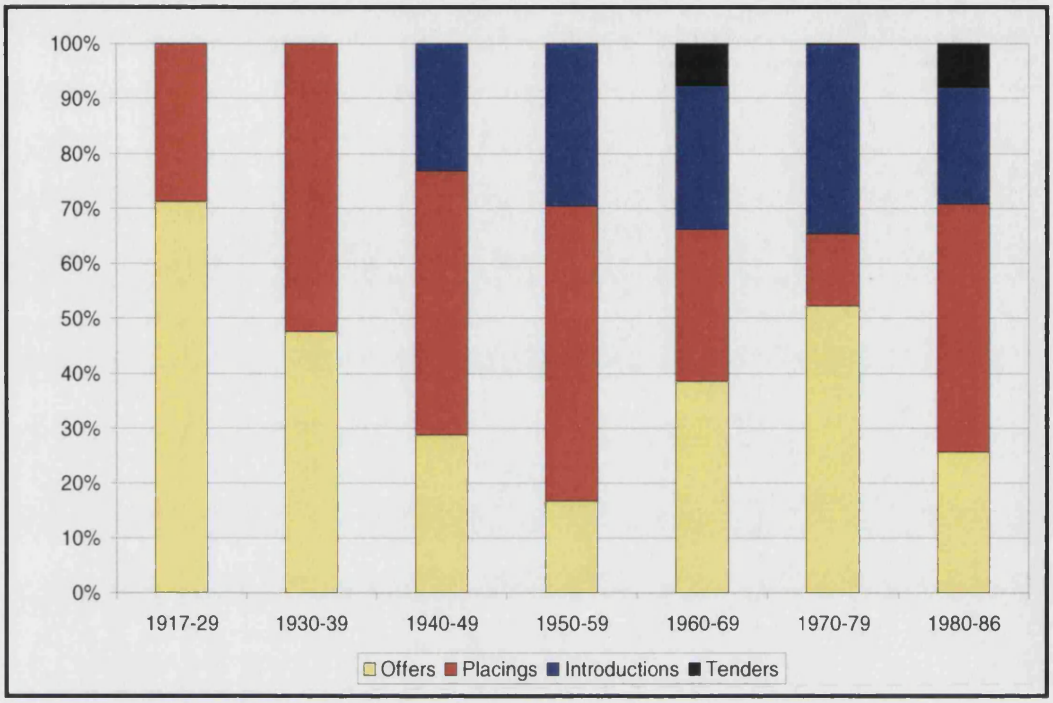


Figure 3-2: IPO Volume by Issue Method 1917-86

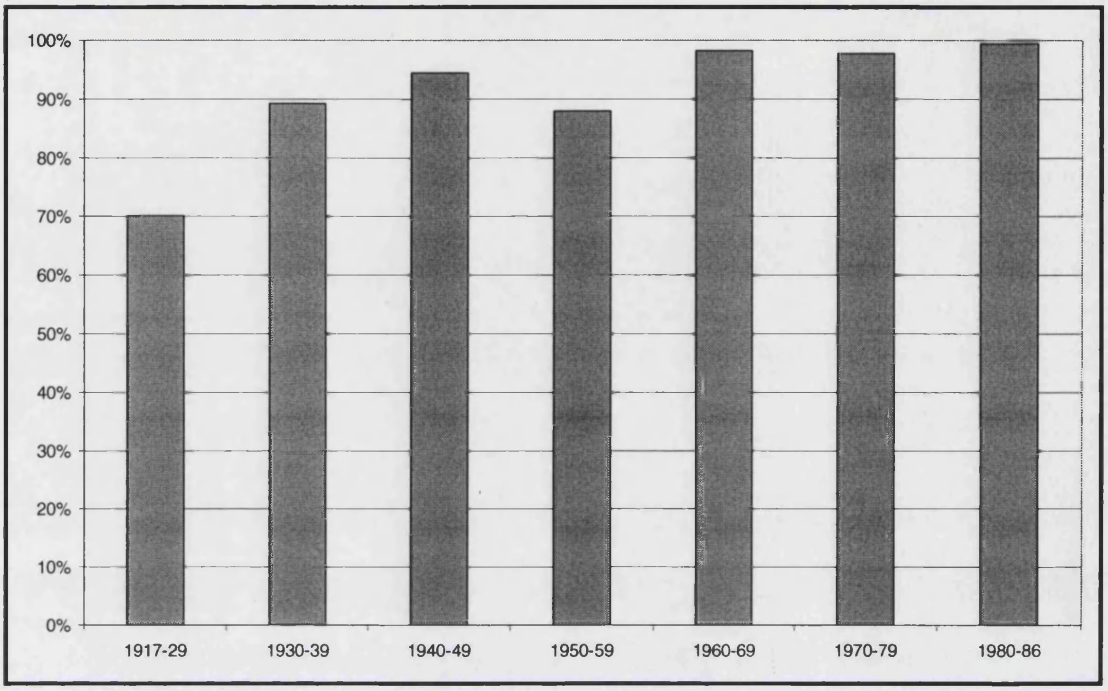
N=3734 equalling the sum of columns (2), (5), and (6) in Table 3-1. Before 1939 introductions cannot be separately distinguished from placings.



	1917-29	1930-39	1940-49	1950-59	1960-69	1970-79	1980-86
Total IPOs	436	407	479	549	874	422	567
Offers	71%	48%	29%	17%	39%	52%	26%
Placings	29%	52%	48%	54%	28%	13%	45%
Introductions	na	na	23%	29%	26%	34%	21%
Tenders	0%	0%	0%	0%	8%	0%	8%

Figure 3-3: Proportion of IPOs Underwritten 1917-86

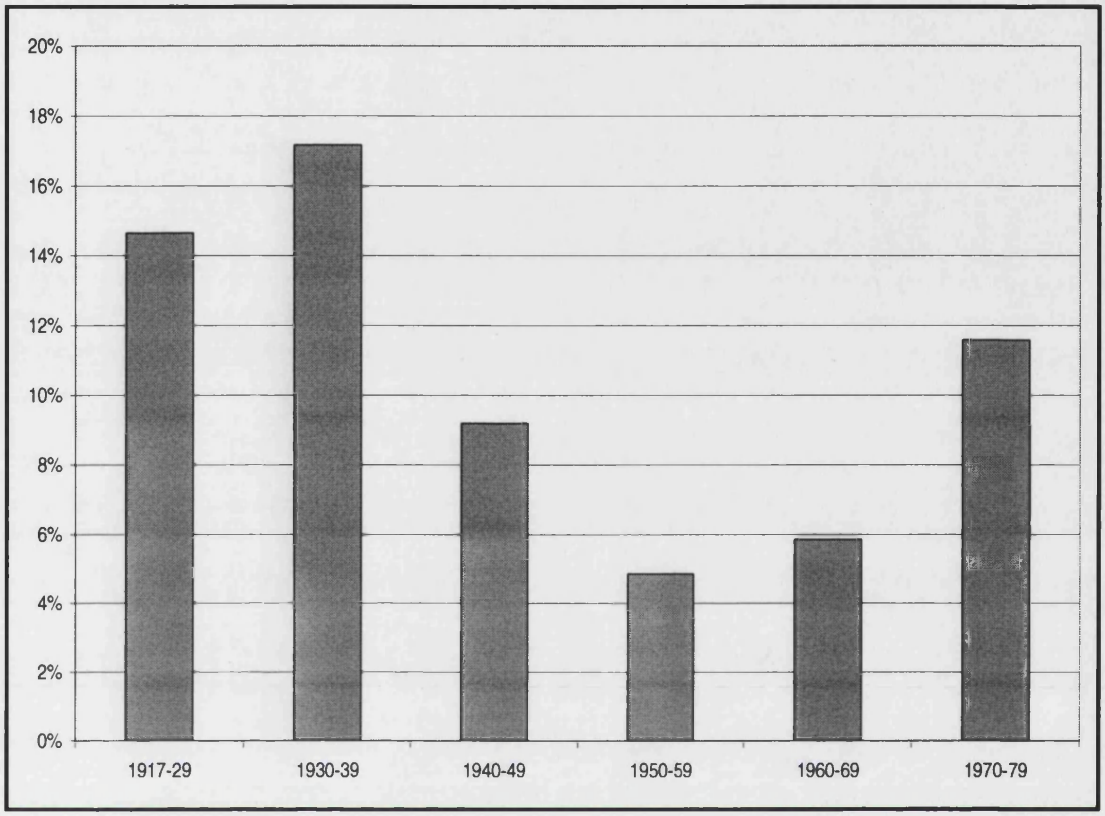
"Underwritten" signifies an IPO underwritten by a third party and excludes underwriting by the issuing firm's directors, controlling shareholders or the vendors to the issuing firm. N=2266 and excludes USM IPOs. Missing obs.=8.



%	1917-29	1930-39	1940-49	1950-59	1960-69	1970-79	1980-86
Underwritten/Total IPOs	70%	89%	94%	88%	98%	98%	99%

Figure 3-4: Board Representation 1917-79

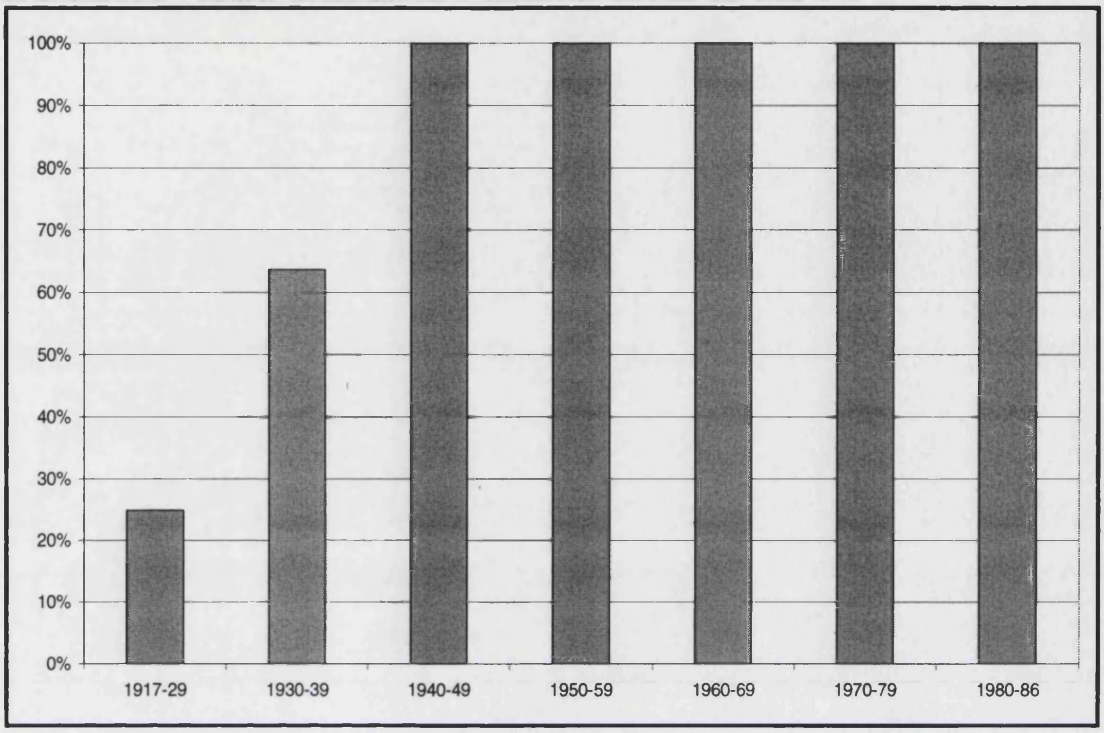
The percentage represents the proportion of all IPOs where the underwriter has board representation at the time of the IPO. I have not collected data for 1980-86. N=2096. Missing obs.=7.



%	1917-29	1930-39	1940-49	1950-59	1960-69	1970-79
BoD/Total IPOs	52	40	25	17	35	33

Figure 3-5: IPOs disclosing audited financials 1917-79

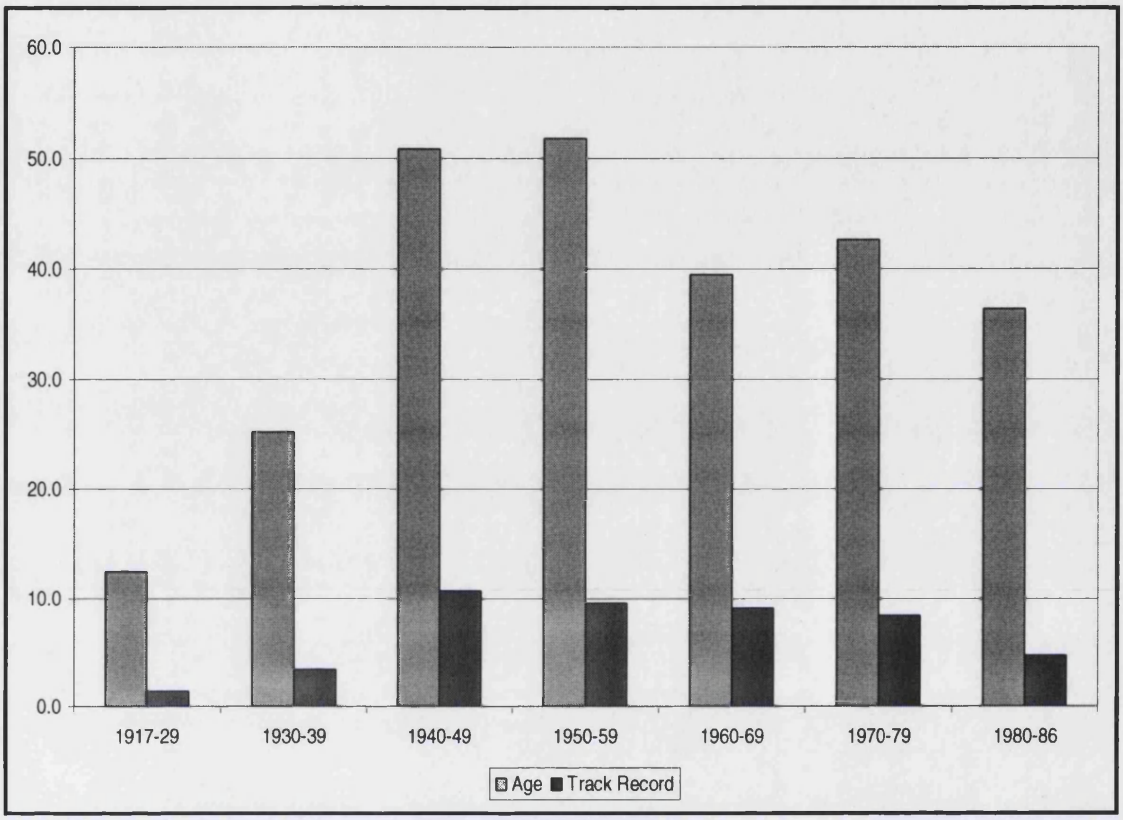
The denominator of the percentages shown below is the number of IPOs capable of disclosing a balance sheet or independent asset valuation and therefore excludes IPOs with firm age equal to zero. N=1937. Missing obs.=117, all in the period 1915-29.



%	1917-29	1930-39	1940-49	1950-59	1960-69	1970-79	1980-86
Audited/Total	25%	64%	100%	100%	100%	99%	100%

Figure 3-6: Mean Firm Age and Track Record of IPOs 1917-86

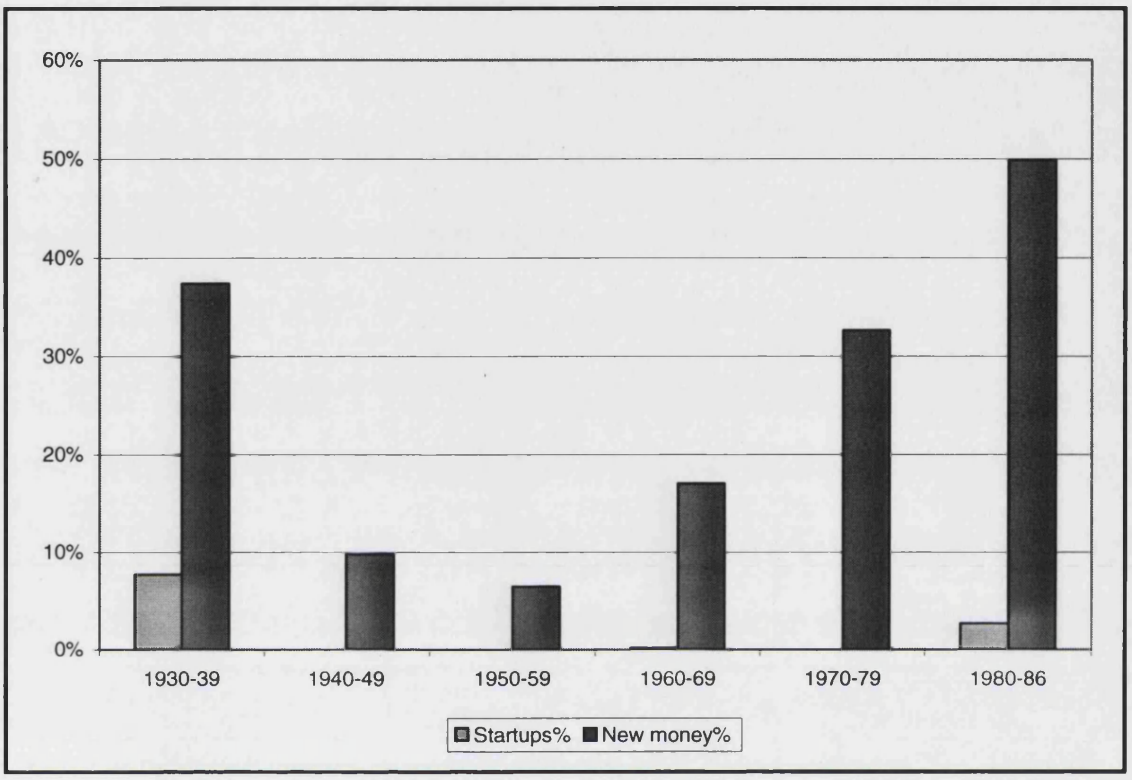
Firm age is the number of years the business has been trading and often predates the date of incorporation. Track record is the number of years of historic profits disclosed in the prospectus. In the case of 30 IPOs with minimal disclosure firm age was taken as being indicated by track record. N=2261 excluding USM IPOs with missing obs.=13 for firm age. Mean age for 1980-86 is likely to overestimate the true IPO population mean. N=2550 with missing obs.=0 for track record.



No. of years	1917-29	1930-39	1940-49	1950-59	1960-69	1970-79	1980-86
Firm age	12.4	25.2	50.8	51.8	39.4	42.7	36.4
Track record	1.4	3.4	10.7	9.6	9.1	8.4	4.7

Figure 3-7: IPO Start-Ups and New Money raised 1930-1986

"Start-ups" are newly established businesses the majority of whose IPO proceeds is new money. N=2194 Missing obs.=1. "New money" is the proportion of the total shares issued at IPO represented by the sale of primary shares by the issuing company for cash. N=2189. Missing obs.=6.
I am not able to estimate either variable for 1917-29.

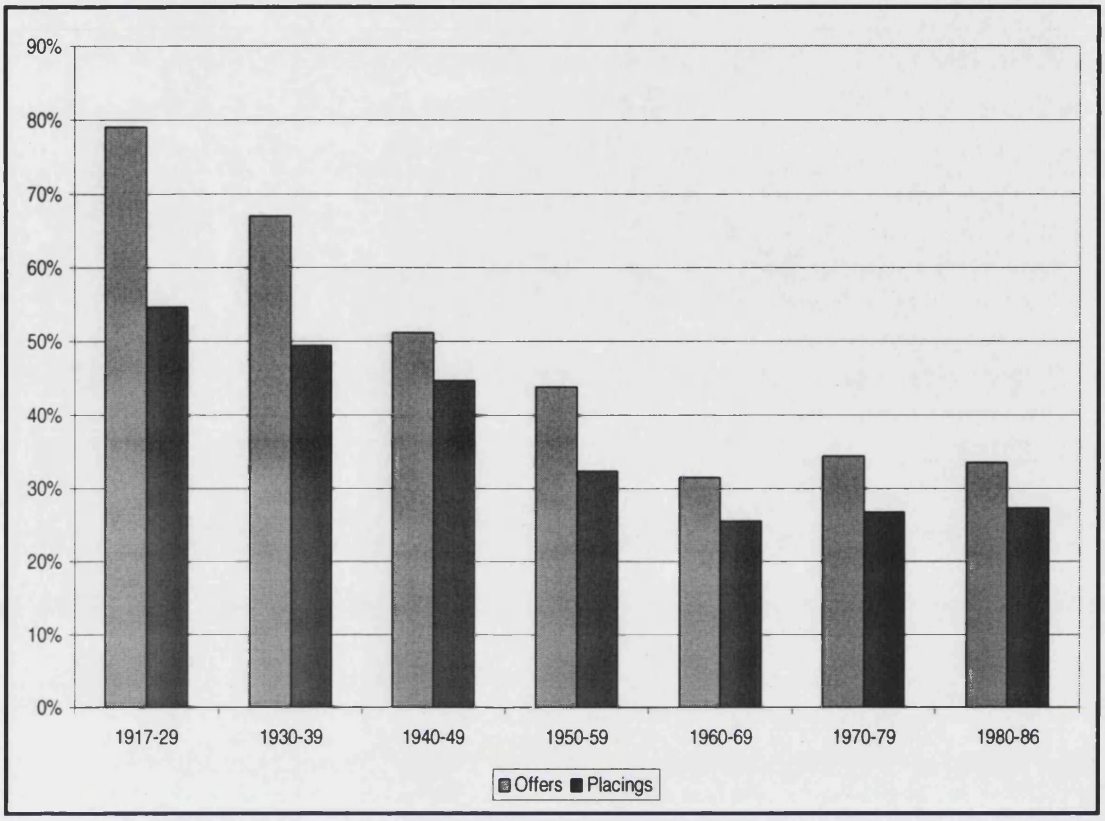


	1930-39	1940-49	1950-59	1960-69	1970-79	1980-86
No. start-ups	18	0	0	1	0	12
Start-ups %Total	8%	0%	0%	0%	0%	3%
% New money	37%	10%	6%	17%	32%	50%

Note: I have estimated the number of start-ups among USM IPOs between 1980 and 1986 despite not having age data on the basis that the lack of a track record in the prospectus is sufficient indication.

Figure 3-8: Marketability of IPOs by Issue Method 1917-86

Marketability is defined as the proportion of total shares outstanding which are offered or placed at the IPO. N=2550.



	1917-29	1930-39	1940-49	1950-59	1960-69	1970-79	1980-86
Offers	79%	67%	51%	44%	33%	34%	33%
Placings	55%	49%	45%	32%	31%	27%	27%

Figure 3-9: Balance Sheet Disclosure 1917-58

"No. of Items" equals the number of separate items on both the assets and liabilities sides of the balance sheet or professional asset valuation statement (in the absence of a balance sheet), excluding sub-totals. The 1917 observation is based on a single IPO. N=849 and excludes start-ups.

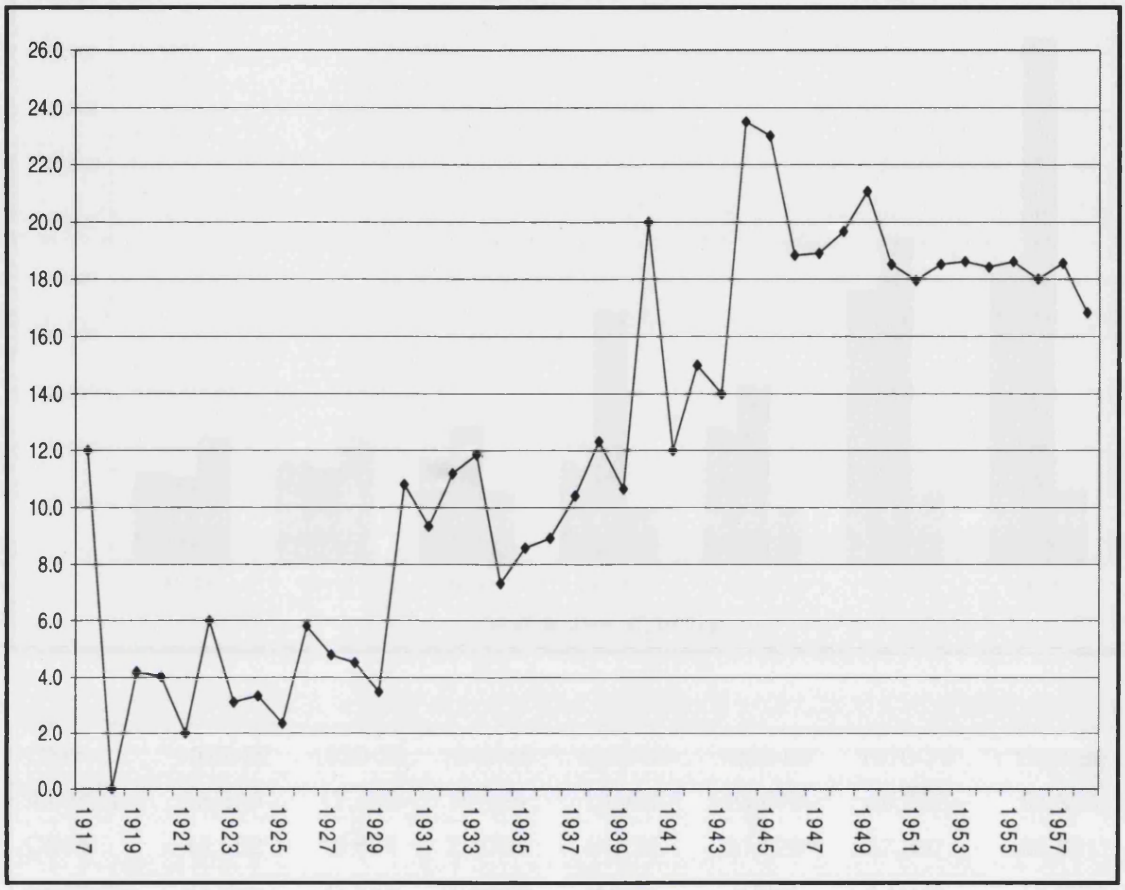
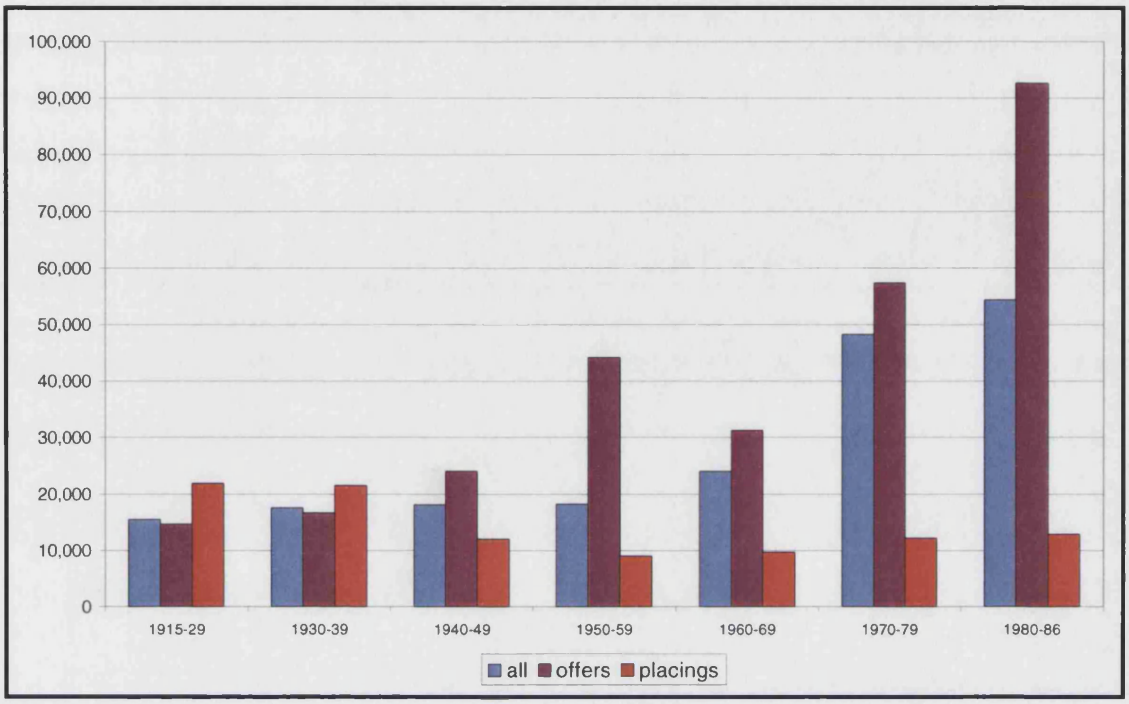


Figure 3-10: Firm Size of IPOs 1917-86

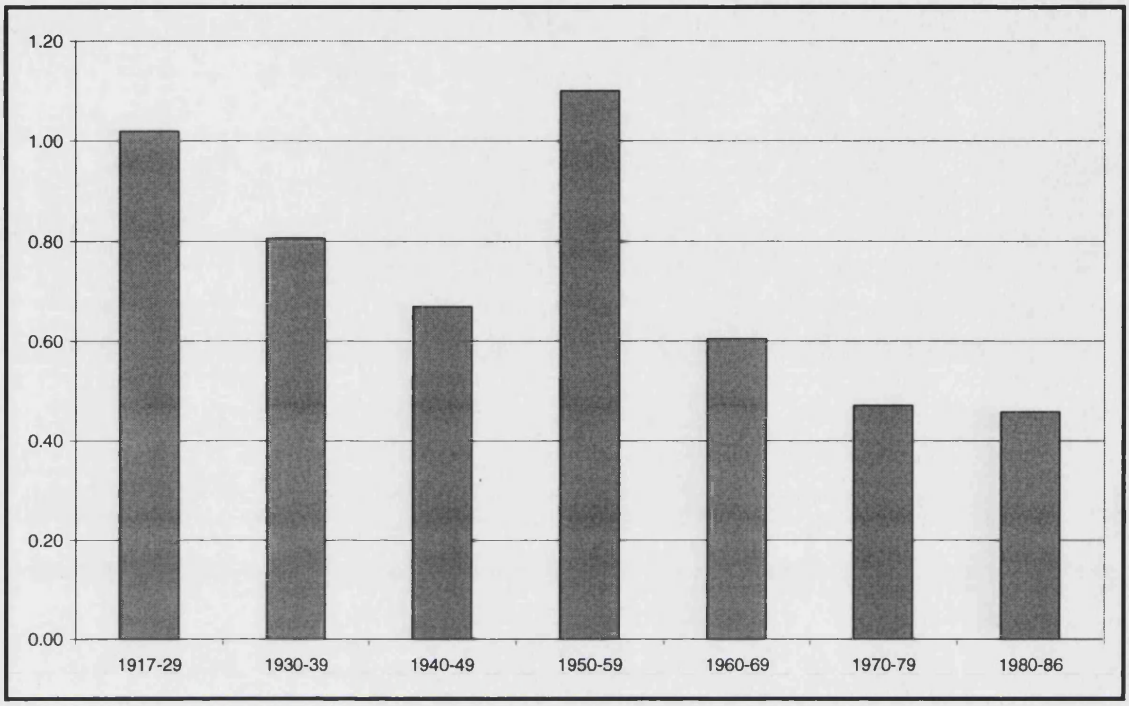
Firm size is defined as voting share market capitalisation of the IPO at the offer price expressed in 2004 prices. N=2550.



£000	1917-29	1930-39	1940-49	1950-59	1960-69	1970-79	1980-86
All IPOs	15,529	17,499	18,125	18,237	24,070	48,252	54,334
Offers	14,582	16,684	24,056	44,188	31,328	57,367	92,601
Placings	21,905	21,552	12,018	8,983	9,680	12,235	12,902

Figure 3-11: IPO Valuations 1917-86

Book value to offer price (BVP) is defined as ratio of the proforma net asset value attributable to voting shareholders per share to the offer (or placing) price. N=2390. Missing obs.=160.



(x)	1917-29	1930-39	1940-49	1950-59	1960-69	1970-79	1980-86
BVP	1.02	0.81	0.67	1.10	0.61	0.47	0.46

CHAPTER 4: IPO UNDERPRICING 1917-86[158]

I define underpricing as the rise in the share price at the end of the first day of trading over the offer price. The difference represents a positive initial return to investors in the IPO. It also represents the difference between the proceeds the firm actually received as opposed to what they should have received had offer pricing been more accurate. The greater is this positive return, the lower are gross IPO proceeds and therefore the greater is the money issuing firms and selling shareholders have "left on the table".

Underpricing is a well documented feature of international IPO markets over the last three decades. Previous empirical studies of underpricing were reviewed in chapter 1. Several British empirical studies ranging over the period between 1959 and 2002 have also reported IPO underpricing significantly different from zero (Table 4-1). The latest study by Ljungqvist (2003) reported mean underpricing of 29.10% between 1991 and 2002. There has been no underpricing study in Britain prior to that of Merrett, Howe and Newbould (1967) over the period 1959-63, despite *The Economist* pointing out that issuers were leaving considerable sums of money on the table as early as 1929.[159]

In this chapter, I examine underpricing behaviour between 1917 and 1986. The choice of end date is intended to coincide with Big Bang and reflects the fundamental changes marking the beginning of the end of the fixed offer price regime. With a new IPO data set covering the period 1917-79, supplemented by data predominantly from Buckland and Davies (1989) for the period up to Big Bang, I consider three main questions in this chapter. Firstly, is there evidence of underpricing in this period and how does it compare to the results from existing studies of the modern period? Secondly, to what extent can existing theory explain observed underpricing? Lastly, did the improvements in regulation, financial disclosure and investor protection and the emergence of a more orderly underwriting market in the second half of the century discussed in chapter 2 reduce underpricing, other things being equal?

The results of this chapter confirm the existence of positive first-day returns averaging 12.14% across 2436 IPOs on the LSE between 1917 and

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[158] There were no IPOs falling into my sample for which share prices were available in 1915 and 1916.

[159] 27 July 1929, p.175-6.

1986, excluding tender offers.[160] Returns were statistically significantly different from zero in all decades. Contrary to my prior expectation, underpricing rises over time. Having averaged only 7.65% in the interwar years, returns rose to average 15.25% between 1955 and 1986.[161] I have modest success in fitting a linear model of underpricing to this data. Controlling for the changing risk composition of the IPO sample, issue method and overall equity market conditions, this puzzling underpricing result still holds.

The outline of this chapter is as follows. In section 4.1, I review the theory of underpricing relevant to the period and set out a simple linear model for underpricing in section 4.2. Section 4.3 discusses data issues specific to estimating underpricing. Section 4.4 presents my results and section 4.5 summarises.

4.1 Explanations of underpricing 1917-86

Having reviewed the literature on underpricing theory in chapter 1, I recapitulate on the points most relevant to modelling the behaviour of underpricing over the period 1917-86.

Theory has run ahead of the ability of empiricists to go back in time in order to test it. Some theories are not relevant to this period. As I argued in chapter 1, irrelevant theories include signalling, information revelation and legal liability theories. Signalling is precluded by the adoption of pre-emptive rights after 1945. The information revelation hypothesis assumes book-building of the IPO, a method not employed in Britain until after Big Bang. Tender issues have some of the characteristics of book-building. Given their differences from fixed price offers, they are excluded here and discussed in the next chapter. Legal liability theories are ruled out by the unwillingness of the British legal system to allow shareholders resort to any claim for damages.[162]

Most recently, the surge in underpricing in both the US and the UK at the end of the nineties spawned an interest in behavioural explanations focussing upon the influence of "irrational" investors prepared to bid up IPO share prices

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[160] This mean return is 10.37% excluding the USM IPOs.
[161] Excluding the USM IPOs, the 1955-86 mean is 13.18%.
[162] Jenkinson (1990), p.46.

beyond their fair value.[163] This type of hypothesis is more amenable to explaining hot IPO markets than any structural changes in underpricing over time. The experience of the late nineties, particularly in the US, also gave rise to hypotheses built on new varieties of agency problem between IPO participants.[164] Their relevance to earlier periods is open to doubt given the different institutional environment.

Notwithstanding the foregoing, I am still left with some hypotheses to help explain underpricing in 20th century Britain, although not all these hypotheses are amenable to testing given data limitations.

The winner's curse, first put forward by Rock (1986) to explain IPO underpricing, claims that uninformed investors are disproportionately successful in being allotted shares in poor quality and overpriced IPOs, which informed investors are able to spot and avoid. In order to avoid their total withdrawal from participating in IPOs, these investors therefore need compensating for their losses by average underpricing. In the absence of data on IPO share allocations, I cannot directly test this hypothesis at present.

Beatty and Ritter (1986) argued that the greater is the *ex ante* uncertainty as to the firm's fair value, or valuation uncertainty, the more it is worth an investor becoming informed about the issuing firm. If one thinks in terms of an investor holding an implicit call option to buy an IPO, then the investor will exercise this option if the fair value of the issuing firm exceeds the offer price. This option becomes more valuable, the greater is the valuation uncertainty. This uncertainty provides an incentive for investors to become informed. An increase in the number of informed investors exacerbates the winner's curse. Consequently, underpricing will be greater, the more uncertainty there is. I make use of firm risk variables, such as size, age, valuation and whether or not a firm undertakes R&D activity, as proxies for information gaps between issuing firms and investors and as explanatory variables for underpricing. Chan, Lakonishok and Sougiannis (2001) claimed that quoted R&D-intensive firms suffer excess share price volatility due to the greater uncertainty of their future cash flows. Their finding can be extended to cover R&D-intensive IPOs.

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[163] Ljungqvist (2004), p.57-64.

[164] See Loughran and Ritter (2002) for a discussion of "prospect" theory and Loughran and Ritter (2004) for a discussion of the "analyst lust" and "spinning" hypotheses.

If information gaps cause a problem for investors in evaluating IPOs, then certification by reputable investment banks underwriting an IPO and by reputable accountants auditing financial statements disclosed in a prospectus should minimise the extent of underpricing. Similarly, better prospectus disclosure, as measured by the number of items disclosed in the balance sheet, and tougher listing requirements such as the number of years of historic profits disclosed ("track record"), should lower underpricing, other things being equal.

Explanations based on agency problems both between investors and issuing firms, as well as between the firms and investment banks, are also relevant to this period. Theories based on the former are of two main types, the realignment of incentives hypothesis and ownership and control hypotheses. In the first case, the issuing firm may care more about underpricing if a greater portion of the firm is being sold ("marketability"). The price pressure hypothesis would suggest the opposite relationship, namely, that the more shares are sold at IPO, the more the market price would decline when trading begins. This hypothesis has not received empirical support in the literature.[165] Habib and Ljungqvist (2001) focus on the proportion of those shares sold at IPO which are vendor shares, which are shares sold by existing shareholders, usually, managers, directors, and other "inside" shareholders, as opposed to primary shares, which are issued by the firm. The greater the proportion of vendor shares sold in the IPO, the more managers care about underpricing. Ljungqvist and Wilhelm (2003) refine this hypothesis by showing the importance of the size of managerial shareholdings. The more of his total shareholding being sold at IPO, the more the manager is motivated to minimise underpricing. Similarly, the smaller their stake in the firm seeking a listing, the less incentivised are managers to be good agents for other shareholders. In either case, prospectus disclosure as to whether the shares offered at IPO were vendor or primary shares and regarding directors' shareholdings in the firm was too inconsistent in the 1920s to allow these hypotheses to be tested across the whole period. I can, however, test for the influence of marketability on underpricing throughout the period.

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[165] Marsh (1979) tested this hypothesis on UK rights issues between 1962 and 1975 against the alternative "substitution" hypothesis, which says that there is a large supply of risky assets (or shares) which are close substitutes, and found in favour of the latter.

Regarding ownership and control theory, as argued in chapter 1, the Brennan and Franks view that underpricing is a deliberate strategy employed by non-selling managers of issuing firms to spread ownership at the time of IPO and retain control of the firm is most appropriate to this period. However, my lack of data on IPO share allocations does not allow me to test this hypothesis.

Baron (1982) considered agency problems between issuers and underwriting banks and argued that investment banks were incentivised to underprice IPOs in order to minimise the effort expended in selling the deal to investors. This view has been challenged by Muscarella and Vetysupens (1989) on the grounds that, although IPOs by US investment banks should not exhibit effort avoidance if Baron's hypothesis is correct, they have been underpriced just as much as those of their clients. Unfortunately, there were only 11 IPOs by issuing houses on the LSE between 1917 and 1986, which represents too small a sample to test these hypotheses. Problems between investment banks and issuing firms can be ameliorated where there is a longer-term commitment between the two, as for example, when the investment bank takes a seat on the board of directors of the issuing firm. Board representation should moderate underpricing *ceteris paribus* and is part of my data set.

Those hypotheses which are both relevant and amenable to empirical testing in the period in question are summarised in Table 4-2 along with a related explanatory variable and in each case its hypothesised impact on underpricing. I use these variables to construct a simple linear model of underpricing in the next section.

4.2 A model of underpricing

Treating my sample of IPOs between 1917 and 1986 as a cross-section, I test these various hypotheses with a simple linear model of underpricing employing the explanatory variables listed in Table 4-2. The dependent variable is the first-day return of the IPO (D1RET). Since the daily FT30 Index was only published from 1935, I am unable to adjust for market movement between the date of publication of the prospectus and the first day of trading across the whole sample in the absence of daily market index levels. Hence, I include the length of this period (T) as a right hand side variable. The linear regression model is as follows:

$$D1RET = \beta_1*LNMCAP + \beta_2*LNBVP + \beta_3*RD + \beta_4*TRACK + \beta_5*UW + \beta_6*MKTABILITY + \beta_7*PLACING + \beta_8*YEAR + \beta_9*SEDOL + \beta_{10}*MRET + \beta_{11}*T + \varepsilon$$

where the error term, ε, is assumed to be i.i.d. normal and where:

a) LNMCAP, the natural logarithm of market capitalisation at the offer price in constant 2003/04 prices, is a proxy for firm size. Firm age, LN(1+AGE) is an alternative proxy. Age is calculated from the foundation date of the underlying business rather than the incorporation of the firm which usually occurs later and where both are disclosed; otherwise, the date of incorporation is used. The *ex ante* uncertainty hypothesis implies negative coefficients on both variables.

b) LNBVP, the natural logarithm of the book value to offer price ratio, measures firm valuation where book value is the *proforma* post-IPO net asset value per share attributable to voting shareholders. Alternative measures are dividend yield and price earnings ratios but data on these variables was not available across the whole period. The *ex ante* uncertainty hypothesis implies a negative coefficient.

c) RD is defined by a dummy variable which takes the value 1 if the IPO prospectus indicates the firm undertaking R&D activity and 0 otherwise. The expected sign is positive.

d) TRACK, the number of years historic profits disclosed in the accountant's report included in the IPO prospectus, proxies financial disclosure. The expected sign is negative.

e) UW, an underwriting dummy variable, takes the value of 1 when an IPO is underwritten and 0 otherwise. Placings are treated as underwritten, unless it is clear from the prospectus they are conducted on a best efforts basis. The certification hypothesis implies that underpricing will be greater, if an IPO is not underwritten and therefore a negative sign is expected; and

f) MKTABILITY, the proportion of the total shares outstanding sold at IPO, is one test of the realignment of incentives hypothesis. The issuing firm's managers care more about underpricing, the more shares are being sold. A negative coefficient is expected. The proportion of vendor shares offered (VENDOR) is a more precise test of the same hypothesis. I do not have this data for IPOs before the 1930s due to inadequate disclosure.

I control for issue method by the use of a dummy variable which takes the value 1 if the IPO is a placing and 0 otherwise. Year dummy variables, indicating the calendar year in which the IPO took place (YEAR), and industry dummy variables based on SEDOL classification (SEDOL) are also employed as control variables. Equity market conditions are proxied by lagged market returns, either 1 month or 3 months prior to the first day of trading, (MRET). For IPOs prior to 1935, the lagged market returns are estimated over 1 and 3 month periods up until the end of the month before the first day of trading. Daily volatility of the market over the 90 days prior to trading can only be estimated for IPOs after March 1935.

Alternative explanatory variables to test for prospectus disclosure, such as, a dummy variable for the audit of financial statements disclosed in the prospectus (AUDIT), and a count of the number of lines disclosed in the balance sheet (ITEMS) were also included in the model. I also made use of a dummy variable for whether the underwriter had representation on the board of the issuing firm at the time of the IPO (BoD).

4.3 Data

I discussed my data set in detail in the previous chapter. Here I recapitulate on the main points specifically relevant to modelling IPO underpricing.

Following modern empirical studies, underpricing in this study is defined as the percentage change between the mid-point of the closing bid and ask quotations in the SEDOL on the first day of trading and the offer price. Where bid-ask was not quoted, I collected all price quotations, or "marks". Since the marks in SEDOL are not time-ordered, I was unable to identify the closing price and so took the simple average of all marks on the first day.

There were 320 IPOs with call features, equivalent to 54% of all IPOs, in the interwar years. Thereafter, there were none in my data set excluding the privatisations of the 1980s. According to the prospectus, shareholders had a legal obligation to meet the outstanding calls when due, or otherwise faced forfeiture of their shares according to the terms of the prospectus. I have taken

account of this obligation by calculating first-day returns based on the fully-paid offer price. Most call periods extended from a month up to a year and occasionally some calls were undated. I assumed that the investor earned the 3-month Treasury Bill rate on the call money up until the date of call. Accordingly, I estimated first-day returns based upon the percentage change in the share price quoted on a fully-paid basis and the present value at the first dealing date of the fully-paid offer price discounting any outstanding calls at the bill rate. Where the shares were not quoted on a fully-paid basis, I added the outstanding calls to the partly-paid price. In the 44 cases where shares had undated calls outstanding, I assumed that these would not be called and estimated first-day returns based on the partly-paid share price and offer price *ex* the undated call.

Table 4-3 sets out the descriptive statistics and a correlation matrix of the explanatory variables employed in the regression analysis reported in the next section.

The discussion of the annual time series of mean first-day returns is based on 2436 IPOs between 1917 and 1986, including 266 IPOs on the USM between 1980 and March 1985 but excluding tender offers[166]. Data on such explanatory variables as firm age, underwriting arrangements, net asset values and R&D activity are not included in the data set of Buckland and Davies (1989) which covers USM as well as Official List IPOs. The multiple regression results presented in the next section are based on 2170 IPOs between 1980 and 1986, excluding both the USM IPOs and the tender offers, unless otherwise stated.

A word is necessary on the IPOs occurring during 1940 to 1944. Essentially the British stock market, although open for share trading, was shut down for new issues during both world wars. As a result, there were only 4 public issues during WW1 and 8 placings during WW2 in my data set. The 8 IPOs in 1945 took place after the end of the war in Europe. Before 1945, statements in the Times Books usually did not indicate the price at which shares were placed with outside investors, only the price at which shares were acquired by the sponsor. The spread between these two prices represented the sponsor's profit. Failure to take this into account would upward bias underpricing. The 8 placings between 1940 and 1944 did not disclose the

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[166] 10 of the USM IPOs were tender offers.

placing price which I estimated in order to obtain some measure of underpricing during these years.[167] I also included 5 SEOs in 1930, a year in which there were no IPOs at all following the collapse in the stock market.

Table 4-4 summarises the IPO returns of the 2170 IPOs by SEDOL classification. As already noted, IPOs in the "Commercial, Industrial, etc." sector represent almost 80% of all IPOs.

4.4 Results

I firstly present my results on the annual time series of mean underpricing, then examine how IPO characteristics influence underpricing univariately, and lastly, estimate the linear model set out in section 4.2 in order to analyse the behaviour of underpricing over time.

(i) Annual Time Series of Underpricing

The annual time series of equally-weighted (EW) mean underpricing for the 2436 IPOs between 1917 and 1986 is graphed in Figure 4-1 along with mean underpricing results from recent IPO studies. Table 4-5 displays the underlying data for all IPOs as well as by issue method. Table 4-6 aggregates the data into decades with the exception of the first and last periods which reflect the choice of the 1917 start and the 1986 end dates. Also displayed are standard deviations, medians, the proportion of IPOs with a positive first-day return and the mean number of days between publication of the prospectus and initial trading (T). Table 4-7 presents mean underpricing by issue method for these same sub-periods.

As Figure 4-1 illustrates, there is a cycle of "hot" and "cold" markets in underpricing. In the case of 1919 (20.60%, Table 4-5) and 1945-46 (23.35%, 14.55%), this is a reaction to the relaxation in capital market controls on IPOs following the end of war. The 15.30% average underpricing between 1940 and 1944 is based on only 8 observations and is only an approximation, as explained in the previous section. Other than the surge in underpricing which

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[167] I assumed the broker took a turn of 15% based on the average difference between the placing price and the price paid by the broker for 7 IPOs between 1941 and 1945 where there was full disclosure.

takes place at the very end of the century, the most striking feature of the chart is the unexpected rise in underpricing from the mid-fifties onwards. Equally-weighted (EW) mean underpricing was 8.93% and 5.70% in the interwar decades but then increased in the 1950s, 1960s and in 1980-86 to 11.87%, 14.12% and 21.73% respectively (Table 4-6). In the 1970s, underpricing dipped just below 10%. The same pattern is visible in median underpricing. In fact, median underpricing in the interwar years was only around 1%.

When issue method is taken into account, there is a marked tendency for underpricing of placings to exceed that of public offers and issues (Figure 4-2 and Table 4-7). This is particularly true during the interwar years. Thereafter the gap narrowed reflecting the attempts of the LSE to improve the transparency of the placing method. The fact that underpricing of placings in the period 1980-86 widened once more reflects the choice of this method by small firms listing on the USM and the prohibition by the LSE of placings above £3 million.[168] Notwithstanding the behaviour of placings, the unexpected rise in mean underpricing of public issues and offers from the mid-1950s onwards remains.

(ii) IPO characteristics and Underpricing

The univariate relationships between underpricing and firm size (MCAP), firm age (Age), book value to offer price (BVP), length of disclosed profits track record (TRACK) and the proportion of an issuing firm's outstanding ordinary shares sold at IPO (MARKETABILITY) are described in Table 4-8. Ignoring the few observations falling into the restricted war years, the data set is divided into the interwar period 1919-39, the period immediately after WW2 up to 1949, the period from 1950 up to the establishment of the USM in 1979, and the run-up to Big Bang 1980-86. IPOs are sorted by characteristic into quartiles within each period and the equally-weighted mean first-day return is estimated for each quartile. If underpricing varies negatively with market capitalisation, as hypothesised, we should observe a monotonic decrease in underpricing as capitalisation increases, other things being equal. At the minimum, the smallest 2 quartiles should display higher underpricing than the largest 2 quartiles. I am

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[168] Jackson (1986), p.532

missing firm age and firm valuation data for the USM IPOs in the 1980s. Hence, there are fewer observations for these two variables.

There is a clear monotonic relationship between firm size and underpricing in 1980-86 only, whilst from 1945 to 1986 the largest two quartiles are underpriced less than the smallest two quartiles. The evidence that underpricing decreases with age is strongest in the period 1950-79 and again in 1945-49. There is no relationship in the interwar years and in 1980-86 the oldest firms suffer the greatest underpricing. Only in 1950-79 is greater valuation uncertainty associated with more underpricing. Again in 1980-86 and also in 1945-49, there is some evidence of the opposite relationship. With the exception of the last period, the two quartiles with the shortest track records are, as expected, more underpriced than the two longest two quartiles. These results suffer from the lack of variability in track record reflecting the impact of tighter LSE regulation from the 1950s onwards. Greater marketability is, as expected, associated with lower underpricing in all periods. In 1950-79, there is a clear monotonic decrease of underpricing as the proportion sold increases. I also examined the proportion of vendor shares sold at the IPO (VENDOR) starting in 1930 but there was no relationship with underpricing in any period. These results are not shown.

Summarising, univariate analysis gives modest support for the hypothesised relationships between underpricing and firm size, firm age, length of track record and firm valuation. Marketability has the strongest association with underpricing in all periods. Looking across time, the clearest support for the five hypothesised relationships is found in the period 1950-79.

As Loughran and Ritter (2004) pointed out, the changing risk composition of the IPO population is one reason for observed shifts in underpricing. How might the changes in IPO characteristics across the whole period 1917-86 explain underpricing? The shifts in mean IPO characteristics discussed in the previous chapter up are summarised in Table 4.9. Up until the start of the USM in 1980, firms became larger and older, were more likely to have their IPOs underwritten and to disclose an audited net asset value, had longer track records and were selling fewer primary shares in the IPO post 1945 compared to the interwar years. These changes should lower underpricing other things being equal. On the other hand, the observed decline in the marketability of IPOs is expected to raise underpricing, as might the upward drift in firm

valuations (lower BVP). However, whilst in cross-section higher firm valuations equate with greater *ex ante* uncertainty other things being equal, a rise in valuations over time does not necessarily do so. The latter may reflect the increased appetite of institutional investors for equity investments and the better macro-economic background of the Golden Age compared to the turbulence of the interwar years.

(iii) Multiple Regression Results

One way to unwind this tangle of univariate relationships is to analyse underpricing in a multivariate framework. I have run OLS regressions of the underpricing model set out in section 4.2. Regression results are summarised in Table 4-10.

All regressions use year dummy variables, industry dummy variables based on SEDOL classifications, and a lagged market return variable for one month or three months prior to the first day of trading, or to the end of the month prior to the first day of trading as appropriate. Daily market volatility over a 90 day window prior to the first day of trading could only be estimated starting from early 1935, when the FT30 Index was published on a daily basis. It did not enter significantly into any regressions, implying that underpricing did not fluctuate directly with overall equity market uncertainty.

Regressions (1) to (8) are estimated on 2170 IPO observations, excluding USM IPOs and tender offers. Missing variables are most problematic in the case of book values. All variables are of the correct sign with the exception of LNMCAP. UW and MKTABILITY are significant at the 1% level, LNBVP at the 5% level and RD and TRACK are only marginally significant. Regression (8) represents the model with the best statistical fit to the data. LN(1+AGE) has the wrong sign but is not statistically significant. TRACK, RD, UW and MKTABILITY are all statistically significant at least at the 5% level. These variables are also economically significant. A two standard deviation increase in the length of track record and in marketability would lower underpricing by 3.58% and 4.76% respectively other things being equal. An underwritten IPO would benefit underpricing by 5.53%. An IPO undertaking research and development activity would suffer 4.10% higher underpricing. The substitution of LN(1+AGE) with LNMCAP yields very similar results (not shown).

These results in general agree with those from the univariate analysis. Several variables have significant coefficients and carry the correct sign. Whilst the overall explanatory power of the regressions is disappointing, this is not untypical for this type of underpricing model under a fixed offer price regime. It is not clear why firm size and age do not have better explanatory power. In the interwar years, LN(1+AGE) is marginally statistically significant but the wrong sign (regression (10)); in the post war period, the coefficient is the correct sign but not significant (regression (11)). These results may be attributable to a material number of IPOs in the interwar period being those of mature firms acquired by a new firm applying for a listing and where management retained control. In such cases there was little or no disclosure about the history of the underlying business. Disclosure about the age of mining and plantation IPOs pre-1929 was particularly poor in this regard. There were 87 such IPOs in the data set.

Alternative explanatory variables, namely, dummy variables for an audited balance sheet (AUDIT), the number of items in the balance sheet (ITEMS), the dummy variable for underwriter representation on the board (BoD) and the proportion of vendor shares sold at IPO (VENDOR) did not have any statistical significance. These results are not reported.

Having controlled for the influence of the above explanatory variables what happens to underpricing of IPOs over time? I have graphed in Figure 4-3 the coefficients of the YEAR dummy variables from regression (8) along with their 99% confidence intervals. The graph confirms my earlier claim that underpricing rises from the mid-fifties onwards, once these variables are controlled for. Somewhat more rigorously, a Wald coefficient test, or F-test, rejects the null hypothesis of the average coefficients for 1920-39 and 1955-86 being equivalent at the 1% level. The F-statistic is 10.50 (p-value is 0.001). The rise in underpricing is 6.58%. The widening of the interwar period dummy variable to include the 1919 IPOs does not affect this result.[169]

Does this result imply that regulation, and the 1948 Companies Act in particular, had little or no impact on underpricing? There are several challenges in trying to model the impact of the 1948 Companies Act, which became law in July. The first is that IPOs are highly clustered in the two and a half years just

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[169] F-statistic is 9.35, p-value is 0.002 and the difference in means is 6.06%.

before the Act was passed, a period when the ICAEW, as we know, was anticipating the Act and urging fuller disclosure on firms through its members. Due to wartime restrictions there are virtually no IPOs between 1940 and 1945. The second challenge is that the financial disclosure provisions of the 1948 Act were as much about the quality as the quantity of disclosure and it is difficult to find a variable which reflects this quality dimension. Lastly, the LSE, as mentioned in chapter 2, were strengthening their own vetting of IPOs and, for example, required consolidated accounts of holding companies from 1939 onwards. It is difficult if not impossible to isolate the influence of such self-regulation from that of statutory law, given the lack of IPO observations between 1939 and the run up to the 1948 Act.

An alternative, but indirect, way to test for the impact of the 1948 Act is firstly to test for the stability of the basic underpricing model before and after 1948 and then to examine whether the coefficients on firm valuation (lnBVP) and track record improve in statistical and economic significance. A Chow breakpoint test indicates that there is a structural break in the basic underpricing model. When the sample was partitioned in July 1948, the null hypothesis of stability in the model was rejected at the 1% level. The structural break is confirmed by a comparison of regressions (10) and (11) in Table 4.10 which split the sample into two sub-periods straddling wartime, the period marked by the establishment of the Issuing Houses Association in 1945 and the passage of the 1948 Companies Act. Whilst the coefficients in regression (10) are statistically insignificant apart from the UW dummy variable, those on LNBVP and TRACK become both highly statistically significant as well as economically significant in regression (11). The significance of these two variables is perhaps indicative of the greater reliability of book values and profits disclosed in prospectuses and the greater confidence of investors in reputable underwriters having done their due diligence on issuing firms in the post 1945 period.

(iv) Robustness

Early studies of British IPOs defined underpricing over a period from the first two days to the first week of trading (Table 4-1). I therefore also estimated underpricing by partial first month returns to verify whether underpricing had any tendency to increase beyond the first-day. For the interwar period, these

returns were not statistically significantly different from first-day returns. Mean partial first month returns could only be adjusted for overall market movement beginning in 1935 when the daily FT30 index started. Accordingly, the mean adjusted partial first month return was 2.72% as against a mean first-day return of 2.26% for 153 IPOs between 1935 and 1939. The unadjusted mean partial first month return for 348 IPOs between 1917 and 1929 was 9.0% as against a mean first-day return of 9.1%. Similarly, the 53 IPOs between 1930 and 1934 had unadjusted partial first month returns of 3.63% as against first-day returns of 5.03%. None of these differences in means are statistically significant. I also checked adjusted partial first month versus first-day returns for the five year period just after WW2, 1946-50, and again over the period of the Merrett, Howe and Newbould study, 1959-63, these authors having argued that all underpricing could not show up on the first day. In each case, first-day returns were 5.40% and 17.28% as against adjusted partial first month returns of 6.43% and 20.65% respectively. Both differences in means were not statistically significant.

Davis and Yeomans (1975) adjusted their estimates of underpricing for the overall movement in the market between the estimated date of setting the offer price and the first week of trading to reflect the inability of issuers and underwriters to incorporate fully any change in market conditions. I, therefore, also estimated first-day returns adjusted for market movement between the date of publication of the prospectus, approximating the date of setting the offer price, and the first day of trading. As mentioned above since the daily FT30 index was only published from 1935, I could not adjust first-day returns before that date. The market-adjusted returns since 1935 were not statistically significantly different from the unadjusted first-day returns (Table 4-11).

I have used White heteroscedasticity-consistent standard errors in all regressions in an attempt to deal with the problem of clustering in IPO observations and the resulting heteroscedasticity. In regression (9), I re-estimated the model in regression (8) after removing 62 outlier observations, defined as those IPOs with returns falling outside 2.5 standard deviations either side of the mean for the whole period. The main difference between the two regressions is the decline in both the statistical and economic significance of the UW and MARKETABILITY variables. The overall explanatory power of the regression increased slightly. The main result stands and a Wald-test again

rejected the equality of the coefficients on the interwar and post-war period dummy variables.[170]

Unlike equally-weighted (EW) returns, capitalisation-weighted (CW) mean first-day returns do not rise over time. In the period after 1945, the EW mean is greater than the CW mean, as would be expected if larger firms are less risky and therefore less underpriced. However, this expected relationship does not hold for the interwar years and for the 1930s in particular. This result could be attributable to my use of ordinary share market capitalisation which excludes non-voting preference shares. These shares may have been used more frequently by large firms and their exclusion might underestimate the size of large firms as perceived by interwar investors.

Finally, I have excluded 164 dual share IPOs from the foregoing analysis. In fact, these IPOs, priced as a package of ordinary and preference shares based on the terms of application disclosed in the prospectus, exhibited overpricing, or negative first-day returns of 2.9%, on an equally-weighted basis. On a capitalisation weighted basis, this overpricing virtually disappears (-0.3%). The ordinary share component was usually underpriced and the preference share component overpriced reflecting the intentions of the insiders and promoters in launching this type of issue. Post-IPO trading activity was channelled into the low-priced ordinary shares, of which the insiders owned the majority, at the expense of the preference shares, the vast majority of which were issued to outside investors. When dual share IPOs are added to the sample and a dummy variable for dual share IPOs included, the main results from the multiple regressions in Tables 4-10 do not change, although the dummy on dual shares has a negative coefficient which is statistically significant.

4.5 Summary

Underpricing was a consistent feature of the IPO market from WW1 up to 1986. I have modest success in modelling IPO underpricing. I find support for the certification hypothesis and for better disclosure in the form of longer track records moderating underpricing. Furthermore, after 1948, there is perhaps

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[170] F-test statistic is 28.81 (p-value=0.000). The difference between the interwar and post-war means is 7.14%.

evidence that better disclosure brought on by the Companies Act of that year improved the performance of the model.

The major finding of this chapter is that, contrary to my expectations and the improvements in regulation, disclosure, investor protection and underwriting after WW2, there was no decline in mean first-day returns in the second half of the century. On the contrary, returns increased from the mid-fifties onwards compared to the interwar years. This result still holds when changes in the risk composition of the IPO sample and issue methods are taken into account. In contrast, capitalisation-weighted returns do not exhibit any increase over time. On the basis that we should be as interested in the experience of the "average" firm undertaking an IPO as of the largest firms compared to the smallest, I believe that the equally-weighted results deserve particular attention.

At present I cannot explain this puzzling rise in underpricing. There are several plausible hypotheses one of which relates to the change in the role of the issuing house over the last century and the possibility of their exercising monopsonistic power. A fragmented interwar underwriting market in which the reputable merchant banks did not participate became a considerably more organised market post-1945 with the Issuing House Association in its vanguard. The full implications of this change for IPO underpricing are examined in the next chapter. Other plausible hypotheses are discussed in the concluding chapter and provide a basis for my post-doctoral research.

Table 4-1: Previous Major Studies of British IPO Underpricing

OL is Official List, USM is Unlisted Securities Market and AIM is the Alternative Investment Market. Note that underpricing was not necessarily the only area of enquiry of the studies below.

Study	No. of IPOs	Period	Issue method	Mean Under-pricing	Underpricing definition
Merrett Howe & Newbould (1967)	357	1959-63	Offers 149	17.20%	End of day 2
			Placings193	24.97%	market-adjusted
			Other15	6.46%	
Davis & Yeomans (1975)	275	4/65 - 3/71	Offers 172	8.88%	End of first week
			Placings 60	19.08%	market-adjusted
			Other 43	6.93%	
Buckland Herbert & Yeomans (1981)	297	4/65 - 3/75	Offers only	9.67%	End of first week unadjusted
Buckland & Davies (1989)	331 OL&USM	1/80-3/85	Offers 56	15.68%	End of first week
			Placings 214	27.10%	market-adjusted
			Tenders 33	10.90%	
			Other 28	29.95%	
Jenkinson & Trundle (1990)	227 OL only	1/85 - 12/89	Offers 100	8.50%	Average of first week
			Placings 112	14.30%	market-adjusted
			Other 15	19.60%	
Levis (1993)	712 OL&USM	1/80 - 12/88	Offers 184	11.50%	End of first day
			Placings 528	15.28%	market-adjusted
Ljungqvist (2003)	1108 OL&AIM	1/91-12/02		29.10%	End of first day unadjusted

Table 4-2: Underpricing Theories Relevant to UK IPOs 1917-86

Hypothesis:	Explanatory variable:	Variable Name	Impact on underpricing
1. *ex ante* uncertainty:			
(a) firm risk	(i) firm age	AGE	-
	(ii) market capitalisation	MCAP	-
	(iii) book value to offer price	BVP	-
(b) technology risk	R&D dummy variable	RD	+
(c) industry risk	SEDOL sector	SEDOL	+/-
2. certification and disclosure	(i) underwriting dummy variable	UW	-
	(ii) audited balance sheet dummy variable	AUDIT	-
	(iii) length of profits record	TRACK	-
3. agency problems:			
(a) realignment of incentives	(i) proportion of shares outstanding sold at IPO	MKTABILITY	-
	(ii) proportion of shares issued at IPO which are existing or vendor shares	VENDOR	-
(b) between investment bank and issuing firm	(i) dummy variable for underwriter presence on board of issuing firm	BoD	-

Table 4-3: Descriptive Statistics and Correlation of Variables Used in OLS Regressions

D1RET is the first-day return on the IPO. AGE is firm age and LNAGE is the natural logarithm of (1+AGE). MCAP is the market capitalisation at the offer price in constant 2003/04 prices and LNMCAP is the natural logarithm. BVP is the book value to offer price ratio and LNBVP is the natural logarithm. TRK is the length of historic profits record disclosed by the IPO in years. Sold is the proportion of total shares outstanding sold at the IPO. UW is a dummy variable for whether the IPO was underwritten by a third party. R&D is a dummy variable indicating whether the firm engages in R&D activity or not. T is the no. of days between the publication of the prospectus and the first day of trading. N=2170, excluding USM IPOs and tender offers. Missing observations are 13 age observations, 159 book values, 11 underwriting dummy variables, 2 R&D dummy variables and 1 T period. 2 of the missing book values are due to firms having negative net worth after deducting goodwill.

Panel A: DESCRIPTIVE STATISTICS

	D1RET %	AGE yrs	LNAGE	MCAP £000	LNMCAP	BVP x	LNBVP	TRACK yrs	AUDIT	UW	MKT-ABILITY	RD	T days
Mean	10.37%	36.93	3.04	27,565	16.37	0.76	-0.51	7.11	0.81	0.91	0.45	0.07	12.32
Median	5.40%	27.00	3.33	11,367	16.25	0.66	-0.41	10.00	1.00	1.00	0.37	0.00	10.00
Maximum	212.91%	256.00	5.55	1,901,537	21.37	5.30	1.67	41.00	1.00	1.00	1.00	1.00	495.00
Minimum	-61.00%	0.00	0.00	533	13.19	0.10	-4.61	0.00	0.00	0.00	0.03	0.00	0.00
Std. Dev.	23.00%	35.76	1.33	77,369	1.06	0.56	0.73	4.23	0.39	0.29	0.26	0.25	19.88
Skewness	2.970	1.691	-0.962	12.793	0.717	2.975	0.875	-0.075	-1.570	-2.820	0.956	3.482	14.818
Kurtosis	18.935	7.118	3.282	233.005	3.992	18.044	6.052	4.539	3.465	8.951	2.758	13.127	277.200
N. Obs.	2170	2157	2157	2170	2170	2011	2011	2170	2170	2159	2170	2168	2169

Panel B : CORRELATION MATRIX 1917-86

Common sample. N=2000.

	D1RET	AGE	LN(1+AGE)	MCAP	LNMCAP	BVP	LNBVP	TRACK	UW	MKTABILITY	RD	T
D1RET	1.000	-0.036	-0.010	0.023	-0.009	-0.028	-0.054	-0.004	0.087	-0.063	-0.151	0.044
AGE		1.000	0.804	0.108	0.127	0.107	0.111	0.372	0.262	0.043	-0.160	-0.021
LN(1+AGE)			1.000	0.083	0.123	0.005	-0.002	0.620	0.504	0.105	-0.314	-0.018
MCAP				1.000	0.593	-0.051	-0.097	-0.041	0.069	0.048	-0.105	0.086
LNMCAP					1.000	-0.260	-0.320	0.027	0.179	0.142	-0.244	0.090
BVP						1.000	0.849	-0.074	-0.172	-0.159	0.149	-0.057
LNBVP							1.000	-0.088	-0.220	-0.148	0.215	-0.039
TRACK								1.000	0.584	0.137	-0.390	-0.031
UW									1.000	0.154	-0.565	0.024
MKTABILITY										1.000	-0.067	0.020
RD											1.000	-0.005
T												1.000

Table 4-4: SEDOL Classification of IPOs 1917-86

N=2170. Transport combines Shipping and Tramways and Utilities combines Gas and Electrical Lighting & Power.

SEDOL SECTOR	N	%	MEAN RET%
TEA, COFFEE & RUBBER	50	2.3%	16.69%
MINING	75	3.5%	11.46%
OIL	31	1.4%	8.55%
PROPERTY	137	6.3%	10.32%
BANKS	20	0.9%	7.66%
FINANCIAL TRUSTS	39	1.8%	3.11%
INSURANCE	36	1.7%	19.18%
BREWERIES & DISTILLERIES	19	0.9%	10.45%
TRANSPORT	18	0.8%	1.88%
UTILITIES	6	0.3%	2.64%
IRON COAL & STEEL	28	1.3%	2.86%
COMMERCIAL, INDUSTRIAL, ETC	1711	78.8%	10.43%
	2170	100.0%	10.37%

Table 4-5: Annual Time Series of Mean First-day Returns and IPO Volume 1917-86

All means are equally-weighted (EW). There are 1439 Public Issues and Offers and 997 Placings totalling 2436 IPOs in all.

	ALL		PUBLIC ISSUES, OFFERS		PLACINGS	
	Mean	no.IPOs	Mean	no.IPOs	mean	no. IPOs
1917	-3.68%	1	-3.68%	1		0
1918	0.97%	3	0.97%	3		0
1919	20.60%	43	20.60%	43		0
1920	-0.60%	62	-1.45%	58	11.68%	4
1921	0.34%	3	0.34%	4		0
1922	5.80%	5	5.80%	5		0
1923	18.09%	13	18.09%	13		0
1924	-5.08%	8	-4.21%	7	-11.16%	1
1925	7.32%	39	4.22%	34	28.36%	5
1926	7.17%	20	-6.46%	13	32.47%	7
1927	6.53%	38	5.21%	29	10.77%	9
1928	9.03%	75	3.86%	64	39.12%	11
1929	16.57%	45	5.62%	38	75.96%	7
1930	-0.70%	5	-0.70%	5		0
1931	1.37%	3	1.37%	3		0
1932	13.58%	5	-4.89%	2	25.90%	3
1933	8.41%	10	2.09%	7	23.16%	3
1934	13.09%	36	1.53%	28	53.54%	8
1935	2.20%	49	0.57%	43	13.83%	6
1936	7.28%	65	4.35%	56	25.50%	9
1937	2.50%	48	1.02%	43	15.23%	5
1938	2.17%	9	-17.25%	4	17.71%	5
1939	-5.29%	3	-5.29%	3		0
1940	19.35%	1		0	19.35%	1
1941	-13.20%	1		0	-13.20%	1
1942	23.57%	1		0	23.57%	1
1943	57.33%	1		0	57.33%	1
1944	8.68%	4		0	8.68%	4
1945	23.35%	8		0	23.35%	8
1946	14.55%	60	15.33%	34	13.52%	26
1947	5.06%	96	3.42%	56	7.35%	40
1948	0.64%	64	-1.94%	35	3.74%	29
1949	2.07%	36	0.38%	13	3.03%	23
1950	3.54%	28	1.18%	5	4.05%	23
1951	4.98%	38	4.84%	9	5.02%	29
1952	7.74%	19	-5.94%	2	9.35%	17
1953	6.69%	32	0.95%	8	8.60%	24
1954	9.52%	40	3.29%	7	10.85%	33
1955	13.17%	39	15.18%	9	12.57%	30
1956	15.53%	15	0.61%	2	17.82%	13
1957	14.14%	23	-8.87%	3	17.59%	20
1958	14.34%	36	11.08%	10	15.60%	26
1959	19.20%	80	17.56%	37	20.61%	43

Table 4-5: Annual Time Series of Mean First-day Returns and IPO Volume 1917-86 (cont.)

	ALL		PUBLIC ISSUES, OFFERS		PLACINGS	
	Mean	no.IPOs	Mean	no.IPOs	mean	no.IPOs
1960	12.21%	93	8.65%	35	14.36%	58
1961	17.08%	59	15.65%	31	18.73%	28
1962	17.31%	68	12.90%	36	22.30%	32
1963	26.02%	49	22.66%	34	33.63%	15
1964	10.03%	65	8.65%	54	16.82%	11
1965	7.50%	57	5.87%	28	9.08%	29
1966	12.31%	30	11.79%	22	13.75%	8
1967	23.10%	26	20.96%	17	25.46%	9
1968	13.66%	50	10.49%	37	22.71%	13
1969	8.14%	52	5.42%	43	21.14%	9
1970	2.33%	53	2.21%	43	2.87%	10
1971	14.71%	59	13.60%	45	18.42%	14
1972	9.02%	88	9.68%	80	2.40%	8
1973	3.37%	43	5.51%	31	-2.17%	12
1974	21.25%	1	0.00%	0	21.25%	1
1975	19.50%	2	10.67%	1	28.33%	1
1976	15.40%	5	12.81%	5	28.33%	0
1977	19.51%	6	17.52%	3	21.49%	3
1978	25.51%	11	29.98%	8	13.59%	3
1979	32.49%	8	21.27%	5	43.70%	3
1980	19.1%	13	16.00%	5	21.41%	8
1981	18.0%	50	5.62%	12	11.38%	38
1982	34.9%	55	2.53%	11	19.96%	43
1983	31.1%	81	13.15%	22	22.70%	59
1984	20.5%	103	20.03%	30	16.14%	73
1985	11.7%	48	5.78%	30	9.06%	18
1986	8.6%	51	8.86%	36	10.08%	15

Table 4-6: First-day Returns of British IPOs by Sub-period 1917-86

Means are both equally-weighted (EW) and capital weighted (CW). Return>0 is the percentage of all IPOs within a given period with a positive first-day return. T is the number of days between publication of the prospectus and the first day of trading. EW mean returns are significantly different from zero at the 1% level for all periods shown below.

	EW mean return	median return	stdev return	t-statistic EW mean>0%	CW mean return	return>0 (% total)	T mean #days	No. of IPOs
1917-86	12.14%	6.33%	25.65%	23.54	11.89%	71%	12.3	2436
1917-29	8.93%	1.37%	36.04%	4.67	9.20%	55%	16.7	355
1930-39	5.70%	0.89%	23.89%	3.64	16.69%	57%	9.0	233
1940-49	6.55%	4.38%	16.15%	6.69	4.03%	67%	14.0	272
1950-59	11.87%	8.70%	17.27%	12.86	9.00%	81%	8.9	350
1960-69	14.12%	8.93%	19.70%	16.79	11.13%	81%	11.4	549
1970-79	9.73%	5.33%	18.90%	8.56	2.98%	68%	14.5	276
1980-86 ALL	21.73%	12.74%	34.05%	12.78	14.17%	86%	-	401
1980-86 OL	12.07%	7.50%	19.54%	7.18	14.32%	79%	12.1	135

Table 4-7: Mean First-day Returns and IPO Volume by Method 1917-86

Means are equally-weighted. There are 1439 Public Issues and Offers and 997 Placings totalling 2436 IPOs in all.

	Public issues, offers			Placings		
	mean	No of IPOs	%	mean	No of IPOs	%
1917-29	5.49%	311	88%	33.26%	44	12%
1930-39	1.42%	194	83%	26.99%	39	17%
1940-49	4.71%	138	51%	8.45%	134	49%
1950-59	10.22%	92	26%	12.46%	258	74%
1960-69	11.07%	337	61%	15.62%	212	39%
1970-79	9.44%	221	80%	10.88%	55	20%
1980-86	13.91%	146	38%	26.48%	248	64%

Table 4-8: Univariate Analysis of First-day Returns by IPO Characteristics 1917-86

Firm size is defined as market capitalisation at offer price in constant 2003/04 prices. Age is firm age. BVP is book value to offer price. Track record is no. of years of historic profits disclosed in IPO prospectus. Marketability is proportion of shares outstanding sold at IPO.

	Quartile	1919-39			1945-49			1950-79			1980-86		
		Mean	Mean ret	N	Mean	Mean ret	N	Mean	Mean ret	N	Mean	Mean ret	N
MCap (£000)				584			264			1175			401
	1:lowest	3,220	13.08%	146	4,859	10.87%	66	4,542	13.36%	294	4,635	33.03%	101
	2	5,929	6.31%	146	9,140	6.64%	66	9,260	13.17%	294	10,510	26.20%	100
	3	10,327	3.24%	146	15,973	3.43%	66	17,748	11.33%	294	23,453	17.61%	100
	4: highest	46,045	8.20%	146	44,026	4.22%	66	78,730	11.82%	293	135,034	9.79%	100
Age (Yrs)				574			264			1175			133
	1: youngest	0.0	9.33%	144	17.9	11.79%	66.0	9.9	15.81%	294	6.7	10.43%	34
	2	2.2	8.53%	143	33.7	5.28%	66.0	25.5	13.84%	294	14.6	10.83%	33
	3	13.3	9.86%	143	53.3	3.94%	66.0	45.4	10.12%	294	28.2	11.47%	33
	4: oldest	54.9	3.84%	144	99.3	4.15%	66.0	94.1	9.91%	293	82.5	15.87%	33
BVP (x)				433			264			1173			135
	1:lowest	0.48	4.42%	109	0.22	4.97%	66	0.24	15.24%	293	0.14	15.97%	34
	2	0.83	0.26%	108	0.46	5.09%	66	0.49	13.19%	293	0.30	10.83%	34
	3	0.96	12.37%	108	0.68	6.96%	66	0.78	11.05%	293	0.46	12.12%	34
	4: highest	1.48	5.39%	108	1.15	8.14%	66	1.57	9.95%	294	0.56	24.66%	33
Track (Yrs)				584			264			1175			401
	1: shortest	0.0	8.27%	146	9.3	15.45%	66	5.3	14.99%	294	3.8	15.89%	101
	2	0.0	9.55%	146	10.0	4.91%	66	10.0	12.50%	294	5.0	13.54%	100
	3	2.4	7.09%	146	10.2	2.37%	66	10.0	13.41%	294	5.0	37.02%	100
	4: longest	6.5	5.92%	146	13.7	2.42%	66	10.6	8.76%	293	5.1	20.34%	100
Mktability (%)				584			264			1175			401
	1:lowest	34%	15.55%	146	23%	5.44%	66	20%	14.58%	294	15%	26.24%	101
	2	64%	6.31%	146	37%	8.68%	66	27%	14.65%	294	24%	20.05%	100
	3	87%	6.56%	146	51%	4.60%	66	34%	11.50%	294	30%	21.42%	100
	4: highest	100%	2.41%	146	79%	6.44%	66	52%	8.95%	293	52%	18.99%	100

Table 4-9: Change in Equally-Weighted Mean IPO Characteristics 1917-86

Vendor (%) is proportion of shares offered or placed which are vendor shares. Audited Asset Value is proportion of IPOs which disclose an audited or professionally valued net asset figure. Underwritten (%) is proportion of IPOs which are underwritten by a third party. Other characteristics are as defined in Table 4.3.

	1917-29	1930-39	1940-49	1950-59	1960-69	1970-79	1980-86
MCap (£000	15,529	17,499	18,125	18,237	24,070	48,252	54,334
Age (yrs)	12.4	25.2	50.8	51.8	39.4	42.7	36.4
BVP (x)	1.02	0.81	0.67	1.10	0.61	0.47	0.46
Track record (yrs)	1.4	3.4	10.7	9.6	9.1	8.4	4.7
Marketability (%)	76%	64%	48%	35%	33%	33%	30%
Vendor (%)	-	63%	90%	94%	83%	68%	50%
Audited Asset Value	25%	64%	100%	100%	100%	99%	100%
Underwritten (%)	70%	89%	94%	88%	98%	98%	99%

Table 4-10: OLS Regressions of First-day Returns 1917-86

The dependent variable is first-day return on the IPO (%). Firm size is proxied by the natural logarithm of market capitalisation at the offer price in 2004 prices, LNMCAP, and age, LN(1+AGE). Age is the no. of years difference between the founding year of the business and the year of IPO. Book Value to Price (BVP) is the proforma net asset value attributable to voting shares divided by the market capitalisation at the offer price. TRACK is the number of years historic profits included in the prospectus. RD is a dummy variable indicating where a firm is engaged in R&D activity according to the prospectus. UW is a dummy variable for whether the IPO was underwritten by a third party. MKTABILITY is the proportion of total shares outstanding sold at the IPO. There are 169 book values, 20 age observations, 8 track records and 7 underwriting dummy variable observations missing. The estimated model is as described in the text. Substituting with ln(Mcap) gives similar results. Regression (9) is the same model as excludes outliers from the data. Outliers are those first-day returns lying outside +/- 2.5 standard deviations from the mean. Estimation method is OLS. The standard errors in brackets are calculated using White's (1980) heteroscedasticity-consistent method. Statistical significance of coefficients at the 10%, 5% and 1% level is indicated by *, ** and *** respectively.

	LN 1+AGE	LN MCAP	LN BVP	TRACK	R&D	UW	MKT-ABILITY	N	Adj. Rsqd
(1)	-0.766							2156	0.087
ALL	(0.564)								
(2)		0.628						2169	0.086
ALL		(0.656)							
(3)			-1.451**					2010	0.101
ALL			(0.742)						
(4)				-0.346*				2169	0.086
ALL				(0.199)					
(5)					3.455*			2167	0.086
ALL					(1.945)				
(6)						-8.942***		2158	0.096
ALL						(2.573)			
(7)							-11.084***	2169	0.093
ALL							(2.882)		
(8)	0.070		-1.921	-0.423**	4.096**	-5.525**	-9.408***	2003	0.120
ALL	(0.605)		(1.929)	(0.182)	(1.890)	(2.657)	(2.904)		
(9)	0.635		-0.820	-0.322**	2.854*	-1.319	-3.097	1953	0.158
ALL	(0.396)		(0.542)	(0.144)	(1.520)	(1.376)	(1.975)		
(10)	2.281*		-1.972	-0.172	7.660	-12.815**	-8.460	427	0.127
1917-39	(1.174)		(1.882)	(0.399)	(5.292)	(5.421)	(5.900)		
(11)	-1.012		-2.634***	-0.614**	4.139**	-2.068	-7.582***	1338	0.125
1948Jul-86	(0.736)		(0.913)	(0.243)	(1.990)	(2.538)	(3.220)		

Table 4-11: Adjusted First-day Returns 1935-86

Tender offers are included in 1960-69 and 1980-86. USM IPOs are excluded.

D1DATE	N	EW MEAN UNADJUSTED	STDEV	EW MEAN ADJUSTED	STDEV
1935-39	174	4.05%	22.11%	4.04%	21.82%
1940-49	272	6.55%	16.15%	5.95%	16.36%
1950-59	350	11.87%	17.24%	11.60%	17.47%
1960-69	616	13.21%	19.02%	13.58%	20.38%
1970-79	276	9.73%	18.90%	9.55%	18.89%
1980-86	171	10.70%	17.91%	10.57%	17.62%

Figure 4-1: Annual Time Series of Mean Underpricing of IPOs 1917-2002

Mean underpricing is defined as the equally-weighted mean of first-day returns. There were no IPOs in 1915 and 1916. The 5 issues in 1930 are SEOs. The underlying data for 1917 to 1986 is taken from column (2) in Table 3-1. 1987 and 1988 estimates are from Levis (1990); 1989 estimate from Jenkinson & Trundle (1990); and 1991-2002 estimates from Ljungqvist (2003). 1990 mean is my own estimate. Jenkinson & Trundle exclude USM IPOs. Estimates of underpricing between 1940-44 are made despite no disclosure of the placing price (see text).

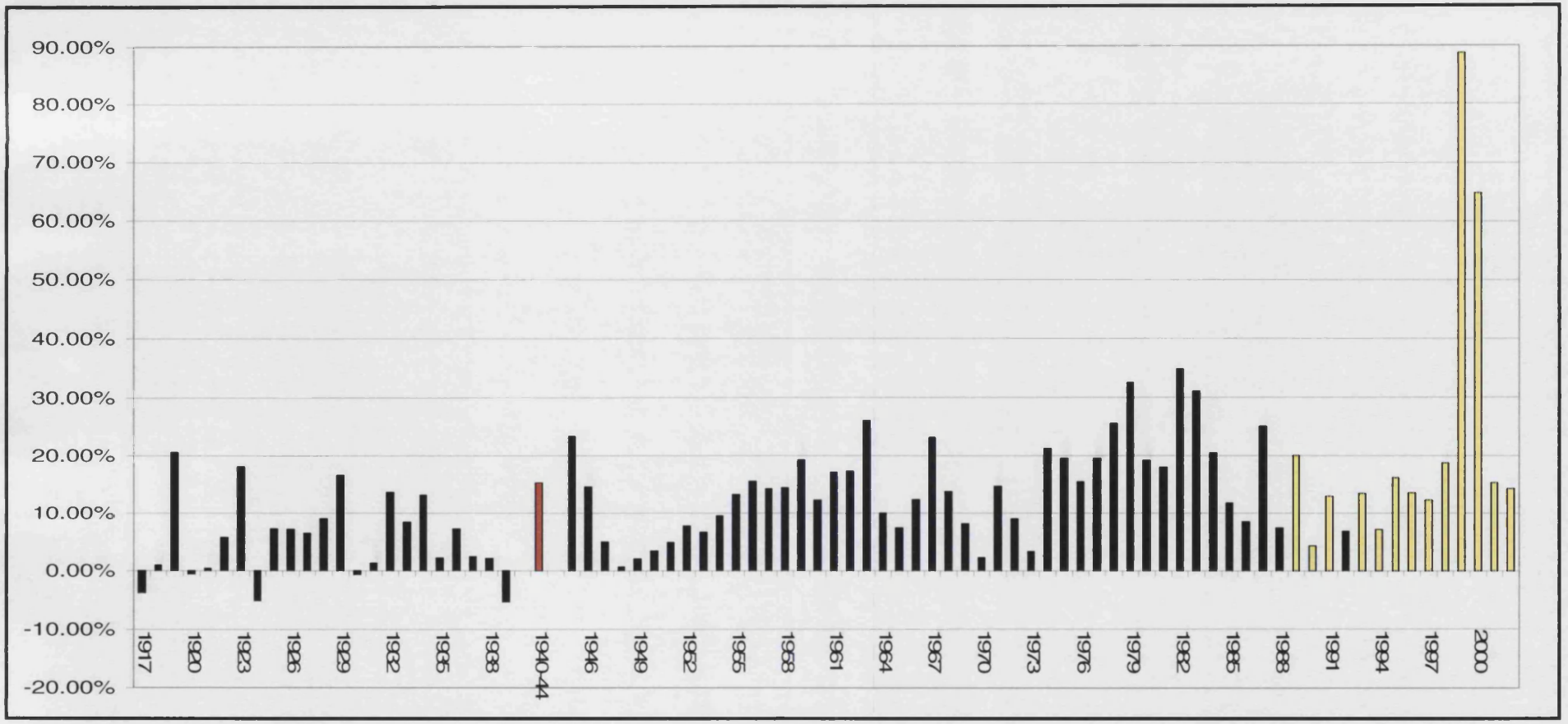


Figure 4-2: Annual Time Series of Mean Underpricing of IPOs by Method 1917-86

Mean underpricing is defined as the equally-weighted mean of first-day returns. There were no placings in 1917-19, 1922-23,1930-31,1939,and 1976, and no public offers between 1940 and 1945. The mean is shown for the war years 1940-44.

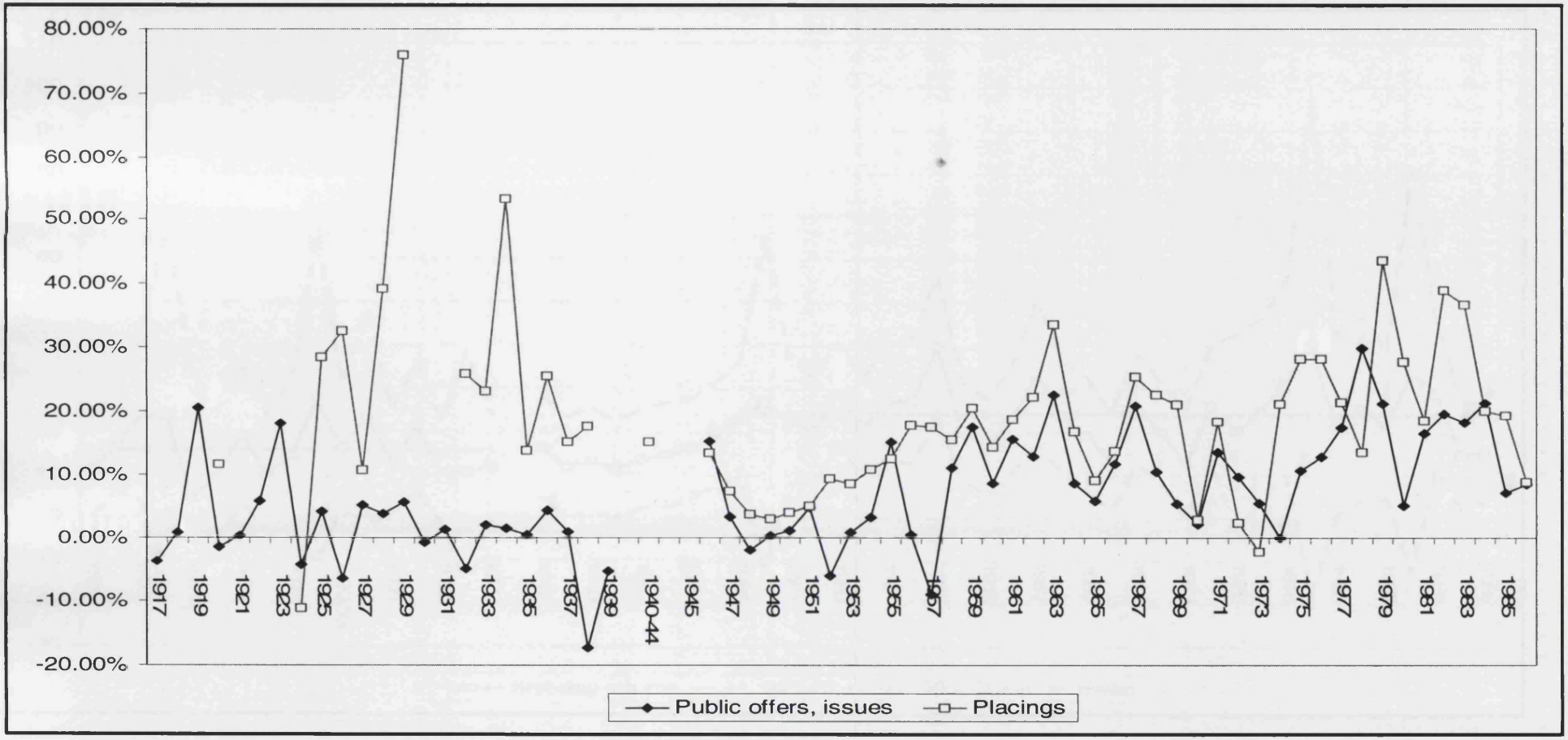
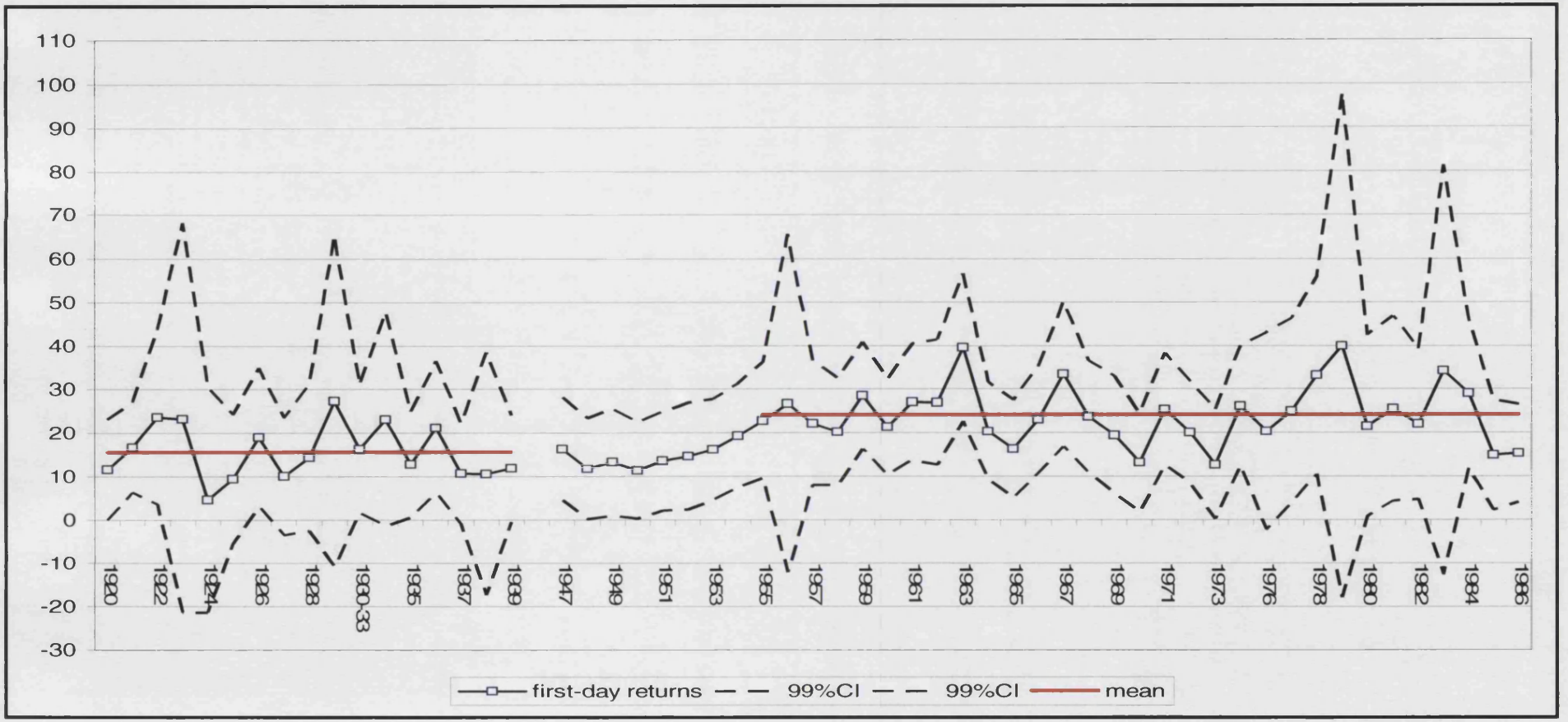


Figure 4-3: Econometric Evidence on First-day Returns 1920-39 and 1947-86

First-day returns (%) are the coefficients of the year dummy variables included in regression (8) in Table 4-7. The mean is the simple average of the dummy coefficients for 1920-39 and 1955-86 respectively.



CHAPTER 5: THE IMPACT OF REPUTABLE UNDERWRITERS

An issuing house, broker or investment bank which underwrites an IPO is certifying the quality of the listing firm to outside investors. Since Big Bang in October 1986 the distinction between issuing houses and brokers has disappeared and their functions have been merged into the modern investment bank. Underwriting is the contractual obligation entered into by an issuing house or stock broker to buy at an agreed price, usually the offer price less an underwriting commission, any shares not subscribed by investors in the IPO. An IPO which is not underwritten is executed on a "best efforts" basis and as such the issuing firm has no guarantee of a minimum level of IPO proceeds. IPOs sponsored but not underwritten by an issuing house avoid any commitment of financial capital, in which event ,however prominently placed the name of an issuing house is on a prospectus, this should be of little comfort to any serious investor. I regard an IPO by way of placing as "underwritten" where the issuing house or broker agrees to buy any shares not placed.[171] Under the fixed offer price regime in Britain underwriters have typically been at risk for around 10 days between the date of price fixing and the start of trading.[172]

In this chapter I make further use of my data set to address three questions regarding the role played by issuing houses in the IPO market. Firstly, were the criticisms of the Macmillan Committee in 1931 regarding the lack of merchant bank participation in IPO underwriting in the 1920s justified and, if so, at what point did participation begin to improve? Secondly, did the entry into the process of reputable issuing houses such as the merchant banks have a beneficial effect on underpricing? Alternatively, to the extent that no beneficial effect is observable in underpricing, could the issuing houses be accused of exercising monopsonistic power over issuing firms? Finally, what light does the new evidence presented in this chapter throw on the claim that the stock market failed British industry?

The research findings presented in this chapter point to merchant banks committing themselves to the underwriting of ordinary share IPOs starting in 1945, when the Issuing Houses Association (IHA) was founded. By the time of

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[171] Of course an underwriter is usually at risk for a much longer period of time in the case of a public offer than in the case of a placing.

[172] This was still true in the mid-eighties, *The Times* 18 September 1984, p.22 "New issue pricing is more of an art than a science" by R. Broadley, Chairman of IHA.

the Radcliffe Report (1959), the IHA, with the reputable merchant banks at its core, had steadily increased their influence over IPOs and continued to do so up to the 1980s. However, there is little sign that this change worked in the interests of issuing firms by lowering underpricing. Instead, it appears that the IHA could have operated as a cartel in self-regulating underwriting activity in its own interests. At the minimum, the issuing houses can be accused of being content to tolerate a higher level of underpricing than would have prevailed in a more competitive underwriting market. Their reluctance to implement the tender offer more widely and thereby to exploit fully the benefits of lower underpricing for their corporate clients is an indictment of their lack of dynamism.

In the case of British Motor Corporation (BMC), the claim is that insufficient monitoring by institutional investors contributed to its poor industrial and financial performance in the 1960s.[173] Bowden (2002) drew attention to a similar failing by institutional shareholders in Rolls Royce between 1968 and 1971. Both cases can be at least partially excused. At BMC the controlling shareholding of the Nuffield Trust made it difficult if not impossible for institutional shareholders to exercise "voice." At Rolls Royce the problems were already being addressed by the clearing and investment bankers, if somewhat rather late in the day. By comparison, the missed opportunity of the tender offer method described in this chapter provides a clear instance of post 1945 capital market failure.

The layout of this chapter is as follows. I discuss in detail the historical background to the development of underwriting and the rise in influence of both the merchant banks and the IHA on the IPO market through the last century (5.1). I then analyse their impact on underpricing (5.2). Finally, in returning to the question of whether the stock market failed industry, I recount the history of the tender offer and the extent of its use (5.3). Section 5.4 summarises.

5.1 The entry of reputable capital into IPO underwriting

The IPO underwriting market in the 1920s was extremely fragmented and disorganised by the standards of the post 1945 period. As discussed in

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[173] Bowden, Foreman-Peck and Richardson (2001), p.68-72.

chapter 2, section 2.3, underwriting was carried on by company directors themselves, industrial and mining companies, syndicates of private investors as well as broking firms and issuing houses. Many of the former entities were not underwriting on an arm's length basis and were undercapitalised. As a consequence, underwriters frequently escaped their underwriting obligations by making use of an undercapitalised subsidiary which then filed for bankruptcy.[174] In 1931, the Macmillan Committee on Finance and Industry argued that:

"It would in our opinion be an important reform that relations between finance and industry should be so developed that issuing institutions of first-class strength and repute should vouch for the intrinsic soundness of the issues made.... "[175]

As the Committee pointed out, such certification was forthcoming in the case of foreign issues but not in the case of domestic industrial issues. Furthermore, stockbrokers were no substitute for a first-class issuing house and the "Big Five" clearing banks were simply confusing investors by agreeing to act as receiving banker for share subscriptions. The Report left its reader in no doubt that responsibility for the disastrous performance of the 1928 crop of IPOs over the following 2 to 3 years was largely attributable to the absence of first-class issuing houses from the underwriting process.[176] By the time of the Radcliffe Report (1959), the merchant banks had involved themselves fully in sponsoring and underwriting domestic issues to the apparent satisfaction of the Committee.[177] Even small firms seemed to be in receipt of a better service.[178]

In order to establish exactly when this commitment was forthcoming, I first need to define a "first-class" or reputable merchant bank. As Cassis (1994) has pointed out, the definition of a merchant bank before 1914 is difficult to pin down. The definition offered is that of a financial institution whose main activity comprised the acceptance of bills of exchange and an involvement in large international financial operations.[179] Hence, merchant banks were also called "accepting houses." Chapman (1984) traces the emergence of Barings and

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[174] Finnie (1934), p.137-42.
[175] Macmillan Report, para.388.
[176] ibid., para.387.
[177] Bolton Report, para.226.
[178] ibid., para.229.
[179] Cassis (1994), p.29.

Rothschilds as the pre-eminent accepting houses through the middle of the 19th century.[180] These two leading houses were joined by another nineteen firms to form the Accepting Houses Committee (AHC) on 5 August 1914.[181] The primary purpose of the Committee was to address the liquidity crisis precipitated by the non-payment of debts by Germany and its allies.[182] These houses made up the "magic circle" of the City banking community.[183] Membership of the AHC continued to confer prestige on a bank up until its dissolution in the late 1980s.

Table 5-1 lists those merchant banks which Cassis (1994) considered the most important in 1914 judged by size and by business focus[184] (col.(1)), the members of the Accepting Houses Committee in 1914 (col.(2))[185], and the members of the same Committee just after WW2 once membership had stabilised (col.(3)). Membership of the Accepting Houses Committee was by invitation only and dependent upon the willingness of the Bank of England to accept any members' discounted bills of exchange at the finest discount rates.[186] As far as it is possible to tell, given the lack of coverage by the *Bankers Almanac* and the fact that the Committee met irregularly, this membership did not change substantially through the interwar years. Whilst there is some overlap between the Cassis list and the AHC membership in 1914, in total there are thirty-two merchant banks listed in columns (1) and (2). This extended list furnishes me with a definition of the most reputable merchant banks in the interwar years.

In the fifties, first S. Japhet and then S.G. Warburg gained entry to the AHC, increasing membership to seventeen at which level it stabilised. The members of the AHC from 1945 until the merger of the Committee with the IHA in 1988 to form the British Merchant Banking and Securities Houses Association are summarised in Table 5-2, along with the year of establishment and the period of membership. According to Clay and Wheble (1976), qualifications for membership in the post 1945 period included a first-class reputation, a meaningful acceptance business and the ability to discount bills of exchange at only the finest rates as well as a determination to undertake the other functions

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[180] Chapman (1984), ch.2.
[181] ibid., p.55 Table 3.4.
[182] ibid., p.30.
[183] ibid., p.30. Saemy Japhet referred to the AHC as the "inner circle" of London's merchant banking community, Dennett (1979), p.78.
[184] Cassis (1994), p.10.
[185] ibid., p.30-31.
[186] Orbell and Turton (2001), p.562.

of an accepting house, and the intention to run the bank prudently in the interests of depositors and shareholders.[187] Other functions of accepting houses by the 1970s included new issues as well as medium-term finance, mergers and acquisitions, foreign exchange and commodity dealing, and leasing.[188] Membership of the AHC continued to be synonymous with pre-eminence in merchant banking and the issuing of securities was now recognised as a growing and important business of any serious merchant bank. I shall take AHC membership as my definition of a reputable merchant bank after 1945.

The change in underwriting market share of reputable merchant banks in my data set over the period 1917-1986 is graphed in Figure 5.1.[189] Figure 5-1 confirms the conclusions reached by the Macmillan Committee. The merchant banks were indeed noticeable by their absence in the 1920s and this situation did not improve in the following decade. Only from the 1960s did the accepting houses take a significant share of IPO underwriting.[190] Over the interwar period as a whole only 5 IPOs, or less than 1% of my interwar sample, were underwritten by an AHC member.[191] This statistic is consistent with the general picture which emerges from the business histories of Schroders by Roberts (1992), of Kleinwort Benson by Wake (1997) and of Morgan Grenfell by Burk (1989). Neither of the latter banks became prominent in the IPO market until the steel privatisations of the 1950s. Whilst extremely active in underwriting foreign bond issues in the 1920s and willing to begin underwriting debenture issues made by more mature domestic industrial firms, Schroders never turned its attention to the industrial share IPO market. Their issuing and underwriting revenues declined by almost four-fifths in the 1930s compared to the 1920s consequent upon the drastic decline in foreign bond business.[192] This situation was not remedied until the merger with Helbert Wagg in 1965.

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[187] Clay and Wheble (1976), p.24.
[188] ibid., p.v-vii.
[189] Although the IHA continued in existence for a further year after Big Bang, in keeping with the analysis in previous chapters I have opted for 1986 as the end date for my analysis of underwriting market shares and of the influence of reputable underwriting on underpricing.
[190] The 65% share in the period 1980-86 may well overstate the importance of the leading merchant banks given that the IPOs in this sample are all Official List IPOs and the banks' share of USM IPOs is probably much lower.
[191] Helbert Wagg did underwrite 8 interwar IPOs and was growing rapidly in stature but was not an accepting house.
[192] Roberts (1992), p.268-69.

The criticisms of the Macmillan Committee are therefore borne out by my data. When did matters start to improve? The impetus for change came from outside the inner circle. Helbert Wagg, a stock broker turned issuing house began underwriting industrial IPOs with considerable enthusiasm in the interwar years.[193] This firm was influential in pushing for the establishment of a body to represent to government, the Bank of England and the LSE among others the interests of those houses specifically handling new issue business rather than acceptance business. Such a body was the Issuing Houses Association (IHA), established in November 1945.

The IHA shared the same offices and secretarial staff as the AHC and had at its core the leading merchant banks. It was intended as a consultation body and did not generally seek to regulate the affairs of its members. The only departure from this principle was the insistence in June 1969 that henceforth every member had to give a written undertaking to comply with the new City Code on Takeovers and to accept the jurisdiction of the Takeover Panel. By this time, the IHA concerned itself with merger and acquisition advice as well as the issuing business of its constituent members. The IHA did vet applications for membership, requiring a statement of the applicant's financial position, its board of directors and underwriting record.[194] Applications were frequently deferred when applicants were felt to be undercapitalised and inexperienced.[195] Such an approach provided a marked contrast with two decades earlier. There is also evidence that the Executive Committee of the IHA, which consisted of between 8 and 10 members dominated by the established accepting houses, informally censured members from time to time. In 1951, Whitehead Industrial Trust was reprimanded over the way it advertised IPOs and in 1968 Morgan Grenfell was criticised over its reaction to a Takeover Panel ruling.[196] Hence, the IHA did to some extent seek to regulate entry and conduct in order to preserve the reputation of its members.

The IHA was certainly influential in terms of market share. A full list of the members of the IHA from its inception is drawn up in Table 5-3. The considerable merger activity among members is apparent from the highlighted entries in the Table. Hill Samuel, for example, was established in 1965 and was

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[193] ibid., p.360-414.
[194] *Issuing House Association Rules*, 20 June 1969, MS29336, Guildhall Library.
[195] Executive Committee Minutes, IHA Archive, Guildhall Library, MS29328
[196] ibid., Files 2 and 6.

the product of mergers between Philip Hill & Partners, Higginson, Erlangers and M.Samuel over the previous 14 years. The IHA enjoyed a majority share in IPO underwriting from the start (Figure 5-2). The rest of the market was shared among stock brokers, issuing houses which were not members of the IHA, and those IPOs handled on a best efforts basis. Stockbrokers were by far the most important underwriters outside of the IHA accounting for about 20-30% of the market.[197] I have estimated retrospectively the IHA's share of underwriting assuming the Association had been constituted in the 1930s and that the IHA membership of 1947 applied to 1930. The year 1947 was chosen given that most of the new membership joined in the first 2 years of the IHA's existence. Its market share comes out at only 30%, considerably below that of post 1945. Clearly, both the degree of organisation and influence of the issuing houses upon the underwriting of ordinary share IPOs was substantial after 1945.

The membership of the IHA numbered around 50 and membership turnover was modest averaging around one or two firms each year (Figure 5-3). The most active period of new entry occurred in the 1960s and 1970s when there was considerable merger activity among issuing houses. Only in the late 1970s did two major US banks, namely Credit Suisse First Boston and Manufacturers Hanover, join the IHA. Other foreign financial institutions to gain entry were Scandinavian Bank (1978), Enskilda Securities (1983) and Svenska Handelsbanken (1986) and Australia and New Zealand Banking Corporation (1981) via the acquisition of Grindlays Brandts. None of these foreign issuing houses subsequently claimed a material share of IPO underwriting in London. Similarly whilst three of the main UK clearing banks attained membership in the 1970s, National Westminster in 1971, Barclays in 1972 and Lloyds in 1979, none made aggressive inroads into IPO underwriting. The fourth, Midland Bank, acquired an established player, Samuel Montagu in the early 1970s. Equally significantly, none of the US investment banks who were the dominant players in their domestic IPO market chose to join.[198]

Was there a subset of the IHA which were particularly influential in terms of market share? Table 5-4 tracks the market shares of the largest underwriters in

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[197] These IPOs are underwritten by stockbrokers acting alone without an issuing house. Those underwritten by an issuing house almost always had a stockbroker associated with the IPO as well to advise on "market conditions" and to arrange sub-underwriting with institutional investors.

[198] First Boston, the US investment banking arm of the CSFB group, ranked 14th in securities underwriting in the 1960s, Hayes (1971), Exhibit III, p.143.

the period 1930-86 decade by decade. Apart from Whitehead Industrial Trust in the late 1940s, no issuing house had a share of ordinary share IPO underwriting greater than 10%. Furthermore, there is no stable coalition of underwriters dominating the market across the period. The C5 concentration measure varies between 19.7% and 37.7% over the life of the IHA. Although the make-up of the top 5 issuing houses is unchanged between 1945 and 1959, it does change from decade to decade thereafter. It does not appear therefore that there was a stable coalition within the IHA exercising market power.

In summary, reputable capital entered the ordinary share IPO market from 1945. Membership of the AHC and IHA between 1945 and 1986 provides me with both a narrow and a broad definition of issuing house reputation, respectively, with which to model the impact of reputation on underpricing. It is possible, given its large market share, stable membership and lack of aggressive new entrants, that the IHA tended toward the oligopolistic. Although the minutes of the AHC and IHA do not reveal any discussion of underwriting fees or underpricing[199], underwriting fees remained unchanged at 2% for the period of the IHA's existence. Almost certainly competition in underwriting was subdued until the approach of Big Bang in the mid-eighties. I will return to this theme after examining the impact on IPO underpricing of the entry of reputable capital into underwriting.

5.2 Impact on underpricing

The empirical literature on the impact of underwriting on IPO underpricing is largely US-centric. In the modern period, US investment banks publicised their IPO underwriting activities by taking out a "tombstone" advertisement in the financial press. A "tombstone" advertises an IPO after its successful launch and lists up its underwriters in order of importance as judged by the number of shares underwritten. Such a custom was not established in Britain until very recently and does not therefore allow me a measure of underwriting reputation over the period of study. The discussion in the previous section does provide me with two binary variables, membership of AHC (AHCDV) and membership of IHA (IHADV), which take the value 1 for membership and 0 otherwise. I would

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[199] Manuscripts Section, Guildhall Library.

expect the coefficient signs in both cases to be negative if reputation minimises underpricing. I make use of a third ordinal variable RANK which takes the value 1 if the underwriter is an AHC member, 2 if an IHA but not AHC member, 3 if a broker or non-member of IHA, and 4 for non-underwritten IPOs. I would expect the coefficient sign to be positive in this case.

The OLS regression results from including these two variables in turn on the right hand side of the underpricing model outlined in the previous chapter are summarised in Table 5-5 (regressions (i) (ii) and (iii)). A correlation matrix of the dependent and independent variables is set out in Table 5-6. The regressions reported here and for the rest of this chapter cover the period from 1949, just after the 1948 Companies Act, up to 1986. The coefficients on AHCDV, IHADV and RANK are not statistically significantly different from zero. The IHADV and RANK coefficients are the correct sign but are barely economically significant, the maximum benefit to underpricing being a modest 1% and 1.5% respectively. Merchant bank or issuing house reputation apparently did little to minimise underpricing in this period.

An alternative proxy for underwriter reputation is the age of the underwriter. The year in which an issuing house was established is disclosed in either the *Bankers Almanac* or the *Stock Exchange Year Book.* Where unavailable, I default to the date of registration of the issuing house. In each decade from the 1940s onwards, I place all active members of the IHA into quartiles according to the year of establishment. The issuing houses in the first quartile are the oldest and most reputable whereas those in the bottom quartile are the youngest and least reputable. To these four categories I then add a fifth consisting of issuing houses that are not members of the IHA, these being the least reputable (rank 5). I proceed to allocate a rank from 1 to 5 to each underwritten IPO based on the rank of the issuing house beginning at the end of 1945 when the IHA was established. I call this ordinal variable IHAGE.

I previously included brokers in my definition of RANK as belonging in the next to bottom category. This judgement of broker reputation is somewhat harsh. Although regarded by the Macmillan Committee as inferior to issuing houses, broking firms such as Cazenoves and Rowe & Pitman established first-class reputations in the post-war period and were invariably employed by such houses as Barings to assist in the arrangement of underwriting and in the

distribution of IPOs.[200] Consequently I exclude them in defining IHAGE because I currently have no means of assessing their reputation. I also exclude IPOs not underwritten at all.

Despite IHAGE having more variability than AHCDV, IHADV or RANK, it does not perform any better in explaining underpricing in the linear model of underpricing (Table 5-5, regression (iv)). The coefficient on IHAGE is the correct sign but not statistically and barely economically significant. Reputation no matter how defined still seems not to explain any variability in underpricing.

However, there may be an endogeneity problem causing the estimated coefficients to be biased. As well as issuing firms choosing prestigious underwriters, reputable issuing houses may wish to associate with certain types of IPO. In accordance with the certification hypothesis, such houses may be more likely to underwrite riskier firms, or those IPOs where only existing shares are sold, in other words, the type of IPO where the issuer is in particular need of certification to minimise potential underpricing.

Following the approach of Habib and Ljungqvist (2001), I use a two stage least squares estimation method to attempt to handle this endogeneity problem instrumenting for IHAGE with the natural logarithm of the post-IPO net assets of the issuing firm attributable to its voting shareholders expressed in 2004 prices and the total dividends to be paid by the issuing firm in the financial year of its IPO as disclosed in the prospectus expressed in 2004 prices.[201] However, IHAGE is once again the wrong sign and is not statistically significant (regression (v)). Furthermore, a Hausman (1978) specification test fails to reject the null hypothesis that the OLS estimation such as regression (iv) is consistent.[202]

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[200] Kynaston (1991), ch.5, 6 and 7 documents Cazenove's rise to prominence as a new issue broker. Their success is attributed to their being at the centre of information flows between the large financial institutions, p.232.

[201] In cases where no forecast for the current year is disclosed, the historic figure is taken. Habib and Ljungqvist used historic earnings.

[202] This test is the version of the Hausman test proposed by Davidson and Mackinon (1989). The null hypothesis is that the OLS estimation of underpricing with IHAGE as an explanatory variable (regression (v)) produces consistent estimates. This test firstly runs a regression of IHAGE on all exogenous variables plus the two instruments, saves the residuals and then runs a second regression of underpricing against the exogenous variables including IHAGE and the saved first-stage residuals. The Hausman test rejects the null hypothesis if the coefficient of the first-stage residuals is statistically significant. *EVIEWS 5 User's Guide* (2004), p-578-79.

There is no support for the hypothesis that reputable underwriters minimised underpricing in this period given the adequacy of the proxy for underwriter reputation used above.

5.3 Tender Offers – a missed opportunity

The first IPO of ordinary shares by tender occurred in 1961. Although tender offers had the potential to lower underpricing for issuing firms, only 1 in 8 IPOs between 1961 and 1986 adopted this method. The analysis of this section concludes that the tender method was underexploited by issuing houses on behalf of their corporate clients and this provides empirical evidence of what appears to be an instance of capital market failure.

The mechanics of a tender offer are similar to an offer for sale with the important difference that in the case of a tender offer, investors are invited to apply for shares at or above a minimum price set by the issuing firm and its adviser. A potential weakness of tenders is that investors collude to submit low bids and buy the offered shares on the cheap. The minimum tender price acts as a reservation price to prevent investors colluding in order to buy shares cheaply. In an underwritten tender offer, if applications are received for fewer shares than the number offered, the offer price is fixed at the minimum tender price and the issuing house will take up those shares not applied for at this minimum price less a commission.

The vast majority of tender offers in Britain between 1961 and 1986 were simultaneous uniform price auctions.[203] In other words, each investor submitted a one-shot, sealed bid for a single block of shares at a specified price. Hence, in the stylised example in Figure 5-4, Investor *A* tenders for an amount of *a* shares at a price of P_1, Investor *B* for an amount of *b* shares at a price of P_1, and Investor *C* for *c* shares at a price of P_2.[204] This stylised example describes a demand curve for IPO shares which is classically downward sloping to the right. Once all bids are submitted, the issuing firm and its adviser allocate shares at a single "strike price."

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[203] Merrett, Howe and Newbould (1967), p.214-224, describes four different types of share tenders, Klemperer (2004), p.30-31, discusses share auctions, as do Brealey and Nyborg (1997).

[204] Merrett, Howe and Newbould (1967), p.214, Figure 10.1.

The strike price in its purest sense is that price which just clears the demand and supply of shares. In practice, issuing firms and their advisers are also preoccupied with ensuring a reasonable spread of ownership and liquidity in the shares. The Joseph Bradbury & Sons prospectus, dated 9 December 1963, illustrates the point. It stated that:

"In deciding the sale price and the basis of allocation due consideration will be given to the desirability of distributing shares over a reasonable number of applicants in relation to the number of shares offered, the size of the company, the obtaining of a quotation and the establishment of a market."

Whilst the primary objective of any issuing firm was to maximise proceeds, as this quotation makes clear it is also necessary to fulfil the LSE's requirement regarding marketability of the shares. Hence, "scaling down" occurs where the tender offer was oversubscribed at or above the minimum tender price. In such a case, successful applicants receive only a *pro rata* allocation rather than being allotted shares in full. This lowers the strike price below the level necessary to clear the market.

An example is provided by one of the earliest tender offers. In November 1963, Renwick Wilton & Dobson offered 405,000 existing shares out of a total of 1.735 million shares outstanding at a minimum tender price of 13s. through S.G. Warburg. The offer was fifteen times oversubscribed, there being applications for 6,230,900 shares at prices between 13s. and 30s. As can be seen from Table 5-7 (i), the market-clearing strike price would have been 17s. 9d., at which price shares would have been allocated to a relatively small number of investors - between 220 and 230 investors. Due to the heavy oversubscription, all applications had to be scaled down and the basis of allotment is set out in Table 5-7 (ii). After scaling down had taken place, the strike price was set at 15s. 9d. and 1194 investors were allocated shares. The tender was successful in achieving an offer price 2s. 9d. above the minimum price of 13s.. However, the company gave up an extra 2s. per share, equivalent to 12.6% of IPO proceeds, in order to distribute shares to approximately five times as many shareholders.

The Renwick Wilton & Dobson demand curve is graphed in Figure 5-5.[205] Approximately 90% of the applications were made at prices 10% either side of the strike price. Merrett, Howe and Newbould (1967) obtained data on the quantities and prices of all applications in the case of 12 tenders in 1963. The resulting demand curves were very similar to that of Renwick Wilton & Dobson, namely, downward sloping. This is evidence that it was feasible for issuing firms and their advisers to practise discriminatory pricing in which event shares would be allocated to successful applicants at various strike prices descending the demand curve. Hence, in the stylised example investors *A* and *B* receive shares at P_1 and Investor *C* shares at the lower price of P_2 (Figure 5-4). This method allows the issuer to maximise gross IPO proceeds by capturing the additional proceeds described by the area P_1YZP_2.

However, there were only 2 IPOs which adopted discriminatory pricing, Hurst and Sandler and Hurst Park Syndicate, both launched in the early 1960s.[206] Given LSE concerns about the ability of some retail investors to assess the valuation of an IPO, tenders were restricted to the uniform price type. There was concern that investors might submit excessively high bids in their efforts to secure share allocations and would be forced to overpay for any shares allocated to them. Similarly, although in theory "multiple bid" tenders allowing each investor to submit multiple applications at different prices were preferable to the one-shot bid approach because they would reveal more information about the nature of the demand curve for the IPO, such tenders were not experimented with. Merrett, Howe and Newbould (1967) recommended a modified single bid, multiple price version of the tender but this was never adopted.[207] Uniform price auctions dominated.

The first tender offer was undertaken in June 1961 for Parway Land and Investments, a small property company with a market capitalisation at the strike price of £700,000 which was less than half the mean firm size. All 250,000 shares were sold by insiders who presumably had a particular incentive to maximise gross proceeds from the IPO. In early 1960, the LSE had previously rejected a request for a relaxation of the restriction of the tender method to only

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[205] The curve is truncated below 15.75s., the strike price, because details regarding the 2754 applications for 4.17 million shares below this price down to 13s. were not provided.
[206] Even in these 2 examples, price discrimination was limited with only 2 or 3 strike prices at various points on the demand curve being chosen.
[207] Merrett, Howe and Newbould (1967), ch.11

water company issues, this restriction having existed since the early twentieth century. The approval of the tender method in the case of the Parway IPO was for two reasons. Firstly, there had been a recent spate of heavily-underpriced IPOs characterised by "stagging" and, secondly, the valuation of Parway's property portfolio was less than straightforward given that much of it was still under development.[208] Kleinwort Benson was the issuing house credited with this particular innovation.[209] The minimum tender price was set at 16s. and the strike price was set at 17s. 6d. the issue having been three and a half times oversubscribed. Whilst bids for shares were received all the way up to 40s., 17s. 6d. represented the highest price at which a desirable dispersion of ownership could be achieved.[210] The shares closed at 20s. on the first day of trading, representing an underpricing of 14.3%. This was somewhat better than the average underpricing of 23.5% on the 17 public offers since the beginning of that year.

Despite a second IPO of ordinary shares by tender occurring in the same month[211], this innovation was slow to catch on. Only one further ordinary share tender offer occurred during the next 26 months and this was strictly speaking a re-admission to the market of Rolls Razor following a reverse takeover in May 1962.[212] Thereafter, there were a further 66 ordinary share IPOs by tender, almost half of which occurred in 1968 alone when one in two offers were by tender (Table 5-8). After the heavy issuance in 1968, there were then only four further IPOs by tender in the following year and only one at the very end of the 1970s despite there being 285 IPOs, 223 of which were fixed price offers. There were a further 36 tenders up until "Big Bang" in 1986. The resurgence of interest occurred in 1983 when 16 tenders were launched on the market following renewed dissatisfaction with underpricing of fixed price offers exemplified by the shares of Superdrug rising by 54% on its first day of trading.[213] Unfortunately, the London market's interest in tenders had a

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[208] *The Times*, 10 June 1961, p.15: "First Equity Issue by Tender".
[209] Wake (1997), p.391.
[210] *The Times*, 19 June 1961, p.16: "Kleinwort Tender Issue Success".
[211] Country and New Town Properties. This was a "penny" share IPO, the strike was set below 2s. at 1s.10 1/2d. I have excluded this issue from my analysis to preserve comparability with the rest of the sample. There were no other "penny" share IPOs by tender.
[212] Rolls Razor is excluded from the foregoing because it was a readmission. This firm was first listed in 1927 and is included in my data set for that year.
[213] *Investors Chronicle,* 21 October 1983, p14.

tendency to wax and wane[214] and the number of tenders fell away again in 1984. The very last IPO by tender offer was The Virgin Group in November 1986.

Between 1961 and 1969 tender offers only represented 13% of all IPOs (Table 5-8). Given that placings in the 1960s may not have been close substitutes for public offers in this period, it is perhaps preferable to regard fixed price offers as the only alternative to tender offers. In this case tenders accounted for 18% of all public offers between 1961 and 1969, still only one in five IPOs. In the seventies, tenders virtually disappeared. Whilst the market became very inactive after 1973, there is no obvious reason for this disappearance in the early years of the decade. The risk characteristics of IPOs in the 1970s judged by firm age, valuation and R&D intensity along with the measures of incentive alignment (VENDOR) were not particularly different from those of the sixties or the eighties (Table 5-9). In addition, the underpricing of offers in 1971 and 1972 averaged over 13% and close to 10% respectively and there were still instances of IPOs climbing to large first-day premia. Mothercare in 1972 and Rolls Royce Motors in 1973 both recorded first-day returns over 50%. Yet, the tender method was ignored. When tenders did make a comeback in the 1980s, they still only accounted for 22% of all ordinary share IPOs on the Official List.[215]

What sort of firms went public using the tender method? Is it the case that this method was rationally chosen by those firms which were more difficult for the market to value or had incentives to avoid underpricing? Tenders were felt to be necessary where there existed a lack of directly comparable quoted companies with which to benchmark an IPO. Such IPOs exhibited firm risk. Equally, if riskier firms are likely to suffer from a greater propensity of underpricing, I would expect these firms to opt for the tender method, other things being equal. I would also expect incentives to play a part in the decision over issue method. The more of the issue sold by existing shareholders, the more likely they would opt for a tender, whereas, the greater the proportion of primary shares in the IPO, the less likely is the occurrence of a tender. I first summarise the characteristics of IPOs by tender relative to those undertaken by

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[214] ibid., 11 November 1983, "Don't write off the stags".
[215] I make the assumption that offers and placings were close substitutes by this time.

other issue methods and then analyse how the likelihood of a tender varies with these characteristics.

Table 5-9 compares the characteristics of IPOs by tender with IPOs by other methods. In the 1960s, the characteristics of IPOs by public offer (row (2)) are also included since this is probably the more relevant comparison, as discussed above. The conclusions to be drawn are consistent across the two periods. Firms choosing tenders were larger than those doing offers and placings but age was similar. Valuations of IPOs by tenders, whether judged by book value to offer price (BVP) or dividend yield (DY), were more expensive. Firms making use of tenders were more likely to be undertaking R&D activity. In summary, whilst firm age and firm size suggest firms opting for tenders were not riskier, firm valuation and R&D intensity indicate the opposite. Finally, IPOs by tender were more likely to be selling existing shares as a percentage of post-IPO shares outstanding (VENDOR) than new shares (PRIMARY). In such circumstances, issuing firms were more incentivised to moderate underpricing and to opt for a tender as predicted.

A probit model offers a more rigorous tool for analysing the marginal influence of the various choice variables on the decision to opt for a tender. The dependent variable takes the value 1 if the IPO is a tender and 0 if it is a fixed price offer or placing. The statistically significant explanatory variables are firm size (MCAP), valuation (BVP), R&D and incentive alignment proxy variable (VENDOR) (Table 5-10). The sign of the coefficients of the latter variables were generally as predicted. More highly valued firms, R&D-intensive firms and firms selling existing shares were more likely to select a tender offer but larger firms tended to choose tenders, contrary to expectations. Firm age was not at all statistically significant (results not shown). Firm size in this regression may be picking up the degree of financial sophistication of the issuing firm rather than acting as a risk proxy. Hence, with the exception of firm size, the probit results confirm that riskier issuing firms and firms selling vendor shares are more likely to choose the tender method in expectation of minimising underpricing.

Did the tender offer deliver lower underpricing? Merrett, Howe and Newbould (1967) provided early evidence that tenders delivered lower underpricing.[216] However, was this sustained after 1963? My results show that

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[216] Merrett, Howe and Newbould (1967), p.113, Table 5.7.

tenders did continue to deliver lower underpricing thereafter (Table 5-11). Underpricing of tenders averaged 7.57% and 5.19% as compared to that of public offers and placings averaging 14.12% and 12.83% for 1960-69 and 1980-86 respectively. I have omitted the 1970s because there was only a single tender the results of which were not reported in the financial press. Furthermore, controlling for the various IPO characteristics, tenders still delivered lower underpricing. Tables 5-12 and 5-13 summarise the results from OLS regressions with first-day returns as the dependent variable for the two periods 1960-69 and 1980-86. Controlling for firm age, firm valuation defined as book value to offer price, incentive alignment (VENDOR) and R&D activity, the tender method significantly lowers underpricing by 10.0% across the period 1961-86 (Table 5-12, regression (1)). A similar margin of lower underpricing in favour of tenders is apparent for both sub-periods, 1961-69 and 1980-86 (regressions (2) and (3)).

Lower underpricing of this magnitude would have increased gross proceeds by approximately £1,200 million between 1961 and 1986 in 2004 prices.[217] Privatisations have been excluded from this calculation, in keeping with the rest of my analysis, primarily because these IPOs did not, first and foremost, aim to maximise proceeds but to encourage the growth of share ownership among the general public which therefore required an attractive level of underpricing.[218]

Given that the tender method was successful in lowering underpricing why then was it not more widely employed? One possibility is that there was resistance to this new innovation by the more established issuing houses. For example, the first issuing house to underwrite a tender was Kleinwort Benson, a relative new entrant to the issuing business following the merger between Kleinwort & Sons, a first-tier accepting house, and Robert Benson Lonsdale, a small issuing house. Table 5-13 summarises the extent to which AHC and IHA members were underwriting tender offers. Whilst only 25% of the tenders in the sixties were underwritten by a member of the Accepting Houses Committee (AHC), this proportion had risen to 72% by the 1980s. The broader membership of the Issuing Houses Association was active in underwriting

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[217] This estimate is based on applying the 10.0% average to all offers between 1961 and 1969 and all offers and placings between 1970 and 1986. It includes IPOs on the USM between 1980 and 1985 only 10 of which were by tender.

[218] Jenkinson and Mayer (1994).

tenders with an overall market share of close to 60% in the sixties, rising to 80% in the eighties. In each decade, seventeen and twelve AHC members respectively separately underwrote tenders. There is therefore no evidence that tenders were being promoted by a very small number of houses and being resisted by the majority. Most houses experimented with tenders, a few more enthusiastically than others.[219] Notwithstanding this fact, the tender method was underutilised.

What were the disadvantages at least as perceived by the market? Alleged disadvantages included IPO pricing being left to uninformed investors, such investors bidding at excessively high prices to secure shares and incurring losses in post-IPO trading, and the deterrence of stags.[220] The view of the Chairman of the IHA as late as 1984 was that tenders deterred both retail investors and stags.[221] These arguments do not stand up to scrutiny. Firstly, informed investors also participated in tenders and, despite the noise created by uninformed investors, their participation would help to secure a better price for issuing firms. The alternative was a fixed price offer which required the issuing house, usually in combination with a broker, setting the offer price. Yet, the overwhelming evidence of this chapter is that such an approach did not secure the best price for their corporate clients. Secondly, any investors overbidding for shares in a tender and incurring losses would quickly revise their price expectations and their approach to valuing IPOs. Finally, stags still participated in tenders but compared to fixed price offers they would no longer be able to profit from excessive initial returns. One further alleged disadvantage of tenders was that the extra effort required of investors in assessing firm value and then submitting a bid discouraged them from applying at all, leading in turn to under subscription. One such instance of undersubscription was VG Instruments, a high-technology company, where over half the issue was left with the underwriters.[222] Yet, there were very few instances of tenders being undersubscribed.[223] Perhaps the most legitimate criticism levelled at tenders is

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[219] Morgan Grenfell underwrote 8 and NM Rothschild 6 tender offers out of the 36 in the 1980s.
[220] Briston (1970), p.91; and *The Times* 7 October 1963, p.16, "Offers by Tender May Become Standard Practice".
[221] *The Times* 18 September 1984, p.22 "New issue pricing is more of an art than a science" by R. Broadley, Chairman of IHA.
[222] *Investors Chronicle,* 13 January 1984, p.28, "VG gaining its due".
[223] The Britoil privatisation in November 1982 was the most spectacular example. Approximately 75% of the offer was left with the underwriters. As a privatisation this IPO is not included in my sample.

the lack of transparency in the basis of allotment when offers were oversubscribed and a tendency to discriminate against large bids from institutions.[224] However, it is far from obvious that the allocation basis of fixed price offers was any more transparent.

Since the criticisms of tenders lack substance, the strong suspicion is that it was inertia on the part of the issuing houses which prevented the switch to tenders.[225] As discussed in section 5.1, before Big Bang, competition among issuing houses was a restrained affair, at least as far as IPOs were concerned. The number of new entrants into the IHA was relatively modest and none made any great impact in terms of market share. The merchant banking arms of the clearing banks made only modest attempts to break into IPO underwriting and the leading US investment banks made no attempt to enter the business. Consequently, both issuing houses and brokers enjoyed a relatively "quiet life". They neither needed to compete for IPO business on their record of underpricing, nor adopt the tender method aggressively.

Issuing houses were not perhaps solely to blame however. It is possible that institutional investors whose ownership of the market rose steadily from the 1960s onwards were equally happy to maintain the *status quo*. Generally, issuing houses arranged for IPOs (and rights issues) to be sub-underwritten by the large investment institutions whilst keeping a portion of the underwriting for themselves. Merrett, Howe and Newbould (1967) in respect of the period 1959-63 and Marsh (1980) in respect of the period 1962-75 commented on the fixed nature of underwriting fees at around 2% of issue proceeds.[226] This fee schedule still applied in the 1980s.[227] The issuing house would typically pay 1.25% out of the 2% to the sub-underwriters. Since many of these same sub-underwriters were investment institutions also applying for shares in the IPO, they had a dual interest in seeing the shares underpriced. Not only would they be allocated shares at a favourable price, they would also earn a relatively risk-free sub-underwriting profit given that underpriced issues were very unlikely to be undersubscribed. Marsh (1979) in a study of the underwriting of 671 UK

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[224] *The Economist,* 14 December 1963, p.1203-04, "Experiment Justified".
[225] *The Times,* 14 August 1967, p.18, "Equity issue by tender – efficient but seldom used". This article reviewed the Merrett, Howe and Newbould study and concluded issuing houses not only "found conventional issues sufficiently rewarding but also tenders require a great deal more effort to arrange".
[226] Marsh (1980), p.694.
[227] *The Times* 18 September 1984, p.22 "New issue pricing is more of an art than a science" by R. Broadley, Chairman of IHA.

equity rights issues between 1962 and 1975 concluded that sub-underwriting fees appeared excessive relative to the risks being borne. The underwriting institutions were earning excess *ex post* returns and issuing firms consequently overpaying for rights issues. Merrett, Howe and Newbould also found that excess underwriting returns were made on a sample of 168 IPOs between 1959 and 1963.

As Marsh recognised, the possibility remains that these excess returns are offset by side payments such as the brokerage commissions which the sub-underwriting institutions have to pay to the broker in order to get onto the sub-underwriting list in the first place. Nonetheless, the impression created is one of institutional investors also content with the fixed price offer system. The growing power of these investors with whom the issuing houses played a repeated game in the underwriting market made it difficult to shift the balance of power back towards the issuing firms.[228]

Such a shift did take place in the 1980s. The abolition of foreign exchange controls in October 1979 automatically meant that the LSE as the primary market for the trading of British securities would now have to compete for a share of the investment portfolios of British institutional investors.[229] This was followed in July 1983 by the LSE agreeing to the abandonment of certain restrictive practices, namely, fixed commissions, the prohibition of dual capacity and the prohibition of foreign ownership of LSE members. The seeds of this momentous decision lay in the referral of the LSE to the Monopolies Commission in August 1973 over the restriction on advertising by brokers which subsequently led on to an investigation into fixed brokerage commissions. The threat of a referral to the Restrictive Practices Court hung like a black cloud over the LSE for the following decade.[230]

The fresh winds of competition ushered in by exchange control abolition and then Big Bang created an environment conducive to innovation in the underwriting market. Wall Street had deregulated fixed commissions over a decade earlier in 1975 and as a consequence new techniques were imported from the US the first of which in the case of the IPO market was the "red

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[228] R. Broadley, Chairman of the IHA, in a second article on the new issue market acknowledged this power in putting forward suggestions as to how to attract the retail investor to IPOs, *The Times* 13 February 1985 "Opening the new issue door to a wider share-owning public".

[229] Michie (2001), p.544.

[230] ibid., p.482-83 and p.547.

herring." This was a preliminary prospectus filed with the relevant listing authority containing all necessary disclosures on the issuing firm excepting details on the offer price. The investment bank would then use this document to market the IPO to investors and on the basis of their feedback adjust the final offer price. This technique was first adopted in Britain in the case of the British Telecommunications and the British Aerospace privatisations in November 1984 and February 1985 respectively. Thereafter, red herrings became more common.

As it turned out, this particular innovation was only an intermediate step on the way to the adoption of another Wall Street technique, book-building, in the early 1990s. This method improved upon the tender offer by introducing more flexibility into the process of setting the terms of the IPO. Firstly, the investment bank would set an indicated offer price range rather than a minimum tender price for investors to consider; secondly, investors had the opportunity to revise their indicated interest rather than be constrained to submit a single bid as under the tender method; and thirdly, the book-building method allowed more flexibility in increasing the offer size and in allotting more shares to investors with price-sensitive information. In theory at least, this should have led to lower underpricing other things being equal. However, in practice IPO underpricing was disrupted by the dotcom bubble at the end of the 1990s and the subsequent collapse in issue activity in the following 3 years. It is still too early to tell whether this new technique has improved the underpricing result as far as issuing firms are concerned.

5.4 Summary

Reputable underwriters became more involved in the IPO market from 1945 onwards. They appear to have had no beneficial impact on underpricing. What is equally apparent is that the merchant banks, having had a good idea, failed to adopt the tender method as enthusiastically as they might have. This looks like an opportunity missed and resulted in issuers between 1961 and 1986 leaving £1.2 billion on the table in 2004 prices. At its worst, the merchant banks may have been guilty of operating a cartel; at the minimum, they opted for a quiet life. According to Broadberry and Crafts (2001), cartels operated to the detriment of innovation and industrial performance through the 1950s and

1960s in a large number of manufacturing industries. This chapter has uncovered an interesting parallel in the financial sector in the same era. Whether the result of a premeditated cartel or not, competition was lacking in IPO underwriting to the detriment of financial innovation.

Table 5-1: The leading London Merchant Banks 1914-47

Cassis (1994), p.10, provides a list of merchant banks (col.(1)) based on his estimation of size and their financial orientation. The membership of the Accepting Houses Committee (AHC) in 1914 (col.(2)) is from Cassis (1994) p.30-31 and in 1947 (col.(3)) from *Bankers' Almanac and Yearbook 1947-48.*

	Merchant Banks 1914 col. (1)	AHC 1914 col. (2)	AHC 1947 col. (3)
# members	22	21	15
Arbuthnot Latham & Co	⊙	⊙	⊙
Baring Bros & Co	⊙	⊙	⊙
Arthur H. Brandt & Co.		⊙	
Wm. Brandt, Sons & Co.		⊙	⊙
Robert Benson & Co	⊙		⊙
Brown Shipley & Co	⊙	⊙	⊙
Cunliffe Brothers		⊙	
Erlangers & Co	⊙		
Robert Fleming & Co	⊙		
Fruhling & Goschen	⊙	⊙	
Antony Gibbs	⊙	⊙	⊙
C.J.Hambro & Son (note1)	⊙	⊙	⊙
Horstman & Co.		⊙	
Frederick Huth & Co	⊙	⊙	
Kleinwort Sons & Co.	⊙	⊙	⊙
Konig Brothers		⊙	
Lazard Brothers & Co.		⊙	⊙
H.S. Lefevre & Co	⊙		
Matheson & Co	⊙		
Morgan Grenfell & Co.	⊙	⊙	⊙
Samuel Montagu & Co	⊙		⊙
Neuman Luebeck & Co.		⊙	
NM Rothschild & Sons	⊙	⊙	⊙
A. Ruffer & Sons		⊙	
M. Samuel & Co.	⊙		⊙
D. Sassoon & Co.	⊙		
J Henry Schroder	⊙	⊙	⊙
Seligman Bros		⊙	⊙
Wallace Brothers & Co.		⊙	⊙
Stern Brothers	⊙		
S. Japhet (note2)	⊙		
Speyer Brothers	⊙		

Notes: 1. C.J. Hambro merged with British Bank of Northern Commerce to form Hambros Bank in 1920

2. S. Japhet joined the Committee in 1921, resigned in 1942 and then rejoined in 1952 [Dennett (1979), p.78-79, p.82].

Table 5-2: Accepting House Committee Membership after 1945

ACCEPTING HOUSE	EST.	AHC	IHA	CORPORATE HISTORY
Arbuthnot Latham	1833	1952-87	1961-79	
Baring Brothers	1762	1914-87	1946-87	
Wm Brandts	1805	1914-76	1947-81, 1987	1976 acquired by Grindlays Bank
Brown Shipley	1810	1914-87	1946-87	
Charterhouse Japhet/Charterhouse Bank	1880	1965-87	1965-87	acquired by RBS 1986, renamed Charterhouse Bank
Erlangers	1859	1945-59	1946-58	1959 merged with Philip Hill Higginson
Robert Fleming	1909	1980-87	1967-87	
Anthony Gibbs & Sons	1808	1947-79	1949-83	1980 acquired by HSBC
Guinness Mahon	1836	1946-87	1946-87	
Philip Hill Higginson Erlangers	1859	1960-65	1961-64	1965 merged with M. Samuel
Hambros Bank	1839	1914-87	1946-87	
Hill Samuel	1831	1965-83	1965-87	
S. Japhet	1880	1921-42, 1952-64	1946-64	1954 acquired by Charterhouse; 1964 renamed Charterhouse Japhet
Kleinwort Benson	1830	1961-87	1962-87	
Kleinwort, Sons & Co	1830	1914-61	1946-61	1961 merged with Robert Benson Lonsdale
Lazard Brothers	1877	1914-87	1946-87	
Samuel Montagu	1853	1914-87	1946-87	
Morgan Grenfell	1838	1914-87	1946-87	
N. M. Rothschild & Sons	1805	1914-87	1946-87	
Rea Bros	1919	1969-87	1951-87	
M. Samuel	1831	1914-65	1946-64	1965 merged with Philip Hill Higginson Erlangers
J. Henry Schroder	1804	1914-87	1946-61	1960 merged with Helbert Wagg
Seligman Brothers	1864	1946-57	1946-56	1957 acquired by S.G. Warburg
Singer & Friedlander	1907	1973-87	1946-87	
S G Warburg	1934	1958-87	1946-87	1957 acquired Seligman Brothers

Source: *Bankers Almanac* 1945-87, *Stock Exchange Year Books* 1945-87, Orbell and Turton (2001)

Table 5-3: Membership of Issuing Houses Association and Accepting Houses Committee

ISSUING HOUSE	Est.	IHA	AHC	Corporate History
British Linen Bank	1746	1978-79		
James Finlay Corp	1750	1980-87		
Glyn Mills /Williams & Glyn's	1753	1969, 1971-83		1970 merged with Williams & Deacons and National Commercial Bank
National Commercial & Schroders/ National Commercial & Glyn's	1964	1967-69		1969 renamed; 1970 merged with Glyn Mills and Williams & Deacons
Baring Brothers	1762	1946-87	1914-87	
J. Henry Schroder	1800	1946-61	1914-87	
Helbert Wagg	1848	1946-61		
J. Henry Schroder Wagg	1800	1962-87		1962 Helbert Wagg and J. Henry Schroder merge
Leadenhall Securities Corp	1935	1947-69		1949 acquired by J. Henry Schroder
N. M. Rothschild & Sons	1805	1946-87	1914-87	
Wm Brandts/Grindlay Brandts/ ANZ Merchant Bank	1805	1947-81, 1987	1914-76	1976 acquired by Grindlays Bank; acquired by Australia and New Zealand Bank, parent of ANZ Merchant Bank
Anthony Gibbs & Sons	1808	1949-83	1914-79	1980 acquired by Hong Kong & Shanghai Banking Corp.
Brown Shipley	1810	1946-87	1914-87	
Kleinwort, Sons & Co	1830	1946-61	1914-61	
Robert Benson	1852	1946-54		
Robert Benson, Lonsdale	1852	1955-60		1955 merger of Robert Benson and Lonsdale Inv. Trust
Kleinwort Benson	1830	1962-87	1961-87	1962 merger of Kleinwort and Robert Benson Lonsdale
M. Samuel	1831	1946-64	1945-65	
Higginson	1907	1946-51		
Philip Hill & Partners	1932	1946-58		

ISSUING HOUSE	Est.	IHA	AHC	Corporate History
Philip Hill, Higginson	1907	1952-60		1951 merger of Philip Hill & Partners and Higginson & Co
Erlangers	1859	1946-58	1945-59	
Philip Hill Higginson Erlangers	1859	1961-64	1960-65	1959 merger of Philip Hill, Higginson and Erlangers
Hill Samuel	1831	1965-87	1965-83	1965 merger of Philip Hill Higginson Erlangers and M.Samuel
British Shareholders Trust	1921	1947-55		1955 acquired by Philip Hill Investment Trust
Investment Registry	1903	1946-65		1964 acquired by M. Samuel
Arbuthnot Latham	1833	1961-79	1914, 1952-87	
Dawson & Forbes	1833	1967-72		
Stern Bros.	1833	1946-63		
Barclays Merchant Bank/BZW	1836	1972-87		
County Bank	1836	1971-87		
Guinness Mahon	1836	1946-87	1946-87	
Morgan Grenfell	1838	1946-87	1914-87	
Ionian Bank	1839	1965-86		
Matheson	1848	1964-84		
Edward Bates	1852	1946, 1971-77		owned by Arbuthnot Latham
Ullmann	1853	1947-63		
A. Keyser	1868	1962-63		
Keyser Ullmann	1853	1964-81		1962 merger of A.Keyser and Ullman; 1981 acquired by Charterhouse Japhet
Samuel Montagu	1853	1946-87	1945-87	
Drayton Corporation	1852	1955-68		1973 acquired by S. Montagu
Hart Son & Co	1899	1971-72		1960 acquired by Samuel Montagu
Tozer Standard and Chartered/ Std. Chartered Merchant Bank	1853	1976-87		renamed 1976

ISSUING HOUSE	Est.	IHA	AHC	Corporate History
First National Industrial Trust	1855	1971-87		owned by First National Finance Corp
Birmingham Industrial Trust	1959	1962-69		1970 acquired by First National Finance Corp
Lloyds Bk Intl/Lloyds Merchant Bk	1862	1979-87		1973 LBI acquired Bank of London and South America (est. 1862)
Seligman Brothers	1864	1946-56	1914-57	
S G Warburg	1934	1946-87	1958-87	1957 acquired Seligman Brothers
Wardley/HSBC	1865	1984-87		1972 HSBC established Wardley
Gray Dawes	1865	1971-79		
Banque Arab & Internationale d'Investissement (B.A.I.I.)	1865	1985-87		1980 acquired Gray Dawes
Svenska International/ Svenska Handelsbanken	1871	1986-87		
Lazard Brothers	1877	1946-87	1914-87	
Edward de Stein	1925	1946-60		1960 acquired by Lazard Brothers
S. Japhet	1880	1946-64	1921-42, 1952-64	1954 acquired by Charterhouse Industrial Devpmt; 1964 renamed Charterhouse Japhet
Charterhouse Investment Trust/ Charterhouse Finance Corp	1925	1946-63		1954 acquired S. Japhet; 1964 renamed Charterhouse Japhet
Charterhouse Japhet/ Charterhouse Bank	1880	1965-87	1965-87	acquired by Royal Bank of Scotland 1986, renamed Charterhouse Bank
English Assoc. Grp/English Trust	1884	1982-87		English Association of American Bond and Share Holders until name change in 1980
Law Debenture Corp.	1889	1946-56		

ISSUING HOUSE	Est.	IHA	AHC	Corporate History
Henry Ansbacher	1894	1964-87		
Robert Fraser & Partners	1935	1956-77		1972 acquired by Henry Ansbacher
Midland Trust	1896	1946-69		
Singer & Friedlander	1907	1946-87	1973-87	
Robert Fleming	1909	1967-87	1980-87	
Hambros Bank	1839	1946-87	1914-87	
British Empire Trust	1902	1952-69		1970 acquired by Hambros
Lothbury Assets & Land	1912	1960-69		
British Trusts Association	1917	1946-77		
Leopold Joseph	1919	1965-87		
London & Yorkshire Trust	1919	1946-84		
Rea Bros	1919	1951-87	1969-87	
Standard Industrial Trust	1920	1946-84		
United Dominions Trust	1922	1972-83		
Old Broad Street Securities	1939/1922	1946-72		est. 1939; 1949 acquired by United Dominions Trust (est. 1922)
Power Securities Corp	1922	1946-69		
Anglo-Scottish Amalgd. Corp	1925	1946-76		
Close Brothers	1925	1946-87		
Federated Trust & Finance Corp	1925	1946-87		
Gresham Trust	1925	1946-87		
Industrial Fin. & Investment Corp	1925	1946-65		1971 renamed Dawnay Day
Dawnay Day	1928	1946-87		1966 acquired by Industrial Fin. & Inv Corp; 1971 name reverted

ISSUING HOUSE	Est.	IHA	AHC	Corporate History
Anglo-Federal Banking Corp	1925	1946-49		
Electric & General Industrial Trust	1928	1946-72		
Minster Trust	1928	1946-87		
Ocean Trust	1928	1946-68		
ED Sassoon/Wallace Bros Sassoon Bank	1930	1971-77		1972 renamed
Leadenhall Investments & Fin.	1934	1946-58		1958 acquired by Leadenhall Sterling Investments
Seton Trust	1935	1946-81		
Brown Harriman	1935	1947-49		
English Transcontinental	1935	1950-79		
Whitehead Industrial Trust/St Michael's Securities	1936	1946-69		1959 renamed
British Bank of Commerce	1936	1971-76		
Cheviot Trust	1939	1947-50		1950 voluntarily wound up
I.C.F.C.	1945	1965-85		1980 name changed to Finance for Industry
Scottish Industrial Finance/ICFC	1945	1965-77		1964 acquired by I.C.F.C.
Glasgow Industrial Finance	1946	1947-64		1964 renamed Scottish Industrial Finance
Gwent & West of England Enterprises	1946	1960-81		
Tokenhouse Securities Corp	1946?	1946-52		
Bentworth Trust	1950	1953-77		owns Bentworth Securities
Neville Ind. Sec.s/GR Dawes	1952	1949-87		1973 reorganised as GR Dawes
Cayzer	1954	1978-87		
Burston & Texas Commerce Bk/ Burston Hoare	1955	1971-73		both firms part of Burston Group
Slater Walker	1964	1971-77		
J. F. Nash & Partners	1965	1969-79		
CSFB	1968	1977-87		
Manufacturers Hanover Corp	1968	1977-87		
Noble Grossart	1969	1973-87		

ISSUING HOUSE	Est.	IHA	AHC	Corporate History
Scandinavian Bank	1969	1978-84		
Orion Bank	1970	1978-87		
M.J.H. Nightingale/Granville & Co	1971	1981-87		
European Banking Co/EBC Amro Bank	1973	1981-87		
Guidehouse	1978	1986-87		
Enskilda Securities	1982	1983-87		
Consortiums				
Year of establishment unknown				
Energy Finance & General Trust/ Equity Finance Trust/Yorks. Trust	?	1978-84		
Finance for Trade	?	1967-68		
Industrial Securities	?	1958-62		
Avenue Finance Co	?	1969		
Chapter Investments	?	1954-61		
Manchester Exchange Trust	?	1983-87		
Midland Industrial Issues	?	1968-81		
National Securities Corp	?	1946-48		
Ufitec Trust	?	1969		
Equity Capital for Industry	?	1978-84		
E.T. Trust	?	1980-85		
Manchester & Liverpool Industrial Securities	?	1946-87		
Nthn. Ireland Industrial Devpmt. & Finance	?	1960-69		

Table 5-4: Top 20 Issuing Houses underwriting ordinary share IPO 1930-87

ISSUING HOUSE	Est.	AHC	IHA	#IPOs	1930-87	1930-45	1945-49	1950-59	1960-69	1970-79	1980-87
#IPOs				1959		249	256	350	616	285	203
1. Whitehead Ind. Trust/St Michael's Sec.s	1936		'46-69	69	3.5%	5.2%	17.3%	4.8%	0.4%	0.0%	0.0%
2. Charterhouse IT/Finance Corp	1925		'46-63	43	2.2%	3.2%	5.6%	5.6%	2.8%	0.0%	0.0%
3. Charterhouse Japhet/Charterhouse Bank	1804	'65-87	'65-87	22	1.1%				4.8%	2.4%	1.6%
4. N. M. Rothschild & Sons	1805	'14-87	'46-87	38	1.9%	0.0%	0.8%	0.0%	6.0%	2.8%	6.0%
5. Investment Registry	1903		'46-65	38	1.9%	1.2%	3.2%	4.4%	6.4%	0.0%	0.0%
6. S G Warburg	1934	'58-87	'46-87	38	1.9%	0.0%	0.8%	1.6%	6.0%	3.6%	3.2%
7. Singer & Friedlander	1907	'73-87	'46-87	37	1.9%	0.0%	0.0%	1.2%	7.2%	6.0%	0.4%
8. London & Yorkshire Trust	1919		'46-84	37	1.9%	1.2%	3.2%	4.8%	4.4%	1.2%	0.0%
9. Hambros Bank	1839		'46-87	36	1.8%	0.0%	0.0%	2.0%	2.4%	6.4%	3.6%
10.Kleinwort & Sons/Kleinwort Benson	1830	'14-87	'62-87	37	1.8%			0.4%	4.4%	2.4%	7.2%
11.Hill Samuel	1831	'65-83	'65-87	35	1.8%				2.4%	4.4%	7.2%
12.Philip Hill Higginson Erlangers	1859	'61-65	'61-64	26	1.3%		4.4%	5.2%	9.6%		
13.Standard Industrial Trust	1920		'46-84	35	1.8%	3.6%	3.2%	3.2%	4.0%	0.0%	0.0%
14.Morgan Grenfell	1838	'14-87	'46-87	32	1.6%	0.4%	1.2%	2.4%	1.2%	2.4%	5.2%
15.Samuel Montagu	1853	'14-87	'46-87	30	1.5%	0.0%	0.0%	0.0%	5.6%	3.6%	2.8%
16.Minster Trust	1928		'46-87	28	1.4%	0.0%	1.2%	2.8%	6.8%	0.4%	0.0%
17.Gresham Trust	1925		'46-87	26	1.3%	0.8%	0.0%	0.8%	7.2%	1.6%	0.0%
18.J.Henry Schroder Wagg	1804	'14-87	'62-87	24	1.2%				3.6%	2.8%	3.2%
19.Helbert Wagg	1800		'46-61	16	0.8%	0.8%	2.8%	2.8%			
20.Lazard Brothers	1877	'14-87	'46-87	22	1.1%	0.0%	0.4%	0.8%	4.4%	1.2%	2.0%
C5 measure						14.5%	33.7%	19.7%	37.3%	24.1%	28.9%

Notes: 1. Philip Hill Higginson Erlangers includes the IPOs underwritten by Philip Hill & Partners (10), Philip Hill Higginson (6), and Erlangers (7). 2. J. Henry Schroder Wagg includes the IPOs underwritten by J. Henry Schroder (3) but not those of Helbert Wagg (16) before the merger in 1962.

Table 5-5: Underwriter Reputation and Underpricing 1949-86

Dependent variable is first-day returns adjusted for market movement between prospectus date and initial trading date. Regression model is as described in chapter 4. AGE is firm age. BVP is book value to offer price. VENDOR is number of existing shares sold in IPO as a proportion of post-IPO shares outstanding. AHCDV and IHADV are dummy variables taking value 1, if the underwriting issuing house is a member of Accepting Houses Committee and Issuing Houses Association respectively. RANK and IHAGE are defined in the text. The latter excludes IPOs not underwritten or underwritten by a broker. In regression (v) the natural logarithm of real net asset value (LNNAV) and real dividends paid (DIV) are the instruments for IHAGE (see text). Placing and tender method dummy variables are included but results not shown. Standard errors are shown in brackets and are adjusted for heteroscedasticity using White's (1980) heteroscedasticity-consistent covariance matrix. *, **, and *** asterisks indicate significance levels of 10%, 5% and 1% respectively. Missing variables are AHCDV (1), IHADV (1), IHAGE (1), VENDOR (3), AGE (2), RD (2), DIV (5), and NAV(2).

Estimation method	(i) OLS	(ii) OLS	(iii) OLS	(iv) OLS	(v) 2SLS
LN(1+AGE)	-0.016**	-0.016***	-0.015**	-0.016**	-0.016**
	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)
LN(BVP)	-0.026***	-0.026***	-0.026***	-0.030***	-0.031***
	(0.009)	(0.009)	(0.009)	(0.011)	(0.011)
VENDOR	-0.056**	-0.057**	-0.057**	-0.072**	-0.084**
	(0.027)	(0.027)	(0.027)	(0.036)	(0.040)
RD	0.031*	0.032*	0.032*	0.046**	0.050**
	(0.018)	(0.019)	(0.019)	(0.023)	(0.023)
AHCDV	0.008				
	(0.012)				
IHADV		-0.001			
		(0.011)			
RANK			0.005		
			(0.006)		
IHAGE				0.003	0.018
				(0.005)	(0.017)
YEAR EFFECTS	y	y	y	y	y
INDUSTRY EFFECTS	y	y	y	y	y
N obs.	1440	1440	1440	955	952
Adj R-sqd	13.00%	12.96%	13.00%	16.08%	15.03%

Table 5-6: Correlation Matrix of Variables used in Underwriter Reputation Regressions 1949-86

Adj Return is the first-day return adjusted for market movement between prospectus date and first trading date.

	ADJ RET	AGE	LN (1+AGE)	BVP	LNBVP	VDR	RD	AHC	IHA	IHAGE	NAV	LNNAV	MCAP	LNMCAP	DIV	LNDIV
ADJRET	1.000	-0.088	-0.109	-0.053	-0.077	-0.108	0.073	-0.009	-0.026	0.008	0.020	-0.085	0.012	-0.035	-0.005	-0.035
AGE		1.000	0.859	0.181	0.229	0.080	-0.021	0.051	0.010	0.024	0.061	0.213	0.114	0.058	0.139	0.155
LN(1+AGE)			1.000	0.180	0.244	0.110	-0.019	0.035	0.011	0.047	0.045	0.165	0.076	-0.003	0.109	0.200
BVP				1.000	0.862	0.142	-0.075	-0.095	-0.026	0.110	0.217	0.331	-0.022	-0.209	0.049	-0.035
LNBVP					1.000	0.089	-0.071	-0.127	-0.032	0.132	0.145	0.383	-0.068	-0.266	0.016	-0.055
VENDOR						1.000	-0.063	-0.136	-0.066	0.156	0.016	-0.145	-0.085	-0.202	-0.012	-0.017
RD							1.000	0.136	0.068	-0.113	0.048	0.114	0.162	0.168	0.115	0.073
AHC								1.000	0.269	-0.541	0.159	0.376	0.255	0.477	0.248	0.232
IHA									1.000	-0.644	0.049	0.190	0.077	0.219	0.078	0.199
IHAGE										1.000	-0.050	-0.305	-0.169	-0.404	-0.162	-0.221
NAV											1.000	0.474	0.582	0.354	0.661	0.234
LNNAV												1.000	0.560	0.773	0.595	0.460
MCAP													1.000	0.635	0.882	0.354
LNMCAP														1.000	0.614	0.522
DIV															1.000	0.448
LNDIV																1.000

Table 5-7: Renwick Wilton & Dobson Tender Offer Results 11 Nov. 1963

(i) No. of applications, shares applied for and prices tendered

In total there were 3968 applications for 6230900 shares. 405,000 shares were offered by S.G. Warburg on behalf of the company at a minimum price of 13s.. The detail regarding applications below 15.75s. was not disclosed.

Tendered Price (s.)	No. shares applied for	Cumulative no. shares	No. applications	Cumulative no. applications
30	200	200	1	1
26	5000	5,200	1	2
22	2400	7,600	7	9
21	1000	8,600	1	10
20	35000	43,600	49	59
19.75	200	43,800	1	60
19.5	400	44,200	1	61
19.25	13500	57,700	8	69
19	25500	83,200	35	104
18.75	20800	104,000	3	107
18.5	32800	136,800	12	119
18.25	25900	162,700	11	130
18	233800	396,500	89	219
17.75	29000	425,500	12	231
17.5	195800	621,300	73	304
17.25	104700	726,000	25	329
17	236900	962,900	150	479
16.75	59200	1,022,100	23	502
16.5	298400	1,320,500	154	656
16.25	158900	1,479,400	90	746
16	463800	1,943,200	368	1114
15.75	119900	2,063,100	100	1214
13-15.75	4,167,800	6,230,900	2754	3968

(ii) Basis of allocation

Tendered Price (s.)	Pro rata allotment	Maximum no. shares	Minimum no shares
18 and over	50%	3,000	200
17.75	50%	2,745	200
17 to 17.5	20%	1,000	200
15.75 to 17	200%	200	200
below 15.75	0%	0	0

Source: *The Times,* 12 November 1963, p.19.

Table 5-8: IPO Volume by issue methods

Total offers include fixed price offers as well as tender offers. Total IPOs include placings along with fixed price offers and tender offers. There are 67 tenders between 1960 and 1969 excluding 1 "penny" IPO and 1 re-admission (see text) and 35 between 1980 and 1986 excluding 1 privatisation (Britoil). The IPO by tender in 1962 was a re-admission and is excluded. There was a tender offer in November 1979 for which I could not find the results of the tender.

	Tender Offers	Fixed Price Offers	Total Offers	%	Total IPOs	%
1961	1	30	31	3%	59	2%
1962	0	37	37	0%	69	0%
1963	14	34	48	29%	63	22%
1964	11	54	65	17%	76	14%
1965	1	28	29	3%	58	2%
1966	1	22	23	4%	31	3%
1967	4	17	21	19%	30	13%
1968	31	37	68	46%	81	38%
1969	4	43	47	9%	56	7%
1961-69	67	302	369	18%	523	13%
1980	1	2	3	33%	5	20%
1981	1	7	8	13%	13	8%
1982	2	6	8	25%	11	18%
1983	16	7	23	70%	25	64%
1984	4	15	19	21%	22	18%
1985	7	28	35	20%	39	18%
1986	5	36	41	12%	56	9%
1980-86	36	90	126	29%	171	21%

Table 5-9: Comparison of characteristics of IPOs by Tender and IPOs by Offer for Sale and Placings

Rows (1), (4) and (5) include offers for sale and placings. In the later period characteristics of Offers are not separately broken out (see text). Characteristics are equal weighted means of post-IPO market capitalisation at the offer price at 2004 prices (MCAP), firm age (AGE), no. of years historic profits disclosed in IPO prospectus (TRACK), book value per share to the offer price (BVP), forecast dividend yield at the offer price (DY), proportion of the total shares outstanding sold at the IPO (MKTABILITY), the proportion of the shares offered which are existing shares (VENDOR) and new shares (PRIMARY) and the proportion of IPOs which undertake R&D activity (R&D).

	MCAP £000	AGE yrs	TRACK yrs	BVP x	DY %	MKTABILITY %	VENDOR %	PRIMARY %	R&D %	N
1960-69										
(1) All ex. Tdrs	21,577	39.2	8.9	0.85	5.9%	31%	25%	6%	5.3%	549
(2) Offers	31,324	39.0	8.9	0.62	5.5%	33%	25%	8%	4.1%	338
(3) Tenders	33,098	41.8	8.9	0.46	4.3%	35%	31%	4%	9.0%	67
1970-79										
(4) All	48,252	42.2	8.1	0.47	5.6%	33%	23%	10%	5.6%	277
1980-86										
(5) All ex. Tdrs	95,945	32.8	4.9	0.46	4.0%	33%	18%	15%	20.3%	135
(6) Tenders	176,101	33.7	5.1	0.28	2.5%	31%	18%	13%	31.4%	36

Table 5-10: Probit regressions for tender offers 1961-86

Dependent variables is a binary variable taking 1 if tender offer and 0 otherwise. MCAP is the ordinary share market capitalisation at the offer price at 2004 prices. Age was neither economically or statistically significant. Figures in brackets are z-statistics. One, two and three asterisks indicate significance at the 10%, 5% and 1% level or better. The LR statistic tests the overall significance of the model.

Estimation Dep. Variable	(1) Probit Tender	(2) Probit Tender	(3) Probit Tender	(4) Probit Tender	(5) Probit Tender
Constant	-5.138***	-1.594***	-1.295***	-1.407***	-5.581***
	(-5.975)	(-16.603)	(-22.335)	(-13.430)	(-5.714)
LNMCAP (£m)	0.228***				0.220***
	(4.557)				(3.931)
LNBVP		-0.346***			-0.276***
		(-4.719)			(3.608)
RD			0.437***		0301*
			(2.656)		(1.733)
VENDOR				0.644*	1.092***
				(1.838)	(2.805)
LR statistic	20.77***	22.62***	6.71***	3.35*	47.66***
N obs.	970	969	968	967	964
Missing obs.	0	1	2	3	6

Table 5-11: Comparison of underpricing of IPOs by issue method

First-day returns are unadjusted for market movement; adjusted returns are statistically insignificant. Tender offer returns are estimated based on the published strike price. T-statistics test the null hypothesis that mean first-day returns are equal to zero. RET>0% is the proportion of IPOs whose first-day return is greater than zero.

	EW MEAN D1 RET	MEDIAN D1 RET	T-STAT	RET>0 %	N Obs.
1960-69					
(1) All ex. Tenders	14.12%	8.93%	16.79	81%	549
(2) Offers	11.58%	6.82%	11.30	74%	338
(3) Tenders	7.57%	4.17%	3.68	85%	67
1980-89					
(4) All ex. Tenders	12.07%	7.50%	7.18	79%	135
(5) Tenders	5.19%	3.64%	4.19	63%	36

Table 5-12: Regressions of First-day returns for 1961-86, 1961-69 and 1980-86

The dependent variable is first-day return adjusted for market movement between prospectus publication and initial trading (%). Estimation method is OLS. The t-statistics in brackets are calculated using White's (1980) heteroscedasticity-consistent method. Year and industry dummy variables are included all four regressions below but results are not shown. TENDER is a dummy variable taking the value 1 if the IPO is by tender offer and 0 otherwise. Market capitalisation at the offer price gives similar results when substituted for age. I include a placing dummy variable and either a 1 or 3 month lagged market return in all regressions. Standard errors are shown in brackets and are adjusted for heteroscedasticity using White's (1980) heteroscedasticity-consistent covariance matrix. *, **, and *** asterisks indicate significance levels of 10%, 5% and 1% respectively.

	(1)	(2)	(3)
Estimation method	**OLS**	**OLS**	**OLS**
Dep. Var.	**D1RET**	**D1RET**	**D1RET**
Period	**1961-86**	**1961-69**	**1980-86**
LN(1+AGE)	-0.013*	-0.012	0.016
	(0.007)	(0.012)	(0.017)
LN(BVP)	-0.034**	-0.048***	
	(0.010)	(0.0130	
LN(DY)			-0.019
			(0.027)
TRK		-0.010*	
		(0.005)	
RD	0.059**	0.119***	
	(0.023)	(0.033)	
VENDOR	-0.072	-0.110**	-0.155
	(0.045)	(0.054)	(0.098)
TENDER	-0.100***	-0.106***	-0.100**
	(0.020)	(0.020)	(0.042)
YEAR EFFECTS	Y	y	Y
INDUSTRY EFFECTS	Y	y	y
Adj. R-sqd	12.93%	17.46%	18.88%
N obs	964	523	159

Table 5-13: Underwriting of Tender Offers

AHC is the abbreviation for Accepting Houses Committee and IHA for the Issuing Houses Association.

	1960-69 #IPOs	1960-69 %	1980-86 #IPOs	1980-86 %
Tenders	67	100%	36	100%
Underwritten by:				
Issuing House:	44	66%	31	86%
AHC/IHA member	17	25%	26	72%
IHA member only	22	33%	3	8%
IHA non-member	5	8%	2	6%
Broker	23	34%	5	14%

Figure 5-1: IPO Underwriting Share of Reputable Merchant Banks 1917-86

"Underwriting Share" is the percentage of all IPOs in my data set underwritten by AHC members after 1945 and those banks listed in Table 5-1 columns (1) and (2) before that date. Placings are included and are deemed underwritten to the extent that the issuing house has agreed to purchase shares at the placing price in the event of their not being placed with investors.

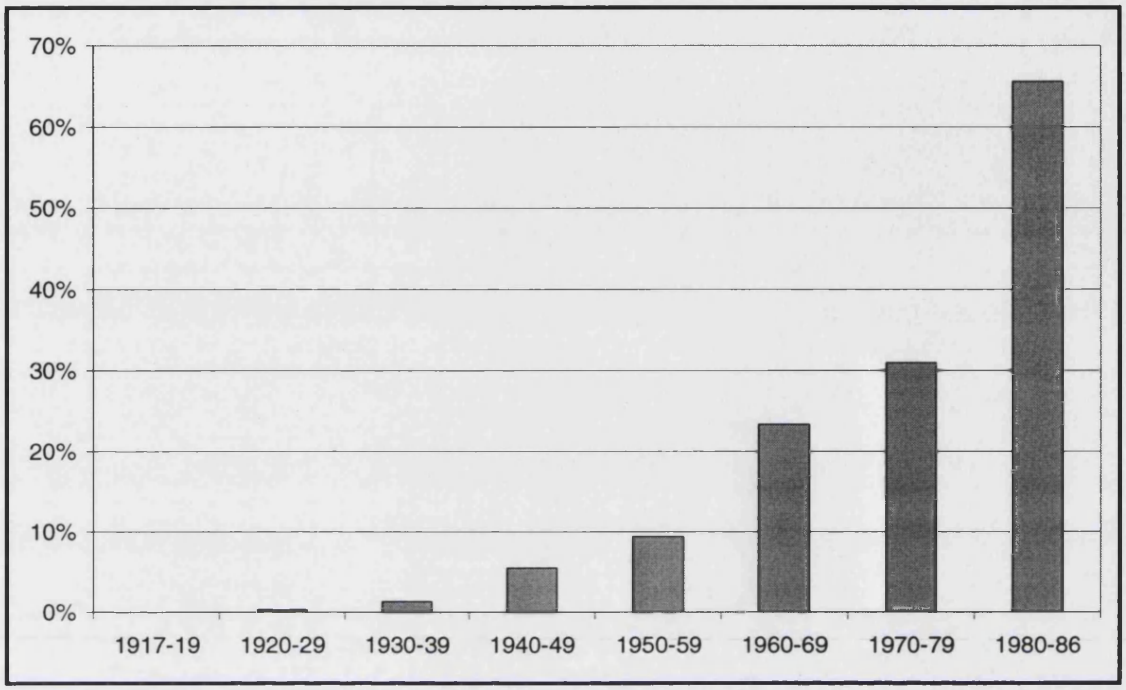


Figure 5-2: IPO Underwriting Market Shares 1930-86

"IHA" denotes issuing houses which were members of the IHA and "Non-IHA" those which were not. "Other" covers companies, syndicates and individual company promoters engaged in underwriting.

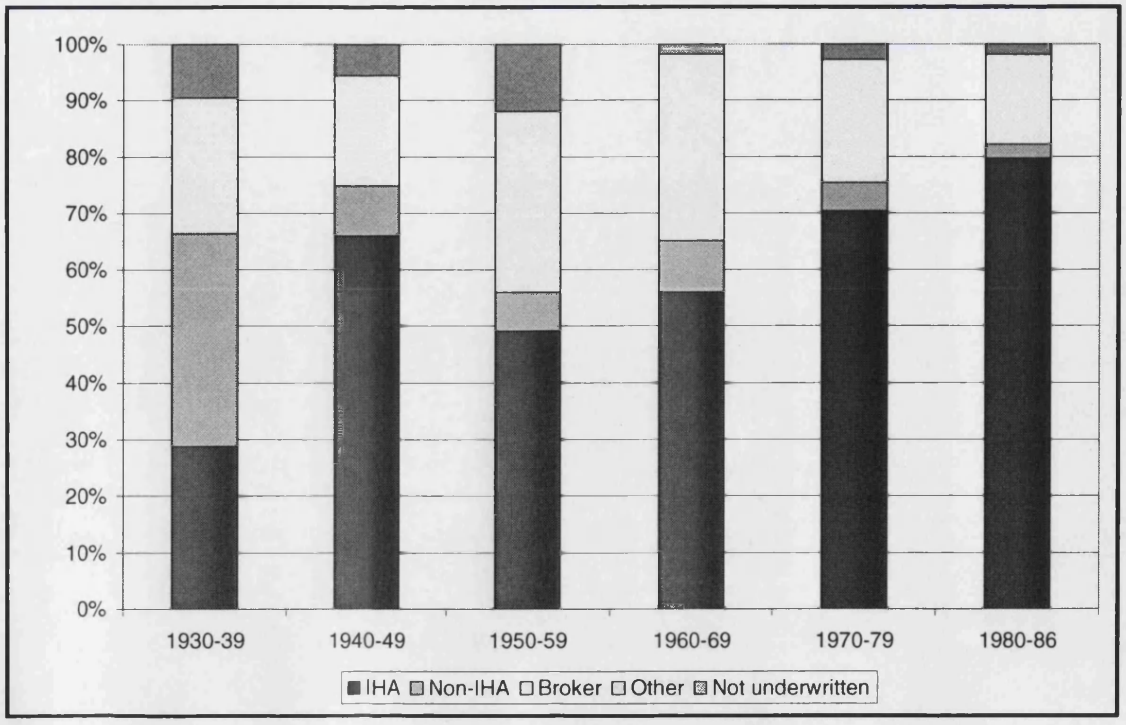


Figure 5-3: IHA Membership 1946-86

No. entrants starts in 1948 (see text).

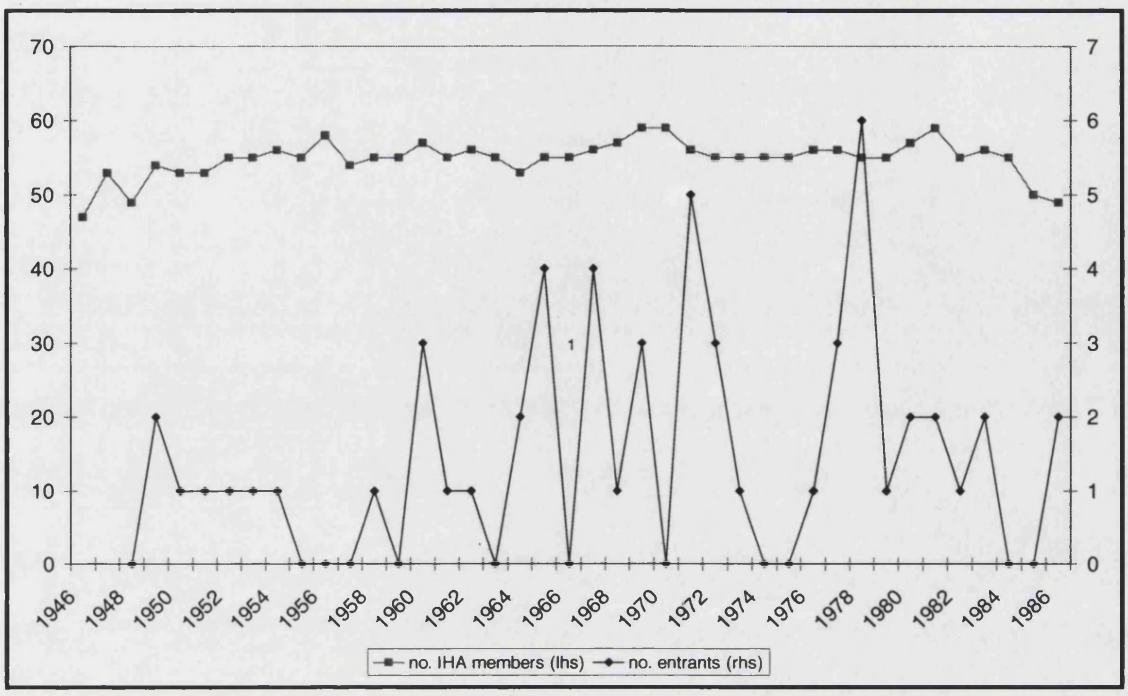


Figure 5-4: Stylised Demand curve for shares under a Tender Offer

This stylised example is taken from Merrett, Howe and Newbould (1967). See text.

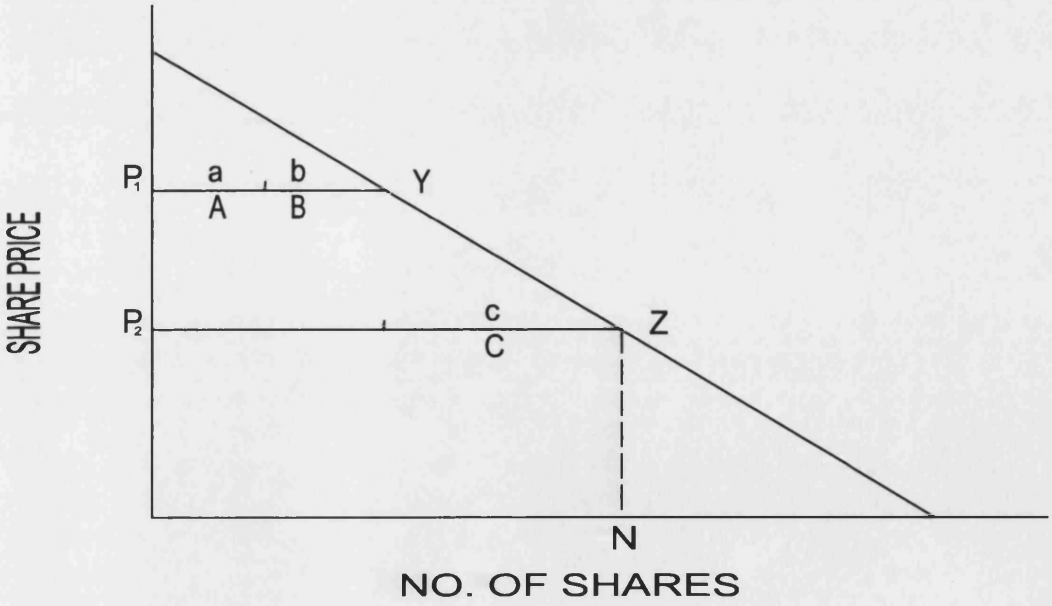
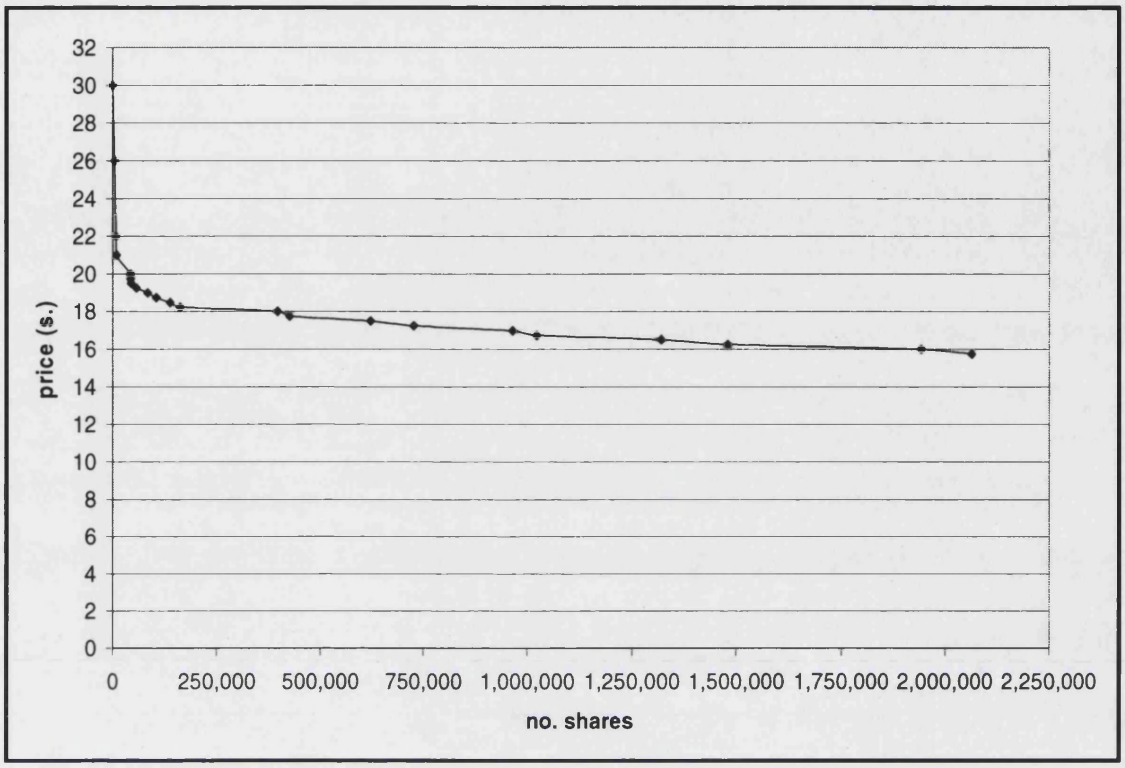


Figure 5-5: Demand curve for shares in Renwick Wilton November 1963

The demand schedule is derived from Table 1 (i).



CHAPTER 6: IPOs DURING TECHNOLOGY BUBBLES

In this final chapter, I examine how the IPO market performed during the technology-related share price bubbles of the late 1920s and the late 1990s. In each period, there was a sudden surge in investor awareness of the potential of new technologies, electricity, chemicals and automobiles in the twenties, and the internet and information and communications technologies (ICT) in the nineties.

The literature on the economics of financial markets with respect to both periods has focussed almost entirely on the US stock market. There is some disagreement, particularly regarding 1929, about whether technology firms contributed to the share price bubble or whether they were undervalued by the market. DeLong and Shleiffer (1991), White (1990) and Rappoport and White (1994) attributed the 1929 Wall Street crash to the irrational exuberance of investors. Ofek and Richardson (2001) explained the US "dotcom" mania of the late nineties in terms of the increased participation of overoptimistic, uninformed investors in internet stocks and the constraints on short selling. Loughran and Ritter (2004) have documented how the surge in US IPO underpricing in 1999-2000 was associated with technology and internet firms. The claim that the stock market of 1928-29 was nothing but a bubble has been challenged by McGratten and Prescott (2004) and by Nicholas (2005). Both argue that far from being overvaluing, the new technologies were undervalued by the market. Nicholas claims that technology firms defined by patent counts and patent citations outperformed the rest of the market both during the bull market and through the post-1929 crash in terms of share price returns and of survival rates.

Whilst IPO activity did not approach the levels of Wall Street, on both occasions London experienced the same frenzied run-up and subsequent collapse in share prices. The surge in underpricing in 1999-2000 bears a strong similarity to the US. No comparison of the two technology bubbles in either period has been made to date. The British experience offers a relevant case study of how markets behave during technology bubbles.

I compare IPO underpricing and IPO survival during 1928-29 and 1999-2000 and their respective run-up periods. Given the improvements in regulation, disclosure and underwriting in the intervening seven decades

discussed in chapters 2 and 5, I would expect these reforms to moderate the extent of underpricing in hot technology markets and improve post-IPO survival prospects other things being equal. Better regulation and disclosure should moderate the increased uncertainty brought on by any technology shock, whilst the switch to book-building of IPOs should extract from exuberant investors a price closer to fair value than in previous hot markets which laboured under the fixed offer price regime. These same reforms should minimise the instances of questionable, if not fraudulent, ventures being sold to an unwary public. Reputable underwriters are motivated to safeguard their reputations and to avoid being associated with an IPO delisted within only a few years of its debut as a quoted company. "Fringe" banks underwrite to make a fast buck.

I recognise the dangers of making sweeping comparisons between two time periods characterised by differences in economic and institutional environments. Yet, the main findings of this chapter are interesting. Underpricing of technology IPOs in 1999-2000 rose to levels well beyond those scaled in 1928-29. On the other hand, survival of technology IPOs launched in 1999-2000 was much better. Improvements in the IPO market probably contributed to this survival performance but could not deliver a better underpricing outcome. Several hypotheses concerning new manifestations of familiar agency problems from the US IPO empirical literature have applicability to the UK and may help to explain this further surprising underpricing result.

The next three sections discuss the background to the 1920s and the 1990s, the data and the associated descriptive statistics. Sections 6.4 and 6.5 analyse underpricing and survival, respectively, in the two periods. Section 6.6 discusses the implications of my findings.

6.1 Background to the 1920s and 1990s

The 1920s was a decade of rapid technological progress built on the science of the Second Industrial Revolution developed over the previous 40 to 50 years.[231] Large US firms with newly-established research laboratories were the driving force behind this progress pulling British industry along in their

[231] Mokyr (2002), p.105-116.

wake.[232] Along with the internal combustion engine, electricity and chemicals were the most important technologies of the early twentieth century.[233] Innovation in these areas spawned a dramatic and observable increase in patent activity.[234] Radio was the most tangible embodiment of this new world, rapidly developing as a mass consumer product[235] and propelling RCA's share price to levels of valuation on Wall Street in 1928 and early 1929 previously unseen.

Although somewhat slow to follow the US lead in electricity, chemicals and automobiles, some authors have argued that nonetheless these "new" industries were decisively important to the British interwar economy and were responsible for the strong relative economic performance of the 1930s.[236] This claim has been contested by Aldcroft (1967) and Buxton (1975) largely on the definitional grounds as to what constitutes a new industry. One authoritative source estimated the direct contribution of these industries to the growth in British manufacturing output at almost 30% between 1924 and 1937 and at over 40% in the post-war period.[237] Reflecting this industrial shift, British corporate as opposed to individual patent applications rose from 15% of the total pre-1913 to reach 58% in 1938.[238] Radio, gramophone, cellulose acetate and automobile-related IPOs featured prominently in the list of LSE IPOs of the late twenties. Decca Gramophone and Ford Motor went public in the last quarter of 1928, their share prices rising 43% and 86% respectively on the first day of trading. Foreman-Peck (1985) has claimed that most new businesses established in the interwar years were more "chaff" than the "seed-corn" of industrial growth. His analysis drew on census data taken from both private and public firms as well as large and small. IPOs of the late 1920s can similarly be categorised into seed-corn and chaff.

The sentiment enveloping share prices in London was almost as frenetic as Wall Street. The increased incidence of share-pushing culminated in the

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[232] Mowery and Rosenberg (1989); Edgerton and Horrocks (1994).
[233] Mowery and Rosenberg (2000), p.8.
[234] Moser and Nicholas (2004) and Nicholas (2005), Figure 3.
[235] Stromberg (2004).
[236] Richardson (1961, 1962).
[237] 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.
[238] Hannah (1983), p114 and footnote 40 which refers to the original study of patenting in Britain by Jewkes, Sawers and Stillerman (1958).

Hatry scandal of September 1929.[239] This does not show up, however, in the available British stock market indices (Figure 6-1). Since the FT30 was not established until 1935. I have made use of the *Bankers Magazine* Variable Securities Index. It is likely that preference as well as ordinary shares are included in this index and that, as a result, it most probably understates both the rise and fall in prices in the late twenties.

The post-1929 economic decline in the UK was modest in comparison with the US. British 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.[240] The annual total of company liquidations, both voluntary and compulsory, increased only 8% between 1929 and 1931 and barely increased as a proportion of all companies both public and private.[241] In as far as 90% of the liquidations were voluntary and some of these were the result of owners wishing to retire or to merge with another firm, these figures represent an upper bound estimate of company deaths due to poor performance.[242]

The 1990s shared some similarities with the 1920s. The internet seemed to represent as profound a technological breakthrough as did electricity in its day.[243] Its scientific foundations were built on the advances made in information and communications technology over the preceding forty years starting with the development of the transistor. Whilst evidence on the productivity growth dividend of these technological advances is still emerging[244], as in the 1920s, this innovative activity had a dramatic impact on share prices of internet firms pushing both US and UK indices to new highs in 2000 before then experiencing a dramatic collapse (Figure 6-2). On both sides of the Atlantic, internet IPOs were to the 1999-2000 market what radio and gramophone IPOs were to the 1928-29 market. Mean IPO underpricing in the UK and US reached almost 90% and over 70% respectively in 1999 (Table 6-1). Internet IPOs contributed significantly to the rise in underpricing over the decade in both

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[239] Michie (2001), p.262.
[240] Mitchell (1988), National Accounts Table 5A, p.836: Compromise Estimate of GDP at Factor Cost in constant price for the UK excluding Southern Ireland.
[241] Hudson (1989), Figures 1 and 2, p.104-105.
[242] ibid., p.111.
[243] A search for articles on the "internet revolution" in *The Financial Times* in 1999 and 2000 generated 175 separate articles.
[244] See Crafts (2002), p.94-98, for a concise review of the evidence in comparison with the US.

cases.[245] In February 2000, for example, Oxygen Holdings saw its share price rise 2775% on its first day of trading on the LSE.

According to Table 6-1, there were almost four times as many IPOs during 1991-2002 in the US compared to Britain, even when penny shares are excluded. Given the larger scale of the US IPO market and the leading role taken by US firms in the commercial exploitation of the internet, the recent empirical finance literature has concentrated exclusively on this market. According to Loughran and Ritter (2004), a change in IPO risk composition can only partially explain the surge in US underpricing. New hypotheses are required to account for the hot market, among them the changing objectives of issuing firms happy to leave money on the table for investment banks in order to "buy" research coverage of their shares by the bank's highly-ranked analysts (the "analyst lust" hypothesis). The emergence of "spinning" whereby an issuing firm's CEO allowed their own IPO to be excessively underpriced in return for shares of subsequently underpriced IPOs brought by their investment bankers is a further example, cited by the authors, of a shift of IPO objectives. A second main hypothesis, the realignment of incentives, put forward by Ljungqvist and Wilhelm (2003) attributes the issuing firm's toleration of higher underpricing to the managers owning a smaller percentage of the firm and selling fewer shares in the offering in 1999-2000 than previously. Loughran and Ritter (2004) have disputed this argument on the grounds that managers may have owned a lower percentage of the pre-IPO firm but the dollar value of those shareholdings at the offer price was significantly higher in 1999-2000 than previously and the desire to maximise dollar wealth should have been incentive enough to minimise underpricing. A third explanation implied by the analysis of Ofek and Richardson (2003) is that internet IPOs were swept up by the irrational exuberance enveloping internet shares consequent upon the greater participation of relatively unsophisticated retail investors in these counters coupled with the constraints on short selling these stocks. The first part of this explanation has certain parallels with the hypothesis advanced by White (1990) for the 1929 Wall Street bubble.

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[245] Ljungqvist (2003), Table 6, in regression (11) the coefficient on the internet dummy for the whole period is highly significantly positive. Loughran and Ritter (2004), Table VI, p.28, in regressions (3) and (4) technology IPOs display a rise in underpricing in 1999-2000 but not internet IPOs. The latter definitions appear to be mutually exclusive (Appendix D, p.35). Ljungqvist offers no definition of "internet-related" IPOs. Note that testing for a hot market in internet IPOs is not at all the focus of the paper.

None of these hypotheses has been tested on UK IPOs. Given certain similarities with the US capital markets, analyst lust, realignment of incentives and irrational exuberance have equal applicability to Britain. Spinning appears not to be relevant to IPOs on the LSE.[246]

I have discussed the regulatory regime surrounding the IPO market in the interwar years in chapter 2. In 1925-29, there were no minimum listing criteria for IPOs on the Supplementary List. Companies did have to apply to the LSE for permission to have their shares dealt in on the floor of the LSE. I have yet to find any evidence of pre-vetting procedures or of the rejection of applications in the LSE minutes. At the end of the last century, listing requirements of the Alternative Investment Market (AIM) superficially appeared as lax as those of the twenties (Table 6-2). However, this would be to ignore the importance of the role of the "nominated adviser" and a commitment by any listing firm to the ongoing obligations of a quoted company, including that of adequate disclosure. Together with the stronger accounting standards and investor protections documented in chapter 2, these represented important reforms to the listing process compared to the 1920s.

6.2 Data

I have assembled data samples comprising 347 IPOs between 1925 and 1929 and 813 IPOs between 1995 and 2000. The choice of period covers both the "hot" IPO years, 1928-29 and 1999-2000, and the "run-up" years, 1925-27 and 1995-98 respectively. The nineties run-up includes an extra year in order to take in the establishment of AIM from June 1995. It is my intention to extend both data sets to encompass the whole decade in each case in my post-doctoral research.

The 1925-29 data set consists of all ordinary share IPOs whose prospectuses are included in *The Times Book of Prospectuses* excluding investment trusts and firms already listed on another stock market. 217 IPOs where disclosure allowed the calculation of first-day returns were included in the

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[246] Following the SEC's lead, the Financial Services Authority did launch an investigation, albeit an informal one, into the occurrence of spinning in October 2002 following a review earlier in the same year of certain internet IPOs from 1999-2000 which failed to uncover any wrongdoing, *Financial Times,* 24 Oct 2002 "FSA launches probe into share spinning". No firms were subsequently prosecuted as a result of this investigation.

underpricing data analysed in chapter 4. A further 77 are penny share IPOs and the remaining 53 IPOs gave no disclosure of the issue or placing price and include introductions (Table 3-1, chapter 3). The data on the 813 IPOs during 1995-2000 were sourced from the LSE website, *KPMG New Issues* and *SDC Platinum.* Transfers from Ofex or Rule 4.2 were excluded as were firms already listed on an overseas stock exchange. Share price data for the twenties came from the *Stock Exchange Daily Official List* (SEDOL), whilst that for the nineties came mainly from *Datastream* supplemented by SEDOL.

Data on characteristics of IPOs in the twenties, namely, firm age (AGE), length of historical profits disclosed in the prospectus (TRACK), the post-IPO net asset value attributable to shareholders (NAV), and whether or not the IPO was underwritten (UW) or the accounts audited (AUDIT), were extracted from the prospectus. Firm size (MCAP) was based on the total number of shares outstanding post-IPO as disclosed in the prospectus and in the *Stock Exchange Year Book* and the first-day share price. Technology IPOs were defined based on prospectus disclosure either as those firms engaging in research and development activities (RD), or possessing or having applied for patents (PAT1) in their own name, or having been granted access to patented innovations following the purchase of rights to manufacture or sell (PAT2). UW, AUDIT, RD, PAT1 and PAT2 are dummy variables.

Characteristics of IPOs in the nineties, MCAP, NAV and R&D expenditure, were sourced from *Datastream.*[247] The R&D expenditure data enables the calculation of a dummy variable (RD). All IPOs in this later period had audited accounts, virtually all were underwritten[248] and all Official List IPOs disclosed the required minimum number of years of historic profits. There is no variability in these characteristics with which to explain either underpricing or survival. I do make use of a dummy variable indicating the less stringent listing criteria on AIM compared to the Official List. The only missing characteristic compared to the earlier IPO sample is firm age. MCAP and NAV are sufficient to proxy for firm risk through firm size.

As discussed in chapter 3, section 3.8, SEDOL industry classifications are crude in the interwar years and do not allow a definition of technology by

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[247] This is in the hope of accessing existing data sets for this period at some stage in my postdoctoral research work.

[248] According to Ljungqvist (2001), only 13 of 735 IPOs in these 6 years were not underwritten., Table 1, p.38

industry. Based on prospectus disclosure as to the main business activity, the 95 broadly defined patent firms (PAT2) fell into the radio and gramophone (21), automobile-related (11), and rayon (8) industries. By the nineties, I am able to make use of the Financial Times Actuaries industry classifications to identify technology industries. The earlier SEDOL classifications do make possible the identification of mining and tea, coffee and rubber plantations as well as oil exploration and production firms. These industries together represent the natural resource sector (NATRES) and were viewed as relatively high risk investments which nonetheless attracted a loyal investor following in London.

Initial returns are first-day returns, the exception being initial returns of penny IPOs between 1925 and 1929 which in order to minimise share price data collection are partial first-month returns. There is no statistically significant difference between first-day and partial first-month returns as discussed in chapter 4, section 4.4 (iv).

Following Fama and French (2004), I identify those IPOs delisted for cause, i.e. those delisted because of winding up or liquidation. In respect of the twenties, the *Register of Defunct and Other Companies* compiles a list of those firms which disappear from the *Stock Exchange Year Books.* There are two problems with this data source. Firstly, these defunct companies were not restricted to those listed on a British stock market. By 1939 the *Stock Exchange Year Book* contained entries on 19,000 securities issued by 9,400 companies. Of these only 10,297 were traded on the London Stock Exchange, another 2,103 were listed on the Provincial Stock Exchanges and the remaining 6,600 securities were quoted overseas or were too small to be quoted at all.[249] Secondly, not all companies disappear for reasons of bankruptcy and the reason for disappearance, other than a change of name, is not made clear. I therefore checked the 347 IPOs for delisting within 5 years of IPO based upon a search of the *Stock Exchange Year Books* and the *Stock Exchange Daily Official Lists* (SEDOL). The entry in the *Year Book* documents when a firm has been wound up or liquidated, been acquired or is still trading as a going concern. SEDOL confirms whether the shares are still quoted.

A word is necessary on the definition of delisting for cause in 1925-29. There is an important distinction between a voluntary and a compulsory winding

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[249] The Stock Exchange Year Book, 1939; Michie (2001), p.283

up. In the former case, a firm may be liquidated, even though it is a going concern, because the owners wish to retire or because of acquisition by another firm.[250] The *Year Books* make it clear when a firm has been liquidated due to acquisition and whether any consideration has been paid. Instances where a voluntary wind up is recorded without mention of an acquisition or asset sale are assumed to be delistings for cause. In the 1925-29 sample there were also 14 instances of IPOs still being included in the *Year Books* despite their share price disappearing from SEDOL following a decline in price to one penny or less. I have treated these cases as delistings for cause. There are 8 IPOs where the share price suddenly disappears at a non-penny value and the firm is still trading according to the *Year Books*. I have excluded these IPOs from the survival analysis. The tracking of IPO survival is more straightforward in 1995-2000 through a combination of the LSE's *Regulatory News Service* and *Datastream*.

As already mentioned, these primary sources also indicate when a firm delists due to merger or acquisition. There were 21 IPOs which were acquired in the 5 years following IPO, accounting for only 6.1% of the 1925-29 data set. In the 1995-2000 period, however, 165 IPOs were acquired within the first 5 years of their life as a public company, equivalent to 20.1% of all IPOs. Following Fama and French (2004), it is difficult to determine *prima facie* whether or not such firms delisted due to acquisition would have survived since in some cases they will have been acquired because of poor industrial and financial performance. I have therefore calculated survival rates both including and excluding acquisitions to estimate a lower and upper bound.

6.3 Descriptive Statistics

The characteristics of this data set are described in Table 6-3. Panels A and B summarise the 1925-29 IPOs and Panel C and D the 1995-2000 IPOs. The 53 penny share issues accounting for over a quarter of all IPOs in 1928 and 1929 is evidence of the speculative activity which infiltrated the market in the late twenties (Panel A). The high penny share issuance in 1925 reflects the boom in rubber plantation IPOs. Natural resource IPOs principally plantation

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[250] Hudson (1989), p.111

and mining IPOs dominated the market in 1925 and 1926 but fell away thereafter. The hot market of 1928 and 1929 was a domestic industrial affair and was not attributable in any way to speculation in natural resource stocks. Although very few of the IPOs were firms undertaking R&D activity (RD), there was a marked increase in the proportion of IPOs with patents, particularly in 1928 when two-fifths of all IPOs had access to intellectual property on the broad patent definition (PAT2, Panel A). Firms with patented products and processes were not yet engaging in the formal R&D activity increasingly characteristic of the largest firms. There are no trend changes in MCAP, NAV, or TRACK in terms of means or medians, IPOs do become younger on average in 1928 and 1929, and are more likely to be underwritten (UW) but less likely to have audited financials (AUDIT) (Panel B). This pattern agrees with that already observed in the data described in chapter 3. The correlation matrix in Table 6-4, Panel A, indicates that patent IPOs were also quite likely to be penny shares.

The characteristics of the 1995-2000 IPOs point up both similarities with and contrasts to the earlier sample. All IPOs in that earlier sample were admitted to the Supplementary List, effectively the interwar junior market. In the second half of the nineties 60% were listed on the junior market, AIM (Panel C).[251] The main listing criteria of AIM, less onerous than those of the Official List, are summarised in Table 6-2. Penny share and natural resource IPOs[252] were of relatively minor importance in contrast to the 1920s (Panel C). Technology IPOs are defined by R&D expenditure disclosure (RD), by membership of the information and communications technology industry (ICT), or as pure internet firms (DOTCOM). The detail is discussed in Appendix 6.1. On the first two definitions technology firms formed an important and increasing share of the IPO market in the late nineties accounting for over 30% of all IPOs in the peak volume year of 2000 (RD and ICT, Panel C). Internet IPOs were heavily clustered in 1999-2000. The definition of a Dotcom company employed is such that there is relatively little correlation between DOTCOM and ICT. In common with patent firms (PAT2) in the twenties, very few of the Dotcom firms were undertaking research and development in contrast to ICT firms, as indicated by the correlation coefficients (Table 6-4, Panel B). As regards firm

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[251] There was just one IPO on the USM in January 1995 before it was replaced by AIM as the junior market.

[252] These include metal mining and oil exploration and development and oil services companies.

risk, firm size (MCAP) increased in 1996 and 1997 before levelling out. AIM IPOs tended to be smaller, both in terms of MCAP and NAV. IPOs became younger on average (AGE) (Table 6-3, Panel D). Since I lack data on firm age, I cannot check whether firm age is positively associated with technology.

In summary, there was a surge in young firms and technology firms accessing the IPO market in both 1928-29 and 1999-2000 compared to the run-up periods. Technology was represented by patents in 1928-29 and by the internet and ICT in 1999-2000. In the next section, I compare the impact which the shift to technology had upon IPO underpricing in these two periods.

6.4 Underpricing

Chapter 4 analysed the annual time series of underpricing between 1917 and 1986. In this section, I compare underpricing of British IPOs in the late twenties and the late nineties and make use of the same linear model to explain underpricing subject to the availability of right hand side variables.

The annual time series of first-day returns for 1925-29 and 1995-2000 are set out in Table 6-5 and 6.6 respectively. My returns data for the latter period is consistent with the pattern described by Ljungqvist's data (Table 6-1). These two returns series, along with that for the US in the 1990s, are graphed in Figure 6-3. Whilst IPO returns averaged 28.5% in 1928, those of 1999 ran up to almost 100%. Part of this surge in underpricing is attributable to penny share IPOs which were particularly susceptible to investor over-exuberance and price manipulation. Although the exclusion of penny shares lowers the mean underpricing in both 1928 and in 1999-2000, 1928-29 still qualifies as a hot IPO market but remains dwarfed by the scale to which underpricing soared at the end of the century. Breaking down the 1995-2000 returns by market clearly shows that AIM IPOs were more heavily underpriced than those on the Official List. The increase in underpricing in 1999-2000 on the Official List is relatively modest by comparison to AIM. This is consistent with IPOs on AIM being riskier, exemplified by their both being smaller and having shorter track records. AIM was also generally the recipient of greater retail investor participation.[253]

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[253] *Wall Street Journal Europe*, S. Ascarelli, 7 Feb 2000, "Small Bourse Makes a Big Mark" Retail investors owned 34% of AIM shares compared to only 19% held by financial institutions in 1999.

How hot was the market in technology IPOs? In 1928-29 there was a marked increase in the underpricing of technology IPOs, as defined by either of the patent dummy variables (Table 6-5, PAT1, and PAT2). This did not diffuse into other parts of the IPO market (NONPAT2). The hot market was exclusively in patent IPOs. There are too few R&D-intensive IPOs for these results to be at all meaningful and they are not shown. ICT IPOs in 1995-2000 were on average more underpriced than other IPOs (NONTECH) and did exhibit a modest surge in underpricing relative to the rest of the market excluding penny IPOs (Table 6-6). DOTCOM IPOs on the other hand did see a sharp rise in mean underpricing to 300% in 1999 and 155% in the following year. Even when excluding penny shares, these IPOs were still on average underpriced by 141% in 1999.

Summarising the analysis of the annual time series of mean underpricing in these two periods, the IPO market was much hotter in 1999-2000 than in 1928-29 particularly when penny share IPOs are removed from the picture. The 1928-29 hot market was exclusively in patent IPOs. In contrast, whilst the 1999-2000 hot IPO market was principally concentrated in internet firms, ICT firms also participated.

These findings are in general supported by the results of multiple regression analysis (Table 6-7). In general, the OLS regressions suffer from clustering of observations, especially in 1925-1929. As a result the coefficient estimates lack precision. Regressions (1) and (2) indicate that the hot market begins in the second quarter of 1928 and runs out during the third quarter of 1929, even controlling for penny share IPOs. This timing concurs broadly with that of Wall Street in the late twenties.[254] If anything, IPO underpricing appears to peak ahead of the market indices in September/October. Accordingly, the hot market dummy variable (HOT) takes the value 1 for all IPOs from April 1928 to the end of June 1929. Firm size (MCAP), the penny share IPO dummy (PENNY), marketability or the proportion of firms sold at IPO (MKTABILITY), and the underwriting dummy (UW) are of the correct sign and economically significant but only UW and MKTABILITY are statistically significant (regression (3)).[255] Including these same control variables in regressions (4) and (5), a

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[254] White (1990).

[255] I have omitted BVP because there are 120 missing net asset values out of a total of 294 observations.

surge in patent IPO underpricing in 1928-29 seen in the simple annual time series is corroborated in the case of IPOs under the broad patent definition (PAT2). The sign of the coefficient on the interaction between PAT2 and HOT is positive (105.79%) and statistically significant at the 1% level, whilst that on PAT1 and HOT is much smaller (18.70%) and not significant.

Turning to the late nineties, underpricing starts to rise in early 1999 (regression (1), Table 6-8) and remains strong through 2000. I define the hot market dummy (HOT) to cover IPOs in 1999 and 2000. Once again MCAP, PENNY and MKTABILITY are employed as control variables along with firm valuation, or net asset value to market capitalisation (BVP). From regressions (2), (3) and (4) I conclude that there was a hot market in dotcom stocks, largely in 1999 and possibly 2000, excluding penny shares.[256] R&D and ICT IPOs were significantly more underpriced around 20% throughout the whole 6 years at a 1% level of significance, but not particularly underpriced during 1999-2000.

Summarising the results of this section, returns in 1999-2000 surged to levels far beyond anything seen in the late twenties or indeed afterwards. The hot market in 1928-29 was exclusively in patent IPOs; in 1999-2000, it was concentrated in Dotcom IPOs, although ICT IPOs also saw increased underpricing given their internet-relatedness. Technology as defined here was hot in both periods but it was a lot hotter in 1999-2000 despite the improvements in disclosure and underwriting. On average the dotcom IPOs of 1999 (140.94%) were underpriced at 3.5x the patent IPOs of 1929 (38.87%). My results say nothing about why this happened in the UK and the relative importance of irrational versus rational explanations. As discussed in section 6.2, some of the explanations put forward for US IPO underpricing are most likely equally applicable to the UK case.

6.5 IPO Survival

Irrational exuberance can lead not only to a surge in underpricing but also to IPOs being successfully launched that in the cold light of day should

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[256] The evidence on a hot market in ICT and Dotcom IPOs together is inconclusive. The coefficient on the interaction term for this group with HOT is positive but not statistically significant.

never have been financed at all. A combination of irrational exuberance and lax regulation can be unfortunate for IPO investors. Was the heightened investor interest in patent IPOs and internet IPOs simply a fad which allowed poor quality firms to be foisted on unwary investors, or was there a fundamental basis supporting the demand for these IPOs considering the riches which the new technologies seemed to promise? To the extent that IPOs launched during hot periods were fads exploited by unscrupulous entrepreneurs out to dupe investors, then these IPOs would not be expected to survive very long. Alternatively, if these IPOs possess good business plans with positive NPV projects, then they should survive their first few years as a public firm, irrespective of underpricing. Intense product market competition may, of course, mean many IPOs do not make the returns that they initially projected to the detriment of share price performance but few would go out of business entirely in such a short space of time.

A further reason for comparing IPO survival arises from the Nicholas (2005) claim that seasoned firms in the US of the 1920s demonstrated better long-term survival records the more valuable was their stock of patents. The intriguing question is whether a similar claim can be made regarding IPOs in the same period.

There are two measures of the post-IPO performance of firms. The first is a calculation of the total returns to an IPO including dividends and capitalisation changes after the first day of trading over a 3 to 5 year period. The latter method is heavily data-intensive. 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 size and book value to price characteristics. The only study of long-run IPO performance was published anonymously in the December 1931 issue of the *Economic Journal* and examined the long-run performance of the 1928 new issue cohort. The 1928 new issues comprised those of debenture and preference shares as well as ordinary shares and investment trust issues. The author concluded that the value of this 1928 portfolio of 277 new issues of ordinary shares, preference shares and debentures alike depreciated by 41% to May 1931, excluding Ford Motor which appreciated by 175%. Harris (1933) re-examined the performance of the same portfolio and estimated its depreciation at 47% over the period to April 1933. He went on to show that the "new ventures", i.e. the youngest firms and the firms with no audited historic profit

record, were the worst performers their share prices declining by 90% on average. Neither study looked at total return or compared IPO performance to a matched sample of seasoned firms. I estimate that underperformance for the 1928 IPO cohort was approximately 10% over the period to April 1933 adjusting for the market return.[257]

A second measure of post-IPO performance is IPO survival rates which I define as the proportion of IPOs which are not delisted for cause by their fifth anniversary as a quoted company. Although not as comprehensive a measure of long-run performance as total return, it does capture the downside risk of IPOs. Investors in IPOs may be prepared to accept share price declines post-IPO but not a substantial portion of their IPO portfolio being delisted and wound up. This level of downside risk is more characteristic of unquoted, early stage venture capital investment, not quoted security investment.[258]

Andrews (1937) analysed the failure rates of newly-registered companies, both quoted and unquoted, between 1919 and 1932 in Britain. The failure rate, or what he called "the risk factor", is the percentage of firms registering in year t failing within x years of registration, where t ranged between 1919 and 1932 and x varied up to 10 years. The survival rate is therefore equivalent to one minus the failure rate. His stratified sampling of the *Stock Exchange Official Intelligence* produced 481 observations. He then defined the failure of a firm in terms of a winding up or being struck off the Companies Register. Mergers and acquisitions were excluded. Andrews' main findings in respect of 5-year survival rates are summarized in Table 6-9. This 5-year rate clearly declines at the end of the decade. 83.6% of IPOs between 1919 and 1927 survive, whereas only 62.7% of the 1928-29 cohorts survive.

The 5-year survival estimates for the 1928 and 1929 cohorts include the depression years of the early thirties fully whilst the 1919 to 1927 cohorts do not. Andrews' data allows the recalculation of survival rates through to the end of 1934, a point at which the economy is past its 1932 trough. 1928-29 IPO survival was considerably worse than that of the run-up period even when the 1929-31 economic downturn is taken into account. Andrews' analysis also

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[257] These returns are price only. The market index is the Bankers Magazine Variable Dividend Series. Relative performance is most likely underestimated given the poorer dividend record of many of the 1928 ordinary share IPOs compared to firms in the index.

[258] 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".

provided a flavour of firm survival by industry, although the basis of classification is not disclosed. He estimated that in the case of two of the leading technology industries, "electric and wireless" and "motors", only 40% and 53%, respectively, of firms survived; in contrast, approximately 70% of metal mining firms (excluding tin), 78% of rubber plantation firms, 80% of oil firms and 82% of tin mining firms survived.[259] Technology firms were less likely to survive in this period than firms in the other acknowledged high risk sector, natural resources.

No subsequent study of survival rates has been carried out on British IPOs since the Andrews' study, although Levis (1990) did undertake a study of long-run performance of IPOs in the 1980s. In the US, Fama and French (2004) conducted a study of 10-year survival rates of IPOs and seasoned firms between 1973 and 2001. Their main finding relevant to my study is the sharp decline in survival rates from 60% for the 1973 IPO cohort to an average of 38% for the 1980 to 1991 IPO cohorts. Seasoned firms saw a much less pronounced decline in survival rates from a similar 60% to 50%. The authors attribute this fall in IPO survival to a decline in the cost of equity capital which allowed "weaker" firms to go public.

In the remainder of this chapter, I do three things. I improve upon the early studies of Andrews (1937) by focussing exclusively upon IPOs, thereby specifically highlighting the role of the stock market in new firm formation, and of Harris (1933) by analysing survival of the 1929 IPO cohort and the cohorts prior to 1928. I then supplement the survival rate analysis by estimating IPO survival times and by employing a hazard regression model to assess whether firm characteristics observed at the time of listing help to explain observed survival times. This approach allows me to analyse the survival of firms possessing technology assets at IPO relative to other types of firm controlling for such covariates as firm age or size. Finally, I compare the 1925-29 IPO cohorts with the 1995-2000 cohorts to ascertain whether survival has improved.

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[259] Andrews (1937), Table VII, p.508.

(i) Survival rates

5-year survival rates for my IPO samples are summarised in Table 6-10. Panels A and B tabulate survival rates for 1925-29 and 1995-2000 respectively. Panels C and D break out the results for 1995-2000 into IPOs on the Official List and those on AIM. Out of the 347 IPOs between 1925 and 1929, 120 (34.6%) were delisted for cause and 21 (6.1%) were merged or acquired within the following 5 years. In contrast, only 93 (11.5%), of the 813 IPOs between 1995 and 2000 were delisted for cause, whereas 165 (20.1%) were subsequently acquired. Reflecting the uncertainty as to whether those firms acquired would have survived, I calculate a lower and upper bound estimate of the 5 year survival rates. The former includes acquired IPOs in the denominator and the latter excludes them. Estimated survival is bounded between 62.3% and 64.6% for 1925-29 and between 85.6% and 88.5% for 1995-2000. A greater proportion of IPOs survived following the nineties' bubble than that of the twenties.

A closer examination of the survival rates in Panel A by cohort and taking the mid-point of the upper and lower bounds indicates an approximately 39% better survival rate of those IPOs launched in the run-up, 1925-27, compared to those in the hot market of 1928-29. There is a much less marked deterioration in survival rates of 1999-2000 IPOs compared to those of the run up, 1995-98 (Panel B). The 1928-29 cohorts could be affected by the economic downturn of the early 1930s. The results of recalculating the survival rates to the end of 1934 are included in the final two columns of Panel A. All survival rates fall, as I would expect, but the gap between the rate for the run-up and for the hot years narrows by only 1 to 2%. In short, fewer than one in two of the 1928-29 IPOs survive 5 years, whereas approximately 80% of the 1999-2000 IPOs did so.

IPOs in the twenties should perhaps be compared exclusively with IPOs on AIM, given the less strict listing criteria of this market relative to the Official List. IPO survival was approximately 10% worse for IPOs on AIM (Panel D) compared to the Official List (Panel C). Taking the approximate mid-point of the upper and lower bounds, survival rates for AIM IPOs deteriorated in 1999 and 2000 to a level 15% and 5% respectively below the run-up years 1996 to 1998. Nevertheless, the survival of AIM IPOs in 1999-2000 was still substantially better than that of the 1928-29 IPOs.

What was the survival experience of technology IPOs? Did those firms coming to market holding patents or undertaking R&D activity improve their chances of surviving other things being equal? Survival rates for technology IPOs in the second half of the twenties deteriorated substantially (Table 6-11, Panel A). On the broad patent definition (PAT2), only 35.7% of the 1928-29 IPOs survived, much worse than the 58.5% survival rate of non-patent IPOs. In comparison to the twenties, the survival rates for technology IPOs in 1995-2000 on all 3 definitions were better in both the run-up and in the hot years (Panel B). In addition, the decline in survival rates was modest, only 7% to 11% for ICT and R&D IPOs respectively. The same comparison for DOTCOM IPOs is of less use given the small number of DOTCOM IPOs in 1995-98.

In summary, a comparison of simple survival rates both for the overall market and for technology IPOs indicates a vastly better performance in 1999-2000 than in 1928-29 subject to the qualification that I may not have been able to account adequately for the more severe macro-economic conditions post-1929 compared to post-2000.

(ii) Survival analysis

An alternative analytical approach is duration or survival analysis. Rather than employing a simple dichotomous survival variable, I make use of the survival time of an IPO, defined as the length of time a firm survives post-IPO and a hazard regression model of survival times against firm characteristics at the time of IPO. 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 medicine 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 my own research theme, Nicholas (2005) has used hazard regressions to analyse the survival of large quoted US firms post-1929 and Woo, Jeffrey and Lange (1995) analysed the survival of Australian IPOs debuting on the market between 1983 and 1988.

I calculate the survival time for each IPO defined as the shorter of the time to exit, equivalent to the number of months between the end of the first month of trading and the month of winding up or delisting for cause, and the

time to censoring, 60 months in this case. I can now make use of survival times to plot Kaplan-Meier estimates of the cumulative survivor function.[260] This function is a step function which describes the probability of an IPO surviving up to time t, where t in this case extends from 0 up to 60 months and steps down at each monthly interval when an IPO exits (Figures 6.4 and 6.5). A comparison of the estimated survivor functions for the two samples confirms that the probability of an IPO surviving is better for the period 1995-2000 than for 1925-29 over any period up to the time of censoring.

The rate of decline of the IPO survivor function measures the risk of an IPO exiting or delisting for cause at time t, conditional upon the firm surviving up to that time. This instantaneous exit rate is called the hazard function or rate. There is an inverse relationship between the two functions. A common model of hazard rates is the Cox (1972) proportional hazards model which assumes an exponential distribution and is of the form:

$$h(t/x) = h(t)exp(X_1\beta_1+....+ X_n\beta_n)$$

where $h(t/x)$ is the hazard of IPO exit and X_i are the explanatory variables and where i=1,...,n. Explanatory variables include firm size, firm age, and track record as well as dummy variables for underwriting, audited accounts, penny shares and technology activity, all observed at the time of IPO, or t=0.

The critical assumption made by the model is that of 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. Given the tendency of the 1925-29 IPO sample to fall into two clusters, I need to test whether the same empirical model would apply to IPOs launched in the run-up and in the hot years. A proportional hazards test rejects this assumption in the case of 1925-29 but not in the case of 1995-2000.[261] I therefore estimate the Cox model separately for the run-up period January 1925 to March 1928 and for the hot market April 1928 to September 1929 (Tables 6.12 and 6.13), whilst estimating a single model for the whole of 1995-2000 (Table 6-14).

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[260] *Stata 7 Reference Q-St*, p.389-390.

[261] *Stata 7 Reference Q-St*, p.296-299. The test for proportional hazards is a test of whether the Schoenfeld residuals which is a diagnostic measure specific to the Cox model is independent of time. If they are not then the proportional hazards assumption does not apply.

A coefficient with a value less than one implies a decrease in the hazard of IPO exit per unit change in the explanatory variable adjusting for the effects of all other explanatory variables in the model; any coefficient greater than one implies an increase in the hazard of exit. For example, in the run-up period, 1925-1928 Q1, the hazard of exit decreases 60% for every £1 million increase in market capitalisation at IPO and 38% for each extra year of audited historic profits disclosed at the IPO evaluated at mean values (regression (1)). None of the regressions for this run-up period have much explanatory power.

During the 1928-29 hot market, the statistical significance of the regressions improves (Table 6-13). Audited financials disclosed in the prospectus (TRACK, AUDIT) lower the hazard of exit (regressions (10) and (12)) but underwriting an IPO increases its hazard (regression (11)). Penny share IPOs had over twice the hazard of exit of non-penny IPOs confirming their highly speculative nature (regression (13)). Patent IPOs raised the hazard of exit by between 35% (regression (16)) and 90% (regression (15)) compared to IPOs without patents. These results were consistent whether market capitalisation or firm age was included as the control variable for firm risk. Finally, patent IPOs launched in 1929 as well as those in the last three quarters of 1928 had a higher hazard of exit than non-patent IPOs (regressions (21) and (23)). Harris's analysis applied as much to 1929 as to 1928 IPOs.

What was the experience of the late nineties? I do not have data on patent ownership for this period and therefore make use of the R&D expenditure dummy (RD), given the mandatory disclosure of this item in company accounts where material, as well as the two technology industry dummy variables, ICT and DOTCOM. The only consistently statistically and economically significant coefficient in the regressions is that of the AIM dummy (Table 6-14). AIM IPOs suffered a hazard of exit between 46% and 56% greater than that of Official List IPOs controlling for firm size and firm age. The coefficients on RD suggest a lower hazard of exit for technology IPOs but this is not borne out in the cases of ICT and DOTCOM definitions of technology. None of these coefficients is statistically significant. There is no evidence to support technology, as defined here, either improving or hindering the survival prospects of an IPO in the late nineties.

In general, the results of the Cox hazard regressions are consistent with the survival rate analysis. Investors in technology IPOs in 1999-2000 experienced less downside risk than those of seventy years earlier.

6.6 Summary and Discussion

In both 1928-29 and 1999-2000 there were hot markets, in patent IPOs and internet IPOs, respectively. However, in their respective peak years the underpricing of the latter averaged 3.5x that of the former, excluding penny shares. Investors may have been prone to greater irrational exuberance at the end of the century than in the late twenties but it is far from clear whether this was the case. The presence of sophisticated institutional investors did mean greater investor heterogeneity at the end of the century than in the twenties. Recent empirical research points to both the emergence of a more complex objective function of issuing firms and the pivotal role played by today's investment banks in the IPO process as contributing to the huge underpricing of 1999-2000. Whatever the relative importance attached to these various explanations, collectively they appear to have more than outweighed the reforms and improvements in the IPO market discussed in chapter 2.

My results confirm the poor survival record of the 1928 IPO cohort commented on by contemporary observers. The 1929 cohort was just as bad. The poor performance was concentrated in patent IPOs. This evidence runs contrary to the findings of Nicholas (2005) in the same period for large seasoned US firms with intangible asset backing undertaking research and development. Few of the IPOs analysed here were doing research and development either because they had not yet organised that activity or simply chose not to disclose it in the prospectus. Company promoters, underwriters and entrepreneurs were most likely exploiting investor interest in patents in order to get IPOs away, however ill-conceived their business plans. This is consistent with the claim made by White (1990) that the increased participation of uninformed investors during the late twenties on Wall Street created a window of opportunity for issuing firms to exploit. The same events were set in train in London and repeated a pattern familiar to investors of the nineteenth century.

Many of the 1928-29 IPOs were probably Foreman-Peck (1985)'s chaff rather than seed-corn. It is possible that some IPOs were well-conceived but simply failed due to intense product market competition. For example, seven new entrants into the rayon business had their IPOs between 1925 and 1929.[262] The dominant player in this new industry was Courtaulds which controlled the key patents on the viscose process by virtue of having acquired the British and American rights before 1913.[263] Consequently, the patents held by the new entrants may therefore have been of little commercial value. Further examination of the nature and importance of the patents held by the 1925-29 IPOs based on an analysis of raw patent counts and patent citations can help to winnow the IPO seed-corn from the chaff.

As argued in chapter 2, the fallout from the 1928-29 IPO boom prodded the LSE into more careful scrutiny of applications to list after 1929 and a tightening of listing requirements after 1945. I have tracked the improvement in 5-year survival rates of the ordinary share IPO sample, described in chapter 3, through the thirties and up to 1948 (Figure 6-6). Given how strict listing requirements remained up to the establishment of the USM in 1980, I would fully expect that survival rates remained at these lofty levels with the possible exception of the 1970s. Unfortunately, this better IPO survival record was bought at the cost of denying younger firms early access to the stock market (Figure 3-6, chapter 3).

Consequent upon the establishment of the USM in 1980 and then of AIM in 1995, the supply curve of equity funding to British IPOs by investors shifted outwards in a similar way to that described by Fama and French (2004) in the case of the US after NASDAQ had started up. Seemingly, a balance had been struck between protecting the IPO investor from unacceptable downside risk, on the one hand, and providing young entrepreneurial firms adequate opportunity to access the equity market, on the other. However, the question still remained as to whether the relaxation of listing requirements would invite a plunge in IPO survival the next time there was a hot technology market. The results presented here suggest that this was not the case in 1999-2000. Dotcom and ICT IPOs of the late nineties had a much better survival record than patent

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[262] This excludes the Canadian Celanese IPO in April 1926 which was a subsidiary of American Viscose Corporation, itself part of the Courtaulds group.
[263] Coleman (1977), p.90 and p.94-94

stocks of the late twenties subject to my inadequate control for the differing post-crash macro-economic backgrounds. Having been much worse than non-technology IPOs in 1928-29, the hazard of exit of technology IPOs was no worse in 1999-2000. This would suggest that there was a material improvement in survival. Although reputable underwriters could neither avoid a surge in underpricing nor being partially enveloped by investor exuberance, they perhaps took their responsibilities more seriously when bringing a firm to the stock market than their counterparts in the twenties. This factor along with higher standards of accounting disclosure, notwithstanding the short track records, and tougher investor protection are likely contributors to this result.

Table 6-1: UK and US First-Day Returns 1995-2000

In addition to the 712 IPOs below I have data on a further 107 introductions for which first-day returns cannot be calculated. Loughran and Ritter's data excludes "penny" IPOs defined as those with an offer price below $5.

	UK IPOs LJUNGQVIST		UK IPOs CHAMBERS		US IPOs LOUGHRAN & RITTER	
	D1RET	N	D1RET	N	D1RET	N
1991	12.9%	12			12.0%	274
1992	6.9%	25			10.2%	385
1993	13.4%	78			12.8%	484
1994	7.2%	120			9.8%	387
1995	16.1%	65	13.93%	68	21.5%	434
1996	13.5%	163	12.69%	159	16.7%	623
1997	12.2%	128	12.59%	129	14.0%	437
1998	18.6%	72	18.80%	65	22.2%	268
1999	88.7%	75	98.27%	69	71.7%	457
2000	64.8%	227	60.57%	222	56.1%	346
2001	15.2%	80			13.5%	80
2002	14.2%	63			8.9%	67
Total		1108		712		4242

Sources: Ljungqvist (2003), Table 1; Loughran and Ritter (2004), Table 1

Table 6-2: Minimum Listing Criteria 1995-2000

Minimum criteria	Official List	AIM	Supplementary List 1925-29
Market capitalisation	Yes	no	no
Marketability	25%	no	no
Trading record	3yrs	no	no
Pre-vetting of prospectus	Yes	no*	no

* No pre-vetting but role of the nominated adviser to the firm is critical in ensuring adequate disclosure.

Table 6-3: Descriptive Statistics of IPOs 1925-29

Panel A

	N Obs.	PENNY N Obs.	PENNY %total	NATRES N Obs.	NATRES %total	RD N Obs.	RD %total	PAT1 N Obs.	PAT1 %total	PAT2 N Obs.	PAT2 %total
1925	71	20	28%	52	73%	1	1%	5	7%	5	7%
1926	31	3	10%	18	58%	1	3%	2	6%	4	13%
1927	50	1	2%	15	30%	0	0%	2	4%	2	4%
1928	122	33	27%	7	5%	8	7%	41	34%	57	47%
1929	73	20	27%	4	5%	5	7%	21	29%	27	37%
N Obs.	347	77	22%	96	28%	15	4%	71	20%	95	27%

Panel B

	N Obs.	MCAP Mean £000	MCAP Median £000	AGE Mean Yrs	AGE Median yrs	NAV Mean £	NAV Median £	TRACK Mean yrs	TRACK Median yrs	UW %total	AUDITED ACCOUNTS %total
1925	71	494	185	13.7	6.0	264	188	0.6	0.0	61%	59%
1926	31	424	257	14.4	0.0	325	198	1.2	0.0	60%	55%
1927	50	438	221	17.8	3.0	520	371	1.1	0.0	60%	46%
1928	122	560	216	9.3	0.0	481	205	1.1	0.0	74%	42%
1929	73	413	193	8.3	0.0	293	161	1.2	0.0	70%	44%
N Obs.	347	347	347	316	316	187	187	347	347	340	347
missing		0	0	31	31	160	160	0	0	7	0

Panel C

ICT and DOTCOM IPOs are defined in Appendix 6.1

	N Obs.	AIM N Obs.	AIM %total	PENNY N Obs.	PENNY %total	NATRES N Obs.	NATRES %total	RD N Obs.	RD %total	ICT N Obs.	ICT %total	DOTCOM N Obs.	DOTCOM %total
1995	84	33	38%	1	1%	6	7%	12	14%	13	15%	1	1%
1996	182	110	59%	14	8%	3	2%	19	10%	43	24%	4	2%
1997	146	79	54%	11	8%	11	8%	13	9%	25	17%	1	1%
1998	82	38	46%	1	1%	5	6%	14	17%	18	22%	1	1%
1999	76	52	69%	5	7%	3	4%	15	20%	24	32%	16	21%
2000	243	176	72%	20	8%	10	4%	85	35%	75	31%	39	16%
N Obs.	813	485	60%	52	6%	38	5%	158	19%	198	24%	62	8%

Panel D

The firm age (AGE) and proportion of underwriting (UW) statistics are taken from Ljungqvist (2001), Table 1.

	N Obs.	MCAP Mean ALL £000	MCAP Median ALL £000	MCAP Mean OL £000	MCAP Median OL £000	MCAP Mean AIM £000	MCAP Median AIM £000	AGE Mean ALL yrs	AGE Median ALL Yrs	NAV Mean ALL £000	NAV Median ALL £000	UW ALL %total
1995	84	68,653	21,153	99,676	44,325	18,240	5,488	24.6	8.0	26,214	9,165	99%
1996	182	155,414	29,822	188,318	49,816	132,350	16,480	21.7	9.0	43,660	4,698	98%
1997	146	361,284	20,651	771,752	61,343	13,166	8,288	27.1	11.0	104,398	4,578	97%
1998	82	253,059	41,852	448,032	126,373	27,301	13,855	19.0	8.0	83,622	7,976	99%
1999	76	241,287	25,712	705,043	203,919	27,245	11,888	11.1	5.0	97,764	8,070	99%
2000	243	226,200	36,747	710,726	213,325	41,750	23,323	5.6	3.0	41,883	7,276	98%
N Obs.	813	813	813	330	330	484	484	730	730	809	809	730
Missing		0	0	0	0	0	0	-	-	12	12	-

TABLE 6-4: Correlation Matrix of IPO Characteristics

Panel A: 1925-29

The 318 observations exclude the 21 acquisitions and 8 IPOs whose survival could not be tracked. 7 IPOs do not disclose underwriting arrangements and 26 do not disclose age.

N=318	MCAP	AGE	TRACK	AUDIT	UW	RD	PAT1	PAT2	PENNY
MCAP	1								
AGE	0.0078	1							
TRACK	0.1106	0.526	1						
AUDIT	0.0941	0.3745	0.4666	1					
UW	-0.0097	-0.0273	0.043	0.1848	1				
RD	0.0184	-0.0037	-0.0358	-0.0203	0.0296	1			
PAT1	-0.0036	-0.0964	-0.0917	-0.1347	0.1267	0.3376	1		
PAT2	-0.0224	-0.1611	-0.148	-0.2258	0.1428	0.2766	0.8301	1	
PENNY	-0.134	-0.1559	-0.1297	-0.1664	0.086	-0.0075	0.2329	0.3157	1

Panel B: 1995-2000

N=589	MCAP	NAV	RD	ICT	DOTCOM	AIM	PENNY
MCAP	1						
NAV	0.1416	1					
RD	0.0444	0.0228	1				
ICT	0.0009	0.0136	0.3432	1			
DOTCOM	-0.0112	0.0328	-0.0421	0.1157	1		
AIM	-0.1903	-0.2028	-0.1941	-0.0679	0.1312	1	
PENNY	-0.0444	-0.053	-0.1226	-0.0982	0.0679	0.1624	1

Table 6-5: Mean Initial Returns 1925-29

Initial returns are first-day returns with the exception of Penny shares which are partial first-month returns.

	ALL	ALL	ALL ex PENNY	PENNY	PAT1	PAT2	PAT1 ex PENNY	PAT2 ex PENNY	NON-PAT2 ex PENNY
	N Obs	D1RET	D1RET	D1RET	D1RET	D1RET	D1RET	D1RET	D1RET
1925	59	5.07%	7.37%	0.59%	-9.29%	-9.29%	-9.29%	-9.29%	8.76%
1926	23	3.20%	7.17%	-23.26%	9.76%	9.76%	9.76%	9.76%	6.88%
1927	39	6.25%	6.53%	-4.17%	-12.41%	-12.41%	-12.41%	-12.41%	7.04%
1928	108	28.50%	9.03%	72.77%	29.62%	30.43%	23.50%	18.02%	2.34%
1929	65	10.92%	16.57%	-1.80%	20.86%	21.59%	35.48%	38.87%	4.26%
Total	294	294	217	77	66	86	43	54	163

Table 6-6: Mean Initial Returns 1991-2000

No R&D IPOs, 6 Information and Communications Technology Industry (ICT) IPOs and 8 Dotcom IPOs were penny shares.

Panel A

	ALL	ALL	ALL x PENNY	PENNY	OFFICIAL LIST	AIM
	Obs	D1RET	D1RET	D1RET	D1RET	D1RET
1995	66	13.93%	13.89%	16.67%	10.63%	23.45%
1996	159	12.69%	10.82%	32.08%	13.36%	12.14%
1997	129	12.59%	11.74%	21.67%	10.15%	14.84%
1998	65	18.80%	18.50%	37.50%	16.47%	21.35%
1999	67	98.27%	59.95%	573.44%	18.95%	137.04%
2000	225	60.36%	40.76%	261.27%	20.58%	75.83%
Total	711	710	659	52	302	409

Panel B

NONTECH are those IPOs not in the ICT or internet sectors.

	RD	ICT	RD x PENNY	ICT x PENNY	DOTCOM	DOTCOM x PENNY	NONTECH	NONTECH x PENNY
	D1RET	D1RET	D1RET	D1RET	D1RET	D1RET	D1RET	D1RET
1995	23.70%	28.57%	23.70%	28.57%			11.62%	11.53%
1996	17.60%	15.11%	17.60%	15.11%	7.14%	7.14%	11.93%	9.29%
1997	16.17%	14.31%	16.17%	12.87%	15.20%	15.20%	12.12%	11.41%
1998	21.40%	30.50%	21.40%	30.50%	180.00%	180.00%	14.65%	14.17%
1999	48.26%	60.66%	48.26%	62.63%	300.42%	140.94%	44.44%	45.02%
2000	41.81%	53.99%	41.98%	51.28%	155.46%	41.48%	33.22%	31.64%
Total	146	186	146	180	56	48	496	457

Table 6-7: OLS Regressions of IPO Returns 1925-29

Dependent variable is first-day returns with exception of penny share returns which are partial first-month (see text). *, **, *** indicate 10%, 5% and 1% levels of significance respectively. The standard errors in brackets are calculated using White's (1980) heteroscedasticity-consistent method. Time dummy variables are included.

	(1)	(2)	(3)	(4)	(5)
MCAP (£M)	-0.0200	-0.0050	-0.0217	-0.0216*	-0.0170
	(0.0221)	(0.0193)	(0.0134)	(0.0131)	(0.0151)
PENNY		0.2170*	0.1806	0.1727	0.1717
		(0.1268)	(0.1171)	(0.1203)	(0.1333)
UW			-0.2053**	-0.2049**	-0.2092**
			(0.1046)	(0.1060)	(0.1055)
MKTABILITY			-0.4736***	-0.4675***	-0.2954**
			(0.1524)	(0.1566)	(0.1509)
PAT1				-0.12434	
				(0.1367)	
PAT1*HOT				0.187	
				(0.1814)	
PAT2					0.1302
					(0.4808)
PAT2*HOT					1.0579***
					(0.2797)
PAT2* MKTY					-1.6903***
					(0.6333)
Y25	0.0613**	-0.0202			
	(0.0289)	(0.0558)			
Y26	0.0425	0.0063			
	(0.0689)	(0.0777)			
Y27	0.0733	0.0596			
	(0.0450)	(0.0460)			
Y281	0.0829	0.0306			
	(0.0593)	(0.0698)			
Y282	0.3527*	0.3295*			
	(0.2056)	(0.1910)			
Y283	0.4006**	0.3504**			
	(0.1889)	(0.1693)			
Y284	0.2595**	0.1468			
	(0.1226)	(0.1102)			
Y291	0.1152	0.0518			
	(0.0964)	(0.1064)			
Y292	0.1617	0.0802			
	(0.1528)	(0.1504)			
Y293	-0.0998	-0.2146			
	(0.1794)	(0.2313)			
Adj R-sqd	0.70%	2.44%	8.78%	7.99%	12.78%
N Obs	294	294	289	289	289

Table 6-8: OLS Regressions of IPO Returns 1995-2000

*, **, *** indicate 10%, 5% and 1% levels of significance respectively. The standard errors in brackets are calculated using White's (1980) heteroscedasticity-consistent method. Time dummy variables are included.

	(1)	(2)	(3)	(4)
MCAP (£M)	-0.0909***	-0.0748***	-0.0706**	-0.0566**
	(0.0321)	(0.0281)	(0.0281)	(0.0259)
PENNY	1.4432**	1.2803**	1.2904**	1.1690**
	(0.6913)	(0.6541)	(0.6561)	(0.5933)
BVP		0.1145***	0.1157***	0.1107***
		(0.0388)	(0.0388)	(0.0363)
MKTABILITY		-0.0027**	-0.0028**	
		(0.0013)	(0.0013)	
RD		0.2117***		
		(0.0572)		
RD*HOT		-0.3543		
		(0.2152)		
ICT			0.2015***	
			(0.0590)	
ICT*HOT			-0.3587	
			(0.2430)	
DOTCOM				0.3712
				(0.2756)
DOTCOM*Y99				1.9291*
				(1.1597)
DOTCOM*Y00				0.6732
				(0.7863)
1995	0.1243***			
	(0.0311)			
1996	0.0080			
	(0.0646)			
1997	0.01772			
	(0.0652)			
1998Q1	0.33362			
	(0.2785)			
1998Q2	0.1386***			
	(0.0244)			
1998Q3	0.0840***			
	(0.0257)			
1998Q4	0.3291			
	(0.2306)			
1999Q1	0.5188			
	(0.3288)			
1999Q2	0.1059			
	(0.2264)			
1999Q3	1.2042***			
	(0.4068)			
2000	0.4924***			
	(0.1240)			
Adj R-sqd	8.05%	13.12%	13.18%	18.20%
N Obs	712	708	708	710

Table 6-9: Andrews' Data on 5-Year Survival Rates 1919-29

Cohort is defined by the year of registration. The sample includes both IPOs and unquoted newly established private companies. Survival rate is the number of firms not wound up or struck off the Companies Register at t + 5 years as a proportion of firms registered at t, where t=1919,....,1929. Analogously survival rate to Dec-1934 is the proportion of firms surviving as of the end of 1934.

Cohort	1919	1920	1921	1922	1923	1924	1925	1926	1927	1928	1929
5yr survival rate (%)	81.0	86.3	77.8	86.4	100.0	81.5	74.4	80.0	85.0	63.5	61.4
Survival rate to Dec-1934 (%)	na	na	na	na	86.4	74.1	59.0	76.7	75.0	60.8	61.4
N Obs.	63	73	18	22	22	27	39	30	40	74	44

Source: Andrews (1937), p.507

Table 6-10: Survival Rates of IPOs 1925-29 and 1995-2000

The denominator of the upper and lower bound survival rates are all IPOs in the cohort at the time of origin and all IPOs less those acquired (M&A) within the defined period respectively.

Panel A: 1925-29

Cohort	IPOs N Obs	Delisted for cause in 5yrs N Obs	M&A in 5yrs N Obs	5-yr Survival Rate Upper	5-yr Survival Rate Lower	Survival rate to Dec-34 Upper	Survival rate to Dec-34 Lower
1925	71	7	7	90.1%	89.1%	84.5%	82.5%
1926	30	3	3	90.0%	88.9%	80.0%	76.9%
1927	49	11	3	77.6%	76.1%	73.5%	71.1%
1928	117	64	7	45.3%	41.8%	39.3%	35.5%
1929	72	35	1	51.4%	50.7%	48.6%	47.1%
1925-27	150	21	13	86.0%	84.7%	80.0%	77.6%
1928-29	189	99	8	47.6%	45.3%	42.9%	40.0%
total	339	120	21	64.6%	62.3%	59.3%	56.1%
missing	8						

Panel B: 5-yr Survival rates of all IPOs 1995-2000

Cohort	IPOs N Obs	Delisted for cause N Obs	M&A N Obs	Survival Rate Upper	Survival Rate Lower
1995	84	9	24	89.3%	85.0%
1996	182	21	45	88.5%	84.7%
1997	146	17	27	88.4%	85.7%
1998	82	8	20	90.2%	87.1%
1999	76	15	13	80.3%	76.2%
2000	243	41	36	83.1%	80.2%
total	813	111	165	86.3%	82.9%
missing	0				

Panel C: 5-yr Survival rates of Official List IPOs 1995-2000

Cohort	IPOs N Obs	Delisted for cause N Obs	M&A N Obs	Survival Rate Upper	Survival Rate Lower
1995	52	0	18	100.0%	100.0%
1996	75	1	21	98.7%	98.1%
1997	67	5	14	92.5%	90.6%
1998	44	3	16	93.2%	89.3%
1999	24	1	3	95.8%	95.2%
2000	67	9	15	86.6%	82.7%
total	329	19	87	94.2%	92.1%
missing	0				

Panel D: 5-yr Survival rates of AIM IPOs 1995-2000

	IPOs N Obs	Delisted for cause N Obs	M&A N Obs	Survival Rate Upper	Survival rate Lower
1995	32	8	6	75.0%	69.2%
1996	107	13	24	87.9%	84.3%
1997	79	11	13	86.1%	83.3%
1998	38	4	4	89.5%	88.2%
1999	52	14	10	73.1%	66.7%
2000	176	32	21	81.8%	79.4%
total	484	82	78	83.1%	79.8%
missing	0				

Table 6-11: 5-Year Survival Rates of Technology IPOs 1925-29 and 1995-2000

Panel A: 1925-29

See text for definitions of technology, PAT1 and PAT2. Survival rate is the proportion of IPOs delisted for cause to all technology IPOs. Given the small number of acquisitions of PAT1 and PAT2 IPOs, I have not calculated the upper bound survival rate adjusting for these observations. NONPAT2 are those IPOs that did not own or have access to patents. This survival rate is the mid-point of he upper and lower bound estimates.

	PAT1 IPOs	PAT1 Delisted for cause	PAT1 M&A	PAT1 Survival rate	PAT2 IPOs	PAT2 Delisted for cause	PAT2 M&A	PAT2 Survival Rate	NONPAT2 Survival Rate
	N Obs	N Obs	N Obs	%IPOs	N Obs	N Obs	N Obs	%IPOs	%IPOs
1925-27	9	3	0	66.7%	11	3	0	72.7%	86.5%
1928	41	26	2	36.6%	57	36	3	36.8%	55.5%
1929	21	12	0	42.9%	27	18	0	33.3%	62.6%
1928-29	62	38	2	38.7%	84	54	3	35.7%	58.5%
Total	71	41	2	42.3%	95	57	3	40.0%	74.0%
missing	0				1				7

Table 6-11: 5-Year Survival Rates of Technology IPOs 1925-29 and 1995-2000 (cont.)

Panel B: 1995-2000

R&D indicates those IPOs undertaking research and development expenditure at time of IPO. ICT denotes those IPOs in a technology industry and DOTCOM those IPOs that are pure internet firms (see Appendix 6.1). Survival rates are the mid-point of the upper and lower bound estimates. Given the small number of DOTCOM IPOs in 1995-98 I have only shown the aggregated figures.

	R&D IPOs	R&D Delisted for cause	R&D M&A	R&D Survival rate	ICT IPOs	ICT Delisted for cause	ICT M&A	ICT Survival rate	DOTCOM IPOs	DOTCOM Delisted for cause	DOTCOM M&A	DOTCOM Survival rate
	N Obs	N Obs	N Obs	%IPOs	N Obs	N Obs	N Obs	%IPOs	N Obs	N Obs	N Obs	%IPOs
1995	12	0	3	100.0%	13	2	3	82.3%	1	0	0	-
1996	19	1	5	93.8%	43	4	10	89.3%	4	0	0	-
1997	13	0	0	100.0%	26	3	3	87.7%	1	1	0	-
1998	14	1	2	92.3%	18	2	4	87.3%	1	0	1	-
1999	15	1	4	92.1%	24	4	6	80.6%	16	2	7	82.6%
2000	84	12	14	84.3%	74	13	10	81.1%	39	7	6	80.4%
1995-98	58	2	10	96.2%	100	11	20	87.6%	7	1	1	84.5%
1999-2000	99	13	18	85.4%	98	17	16	81.0%	55	9	13	81.1%
Total	157	15	28	89.4%	198	21	36	84.3%	62	10	14	81.5%

Table 6-12: Hazard Ratios of IPOs 1925-28Q1

The results below are from estimating a Cox Proportional model. *, **, *** indicate 10%, 5% and 1% levels of significance respectively. Lin and Wei (1989) robust standard errors are reported in brackets.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
MCAP (£Mil)	0.400	0.288	0.274	0.386	0.253	0.255	0.188		
	(0.351)	(0.280)	(0.256)	(0.338)	(0.238)	(0.233)	(0.217)		
Age (no. yrs)								0.980	0.983
								(0.014)	(0.014)
Track	0.620*								
	(0.171)								
UW		1.664							
		(0.768)							
Audit			0.946						
			(0.381)						
Penny				2.041					
				(0.954)					
Pat1					2.193			2.901*	
					(1.355)			(1.848)	
Pat2						1.815			1.803
						(1.121)			(1.132)
No IPOs	150	146	150	150	150	150	150	128	128
No failures	25	23	25	25	25	25	25	20	20
Log-likelihood	-118.160	-110.77	-121.16	-120.11	-120.51	-120.77	-119.95	-93.45	-94.17

Table 6-13: Hazard Ratios of IPOs 1928Q2-29

The results below are from estimating a Cox Proportional model. *, **, *** indicate 10%, 5% and 1% levels of significance respectively. Lin and Wei (1989) robust standard errors are reported in brackets.

	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)	(23)
Period											1928	1929	1928	1929
MCAP	0.274***	0.238***	0.256***	0.378***	0.256***	0.277***			0.382***		0.483*	0.107**		
(£Mil)	(0.102)	(0.097)	(0.099)	(0.142)	(0.102)	(0.109)			(0.138)		(0.200)	(0.023)		
Age							0.961***	0.965***		0.991			0.968**	0.957*
(*no.* yrs)							(0.012)	(0.012)		(0.013)			(0.129)	(0.024)
Track	0.762***								0.764***	0.808**				
	(0.060)								(0.062)	(0.085)				
UW		1.584*							1.542	1.701**				
		(0.424)							(0.416)	(0.471)				
Audit			0.630**											
			(0.139)											
Penny				2.304***					1.865***	2.356***				
				(0.517)					(0.420)	(0.513)				
Pat1					1.501**		1.355							
					(0.316)		(0.287)							
Pat2						1.901***		1.654**	1.357	1.39	1.700**	2.103**	1.421	1.813*
						(0.398)		(0.354)	(0.291)	(0.300)	(0.455)	(0.720)	(0.381)	(0.646)
No IPOs	168	165	168	168	168	168	164	164	164	164	97	95	71	69
No exits	95	095	95	95	95	95	94	94	94	94	60	60	35	34
Log-likelihood	-433.4	-437.6	-439.7	-435.3	-437.2	-440.2	-435.6	-433.7	-422.6	-420.8	-244.5	-242.0	-128.4	-126.3

Table 6-14: Hazard Ratios of IPOs 1995-2000

The results below are from estimating a Cox Proportional model. *, **, *** indicate 10%, 5% and 1% levels of significance respectively. Lin and Wei (1989) robust standard errors are reported in brackets. NAV's were unavailable for 16 IPOs.

	(1)	(2)	(3)	(4)	(5)	(6)
MCAP (£M)	0.9994*		0.9994*		0.9994*	
	(0.0003)		(0.0003)		(0.0004)	
NAV (£M)		0.9971*		0.9969**		0.9969**
		(0.0013)		(0.0013)		(0.0013)
AIM	1.4572*	1.4813*	1.5175*	1.5625**	1.5071*	1.5588**
	(0.3118)	(0.3135)	(0.3293)	(0.3322)	(0.3331)	(0.3383)
RD	0.6795	0.6699				
	(0.1891)	(0.1862)				
ICT			1.0651	1.1122		
			(0.2278)	(0.2401)		
DOTCOM					1.0623	0.9874
					(0.3640)	(0.3587)
No IPOs	589	573	589	573	589	573
No exits	111	107	92	90	111	107
Log Likelihood	-691.35	-664.10	-692.35	-665.09	-692.37	-665.21

Figure 6-1: British and US Stock Market Indices Dec 1921 – Sep 1939 (Dec 1921=100)

BMI is the Variable Securities Values Index of the *Bankers Magazine* from inception in Dec 1921 to Dec 1934. This is spliced with the FT30 Index from 1-Jan-1935.

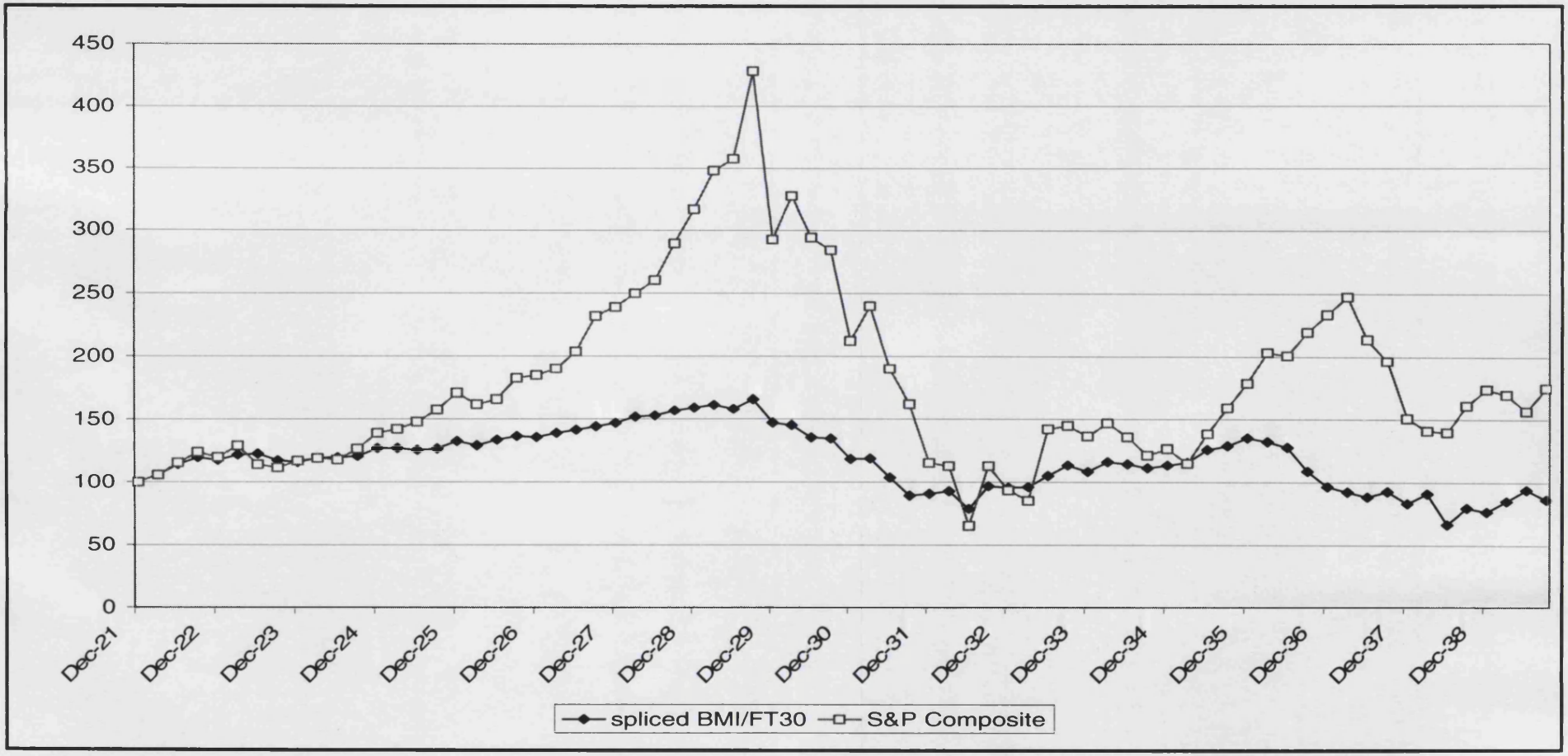


Figure 6-2 British and US Stock Market Indices Dec1989 – Dec 2004 (Dec1989=100)

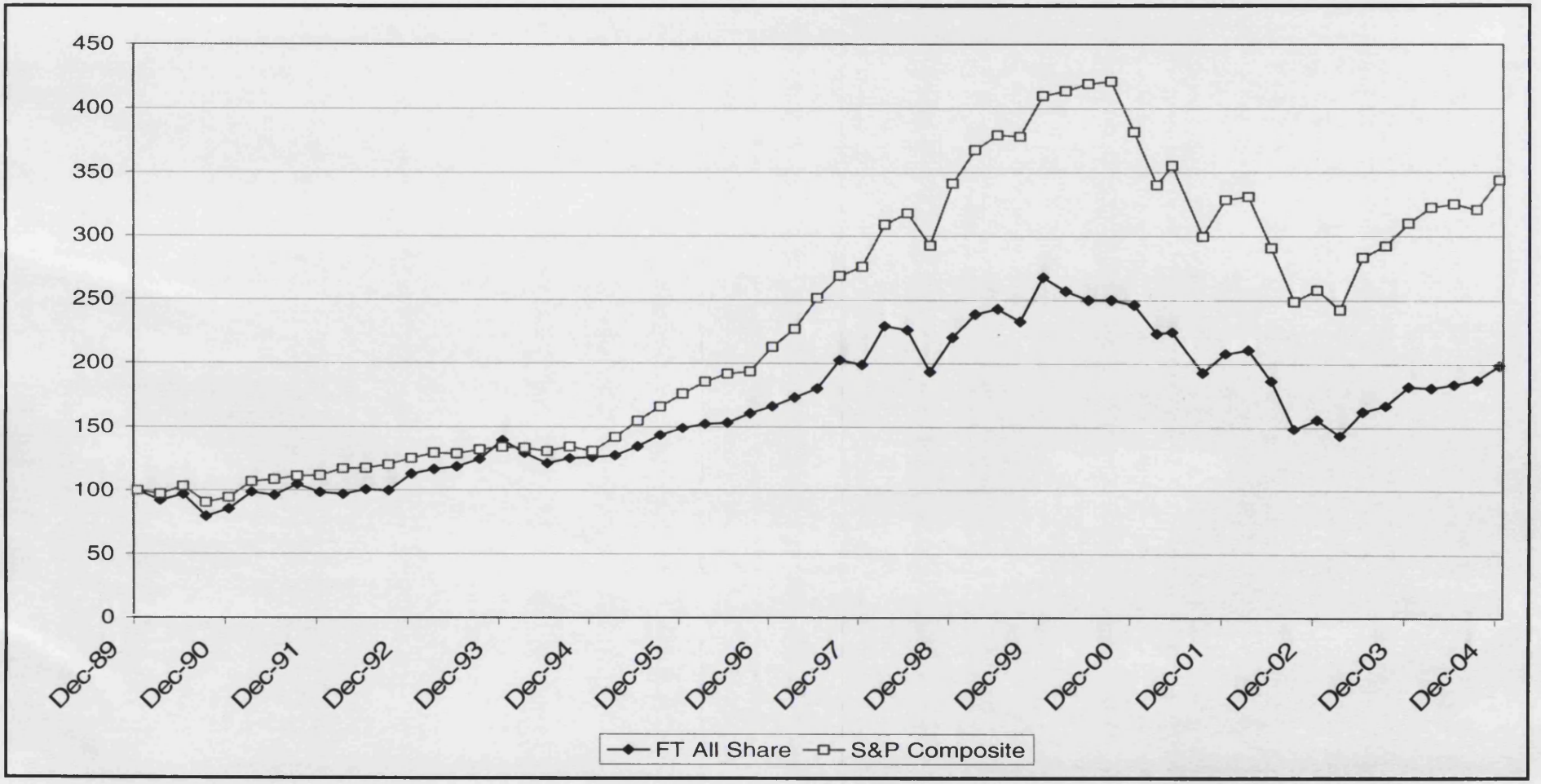


Figure 6-3: Comparison of First-day Returns of UK IPOs 1920-31 and 1991-2002 and US IPOs 1991-2002

The returns for 1920-31 is Chambers data; those for 1991-2002 are from Ljungqvist (2003) and Loughran and Ritter (2004), reproduced in Table 6.1. T=1920 and 1991 respectively.

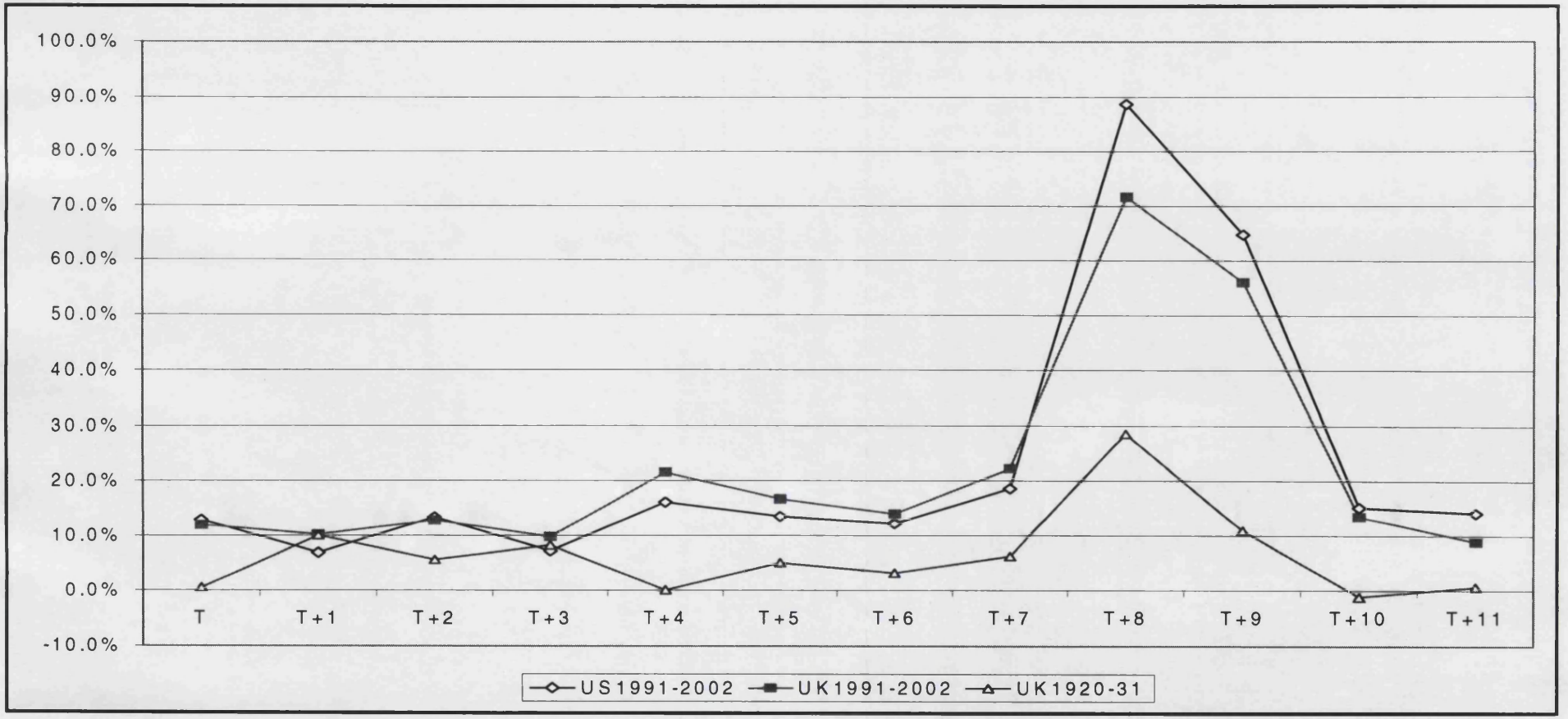


Figure 6-4: Kaplan-Meier Survivor Function of IPOs 1925-29

The y axis is the probability of surviving up to time t; the x axis is survival or analysis time expressed in months.

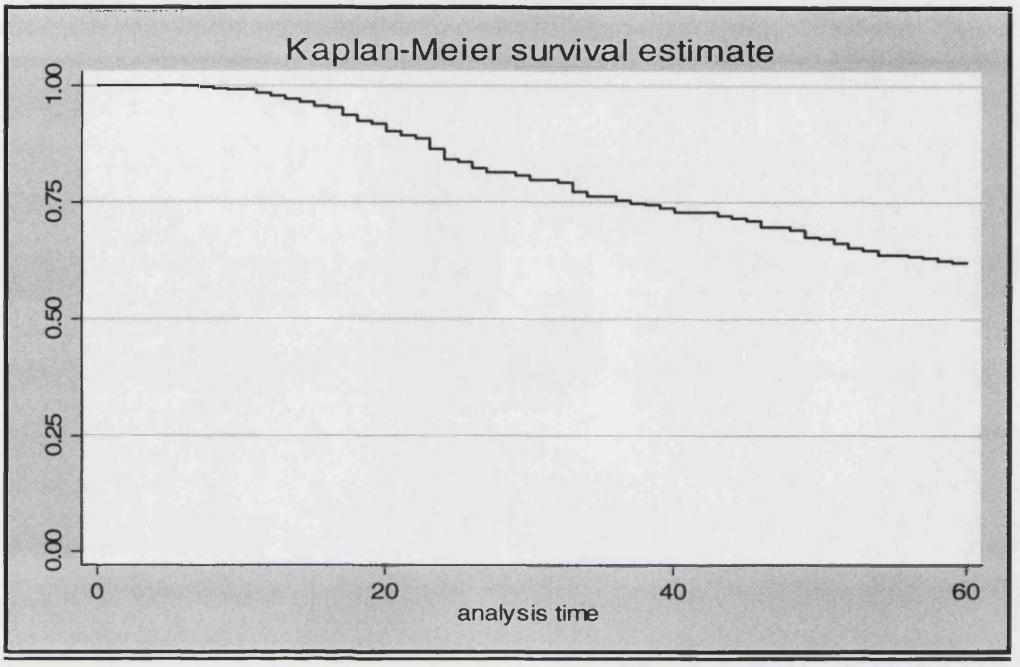


Figure 6-5: Kaplan-Meier Survivor Function of IPOs 1995-2000

The y axis is the probability of surviving up to time t; the x axis is survival or analysis time expressed in months.

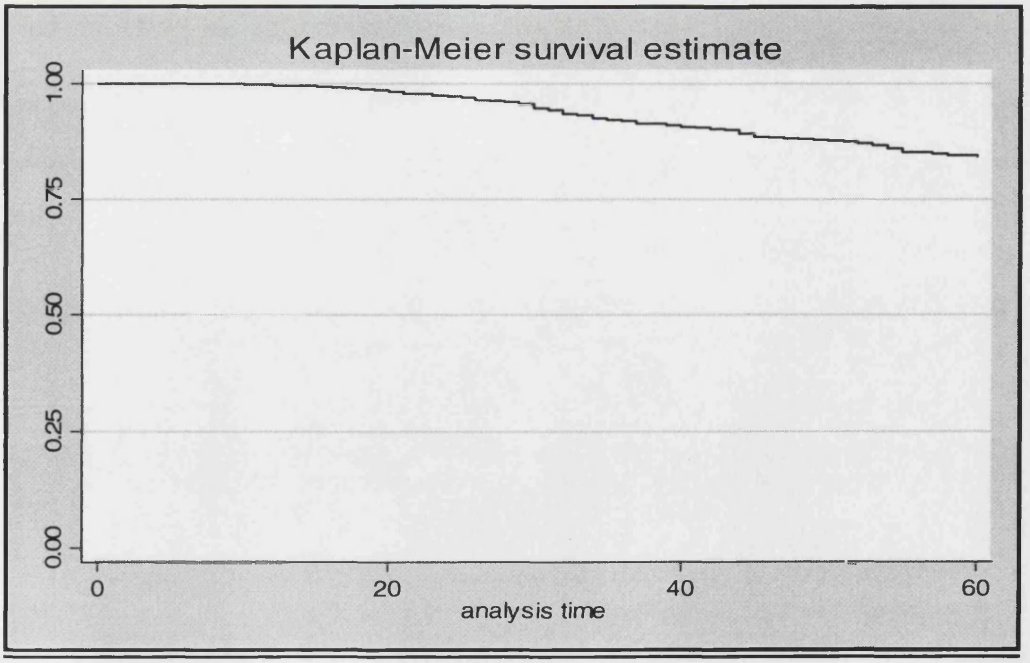
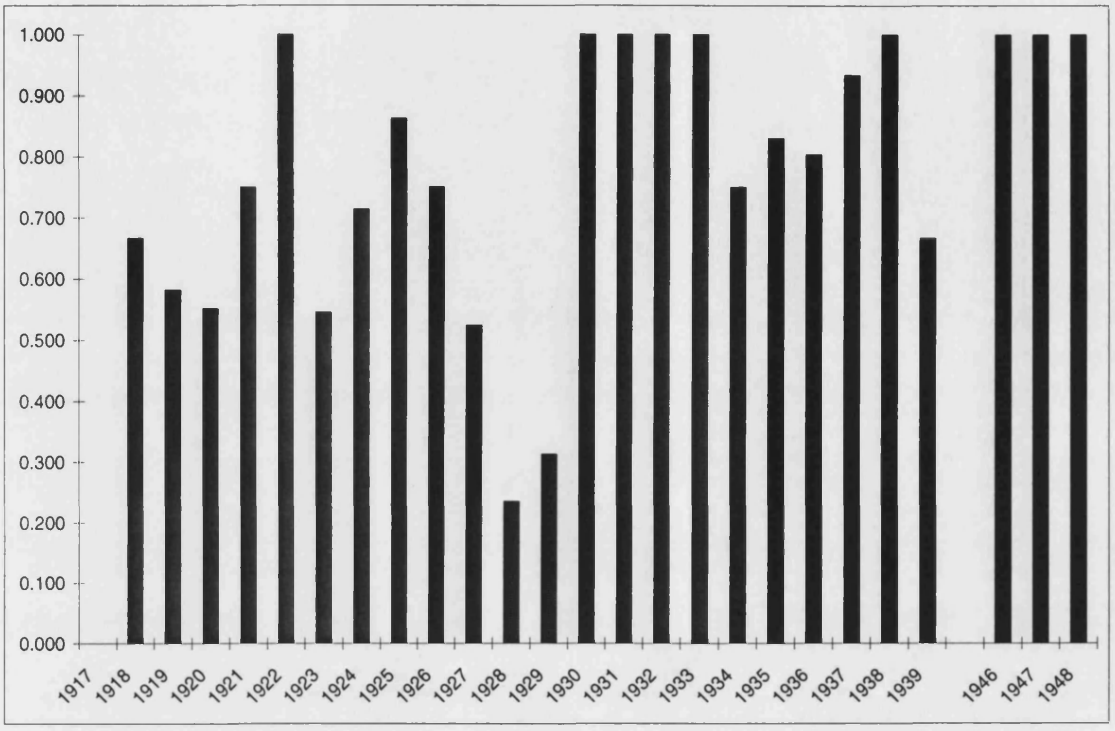


Figure 6-6: 5-Year IPO Survival Rates 1919-48

The 8 IPOs during WW2 are excluded.



Appendix 6-1: Technology IPOs 1995-2000

Among the Financial Times Actuaries industry classifications used by the LSE to categorise IPOs between 1995-2000, those listed in the table below make up the Information and Communications Technology sector (ICT) and following Loughran and Ritter (2004) exclude pharmaceuticals (370 and 480) and medical equipment and supplies (446). The FTA internet industry only captures 23 IPOs. I therefore default to an alternative definition of internet IPOs (DOTCOM) made up of those IPOs classified by the LSE on their website as internet or e-commerce companies supplemented by those with a ".com" or "E-" extension to their names and classified by the LSE in other industries but whose locus of business appeared to be internet-related based on a company news search. The definition of a Dotcom company employed here is a relatively pure one and excludes those ICT companies, part of whose hardware or software business catered to the demand for internet-related products and services. Consequently, there is relatively little overlap between DOTCOM and ICT.

Industry	Code	No. IPOs
Electronic Equipment	253	19
Information Technology	487	0
Fixed-Line Telecommunication Services	673	19
Wireless Telecommunications Services	678	4
Computer Hardware	932	10
Semiconductors	936	6
Telecommunications Equipment	938	8
Computer Services	972	33
Internet	974	23
Software	977	76
Sub-total		198
Pharmaceuticals	370, 480	31
Medical equipment and supplies	446	11
Sub-total		42
Total		238

CHAPTER 7: CONCLUSIONS AND FURTHER RESEARCH

The major contributions of this thesis are the assembly of a new data set of IPOs on the LSE spanning the period 1915-79 and the analysis of IPO underpricing up to the point at which modern IPO studies take over. The main two questions addressed regarding underpricing are: what was IPO underpricing experience before 1959?; and did the improvements in IPO regulation, financial disclosure, investor protection and underwriting in the last half century deliver the lower level of average underpricing that I would have expected? I also isolated the two most notable episodes of investor exuberance over technology, namely, the 1920s and 1990s, in order to examine whether there was any improvement in IPO underpricing and IPO survival given the institutional reforms in the intervening period.

The surprising finding is that underpricing was lower from 1915 through to the early 1950s than it became afterwards, controlling for shifting risk composition, issue method and IPO characteristics such as marketability and whether or not the IPO was underwritten. Extending the definition of underpricing beyond the first day of trading does not affect this result. Neither does adjusting the initial return for market movement between price-setting and initial trading, although I am only able to make this adjustment starting in 1935.

What did this mean for issuing firms? Excluding tender offers, which were more tightly priced, and the privatisations of the 1980s, which were not concerned solely with the maximisation of issue proceeds, the 2436 ordinary share IPOs up to 1986 left £2.5 billion at 2004 prices, or approximately 10% of their real gross proceeds, on the table. Three-quarters of this sum fell into the period after the mid-1950s. Based on the most recent empirical study of the period since 1991 the underpricing problem has become worse, both in percentage terms and in money terms. 1108 IPOs raised £14 billion, or 27% less than what they might have done in the absence of underpricing.[264]

Of course, underpricing may have occurred elsewhere in the IPO market before the mid-1950s. Preference share IPOs, which were as common as ordinary share IPOs in the interwar years, may have experienced more underpricing. Yet, the evidence presented on dual share IPOs is that

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[264] Ljungqvist (2003), p.38, Table 1. I estimated money left on the table by multiplying mean underpricing and real gross proceeds for each year.

preference shares were not underpriced at all. This result could simply be a peculiar feature of this type of IPO and the discovery of the underpricing of preference share only IPOs forms part of my future research. Placings are another possibility. The 83 placings in the interwar data set were certainly underpriced much more - by approximately 30%. Although there were another 471 placings, for which I could not estimate the degree of underpricing, the likelihood is that there was considerable underpricing occurring in placings. However, this issue method, as employed at that time, was never intended as a means of securing the best price for an issuing firm. As such, this finding with respect to placings does not alter the fact that there was only very modest underpricing of the 674 IPOs which did pursue the much more transparent public offer method between 1917 and 1954 by comparison with the modern period.

What might account for this puzzling finding? The low level of explanatory power of the linear model proposed in chapter 4 leaves the field quite open. However, there are four particularly plausible hypotheses which have emerged from this thesis. The first is the investment bank monopsony hypothesis considered in chapter 5. According to this hypothesis, the issuing houses dominated IPO underwriting once they had organised themselves into the Issuing Houses Association (IHA) in 1945 and, rather than lending their good names for the direct benefit of issuing firms, effectively operated as a cartel happy to underprice IPOs as an effort minimisation strategy. The IHA may have been a cartel. Although it had a large membership with no dominant group, there was only a trickle of new entrants into the IHA throughout the period to fill vacancies that arose as firms merged and none of these entrants sought to compete aggressively for market share. In the period 1945-79, there was, at the very minimum, a definite lack of competition in the IPO underwriting market. The collective failure of the issuing houses to implement the tender offer method more aggressively than they did is compelling evidence of this lack of competition. Only when the threat of entry from the leading US investment banks familiar with bookbuilding techniques emerged in the mid-1980s did innovation finally take place. I estimate that the failure to adopt the tender method fully after it first appeared in 1961 cost issuing firms approximately £1.2 billion in forgone proceeds up to 1986 in 2004 prices. Notwithstanding this

finding, econometric evidence of issuing house reputation either lowering or exacerbating underpricing of public offers was inconclusive.

A second possible explanation is the provincial competition hypothesis. The claim is that a combination of competition for IPO business from the Provincial Stock Exchanges and of greater levels of trust existing between issuing firms, issuing houses and brokers, and investors all local to these exchanges contributed to lower underpricing in the first half of the last century. In the second half, these exchanges were increasingly falling into line with LSE regulatory practice, first regionalising in 1965 and finally merging with London in 1973. The preliminary indications from a simple test of this hypothesis provide little or no empirical support. I included in the linear underpricing model, tested in chapter 4, dummy variables for those 326 IPOs in the data set listing on both a Provincial Stock Exchange and the LSE. Whilst significantly lower pricing was apparent in the smaller markets of Sheffield and Nottingham, the opposite result was found in Birmingham, whilst Manchester and Liverpool showed no tendency to underprice either more or less than London.

A further possibility is the ownership and control hypothesis of Brennan and Franks (1997). They claimed that underpricing was a deliberate strategy by non-selling managers of issuing firms to spread ownership at the time of IPO as widely as possible thereby retaining control of the firm whilst obtaining the benefits of a listing. Whilst this strategy was unnecessary prior to 1948 since the threat of takeover was minimal, it held increasing appeal after the Companies Act of that year improved financial disclosure for corporate bidders.[265] It is possible that as the threat of hostile takeovers became real through the following decade thanks to corporate raiders such as Charles Clore, managers and their advisers came to appreciate rather more than previously the advantages of a diversified shareholder register at which point underpricing started to rise.

One final explanation for the lack of underpricing concerns the winner's curse. In the first half of the last century, investors were relatively homogeneous and consequently Rock's winner's curse was not as pronounced as in later years. Institutional investors did not raise their ownership of UK equities above that of private individuals until 1975. With institutional

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[265] Hannah (1974); (1983), p.149.

investment still in its developmental stage during the interwar period and private investors accounting for around 80% of LSE trading volume, the information gaps between investors had not yet become very wide. Consequently, the winner's curse may have been less of a problem than it became in the second half of the 20th century as equity investment by financial institutions gathered momentum.

Each of these hypotheses provides me with an agenda for post-doctoral research. The provincial competition hypothesis can be explored by analysing the behaviour of IPO underpricing on one of the major Provincial exchanges, Birmingham, Liverpool or Manchester, through the interwar years up until the effective merger with the LSE. The testing of the ownership and control hypothesis requires details of the allocation scheme employed by issuers and their advisers in the case of oversubscribed IPOs as well as detailed share ownership both pre- and post-IPO. Whilst the latter information is available through Companies House, the former may be more problematic. I expect some information to be available through a combination of financial press comment, issuing house archives and individual company applications filed with the LSE and now held at the Guildhall Library. Finally, examination of the winner's curse requires data on the size of applications for IPO shares and again the basis of allocation employed by the issuing house. The assumption is that the larger the application, the more sophisticated is the investor, something which may also require closer examination for the interwar period.

The other underpricing question to which I gave consideration was how well the IPO market performed judged by underpricing during the two major technology bubbles of the last century. Underpricing of the 1999-2000 internet and ICT IPOs was substantially more than that of the 1928-29 patent IPOs. This is probably attributable to a combination of greater investor heterogeneity and the greater complexity of agency conflicts between issuing firms and their investment banking advisers post-Big Bang compared to the interwar period. Whilst the London market did not engage in the spinning of IPOs witnessed in the US in the late 1990s, it is possible that the investment banks saw the exuberance of retail investors for dotcom IPOs as an opportunity to underprice and generate initial returns for their favoured institutional clients in exchange for other streams of securities business. Issuing firms were happy enough to go along with the heavier underpricing in exchange for the research coverage of a

leading investment bank. These considerations did not exist two generations earlier.

How well did the stock market serve issuing firms approaching public investors for the first time? The attraction of underpricing as one means of addressing this question lies in the stability of the underlying fixed offer price regime over the period of this study. In contrast, as Ljungqvist, Jenkinson and Wilhelm (2003) have argued, the advent of the bookbuilding method since the early 1990s in non-US markets, including the UK, alongside the traditional fixed price method has provided issuing firms with a menu of issuing possibilities and an underpricing/direct cost trade off which was not previously available to issuing firms. Although direct costs fell between the 1920s and the Merrett, Howe and Newbould study of the 1960s, underpricing did not. Furthermore, in the hottest markets, underpricing in 1999-2000 surged well above the levels witnessed in 1928-29.

These findings together with the missed opportunity of the tender offer and the lack of access to public equity markets for young entrepreneurial firms, effectively blocked by LSE regulation until 1980, support the case for capital market failure after 1945. In contrast, interwar underpricing provides an instance of the stock market not doing too badly by industry in the first half of the 20th century. The robustness of this claim would be strengthened by establishing the level of pre-1915 IPO underpricing, a further avenue down which my postdoctoral research can proceed. It appears that Lavington (1921), Henderson (1951), Grant (1967) and Thomas had been correct to focus on the direct costs of new issues and to exclude any consideration of underpricing. Criticism by the Macmillan Committee of small firm finance was in one sense wide of the mark since there was no apparent size effect operating in IPO underpricing in the interwar years.

Yet, such sanguine conclusions must be tempered by the evidence on IPO survival in the post-1929 period presented in the last chapter. My findings support those of Harris (1933) and Andrews (1937) and extend them by drawing a comparison with IPO survival post-2000. Subject to not being able to control adequately for the post-1929 economic downturn, survival of 1928-29 IPOs was poor compared to those of 1999-2000. Only 46% of the 1928-29 IPOs reached their fifth birthday as a quoted firm compared to 80% for 1999-2000 IPOs (Table 6-10, Panels A and B). The stock market of the 1920s clearly failed to provide

investors with suitable candidates for investment, and, in addition, failed issuing firms in the longer-term by tainting the reputation of the LSE and heightening investor risk aversion. The Macmillan Committee's criticism regarding an absence of reputable underwriters was fully justified.

The margin of the rise in IPO survival rates therefore suggests a material improvement in the performance of the IPO market on this measure and provides a preliminary indication that improved access for younger firms since 1980 has been provided without exposing investors to unacceptable downside risk. Whilst more reputable underwriting, improved disclosure and regulation, and better investor protection did not appear to benefit underpricing, it does appear to have benefited IPO survival. The robustness of this result can be tested by the estimation of long-run total return performance of IPOs relative to a peer group. Whilst the preliminary analysis of Harris (1933) would suggest otherwise, it at least remains a possibility that on a total return basis the 1928-29 IPO cohort fared better than the 1999-2000 IPO cohort because the survivors performed particularly well.

I shall make one last observation on the capital market failure debate concerning the financing of innovative firms and the Kennedy (1987, 2000) claims that such firms faced particular problems posed by unduly large information gaps. I have only touched upon this question in this thesis. Apart from definitional considerations, the main difficulty is presented by the fact that only 7% of my IPO sample was engaged in any R&D activity at the time of IPO as disclosed in the prospectus. I have attempted to contribute to this debate by examining those episodes when investors have become especially interested in technology investments, the late 1920s and 1990s are two such episodes, and establishing how underpricing and survival of such firms relative to non-technology firms has changed. We are again faced with the curate's egg. Underpricing of dotcom IPOs in 1999-2000 exceeded the levels experienced by patent IPOs in 1928-29, but survival of the former was better than the latter. Furthermore, hazard regressions showed technology assets did not increase the risk of exit post-2000, whereas patents did do so post-1929.

An important question touched upon in this thesis is whether better regulation, disclosure and investor protection benefit the development of stock markets. LLSV (1997, 1998) argue that laws matter for financial development. Franks, Mayer and Rossi (2004) counter-claim that laws did not matter in the

British case since companies were active issuers of publicly traded securities in the first half of the last century despite weak regulation, disclosure and protection. This result is based upon a relatively small sample of firms. In this study, I have asked whether laws mattered for the IPO market. I tested whether regulation, disclosure and investor protection narrowed information gaps and lowered underpricing by comparing underpricing in a "strong" state of the world (post-1948) with that in "weak" one (the interwar years). This test ultimately lacks precision, not least because there are likely to be other influences on underpricing of which I have not taken account. Therefore, whilst the behaviour of underpricing is a puzzle, this puzzle may not represent a further refutation of LLSV. In future research, I need to consider applying the event study methodology to underpricing and survival, taking the 1948 Companies Act as the event.

In conclusion, was the LSE doing a better job for firms seeking a listing at the end of the century than in the interwar years? Purely on the underpricing measure the answer appears to be no, despite the improvements in regulation, disclosure and investor protection in the second half of the century. Reputable underwriting did not appear to help issuing firms and issuing houses appeared comfortable with the fixed offer price regime. In contrast, the IPO survival story provides us with the possibility of ending on a more optimistic note. Ultimately, however, an attempt at a complete answer to this question needs to incorporate a consideration of long-run IPO performance and the IPO cycle. These are large questions which lie beyond the boundaries of this thesis.

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The sources utilised directly in assembling the IPO data set were the *Times Books of Prospectuses,* the *Stock Exchange Daily Official List,* the *Stock Exchange Year Books* and the *Issuing House Year Books*, all of which are available at the Guildhall Library and are described in chapter 3.

The *Rules and Regulations of the Stock Exchange* are in the Guildhall Library. Minutes of the Committee for General Purposes of the London Stock Exchange which met up until 1946 and its various sub-committees, of the *Accepting Houses Committee* and of the *Issuing Houses Committee* are lodged at the Manuscripts Section, Guildhall Library. I also consulted the *Issuing House Association Rules.*

I refer to articles in *The Economist* and *The Times* for commentary on regulatory changes and tender offers and to the *Financial Times* and the *Investors Chronicle* for commentary on recent developments in the IPO market.

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