

Regulating IPOs: Evidence from Going Public in London and Berlin, 1900-1913

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January 2012

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Regulating IPOs: Evidence from Going Public in London and Berlin, 1900-1913^{*}

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Abstract:

We revisit debates on the regulation of IPOs by analyzing failure rates of IPOs carried out between 1900 and 1913 on the London and Berlin stock exchanges, two of the leading financial markets during the early 20th century. IPOs were regulated more heavily in Germany than in Britain and, as might be expected, the failure rate of IPOs on the Berlin Stock Exchange was lower than it was on the London Stock Exchange. On the other hand, the failure rate of IPOs obtaining an “Official Quotation” on the London Stock Exchange was almost as low as Berlin’s. Moreover, while tough regulation of IPOs can result in a counterproductive restriction of investment choice, in the case of a London Stock Exchange junior market known as the Special Settlement sector post-IPO performance was sufficiently poor to suggest that tighter regulation would have been beneficial to the average investor.

1. Introduction

The role that regulation should play in the development of securities markets is a much debated topic. There has been for a number of years a lively academic discourse focusing on whether the United States should replace its “one-size-fits-all” federal securities regulation regime with a model that incorporates greater emphasis on issuers choosing their regulatory environment and on private contracting generally. Recently, the “public versus private” debate has shifted to legislative circles as a persistent lull in initial public offerings (IPOs) of U.S. companies has prompted numerous suggestions for at least partial deregulation (Coffee, 2011). For instance, a bill was introduced to the Senate in late 2011 that would provide for a securities regulation “on ramp” – a phased series of compliance hurdles -- permitting entrepreneurial companies to go public without being subject immediately to the full range of rules applicable to publicly traded companies (Sen. Warner, 2011).

While the appropriate scope of public regulation of IPOs and securities markets more generally is an important topic, the related empirical literature is small and generally inconclusive (Mahoney and Mei, 2007: 3-4). In this paper, we contribute to this literature by way of a comparative study of the London and Berlin stock markets between 1900 and 1913 based on hand-collected datasets of IPOs. This period coincides with the apogee of an era of global financial development unmatched until the end of the 20th century (Rajan and Zingales, 2003). Britain and Germany both had well-developed financial markets during this period (Rajan and Zingales 2003: 7) and as such provide an apt departure point for a study of the impact of regulation on IPOs. In Germany, reforms occurring in 1884 and 1896 considerably tightened up rules affecting public offerings of shares (Gömmel 1992: 170-178; Burhop 2011: 13-17). Germany thus became a “first-mover” with respect to

IPO regulation. The UK only engaged in extensive statutory regulation of public offerings of shares after World War II (Cheffins 2006: 1294-95). In the United States, similar to Britain, disclosure requirements were negligible prior to the 1910s.

A key finding in the empirical literature on the impact of regulation on IPOs is that stock return variance decreased after the enactment of the Securities Act of 1933, the cornerstone of federal regulation of IPOs in the U.S. (Stigler, 1964; Jarrell, 1981; Simon, 1989). A plausible interpretation of this finding is that federal intervention imposed relatively greater costs on riskier ventures and forced them off the market. To the extent this is correct, one would expect, as Simon (1989) found, IPO failure rates to be lower when there is tough regulation than if matters are left primarily to private contracting. This insight leads us to test a series of hypotheses using our data on Berlin and London IPOs.

First, given Germany's tougher regulatory regime, IPO failure rates should have been lower on the Berlin Stock Exchange (BSE) than the London Stock Exchange (LSE). Second, given that the LSE imposed various constraints on companies seeking a quotation on its "Official List" and left a "junior" market where companies went public by "Special Settlement" largely unregulated, riskier ventures should have opted for Special Settlements and their failure rate should have been higher. Third, even if the relative lack of regulation by the LSE resulted in riskier ventures going public by way of Special Settlement rather than by becoming officially quoted, investors in Special Settlement IPOs may not have been prejudiced, assuming there were enough "winners" to offset the failures.

Our results largely verify the first two hypotheses but not the last. As predicted, the failure rate of BSE IPOs was lower than that of LSE IPOs between 1900 and 1913, though the failure rate of IPOs of companies that sought an Official

Quotation was low. Moreover, the failure rate of IPOs by way of a Special Settlement on the LSE was considerably higher than it was for Official Quotation IPOs even after other relevant variables are controlled for. Share price data, first available in 1916, indicates that Special Settlement IPOs performed very poorly relative to the overall London market. Hence, while a potential drawback with tight IPO regulation is that it will deter riskier ventures from going public and thereby reduce the investment opportunity set, in this particular case the average investor would have benefitted from having less IPO choice.

One additional striking finding of our study is that the IPO failure rate on the BSE or the LSE's Official List was better than what one finds today. The logical expectation would have been the opposite since IPOs are more tightly regulated now than they were in the early 20th century.¹

The layout of the paper is as follows. Section 2 provides a theoretical overview of the interaction between IPO regulation and IPO performance. Section 3 compares and contrasts the institutional background in Britain and Germany. Section 4 sets out the hypotheses this study tests. The characteristics of our London and Berlin IPO sample are described in Section 5, while Sections 6, 7 and 8 present our main results. Section 9 concludes.

¹ The fact regulation is tighter today can be illustrated by reference to an index La Porta et al. (2006) constructed to measure the strength of securities law. La Porta et al provide scores for 49 countries based on whether a country requires delivery of a prospectus and mandates disclosure of share ownership by blockholders and directors, executive compensation, contracts outside the ordinary course of business and transactions between a company and its directors (2006, Table I). They gave the U.S. the highest possible score, 1.00. According to Franks, Mayer and Wagner (2006: 547), at the turn of the 20th century Germany would have scored 0 because its legislation did not require disclosure of any of the aspects of disclosure La Porta et al. focus on.

2. Regulation and IPO Survival

Various justifications have been offered as to why a mandatory regulatory regime should govern companies going public. First, regulation can build up or restore the public's trust in the stock market. A key goal of the Securities Act of 1933 and Securities and Exchange Act of 1934 was to do precisely this, with confidence in stocks having been battered by the 1929 stock market crash (Zingales 2009: 391). Second, it is claimed that regulation is necessary to correct the "underproduction" of information by companies proposing to go public. This arises because information disclosure can be costly for firms and because the benefits associated with information availability are non-excludable and thus cannot be captured readily (Coffee 1984: 725-33; Zingales 2009: 394).

Third, if stock market investors find it difficult to distinguish between "good" and "bad" issuers, a deleterious market for "lemons" can arise (Akerlof 1970). When investors are mistaken about the quality of a firm going public by way of a share issue – a potentially serious risk with IPOs because information asymmetry can be acute where issuers meet with investors for the first time -- they can lose their entire investment. Bad experiences of this sort can cause investors to steer clear of IPOs, thus impairing the efficient allocation of capital (Fama and French 2004: 230; Cross and Prentice 2006: 365-67).

Those sceptical of mandatory governmental regulation of securities markets make various counter-points. Stock exchanges have strong economic incentives to build up and preserve investor confidence and will likely self-regulate accordingly (Pritchard, 2003). As for arguments in favour of regulation based on a public goods rationale and concerns about the IPO market becoming a market for lemons, firms have incentives to provide salient information voluntarily concerning their business

so as to signal their quality to investors. Firms know that to say nothing may be costly so long as a sizeable proportion of investors are sufficiently sophisticated to assume the worst in the absence of disclosure (Romano, 2002: 14-15). Also, firms can enhance the credibility of disclosures made by relying on informational intermediaries such as investment banks acting as underwriters (Easterbrook and Fischel, 1984: 688). The theory is that, assuming the investment bank is known as a reliable underwriter, it will have strong incentives not to squander its valuable reputation by deceiving investors.

The most prominent empirical studies of the impact of mandatory regulation on IPOs have focused on the enactment of the Securities Act of 1933 (Stigler, 1964; Jarrell, 1981; Simon, 1989). This legislation required registration with federal regulators (ultimately the Securities and Exchange Commission) of securities sold to the public and mandated various types of disclosures in so doing. It also empowered buyers of securities to sue any person signing the registration statement (directors, underwriters, accountants etc.) for “misleading” statements and “omissions of fact”. The empirical literature generally indicates that the introduction of the Securities Act of 1933 did not improve the mean return of companies going public, with the only exception being IPOs on exchanges other than the New York Stock Exchange (NYSE) (Simon, 1989). On the other hand, the variance of stock returns did decrease (Stigler, 1964: 122; Jarrell, 1981: 646; Simon, 1989: 309).

Advocates and critics of mandatory governmental regulation of securities markets disagree on the implications of the reduction in the variance of stock returns following the enactment of the 1933 Act. Supporters of regulation maintain adoption of the Securities Act led to improved information disclosure and hence greater price accuracy, thereby enhancing allocative efficiency (Coffee, 1984: 735-36, 751-52;

Fox, 1999: 1370-71; Prentice, 2002: 1419-20). Those sceptical of regulation, echoing the verdict of Stigler (1964: 122) and Jarrell (1981: 668), argue in contrast that the variance of stock returns decreased because the 1933 Act forced riskier investments off the market (Mahoney, 1997: 1468-69; Romano, 1998: 2377). This conjecture is supported by the fact that the largely unregulated “over-the-counter” market grew rapidly between the mid-1930s and mid-1960s in comparison to national stock exchanges subject to full regulation under the Securities Act of 1933 and the Securities Exchange Act of 1934 (Simon, 1989: 313; Ferrell, 2007: 219-20). Critics of “one-size-fits-all” regulation maintain that, given the absence of evidence that investors irrationally overpriced the shares of companies going public prior to the 1933 Act and given the protection against occasional disastrous outcomes afforded by IPO portfolio diversification, the “regulatory discrimination against relatively risky ventures...(was) inconsistent with social welfare maximization (Jarrell, 1981: 668; see also Romano, 1998: 2377).”

To the extent regulation deters IPOs by riskier companies, a logical by-product will be a reduction in the failure rate of companies that do go public. Empirical studies of the Securities Act of 1933 generally do not focus on IPO failure rates. Simon (1989), however, did examine five-year failure rates for IPOs on the NYSE and the less well regulated US regional stock exchanges and found that while only a tiny proportion of NYSE IPOs failed both before and after the 1933 Act, the failure rate for IPOs on an exchange other than the NYSE did drop substantially.

There are a handful of studies that explicitly address the relationship between regulation and the fate of IPOs, and they generally support the conjecture that tougher regulation reduces the failure rate. Carpentier and Suret (2011) report that among “small cap” Canadian IPOs carried out between 1986 and 2003 the failure

rate was lower for those companies that had to meet tougher stock exchange listing requirements. Klein and Mohanram (2005) look at non-financial IPOs on NASDAQ between 1997 and 2000, a period when firms could list according to a minimum pre-tax earnings standard or a laxer market capitalization at IPO standard, and find that failure rates were markedly higher among the latter, less regulated cohort. Gerakos, Lang and Maffett (2011) report that IPO failure rates on AIM, a present-day UK “junior” market operated by the LSE that is renowned for its flexible regulatory approach, are markedly higher than failure rates on more heavily regulated US stock markets, but Espenlaub, Khurshed and Mohamed (2009) find only minor discrepancies between AIM and US stock exchanges.

The few historical studies to date on IPO failure rates also support the case for regulation ameliorating IPO failure rates. Baltzer (2007: 53-68) finds that among IPOs carried out on the Berlin Stock Exchange the failure rate was considerably lower among companies incorporated prior to 1870 when incorporation was difficult to achieve (a royal concession was needed) than among companies incorporating under 1870 companies legislation that imposed few restrictions. Chambers (2010) analyzed IPOs on the interwar London market and reports that following the failure of numerous IPOs floated in the late 1920s the adoption of tougher regulation by the LSE coincided with a dramatic improvement in the survival rate.

3. Germany and the UK, 1900-13: The Institutional Background

Firms going public are typically regulated by a combination of company and securities laws and stock exchange rules specifying listing requirements. Today it is universal practice for countries to have securities laws in place that require a prospectus to be issued before shares are sold and listed (La Porta et al. 2006: 1, 10).

As the 20th century opened, however, the situation was different. In the US, for instance, disclosure regulation was negligible until the 1910s when the New York Stock Exchange's Committee on Stock List began obtaining IPO disclosure agreements from most firms and individual states began to enact state securities regulations in the form of "blue sky" laws (Hilke, 1986). In the UK, going back to 1867 if a prospectus was issued it had to disclose any contracts that would influence whether or not an applicant would take up shares as well as corporate transactions to which directors were parties (Companies Act of 1867, § 38). Company promoters would sometimes side-step the prospectus disclosure requirements by distributing shares without a supporting prospectus, although a 1908 amendment to companies legislation obliged companies in this position to prepare "a statement in lieu of prospectus" containing much of the same information (Cheffins 2008: 195-96). Regardless, UK companies legislation governing prospectuses did not require companies to divulge information concerning their financial performance until 1929 (Cheffins 2008: 274).

German regulation of companies intending to offer shares to the public was robust in comparison. In response to a large number of firms de-listing from German stock exchanges following the 1873 stock market crash, German authorities introduced a new stock corporation law in 1884 which substantially affected IPOs (Burhop 2006; Baltzer 2007; Burhop 2011). The 1884 law stipulated that when a business was incorporated, independently audited balance sheets and profit and loss statements from the two years preceding incorporation had to be filed publicly. UK companies legislation lacked any equivalent requirement. The 1884 corporate law also required firms to file publicly a balance sheet and a profit and loss account on an annual basis (Franks, Mayer and Wagner 2006: 540), requirements not

imposed by UK companies legislation until 1908 and 1948 respectively (Cheffins 2008: 196, 356).²

The German Exchange Act of 1896, enacted in response to the stock market crash and associated banking failures occurring at the beginning of the 1890s, bolstered regulation further (Franks, Mayer and Wagner 2006: 542). There was minimal regulation of German stock exchange transactions before the 1896 Act, but this legislation constituted “the most elaborate attempt ever made to regulate speculative markets (Emery 1898: 286).” Or as Franks, Mayer and Wagner say of the 1896 Act, “Germany had enacted a corporate code that provided more extensive corporate governance than existed in virtually any other country at the time (2006: 583).”

The 1896 Stock Exchange Act required every company applying for listing on a stock exchange to issue a prospectus, the character of which the German parliament prescribed in considerable detail (Emery 1898: 313). Matters that had to be dealt with included the proposed use of the capital to be raised, the most recent balance sheet, the most recent profit and loss statement and the dividends paid, if any, during the five years preceding the proposed IPO. Those who organized an IPO and underwrote it were additionally deemed to be liable for false statements or suppression of facts, either purposely or through gross negligence, with damages being recoverable on the basis of the difference between the existing price and the price at which the issue was first put on the market (Emery 1898: 313). In the UK legislation did not provide for fully equivalent liability for misdisclosure by those responsible for a prospectus until 1986, though the liability of directors was governed

² The Companies Act 1929 required companies to present to shareholders annually -- but not file publicly -- a profit and loss account (Cheffins 2008: 274).

by statute beginning in 1890 and experts, such as accountants, who consented to a report being included as part of a prospectus were deemed liable for untrue statements in the report from 1948 onwards (Cheffins, 2006: 1297).

In Germany, those organizing an IPO at the turn of the 20th century were required to present the prospectus and other relevant documentation to the admission board of the stock exchange (*Boersenzulassungsstelle*) on which the shares were to be listed. An admission board was obliged in turn to ensure that all pertinent facts in regard to an equity offer were stated to the public as fully as possible, with a listing to be refused if this requirement was not satisfied. A board was also required to reject a public offering of shares which would cause the investing public to be defrauded and could only list a company rejected by the board of another German stock exchange if the latter consented (Loeb 1897: 403, 405).

While it is unclear whether information disclosed at the time of IPOs provided German investors with an accurate idea of their value (Economist, 1898), those organizing IPOs did at least ensure the prescribed information was in fact provided (Obst, 1921, vol. 2, 511-12). In instances of doubt, it was common practice for admission boards to rely on their powers to request additional information from those organizing public offerings (Obst, 1921, vol. 1, 385; vol. 2, 511-12).

Throughout much of the 20th century, the Listing Rules governing companies with shares quoted on the LSE (LSE Rules) were generally a step ahead of UK company law in regulating companies and assuaging concerns public investors might otherwise have had about purchasing shares (Cheffins 2008: 76, 107-8). However, during the late 19th and early 20th centuries the LSE's approach was generally *laissez-faire* in orientation (Cheffins 2008: 75). The Stock Exchange was typically not concerned with the quality of the securities the market handled, leaving

its members free to deal in whatever financial instruments they chose (Michie 1999: 86-87).

Despite the LSE's essentially "hands off" approach, the LSE Rules stipulated that a company seeking a quotation had to have articles of association in a form of which the Committee of the Stock Exchange approved. The precise requirements were only spelled out in 1909, with one stipulation being that a quoted company's articles compel annual circulation of the company's profit and loss account to the shareholders and the Stock Exchange (Cheffins 2008: 197). Moreover, so as to inhibit market manipulation and promote liquidity, the LSE Rules prohibited from the 1850s until the 1940s the quotation of a class of securities unless two-thirds of the capital had been allotted to the public (Cheffins 2008: 76, 332). Before agreeing to quote a security the Committee of the Stock Exchange would additionally require full information on the bona-fide character of the enterprise and would seek to ascertain whether the offering was of "sufficient magnitude and importance" to merit a full listing.

Still, while the Committee had considerable discretion in deciding which firms to quote, "quality control" apparently was exercised sparingly. According to Gibson (1889: 37-38), the Committee would decline "to admit to quotations the questionable enterprises of 'shady' promoters" but would not:

"indicate any opinion, personal or official, as to the value of such issues, or their real genuineness or soundness. That is entirely beyond their province, and persons buying issues that have been 'listed' should scrutinize the property and investigate the value for themselves. *Caveat emptor.*"

As the 20th century opened, firms carrying out IPOs that preferred to side step the requirements associated with a quotation and yet wanted their shares traded on the LSE could apply for a “Special Settlement” (Cheffins 2008: 196). There also were occasions when companies seeking to have their shares traded on the LSE would apply for a full quotation and relied on a Special Settlement as a back-up plan if things did not work out. We uncovered through searches of LSE applications for listing files 15 instances between 1900 and 1913 where those organizing an IPO had to turn to a Special Settlement because their application to join the main market failed. The notation in the files typically focused on the share allotment pattern, implying that the LSE Committee had concerns about the shares not being sufficiently widely distributed.³ In none of the 15 instances was an application for an Official Quotation refused explicitly on grounds of inadequate disclosure or due to concerns about the merits of the company involved.

As of 1900, the only explicit requirement the LSE imposed on a company seeking a Special Settlement was to ensure there were sufficient share certificates ready for delivery (Gore-Browne and Jordan, 1902: 454). By 1909 the LSE Rules stipulated that a company applying to the LSE Committee had to file its prospectus and spell out the number of shares to be allotted to the public and others (Gore-Browne and Jordan, 1909: 488). The LSE Committee would not entertain an application for Special Settlement unless there were transactions to be settled and it had the power to keep off the market the shares of companies where undesirable practices had occurred. The occasions, however, when the Committee felt compelled to refuse an anticipated Special Settlement were “quite exceptional”

³ In two cases no reason was provided for the denial of a quotation and in one instance the application was deferred and not subsequently granted.

(Times, 1913).⁴ Special Settlement IPOs therefore were pretty much entirely unregulated.

With Special Settlement IPOs to which the LSE Committee gave the green light, the Committee would fix a special day outside of the ordinary account calendar for all bargains in the new securities to be settled. After the Special Settlement day, the shares would become part of the normal account system of Stock Exchange dealings and jobbers would make a market in such securities but off the Official List. Share prices of Special Settlement companies were not published until 1916, when a *Supplementary List* of share prices was initiated. Otherwise, the Special Settlement sector resembled what would be regarded today as a “junior market” complementing the main market made up of officially quoted shares. For a sizeable number of companies therefore this market functioned, to use the term being deployed currently in debates about de-regulation of IPO activity, as an “on ramp” to an Official Quotation. As we describe in more detail in Part VII, among the 196 companies that carried out Special Settlement IPOs between 1909 and 1913 that by 1916 had not been acquired, liquidated for value, or gone bankrupt, 32 had graduated to the Official List of the LSE.

Germany lacked a junior market equivalent to the Special Settlement sector. At the beginning of the 20th century the BSE was the dominant stock market among Germany’s 23 stock exchanges, with a majority of all publicly traded companies, representing more than 80% of overall market capitalization, being listed in Berlin (Saling’s *Börsenpapiere* 1902). Little is known about the history of Germany’s regional stock exchanges, but they would not have offered a less regulated

⁴ Our searches of the LSE application for listing files found no instances of refusals of Special Settlement days.

alternative to the BSE. The fact that the 1884 corporate law and the 1896 stock market law applied generally, rather than specifically targeting companies listed on the BSE, precluded this from occurring. The 1896 Stock Exchange Act also prohibited the publication of any information about stocks not officially admitted to a German stock exchange. This precluded the development of an over-the-counter market in shares.

4. Hypotheses

Based on Section 2's overview of regulation and IPO failures and Section 3's summary of the institutional context in Britain and Germany, we formulate three hypotheses to further our understanding of the impact of regulation on IPO markets in London and Berlin in the early 20th century. As Section 2 described, one way to interpret evidence that the enactment of the U.S. Securities Act of 1933 prompted a reduction in the variance of stock returns is that federal regulation deterred riskier ventures from going public on a stock exchange, which should have improved the survival rate of IPOs that went ahead. To the extent this reasoning is correct, and given that as the 20th century got under way IPO regulation was in various ways more robust in Germany than in the UK, our first hypothesis is as follows:

H1: The failure rate of IPOs on the BSE between 1900 and 1913 was lower than those on the LSE, including both Officially Quoted (OQ) and Special Settlement (SS) IPOs.

As Section 3 discussed, while the LSE refrained from engaging in explicit investor protection when granting quotations as the 20th century opened, companies seeking a listing had to fulfil certain requirements not imposed on firms seeking a Special Settlement and there were various instances where companies that failed to

qualify for an Official Quotation obtained a Special Settlement instead. There also would have been occasions where: either operators of companies wanted to have a platform for shares to be traded without distributing two-thirds of the relevant share class to the public, or, probably under advice from their sponsoring stockbroker, realized that applying for a quotation was futile because their company was not of “sufficient magnitude and importance” to qualify. With a Special Settlement being easier to obtain than an Official Quotation, companies going public by way of a Special Settlement likely were riskier ventures than their OQ counterparts. Hence, our second hypothesis is:

H2: The failure rate of IPOs receiving an Official Quotation (OQ) on the LSE between 1900 and 1913 was lower than IPOs only achieving a Special Settlement.

Confirmation of H1 and H2 might at first glance seem like an endorsement of regulatory intervention, in that tougher regulation, whether imposed by legislation or stock exchange intervention, reduces the IPO failure rate and protects investors from backing undeserving companies. However, if regulation is simply forcing riskier investments off the market, investors do not obviously benefit because a number of the riskier ventures may well have generated outsized returns that compensated for the greater likelihood of outright failure. With the LSE’s Special Settlement market, it therefore might have been the case that, notwithstanding a higher IPO failure rate, it provided promising firms with a salutary opportunity to go public promptly. Our third hypothesis therefore is:

H3: There were a sufficient number of Special Settlement IPO “winners” to offset the failures and generate overall performance at least in line with the market.

5. The IPO Sample

To test our hypotheses concerning the relationship between regulation and IPO failure, we make use of two hand-collected datasets for IPOs occurring on the LSE and on the BSE respectively between 1900 and 1913. The London IPO dataset is sourced from Chambers and Dimson (2011), which in turn draws upon *The Times Book of Prospectuses* for equity issues, the *Stock Exchange Official Intelligence*, often referred to as *Burdett's*, as well as the LSE records of applications for listing.⁵ IPOs of ordinary shares, preference shares or both are included but those of shares with an offer price of 2 shillings or less are excluded on the basis these were widely regarded as highly speculative investments (Thomas, 1978: 37).⁶ Including preference share IPOs is appropriate because in our IPO sample preference shares carried full voting rights in approximately four out of five instances and participated fully in profits with the ordinary shares on two out of five occasions.⁷

We identified Berlin equity IPOs occurring between 1900 and 1913 from the annual register of security issues published by the Imperial Statistical Office (*Kaiserliches Statistisches Amt*, various issues) and then cross-checked them against the *Handbuch der deutschen Aktiengesellschaften*, a joint-stock company manual. We excluded seasoned equity offerings by consulting the 1901/02 edition of *Saling's Börsenpapiere*, a stock market manual comprising all companies BSE or provincial stock exchange listings at the end of 1899.

⁵ This index is held at the Guildhall Library, London. Where necessary, the actual application file was consulted.

⁶ In line with previous IPO studies, issues by firms already listed on another stock exchange and investment trusts are also excluded.

⁷ The remaining preference shares only carried votes in certain limited circumstances such as when dividends were in arrears.

Our London sample comprises a total of 825 equity IPOs and our BSE sample 335 equity IPOs. The LSE sample divides between 267 firms obtaining an Official Quotation (OQ) and the remaining 558 going public by way of a Special Settlement (SS) (**Table 1**). The LSE shows evidence of hot (1909-10) and cold (1902-04) periods of IPO activity, while the fluctuations in BSE IPO activity were more muted and were not correlated with LSE IPOs.⁸ The Berlin pattern implies a more managed IPO process with the exchange authorities and the banks responsible for underwriting IPOs operating a queuing system.

LSE IPOs were not only more numerous but also more heterogeneous along various dimensions than Berlin IPOs. One was security design. All Berlin IPOs involved ordinary shares, with shares carrying the same voting rights in each instance.⁹ In contrast, among the 825 London IPOs, 224 involved preference shares only and 85 combined ordinary and preference shares.

LSE IPOs also displayed considerably greater geographic variation.¹⁰ All but 10 Berlin IPOs involved German-based corporations, whereas only three-fifths of London OQ IPOs (151) and one-quarter (143) of SS IPOs respectively involved domestic firms (**Table 2**). Among remaining LSE IPOs, the majority were enterprises based in self-governing Dominions or Colonies. Special Settlement IPOs were much more geographically diverse than OQ IPOs, with SS IPOs involving Empire

⁸ The correlation coefficient of the annual time series of LSE and BSE IPOs is 0.21 for volume and 0.27 for value, neither being statistically significantly different from zero.

⁹ As of 1906, only 3% of the share capital issued by all German corporations to date was in the form of preference shares (Moll 1909: 311).

¹⁰ The location of a firm is defined by its main centre of operations as described in the prospectus rather than the place of registration or incorporation.

companies and foreign companies both outnumbering SS IPOs of domestically based companies.

Another difference between LSE and BSE IPOs was that companies going public in the UK covered a wider range of business activities than their German counterparts, with SS IPO companies being particularly diverse (**Table 2**). Prospectuses issued by companies going public on both the LSE and the BSE invariably provided some details on the nature of the business and these revealed 63% of Berlin IPOs were concentrated in the commercial and industrial sector and in iron, coal & steel, as were 59% of London OQ IPOs. In contrast, only 26% of London SS IPOs fell into these sectors. Likewise, while only 3% of LSE OQ and less than 1% of BSE IPOs were mining and oil companies, one in four SS IPOs involved firms operating in these resource sectors. A further 34% of SS IPOs involved firms operating rubber, tea or coffee plantations, sectors that bypassed the BSE completely, perhaps due to the economic irrelevance of Germany's colonial empire.¹¹ Well over half (160) of the London IPOs in the hot market of 1909-10 were of plantation companies, mainly rubber, seeking to capitalize on investor excitement about the prospects for automobile and motorcycle tire manufacturing.

LSE IPOs also exhibited more variation than BSE IPOs in terms of age and size. Prospectuses would spell out a firm's incorporation date or the date of establishment of the business, enabling an estimation of how long the business had been in operation prior to the IPO (FIRM AGE). Prospectuses also provided sufficient information to calculate the market capitalization of shares outstanding

¹¹ As of 1913, only 101 corporations (German and British joint-stock companies, limited liability companies, and chartered companies) with a capital of 106 million Mark were active in the German colonies. Most of these companies were in the legal form of a GmbH, which could not be listed on a stock exchange (Schinzinger 1984: 37, 60).

post-IPO valued at the offer price (FIRM SIZE). Companies securing an official quotation on the LSE quote were on average more than twice as large as SS IPOs, with Berlin IPOs being in between (**Table 3**).

There were similar disparities with firm age. London OQ IPOs were the most mature, with their prospectuses indicating they had been in business on average for nearly 23 years before the IPO. In contrast, the average age of SS IPOs was under a year, with almost half of these firms having just been established. With the German Exchange Act of 1896 mandating that companies going public had to disclose a financial track record, it was not possible for a German company to carry out an IPO this quickly. Although IPOs on the BSE had apparently been in operation less than half as long as OQ IPOs, the figures are not directly comparable because Berlin firms typically only disclosed their incorporation date rather than the earlier foundation date.¹²

Underwriting is a final area where there were substantial differences between Berlin and London. Germany's Imperial Statistical Office published information on the names of the lead and co-underwriters of companies going public on the BSE and with companies going public on the LSE the prospectuses normally disclosed whether the IPO was underwritten. All Berlin IPOs were underwritten by a third party (**Table 4**). This occurred, in contrast, with only 37% of LSE OQ IPOs and 35% of SS IPOs. Related parties of the newly listed firm (directors and vendors) underwrote 25% and 15% of the IPOs on the OQ and SS respectively. Correspondingly, 37% of OQ IPOs and half of SS IPOs were not underwritten at all.

¹² When the prospectus contained both dates, the firms were in operation on average about five years before becoming a joint-stock company.

As well as underwriting being more common in Berlin, the quality of underwriters was also probably higher (**Table 4**). Most Berlin IPOs carried out between 1900 and 1913 were underwritten by members of the Imperial Loan Syndicate, whose reputation was established by the Syndicate's monopoly of German and Prussian government bond issues. More than half of the IPOs were underwritten by large and established joint-stock credit banks, including Deutsche Bank, Dresdner Bank, Discontogesellschaft, and Darmstädter Bank.

In contrast, the London underwriting market was highly fragmented, with 126 different firms doing the underwriting for the 302 IPOs that were underwritten in our sample. The most prolific -- Emile Erlanger & Co., a French bank, Linton Clarke & Co., a stockbroker, and Central Industrial Trust -- each handled only six IPOs. With the leading London-based merchant banks declining to engage seriously with equity IPO underwriting until after 1945 (Chambers, 2009), only four IPOs were organized by first-tier merchant banks, one each by Brown Shipley & Co, C.J. Hambro & Co., J. Henry Schroder & Co. and Speyer Brothers.

6. IPO failure

To ascertain the fate of the LSE IPOs in our sample, we searched *Burdett's* and the *London Gazette*. For BSE IPOs we relied on *Saling's Börsenpapiere* and *Handbuch der deutschen Aktiengesellschaften*. We ascertained for each IPO whether the company was delisted within five years of the IPO. If this occurred and investors failed to receive any sort of pay-off we deemed the company to have failed (FAIL). Other possible outcomes for firms which were delisted within five years of their IPO were to be acquired for value (ACQUIRED) and to be liquidated with

shareholders being entitled to cash payments reflecting undistributed profits (LIQUIDATE).¹³ The remaining firms we deem to have survived (SURVIVE).¹⁴

The BSE track record was close to flawless – only 3 of the 335 companies that carried out IPOs between 1900 and 1913 delisted within five years of going public (two others were acquired for value) (**Table 5**). Given that IPOs are more strictly regulated today than at the beginning of the 20th century, this is a remarkably low failure rate. Studies of IPOs carried out during the concluding decades of the 20th century and in the 2000s exhibit considerable variation, but pretty much universally report a failure rate of 10% or more (Carpentier and Suret, 2011: 104). The failure rate of IPOs on the LSE before 1913 of 13.8% (114 out of 825) falls into line with modern studies and is considerably higher than Berlin's. H1 is therefore provisionally confirmed.

H2 is also confirmed, in that the failure rate was lower for the LSE OQ sector than for the SS sector (**Table 5**). Only 7 of the 267 companies carrying out a London OQ IPO were delisted within five years of the IPO, a failure rate of just 3%. Ten companies, or 4%, were acquired and one was liquidated with shareholders being entitled to a cash payment. In contrast, the failure rate of London SS IPOs was

¹³ Care must be taken to distinguish between a voluntary and a compulsory winding-up. In the former case, a firm might be wound up even though a going concern because the owners wished to retire or sell out. Such instances are not treated as failures since cash or securities were offered to shareholders. Where firms failed to pay dividends and were delinquent in filing company accounts followed by disappearance from the following edition of *Burdett's*, they are counted as IPO failures.

¹⁴ We typically assess whether a firm survived by whether they maintained their share listing, and thus a publicly available share price. However, since the share prices of Special Settlement companies were not recorded by the LSE until 1916, we define the survival of London SS IPOs in terms of their continuing to operate as a going concern according to *Burdett's*.

almost one in five (107 of 558). A further 47 of the 558 SS IPOs were acquired and 12 were liquidated for value. We return to the significance of the low failure rate of the LSE OQ sector below.

7. To What Extent Did Regulation Dictate Failure Rates?

Factors other than regulation can influence IPO failure patterns. Firm size, industry classification and geographic location are all risk factors to be taken into account. Likewise, extensive voluntary disclosure of pertinent financial data could mimic the performance effects of tougher regulation. High quality underwriting is similarly a plausible substitute for regulation as a means of ensuring IPO quality. We consider here whether the observed IPO failure rates can be accounted for by such variables rather than by regulatory considerations.

To test whether firm size and industry sector influenced BSE and LSE IPO survival patterns, **Table 6** matches the three IPO sub-samples by carrying out a two-way sort on firm size and industry sector. The quartile breaks for Berlin IPOs are the same as those for the sample of London OQ and SS IPOs combined.

Table 6 indicates that size was a relevant variable. Among Berlin IPOs, which were evenly distributed by firm size from the smallest to the largest quartile, all three failures were of companies in the bottom half of the market. Similarly, with London IPOs smaller companies were more likely to fail. Two-fifths and two-thirds of London SS IPO failures were concentrated respectively in the smallest quartile and the bottom half of the market. The survival rate of London OQ IPOs apparently was improved by a dearth of smaller IPOs, as only nine of the firms that chose this route fell into the smallest quartile of LSE IPOs and of these three failed.

With industry sector, the key finding is that just over half of the IPO failures in our samples (54) were natural resource firms, such as mining, oil and rubber

plantation companies. It is possible that the natural resource business was intrinsically risky at this time and left IPOs in this sector particularly vulnerable. Certainly, of the 332 natural resource firms that carried out SS LSE IPOs, 107, or nearly one in three, failed. There nonetheless was a strong regulatory angle since 43 out of the 267 London OQ IPOs (16%) were natural resource firms and none failed.

The fact the failure rate was close to zero on the BSE hampers our ability to analyze its IPOs further. Commentators on early 20th century German stock markets recognized that reputable lead underwriters were associated with high quality public offerings (Jeidels, 1905: 128, 163; Moral, 1914: 43), so it is plausible that, given that all IPOs carried out on the BSE were underwritten, vigilant third party screening accounts in large measure for the fact almost no companies that went public failed. However, the tiny number of BSE IPO failures means that statistically we cannot distinguish between the relative contribution of regulation, underwriting and other potentially relevant variables.

London IPOs are a different matter, given the failure rate of nearly 14%. Moreover, IPO prospectuses provided information on a range of variables which might influence IPO failure. For instance, while UK legislation did not compel companies carrying out IPOs to disclose financial data, prospectuses in fact were often not silent. In addition to providing information permitting an estimate of FIRM AGE and FIRM SIZE and identifying an underwriter (if any), many prospectuses provided at least some historic profits data (TRACK RECORD) (**Table 3**). Similarly, on a substantial minority of occasions LSE prospectuses disclosed an asset valuation (ASSET VALUE), typically by way of an abridged balance sheet (**Table 3**).

To attempt to isolate the effect of regulation on IPO failure, we ran a logistic regression on the whole sample of 825 London IPOs while controlling for firm risk, industry risk, geographic risk, whether or not an IPO was underwritten and the extent to which firms engaged in voluntary financial disclosure. Our dependent variable (FAIL) takes the value 1 if an IPO fails and zero otherwise, and our explanatory variables are FIRM SIZE and TRACK RECORD, and a series of dummy variables, ASSET VALUE, OQ, NATRES, EMPIRE, FOREIGN and UNDERWRITTEN. The results are reported in **Table 7**.

As anticipated, the likelihood of IPO failure on the LSE was inversely correlated with firm size, though the economic significance is not large. Longer track records and voluntary disclosure of an asset value increase the likelihood of IPO survival, other things being equal (regressions 1 and 2). Even controlling for firm size, age and voluntary disclosure, however, OQ IPOs were much less likely to fail than SS IPOs (regression 3). The OQ dummy variable indicating whether an IPO was officially quoted is both economically and statistically significant, with an Official Quotation reducing the probability of failure by 12% as compared to a Special Settlement, other things being equal.

How did exposure to natural resources and foreign markets affect survival, controlling for firm characteristics disclosure and admission to an Official Quotation? Surprisingly, notwithstanding nearly 60% of SS IPOs being natural resource companies, a company being from the natural resource sector (NATRES) actually *reduced* the probability of failure by 7% (regression 4). There was nothing intrinsically risky, it seems, about natural resource ventures. Geographic location, proxied by the two dummy variables for overseas firms (EMPIRE, FOREIGN), also

did not add to the risk of IPO failure. These overseas firms were no more likely to fail than domestic firms, once other risks are controlled for.

Although when we include IPO Year fixed effects in the estimated logistic regression we find that all the statistically significant coefficients decline in economic significance, the overall thrust of our results is not affected (regression 5). Most pertinently for our purposes, the OQ dummy still suggests that obtaining an Official Quotation reduces the probability of failure by 10%.

The coefficients on UNDERWRITTEN are statistically insignificant in regressions 5 and 6, indicating that underwriting did not improve an IPO's survival prospects on the LSE. This is not particularly surprising. When intermediaries did underwrite LSE IPOs they were typically staking little reputational capital and thus had little incentive to scrutinize IPO quality carefully. Indeed, as late as 1931, a government-sponsored committee investigating banking, finance and credit offered a damning judgment of those acting as underwriters for public offerings occurring on the LSE, saying "the public is usually not guided by any institution whose name and reputation it knows."¹⁵

Why was the failure rate of SS IPOs so dismal compared with OQ IPOs? It apparently did not matter that from 1909 onwards the LSE required companies carrying out an OQ IPO to provide in their articles for the annual disclosure of the company's profit and loss account, as the failure rate of LSE OQ IPOs was the same both before and after the change to the rules.¹⁶ More plausibly, those organizing risky IPOs self-selected away from an Official Quotation, surmising that their

¹⁵ H. Macmillan, *Report of the Committee on Finance and Industry*, Cmnd. 3897 (London, 1931), Minutes of Evidence, Q.1308.

¹⁶ Results available upon request.

companies would fail to qualify because the IPO was not of “sufficient magnitude and importance” or was not going to distribute shares widely enough to satisfy concerns about liquidity. To the extent this occurred, and to the extent that LSE officials actually declined to quote companies that failed to meet its standards for a full quotation, riskier ventures may well have migrated to the Special Settlement sector in substantial numbers, thereby reducing the failure rate for OQ IPOs and increasing it for SS IPOs.

8. Was the Special Settlement Sector a Suitable “On Ramp”?

Investors in a BSE IPO occurring between 1900 and 1913 could be confident their investment would not be wiped out within five years of the IPO. This could plausibly be attributed, as our H1 implies, to regulation of IPOs that was stringent by the standards of the time. Correspondingly, the decision of German authorities to upgrade regulation affecting IPOs in the mid-1880s and the mid-1890s seemingly was vindicated.

Any endorsement of German regulatory strategy must be tempered by important caveats. For instance, vigilant underwriting may have contributed more to the BSE’s stellar IPO failure rate than regulation. In addition, the low failure rate may well have resulted from the forcing of riskier investments off the market, which may not have benefitted either investors or social welfare. Certainly, the IPO market was more substantial in *laissez-faire* London than in regulated Berlin. The cumulated market capitalisation of equity IPOs between 1900 and 1913 on the LSE (£283 million) far outstripped that of the BSE (£105 million), with much of that difference being attributable to the existence of the deregulated SS market (**Table 1**). As a proportion of the respective nominal net national products in 1900, total IPO market

capitalisation on the LSE represented 17% compared to 7% in the case of the BSE.¹⁷

While the low failure rate of BSE IPOs lends support to H1, the fact that only a tiny percentage of London OQ IPOs failed indicates that *statutory* regulation was not a necessary pre-condition for precluding numerous IPO failures. Even though U.K. legislation governing companies carrying out IPOs was much less exacting than German legislation, an investor in an OQ IPO occurring between 1900 and 1913 could be confident the firm would survive for at least five years. To the extent that “regulation” contributed to the low failure rate of OQ IPOs, it primarily took the form of oversight by officials of the LSE, at that point a purely private entity with listing rules supported by laws of contract and agency rather than statutory measures (Cheffins 2008: 75).

Another key difference between London and Berlin was that London’s “success” with OQ IPOs was not attributable to excluding risky ventures entirely from the stock market. Instead, the Special Settlement sector could be relied upon as a platform for a public offering for riskier ventures with minimal regulatory fuss. Theoretically, London’s arrangement had advantages as compared to Berlin’s. A “junior” market such as the Special Settlement sector can perform a salutary “incubator” function, providing timely access to risk capital for fledgling enterprises. In addition, overall risk-adjusted returns from IPOs on a junior market with a sizeable failure rate can conceivably match or exceed the overall market to the extent that a

¹⁷ Britain’s nominal NNP from Feinstein (1972). Germany’s nominal NNP from Burhop and Wolff (2005). We use NNP instead of the more common GDP since GDP data are unavailable for Germany.

sufficient number of companies generate outsized returns to compensate for the failed risky ventures. This is the last of our hypotheses, H3, outlined in Section IV.

Share prices for Special Settlement companies first appeared in a *Supplementary List* attached to the LSE's *Daily Official List* in July 1916, outside the period covered by our study. To test our H3, for each IPO we estimate buy-and-hold returns comprising both the cumulative capital gain (loss) and all dividends received from the listing date to July 1916. In order to make manageable the task of tracking down what happened to each IPO, we focus on the 325 of the 558 SS IPOs occurring from 1909 to 1913.

Among these 325 companies, as of mid-1916 119 appeared in the first *Supplementary List*, 32 had graduated to the Official List, 45 were listed in *Burdett's* but were not included in the *Supplementary List*, 19 had been acquired for value, eight had been liquidated for value, 65 had gone bust and 37 were "living dead". For the purposes of calculating total returns we assume that the living dead were worthless, and ascribe to the 45 IPOs with no price quote but with an entry in *Burdett's* a share price equal to par value plus any dividends received.

We report both equally-weighted (EW) and value-weighted (VW) mean returns for each of the five IPO cohorts from 1909 to 1913. Market adjusted returns are estimated with reference to the broad value-weighted London stock market index of Moore (2010) (**Table 8**). Notwithstanding a few individual winners -- ten IPOs generating gains of between 150% and 250% -- the average performance for the annual SS IPO cohorts was disastrous overall. The 1910 cohort of 144 IPOs fared worst, as the companies underperformed the market by 57% and 67% on an EW and VW basis respectively, and the 1911 and 1912 cohorts were nearly as bad. Only the 1909 cohort came close to matching the market on an EW basis (-2.5%) but

on a VW basis even this cohort underperformed the market by 24.6%. Hence, we reject our third hypothesis (H3).

Our results indicate that while theoretically a lightly regulated “junior” market can deliver a sufficient number of IPO “winners” to compensate for a sizeable number of IPO failures, judging by the poor performance of the 325 IPOs occurring between 1909 and 1913 the Special Settlement market failed to meet this standard. A regulatory regime that screens out a substantial number of IPOs reduces the investment opportunity set available to investors, a potentially disadvantageous outcome. However, in the case of companies going public by way of a Special Settlement on the LSE as the 20th century opened, the average diversified IPO investor would have been better off if this particular deregulated “on ramp” was not available.

Why did the Special Settlement system persist in its unregulated form, given the problems apparently afflicting it? One reason may have been a lack of awareness of just how bad things were. With stock prices not being disseminated until 1916, neither investors nor stock exchange officials may have realized how badly Special Settlement IPOs were faring collectively. Moreover, when share prices became available in 1916, investors would have been aware that due to World War I it was not a propitious time for investors in risky projects and thus may not have blamed the Special Settlement system for the poor performance of Special Settlement IPOs.

Another possibility was competitive pressure. If the LSE had exercised close control over the Special Settlement procedure, trading activity in tea and rubber companies may have been lost entirely to the Mincing Lane Tea and Rubber Broker’s Association, formed in 1909 to provide a market in plantation company

shares (Michie 1999: 82, 85, 271). Given the dearth of regulation of public offerings by UK company law and given the absence of German-style rules precluding off-market trading in shares, investors may have been seriously at risk whatever stance the LSE took concerning IPOs.

9. Conclusion

Tighter IPO regulation plausibly will reduce IPO failure rates. This study of IPOs occurring in two of the world's major early 20th century stock markets, Berlin and London, at a time of rapid global financial development generally lends support to this conjecture. IPO failures were considerably rarer on the relatively strictly regulated Berlin Stock Exchange than on the *laissez-faire* London Stock Exchange. Also, with LSE IPOs even when size, age, industry, geography, underwriting patterns and a willingness to disclose financial data voluntarily are controlled for, the failure rate of the more tightly regulated Official Quotation IPOs was considerably lower than that of the less regulated Special Settlement sector.

Regulation may well reduce IPO failure rates by forcing riskier investments off of the market. To the extent this is correct, the implications for investors and for society are ambiguous. On the one hand, tough regulation might reduce social welfare because the availability of financing for promising if untested ventures will be restricted and investors may end up worse off because they may lose out on the opportunity to earn the higher returns associated with higher risk. On the other hand, stricter regulation, in the form of greater disclosure and otherwise, might simultaneously foster the implementation of risky but worthwhile ventures and discourage riskier projects that, based on full information, should not be pursued (Fox, 1999: 1358-59, 1371). The poor market-adjusted shareholder returns delivered by companies carrying out Special Settlement IPOs between 1909 and

1913 arguably bears out the point. While a proper analysis of the relevant social welfare implications are beyond the scope of this paper, at least the average diversified IPO investor in this period would have benefitted if the companies in question had collectively foregone the stock market. Our measurement of the performance of Special Settlement companies is based on share prices in 1916, hardly a propitious time for riskier ventures. Nonetheless, the margin of underperformance relative to the market was considerable.

A final point is necessary to put our Special Settlement results in context. Companies carrying out IPOs on the LSE by way of a Special Settlement before 1913 did so largely without the benefit of screening mechanisms such as reputable underwriters and venture capitalists which now exist in a modern junior or “on ramp” market. Barely one-third of companies that went public by joining the LSE Special Settlement sector before 1913 had a third party acting as an underwriter and participation by first-tier merchant banks was sorely lacking. Similarly, there were no venture capitalists, whose backing can improve the survival prospects of companies going public (Jain and Kini, 2000). With such supporting mechanisms in place, it may well be the case that riskier ventures can go public on a present-day junior or “on ramp” market to the benefit of both investors and the broader economy.

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TABLE 1: IPO ACTIVITY IN LONDON AND BERLIN, 1900-1913

OQ and SS are Official Quotation and Special Settlement respectively and London All is the sum of OQ and SS IPOs. N is the number of IPOs and MC is the total equity market capitalisation of IPOs at the offer price respectively in a given calendar year.

Year	London All		London OQ		London SS		Berlin		
	N	MC	N	MC	N	MC	N	MC	MC
		£m		£m		£m		Mk m	£m
1900	72	39.3	41	18.8	31	20.5	28	125	6.1
1901	57	15.4	18	5.1	39	10.3	15	71.9	3.5
1902	27	24.4	14	19.4	13	5.0	15	53.1	2.6
1903	27	9.8	11	6.1	16	3.6	25	70.9	3.5
1904	14	4.4	6	1.3	8	3.1	34	147.8	7.2
1905	42	14.4	18	5.7	24	8.7	35	190.4	9.3
1906	65	15.3	20	6.6	45	8.7	43	417.5	20.4
1907	51	10.7	13	3.4	38	7.3	7	46.3	2.3
1908	32	11.9	18	8.6	14	3.3	12	96.9	4.7
1909	99	18.7	19	8.2	80	10.5	34	193.6	9.5
1910	179	37.8	33	12.9	146	24.8	26	290.6	14.2
1911	63	23.1	21	14.2	42	8.9	18	135.5	6.6
1912	67	41.4	24	27.7	43	13.7	28	215	10.5
1913	30	16.9	11	9.9	19	7.0	15	94.3	4.6
Total	825	283.4	267	148.0	558	135.4	335	2,148.70	105.2

Source: see text. Exchange rate: 1 Pound = 20.43 Mark.

TABLE 2: GEOGRAPHIC AND SECTOR BREAKDOWN OF IPOs 1900-13

OQ and SS are Official Quotation and Special Settlement respectively. N is the number of IPOs.

	London OQ		London SS		Berlin	
	N	%	N	%	N	%
(i) Geographic breakdown						
Domestic	151	57%	143	26%	325	97%
Empire	87	33%	259	46%	0	0%
Foreign	29	11%	156	28%	10	3%
(ii) Sector breakdown						
Commercial, Industrial	135	51%	134	24%	171	51%
Financial	32	12%	44	8%	41	12%
Iron, coal, steel	22	8%	12	2%	40	12%
Mining (Colonial & foreign)	4	1%	77	14%	0	0%
Oil	8	3%	58	10%	2	1%
Tea, Coffee, Rubber Plantations	39	15%	191	34%	0	0%
Breweries	0	0%	3	1%	17	5%
Other	27	10%	39	7%	64	19%

TABLE 3: COMPARISON OF LONDON AND BERLIN IPO CHARACTERISTICS

OQ and SS are Official Quotation and Special Settlement respectively. All values are simple averages. Firm size is the equity market capitalisation at the IPO offer price. Firm age is the number of years since establishment or incorporation, whichever is earlier, to the year of IPO. Track record is the number of years of historic profits or dividends paid. Asset value is the proportion of IPOs which disclosed a balance sheet or asset valuation.

IPO characteristic		London OQ	London SS	Berlin
Firm size (£000)		425	205	314
Firm age (years)		22.5	5.8	9.7
Disclosure	track record (years)	2.5	0.6	8.3
	asset value disclosed	47%	25%	100%

TABLE 4: IPO UNDERWRITING 1900-13

Market shares by category of underwriter are measured by number of IPOs. No. of underwriters is the number of entities underwriting an IPO in this period in each category. Not Disclosed signifies that the prospectus did not reveal underwriter identity.

(i) London (N=825)

	OQ No IPOs	SS No IPOs	No of underwriters
Underwritten	37%	35%	
Broker	12%	6%	60
Investment Trust	5%	8%	22
Syndicate	4%	8%	1
Foreign Bank	2%	1%	4
Corporate	0%	1%	21
Merchant bank	1%	0%	4
Other	2%	0%	14
Not Disclosed	8%	13%	-
Not underwritten	37%	50%	
Directors/Vendors	25%	15%	
Total	100%	100%	126

(ii) Berlin (N=335)

	No IPOs	No of underwriters
Underwritten	100%	
Joint-stock credit bank	57%	15
Private banking house	40%	44
Mortgage bank	1%	2
Corporate	2%	5
Not underwritten	0%	
Directors/Vendors	0%	
Underwritten / Total	100%	66

TABLE 5: FIRM SURVIVAL OVER THE 5 YEARS FOLLOWING IPO 1900-13

	No IPOs	FAIL	ACQUIRED	LIQUIDATED	SURVIVE
London OQ	267	7 3%	10 4%	1 0%	249 93%
London SS	558	107 19%	47 8%	12 2%	392 70%
Berlin	335	3 1%	2 1%	1 0%	329 98%

TABLE 6: FIRM SURVIVAL OVER THE 5 YEARS FOLLOWING IPO BY SIZE AND INDUSTRY 1900-13

Fails is the number of firms going bankrupt by the 5th anniversary of the IPO. RES, CI, ICS and FIN denotes any firm in the Mining, Oil and Plantation, Commercial and Industrial, Iron Coal and Steel, and Financial and Property sectors. OTHER is any firm in another sector. Firms are classified into four size quartiles from smallest to largest based on market capitalisation at IPO. Each panel shows the no. of IPOs

		No. IPOs						FAILS					
		ALL	RES	CI	FIN	ICS	OTHER	TOTAL	RES	CI	ICS	FIN	OTHER
(i) Ldn OQ	smallest	9	3	3	1	1	1	3	0	3	0	0	0
	Q2	56	15	30	3	2	6	3	0	3	0	0	0
	Q3	87	11	50	12	6	8	1	0	1	0	0	0
	Largest	115	14	52	17	20	12	0	0	0	0	0	0
		267	43	135	33	29	27	7	0	7	0	0	0
	smallest	3%	1%	1%	0%	0%	0%	43%	0%	43%	0%	0%	0%
	Q2	21%	6%	11%	1%	1%	2%	43%	0%	43%	0%	0%	0%
	Q3	33%	4%	19%	4%	2%	3%	14%	0%	14%	0%	0%	0%
	Largest	43%	5%	19%	6%	7%	4%	0%	0%	0%	0%	0%	0%
		100%	16%	51%	12%	11%	10%	100%	0%	100%	0%	0%	0%

TABLE 6 (cont.)

		ALL	RES	CI	FIN	ICS	OTHER	TOTAL	RES	CI	ICS	FIN	OTHER
(ii) Ldn SS	smallest	197	138	35	13	4	7	42	23	10	1	6	2
	Q2	150	95	38	7	2	8	30	21	5	2	2	0
	Q3	119	63	34	13	3	6	23	9	9	0	3	2
	Largest	92	36	27	11	6	12	12	1	6	0	1	4
		558	332	134	44	15	33	107	54	30	3	12	8
	smallest	35%	25%	6%	2%	1%	2%	39%	21%	9%	1%	6%	2%
	Q2	27%	17%	7%	1%	0%	2%	28%	20%	5%	2%	2%	0%
	Q3	21%	11%	6%	2%	1%	2%	21%	8%	8%	0%	3%	2%
	Largest	16%	6%	5%	2%	1%	3%	11%	1%	6%	0%	1%	4%
		100%	59%	24%	8%	3%	9%	100%	50%	28%	3%	11%	7%
(iii) Berlin	smallest	90	1	49	4	6	30	2	0	1	0	0	1
	Q2	83	0	45	10	9	19	1	0	1	0	0	0
	Q3	80	0	41	12	10	17	0	0	0	0	0	0
	Largest	82	1	36	15	15	15	0	0	0	0	0	0
		335	2	171	41	40	81	3	0	2	0	0	1
	smallest	27%	50%	29%	10%	15%	37%	67%	0%	50%	0%	0%	100%
	Q2	25%	0%	26%	24%	23%	23%	33%	0%	50%	0%	0%	0%
	Q3	24%	0%	24%	29%	25%	21%	0%	0%	0%	0%	0%	0%
	largest	24%	50%	21%	37%	38%	19%	0%	0%	0%	0%	0%	0%
		100%	1%	51%	12%	12%	24%	100%	0%	67%	0%	0%	33%

TABLE 7: PROBIT REGRESSION OF IPO FAILS

The dependent variable takes the value 1 of an IPO fails by its fifth anniversary of going public, and zero otherwise. FIRM SIZE is the equity market capitalisation of the IPO at the offer price expressed in £million. TRACK RECORD is the number of years of historic profits or dividends paid. ASSET VALUE is a dummy variable taking the value 1 if the IPO discloses a balance sheet or asset valuation. OQ, NATRES, EMPIRE, FOREIGN and UNDERWRITTEN are dummy variables indicating respectively whether or not the IPO obtained an Official Quotation, was a natural resource firm, a British empire firm, a foreign firm (neither a UK or British Empire firm) and whether or not the issue was underwritten by a third party. IPO Year refers to the year in which the issue was made.

	(1)		(2)		(3)		(4)		(5)		(6)	
	dF/dx	p-value	dF/dx	p-value	dF/dx	p-value	dF/dx	p-value	dF/dx	p-value	dF/dx	p-value
FIRM SIZE	-0.156	(0.021)	-0.111	(0.056)	-0.072	(0.104)	-0.083	(0.072)	-0.060	(0.075)	-0.059	(0.080)
TRACK RECORD			-0.024	(0.000)	-0.012	(0.026)	-0.021	(0.002)	-0.015	(0.004)	-0.015	(0.004)
ASSET VALUE			-0.072	(0.004)	-0.059	(0.014)	-0.042	(0.076)	-0.030	(0.105)	-0.029	(0.113)
OQ					-0.119	(0.000)	-0.130	(0.000)	-0.098	(0.000)	-0.097	0.000
NATRES							-0.066	(0.010)	-0.058	(0.003)	-0.058	(0.003)
EMPIRE							-0.013	(0.662)	-0.012	(0.586)	-0.012	(0.587)
FOREIGN							-0.010	(0.747)	-0.007	(0.779)	-0.008	(0.739)
UNDERWRITTEN											0.012	(0.427)
IPO Year fixed effects	no		no		no		no		yes		yes	
pseudo-Rsqd	0.027		0.073		0.108		0.125		0.166		0.166	
#obs	825		825		825		825		825		825	

TABLE 8: LONG-RUN PERFORMANCE OF LONDON SS IPOs

The table below shows the average buy and hold returns including dividends for each IPO cohort up to July 1916 when prices were first quoted in the Supplementary List. The average is expressed both in equally-weighted (EW) and value-weighted (VW) terms.

Performance to July 1916	IPO cohort				
	1909	1910	1911	1912	1913
No IPOs	79	144	41	43	18
EW IPO returns	0.262	-0.388	-0.426	-0.397	-0.141
VW IPO returns	0.040	-0.479	-0.433	-0.424	-0.146
VW LSE market returns	0.287	0.191	0.148	0.120	0.076
EW market-adjusted_IPO returns	-0.025	-0.578	-0.573	-0.516	-0.217
VW market -adjusted_IPO returns	-0.246	-0.670	-0.581	-0.544	-0.222

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