Cologne Economic History Paper

Universität zu Köln

Seminar für **Wirtschafts- und** Unternehmensgeschichte

No. 2 (2011)

Carsten Burhop, David Chambers

and **Brian Cheffins**

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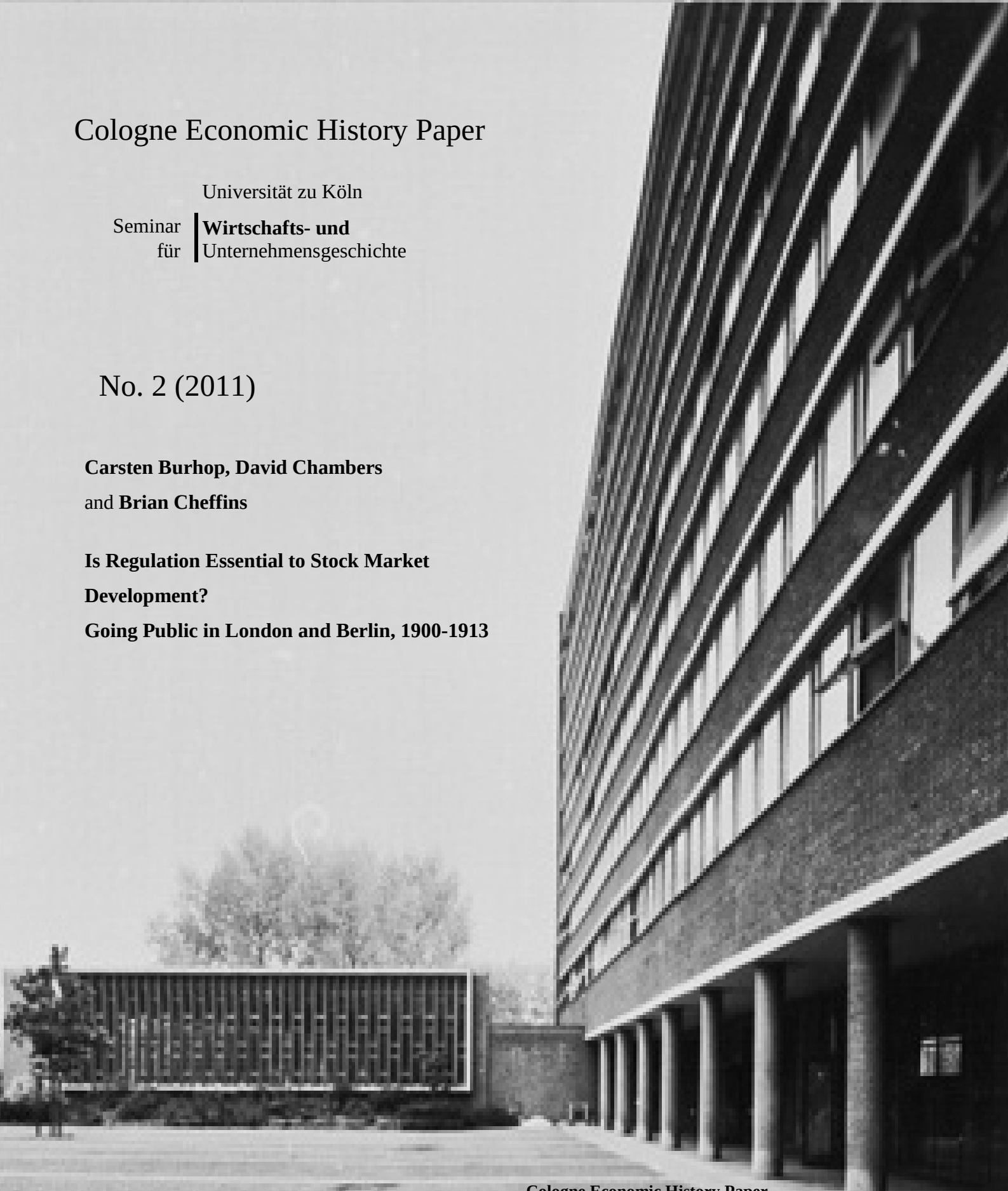

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Is Regulation Essential to Stock Market Development? Going Public in London and Berlin, 1900-1913*

Carsten Burhop, David Chambers and **Brian Cheffins**

Abstract

This study of initial public offerings (IPOs) carried out on the Berlin and London stock exchanges between 1900 and 1913 casts doubt on the received "law and finance" wisdom that legally mandated investor protection is pivotal to the development of capital markets. IPOs that resulted in official quotations on the London Stock Exchange performed as well as Berlin IPOs despite the Berlin market being more extensively regulated than the *laissez faire* London market. Moreover, the IPO failure rate on these two stock markets was lower than it was with better regulated US IPOs later in the 20th century.

JEL classifications: G14, G18, G24, G32, G38, K22, N23.

Keywords: Law and finance, initial public offering, regulation, investor protection, financial history.

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According to a burgeoning "law and finance" literature pioneered by La Porta *et al.* (1998) adequate investor protection is necessary for capital markets to flourish. Fama and French (2004) argue that the market for newly listed firms is a bellwether for the development of public equity markets. The many theories on why companies go public generally ignore differences in laws across countries. Nevertheless, the law and finance literature implies the quality of legal protection afforded to outside investors will do much to dictate the success of initial public offering (IPO) markets (Dodge, Karolyi and Stulz, 2011). If the law leaves outside shareholders unprotected, executing successful IPOs will be problematic due to worries that IPO proceeds will be dissipated through ill-conceived managerial initiatives or consumed in private benefits of control. In contrast, in countries with "good" laws, investors should be well-positioned to evaluate potential IPO candidates and should be protected against egregious mismanagement. IPOs can then occur with greater frequency and transparency to the benefit of post-IPO performance.

In this paper, we undertake a comparative study of the Berlin and London stock markets drawing upon hand-collected datasets of IPOs occurring before World War I. The London market comprised a main market of "officially quoted" companies and a junior market where shares traded after the London Stock Exchange granted a "special settlement," whilst Berlin had no equivalent second-tier market complementing the main exchange. We test whether detailed legal regulation was a pre-condition for a successful IPO market where success is defined by survival rates and by long-run returns post-IPO and show law was not the essential ingredient for a successful IPO market in the manner the law and finance literature implies.

Our results cast doubt on law and finance theories in three ways. First, IPO markets performed well in Britain and Germany despite both countries scoring considerably below the modern average on commonly used law and finance measures of the quality of corporate and securities law. Most strikingly, IPOs carried out on the Berlin Stock Exchange (BSE) and IPOs officially quoted on the London Stock Exchange (LSE) displayed markedly better survival rates than IPOs on US markets regulated by federal securities laws initially introduced in the mid-1930s.

Second, German regulation was considerably more robust than commonly-used law and finance measures imply. Thanks to company and securities law reforms in 1884 and 1896, regulation of equity public offerings was tightened up considerably and protection of outside investors bolstered considerably (Fohlin 2002; Burhop 2011, Franks, Mayer and Wagner 2006: 583). Britain, on the other hand, lacked extensive statutory regulation of

public offerings as the 20th century opened (Cheffins 2006: 1294-95) and companies legislation provided little direct protection to minority shareholders (Cheffins 2008: 35-40, 194-96). We show that Berlin IPOs demonstrated a better survival record and generated higher long-run post-IPO returns than London Stock Exchange IPOs before 1913, once the poor performance of London's Special Settlement IPOs is taken into account. To the extent regulation contributed to the relative success of the Berlin market, it did not do so in a way captured by widely-used law and finance measures of disclosure.

Third, we find that the survival record of London's officially quoted IPOs was almost as good as that of Berlin IPOs and their long-run performance was better. This result suggests that detailed regulation, whether captured by law and finance indices or not, is not a necessary pre-condition for the development of a successful IPO market. Theoretically, alternative institutional safeguards might explain the success of IPOs on London's main market. Much later in the 20th century, a leading UK company law academic praised the "initial screening" which stock exchange officials and underwriters undertook and added that "it is largely to extra-legal techniques that investors owe their present relative immunity from sharp practice (Gower, 1954: 335, 336)." Such alternative institutional safeguards do not provide, however, a ready explanation for the success of IPOs on London's main market between 1900 and 1913. During the late 19th and early 20th centuries the LSE's approach was generally *laissez-faire* in orientation (Cheffins 2008: 75). In addition, we show that only a minority of London equity IPOs were underwritten and that the City's first-tier merchant banks were rarely ever involved.

Various observers have argued that a dramatic decline in IPO activity in the US over the past decade is attributable largely to counterproductive over-regulation (Wall Street Journal, 2011). One might infer from our findings that de-regulation would be a sensible policy choice. Matters are in fact somewhat more complicated.

On the one hand, if the intention is to provide a marketplace where investors can buy and sell any and all securities they wish, this serves to vindicate the LSE's generally *laissez faire* approach (Michie 1999: 138-42). Our data demonstrate that there was greater IPO activity in London than Berlin and that London IPOs covered a considerably wider range of industries and locales. Moreover, IPO investors could self-select conveniently thanks to the "two-tier" London market comprised of Officially Quoted and the Special Settlement stocks. Those seeking safety could focus on the former, whilst those with a higher risk-tolerance could opt for the latter.

On the other hand, our results indicate regulation can be desirable if the aim is to shield unsuspecting outside investors from large and unexpected wealth losses. IPO failure was a regular feature of London's Special Settlement sector between 1900 and 1913 but was a rarity with Berlin's more tightly regulated IPO market. Hence, even a century ago regulation could, by denying (or least delaying) access to the stock market, protect investors, perhaps with an assist from underwriter gate-keeping.

The layout of the paper is as follows. Section I provides a theoretical overview of the interaction between IPO regulation and IPO performance review of the relevant law and finance and IPO literature. Section II compares and contrasts the institutional background in Britain and Germany. Section III sets out the hypotheses we test in this study. We describe the characteristics of our hand-collected London and Berlin IPO data sets in Section IV, whilst Sections V, VI and VII present our main results before Section VIII concludes.

I. IPOs and Law and Finance

The law and finance literature, which originated with papers by La Porta, Lopez de Silanes, Shleifer and Vishny (La Porta *et al.* 1997; La Porta *et al.* 1998), posits that stock market development is determined by the degree to which a country's laws protect minority shareholders and constrain corporate insiders. When corporate and securities law curtails the exploitation of private benefits of control, investor confidence in capital markets reputedly increases, fostering a more robust stock market (Djankov *et al*. 2008). Advocates of what has been referred to as "the legal approach to corporate governance" concede "reputations and bubbles can help raise funds" but maintain that the protection of outside investors is the key mechanism underlying the functioning of a flourishing financial system (La Porta *et al.*, 2000: 4). In a country with laws that effectively protect minority shareholders from overreaching by dominant shareholders, outside investors should feel "comfortable" buying shares. Entrepreneurs, being aware of the potentially healthy demand for equity, will be more inclined to raise capital and/or create an exit option by distributing shares to the public than they would be in a *laissez-faire* environment (La Porta *et al.* 2000).

From a law and finance perspective, any form of corporate or securities law that constrains the diversion of corporate wealth by managers and/or controlling shareholders should theoretically help to foster stock market development. In the context of initial public offerings, however, rules mandating disclosure by those carrying out IPOs are likely to be of particular importance (Stulz 2009). Information asymmetry can be acute for IPOs, where

issuers meet with public investors for the first time. A counterproductive market for "lemons" (Akerlof 1970) that drives out high quality IPOs can ultimately result.

From a law and finance perspective legislative reform is the most straightforward corrective mechanism for a potentially wayward IPO market. Lawmakers can seek to address the information asymmetries that may afflict IPOs by passing legislation, backed by an enforcement scheme to ensure compliance, requiring those organizing a public offering to disclose particular information likely to provide reliable clues concerning future performance. Such information would include an asset valuation, a balance sheet and a track record of profits generated and dividends paid. Mandated disclosure, adequately enforced, should make it easier for public investors operating in an uncertain world to distinguish higher quality shares from their less valuable counterparts, thus facilitating the financing of profitable ventures that otherwise might founder. Regulation should thereby foster IPO activity and channel funds to higher-productivity projects (Shleifer and Wolfenzon 2002; Stulz 2009).

Law and finance scholars have tested their theories on a cross-country basis using various measures of stock market development, such as stock market capitalization-to-GDP ratios and ownership concentration. Stock market development has also been measured by reference to IPO activity, with the predicted relationship between IPOs and tougher regulation typically being verified. La Porta *et al.* (1997), using a sample of 49 countries, found that countries with high scores on an "anti-director" rights index designed to measure how well company law protected investors had larger numbers of IPOs per capita between mid-1995 and mid-1996 than countries with low scores. La Porta *et al.* (2006), focusing on the same 49 countries, reported that high scores on a securities law index they constructed were associated with larger numbers of IPOs per capita between 1996 and 2000. This index focused on laws regulating disclosure in prospectuses rather than securities law in a general sense and measured whether a country required delivery of a prospectus to investors and mandated disclosure of share ownership, executive compensation, contracts outside the ordinary course of business and transactions between a company and its directors. La Porta *et al.*'s securities law index was positively correlated with IPO activity and had considerably greater explanatory power than the anti-director rights index, seemingly confirming the importance of disclosure regulation in the IPO context.

Djankov *et al.* (2008) found in a study of 72 countries that the ratio of equity issued in IPOs to GDP between 1996 and 2000 was positively correlated with indices designed to measure how tightly company law regulated "self-dealing" transactions involving the transfer

of assets between a dominant shareholder and his company. Doidge, Karolyi and Stulz (2011) tested for 54 countries whether throughout the 1990s and 2000s the ratio of the number of IPOs to the number of firms already publicly traded and the ratio of IPO proceeds to GDP were associated with Djankov *et al.*'s revised anti-director rights index, La Porta *et al.*'s securities law index and Djankov *et al.*'s regulation of self-dealing index.

Law and finance studies of the relationship between IPOs and regulation under company and securities law have focused on IPO activity rather than IPO performance. However, given that from a law and finance perspective, regulation should not only foster IPO activity but should also channel funds to worthwhile ventures, IPOs should, all else being equal, perform better in a country that protects outside investors from over-reaching corporate insiders than would be the case in a *laissez-faire* environment.[1] One way to assess the relationship between regulation and IPO performance is by focusing on the survival rates of companies going public. Some IPO companies will disappear due to being acquired, with investors receiving payment for their shares. Otherwise, the poorer the quality of an IPO, the more likely it will be that the company will de-list ("fail") leaving equity investors with nothing. The remaining firms constitute the survivors. Some firms, despite continuing to operate and maintain a listing, will deliver disappointing returns to shareholders. The majority, however, should be well-positioned to perform well going forward (Bhattacharya *et al.* 2011).

Various IPO studies have estimated the failure rate, the reciprocal of the survival rate, defined as the proportion of all IPOs in a market which "fail" (delist without investors receiving any sort of pay-off) within a specified number of years following the IPO. To our knowledge, only two previous studies explicitly address the relationship between regulation and IPO survival. Simon (1989) investigates 5-year failure rates for IPOs carried out on the NYSE and other less well regulated US stock exchanges before and after the 1933 Securities Act and finds that while only a tiny proportion of NYSE IPOs failed both before and after reform, the failure rate for non-NYSE IPOs did drop substantially immediately after federal regulation was introduced. In contrast, Espenlaub, Khurshed and Mohamed (2011) report that IPO survival rates on AIM, the "junior" market of the LSE renowned for a flexible regulatory approach, are broadly similar to survival rates on more heavily regulated US stock markets.

[1] Although an empirical test of this proposition might include controls for better economic growth, the extent to which stock market returns are in fact correlated with economic growth is far from clear (Ritter 2005).

An alternative measure of the performance of IPO markets is long-run IPO stock market returns. Law and finance theories imply that better regulated IPO markets should deliver better results both in terms of survival rates and long-run returns but the two measures of IPO success can diverge if an IPO market with a comparatively high failure rate also has star performers. Diversified investors who focus on portfolio returns will not be greatly concerned about de-listing patterns if stellar IPOs more than off-set the failures.

In sum, the law and finance literature implies that protection of outside investors should be associated with healthier IPO markets and studies done of IPO activity generally tend to confirm this prediction. The law and finance logic dictates that regulation should also improve IPO performance, measured both in terms of survival and long-run returns, but the empirical evidence on this point is both meagre and mixed.

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

Measured purely in terms of indices popular in the law and finance literature, between 1900 and 1913 Britain scored somewhat better than Germany but in modern terms neither country protected investors well. Britain would have recorded a "2" out of six on La Porta et al.'s anti-director rights index because UK companies legislation has never required shareholders to deposit their shares with the company or a financial intermediary prior to a shareholder meeting and because in 1900 shareholders owning 10% or more of the shares were authorized to call a shareholders' meeting (Cheffins, 2008: 36). Germany would have scored a "1" because shareholders owning 5% or more of the shares could call a shareholders' meeting (Franks, Mayer and Wagner, 2006: 546). Both countries would have scored below the average (3.00) for the 49 countries at the end of the 20th century in the original anti-director rights index (La Porta *et al*. 1998: 1131) and below the average (3.29) for the revised anti-director rights index (Djankov et al. 2005: Table XII).

As for securities law, pre-World War I Germany and the UK would again have performed worse than the average present day country. For the 49 countries covered by La Porta *et al.*'s securities law index, the average score for the extent of prospectus disclosure required was 0.60 and the average score for the "liability standard" was 0.47, which La Porta *et al.* define as the burden of proof investors have to meet to sue a company, its directors and its accountants successfully for misdisclosure (La Porta *et al.*, 2006: 16). Between 1900 and 1913 the UK would have scored 0.33 for both disclosure requirements and its liability standard (Cheffins, 2008: 39), reflecting the fact that principles of *caveat emptor* were a well-entrenched feature of disclosure regulation in the UK during the opening half of the 20th

century (Franks, Mayer and Rossi, 2009: 4016). Germany would have scored even worse, with a 0 on both counts (Franks, Mayer and Wagner, 2006: 547-48).

The indices relied upon in the leading law and finance studies of stock market development have been criticized on the basis that they incorporate an insufficient number of variables to capture accurately the quality of corporate and securities law (Lele and Siems, 2007: 19). For instance, while the US scored appreciably better than both France and Germany on La Porta *et al.*'s original anti-director index and on La Porta *et al.*'s securities law index, France and Germany outperformed the US on a 60 variable index constructed by other scholars that measured a wide range of rules governing the protection investors have from directors and from potentially over-reaching dominant shareholders (Lele and Siems, 2007). In a similar way, the commonly recognised law and finance indices fail to capture the relative position of the UK and Germany as "shareholder friendly" jurisdictions between 1900 and 1913. While the UK would have scored marginally higher according to such indices, along various other dimensions the law provided greater protection to outside investors in Germany than it did in Britain.

In response to a large number of firms de-listing from German stock exchanges following an 1873 stock market crash, German authorities introduced a new stock corporation law in 1884 which substantially affected IPOs (Baltzer 2007; Burhop 2006; 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. Correspondingly, if the operators of an unincorporated business were intent upon incorporating and taking the new company public there would be financial information publicly available on the track record of the business. UK companies legislation lacked any equivalent requirement. The 1884 corporate law also required companies to file publicly balance sheet statements and a profits and loss account on an annual basis (Franks, Mayer and Wagner 2006: 540). UK companies legislation lacked equivalent requirements until 1908 and 1948 respectively (Cheffins 2008: 196, 356).[2]

The 1884 stock corporation law provided additionally that companies had to issue shares with a minimum nominal (i.e. "par") value of 1,000 Mark per share, which was to be fully paid up on issuance. Previously, the minimum nominal value ascribed to shares was

[2] The Companies Act 1929 required companies to present to shareholders annually -- but not file publicly -- a profit and loss account (Cheffins 2008: 274). Particular types of companies, such as railways (Regulation of Railways Act of 1868, §4) and electric light companies (Electric Lighting Act 1882, § 9), were required to divulge their annual accounts publicly prior to this being a general requirement.

300 Mark and only 40 per cent of the face value had to be paid up. Given that the annual per capita income in Germany was about 400 Mark when the 1884 stock corporation law was enacted, the share capital rules effectively excluded a large proportion of investors from the stock market. UK company law, in contrast, never prescribed a minimum par value for shares (Gower 1954: 105). One contemporary critic even observed in 1917 that "our company law is less exacting in its safeguards than that of any other great business community (Foxwell 1917: 514)."

The German Exchange Act of 1896, enacted in response to a stock market bust and banking failures occurring at the beginning of the 1890s (Franks, Mayer and Wagner 2006: 542), further bolstered investor protection. 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)." Franks, Mayer and Wagner concur, saying that, by virtue of the 1896 reforms, "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 precluded the listing of shares until at least a year after a company had been incorporated, with the intent being to prevent the spread of doubtful new undertakings (Loeb 1897: 406). The Act also required every applicant for a stock exchange listing to issue a prospectus, the features of which the German parliament prescribed in considerable detail (Emery 1898: 313). Matters that had to be dealt with in the prospectus 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 during the five years preceding the proposed IPO. Those who organized an IPO and underwrote it were 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).

Those organizing an IPO were also required to present to the admission board of the stock exchange (*Boersenzulassungsstelle*) on which the shares were to be listed the prospectus and other relevant documentation. The 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. The admission board was also required to reject a public offering of shares which would cause the investing public to be defrauded (Loeb 1897: 403). The admission board of a stock exchange could only list a company which had been rejected by another German stock exchange admission

board if the latter consented (Loeb 1897: 405). With the BSE being by far the dominant stock market in Germany (Fohlin 2007: 227), its admission board correspondingly functioned as the key IPO gatekeeper.

It is unclear whether information disclosed at the time of IPOs provided German investors with a fully accurate idea as to the value of the securities in question (Economist, 1898). However, those organizing IPOs did 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 London Stock Exchange's listing rule regime was an exercise in investor-friendly self-regulation. The LSE was a privately owned entity lacking formal legislative authority and yet was 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: 75-76, 107-8). However, during the late 19th and early 20th centuries the London Stock Exchange was not concerned with the quality of the securities handled by the market and left its members free to deal in whatever financial instruments they chose (Michie 1999: 86-87). Despite this generally *laissez faire* approach, the Committee of the London Stock Exchange did impose between 1900 and 1913 four main requirements of companies seeking an official quotation.

First, a company undertaking an IPO on the main market of the London Stock Exchange had to be of "sufficient magnitude and importance", with a subscribed capital of £100,000 usually being the smallest amount allowed (Gore-Browne and Jordan 1902: 454). Second, at least two-thirds of the class of shares being quoted had to be allotted to the public (Gore-Browne and Jordan 1902: 456; Gore-Browne and Jordan, 1909: 488), with the intent being the securities in question were sufficiently widely distributed to ensure an active market post-IPO. Third, a company carrying out an IPO had to produce a prospectus that fulfilled the statutory requirements governing such documents (Gore-Browne and Jordan 1902: 455; Gore-Browne and Jordan, 1909: 488). Fourth, a company's articles of association had to be in a form of which the Committee approved. The precise requirements were not spelled out until 1909, at which point one of the requirements was that a quoted company's articles had to compel annual circulation of the company's profit and loss account to the shareholders and the Stock Exchange (Gore-Browne and Jordan, 1909: 489).

While the Committee of the London Stock Exchange had considerable discretion in deciding which firms to quote officially, "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". It would not, however, "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*." Gore-Browne and Jordan (1902: 453) observed similarly that a quotation was "no guarantee of the solidity or stability of the company."

Firms carrying out IPOs that wanted to side step the relevant requirements and yet have the shares traded on the LSE could apply for a "Special Settlement", the earliest reference to which extends back to 1829 (Morgan and Thomas 1962: 152-3). The Committee of the LSE would fix a special day for all bargains in a new security to be settled, outside of the ordinary account calendar. As the 20th century opened, the LSE only required a company seeking a special settlement to ensure there were sufficient share certificates ready for delivery but by 1909 stipulated that a company had to file its prospectus or advertisement relating to the issue and spell out the amount allotted to the public and others (Gore-Browne and Jordan 1902: 454; Gore-Browne and Jordan, 1909: 488).

There 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.

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 out of the market any shares surrounding which it considered undesirable practices had occurred. The occasions, however, when the Committee felt compelled to refuse an anticipated special settlement were

[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.

"quite exceptional" (Times, 1913). Special Settlement IPOs therefore were pretty much entirely unregulated.[4]

If a Special Settlement day was granted, dealings would thereafter be allowed on the stock exchange floor. The special settlement sector therefore resembled what would be regarded today as a "junior market" complementing a main market made up of officially quoted shares. However, the LSE did not publish share prices of special settlement companies until 1916, when a *Supplementary List* of share prices was initiated, and, to the best of our knowledge, there is no surviving record of dealings taking place prior to that date.

In summary, IPO regulation in Berlin was considerably stronger than both the commonly recognised law and finance measures would suggest and regulation in Britain. In the latter case, the LSE did have scope to screen Official Quotation IPOs but exercised this jurisdiction sparingly and IPOs by way of Special Settlement were subject to little screening at all.

III. Hypotheses

The insights the law and finance literature provide offer a platform for formulating various hypotheses concerning the operation of IPO markets in London and Berlin in the early 20th century. We use as our departure point the proposition that laws that preclude overreaching by corporate insiders and protect outside investors are associated with stock market development. Given that between 1900 and 1913 both Germany and the UK would have scored poorly on indices commonly used in the law and finance literature to measure the quality of corporate and securities law, our first hypothesis is as follows:

> *H1: The failure rate of IPOs on the BSE and LSE between 1900 and 1913 should have been higher than on the more tightly regulated US IPO market of a later era.*

As Section II indicated, investor protection was in various ways more robust in Germany than it was in the UK. To the extent that investors were better protected in Germany than in Britain our second hypothesis holds:

> *H2: The failure rate of IPOs on the BSE between 1900 and 1913 should have been lower than those on the LSE, including both officially quoted (OQ) and special settlement (SS) IPOs.*

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

While the LSE refrained from engaging in explicit investor protection when granting quotations, companies seeking a listing had to fulfil certain requirements not imposed on those seeking a special settlement. There were, as discussed in Section II, various instances where companies that failed to qualify for an Official Quotation obtained a Special Settlement instead. Equally, there likely were additional occasions where operators of companies realized, probably under advice from their sponsoring stockbroker, that applying for a quotation was futile because their company was not of "sufficient magnitude and importance" to qualify for a quotation, did not comply with the two-thirds rule or had not prepared a prospectus that could be filed with the LSE. Such firms were likely to lack the commercial standing of their quoted brethren. Therefore, our third hypothesis states that:

H3: The failure rate of OQ companies on the LSE between 1900 and 1913 should have been lower than SS companies.

Clearly, factors other than regulation can determine IPO survival patterns including firm size, industry classification and geographic location. Likewise, extensive voluntary disclosure (e.g. historic profits and an asset valuation) could improve IPO success rates. Section V assesses the impact of these various explanatory variables on IPO survival for both Berlin and London.

The involvement of underwriters is an additional plausible determinant of IPO survival patterns. An underwriter has an incentive to play an IPO gate-keeping function because it will be staking its reputational capital on behalf of issuers with which investors are likely to be unfamiliar. Correspondingly, between 1900 and 1913 underwriters in Germany and Britain could have operated as a functional substitute for law and improved the quality of IPOs in the absence of detailed regulation. Section VI discusses whether this in fact occurred.

Even if our data confirm H2 and H3, a potential qualification to our findings is that a "junior" market with modest listing requirements can fulfil a valuable "incubator" function. In theory, a junior market can supply the main market with a pipeline of viable new listings and can provide timely access to risk capital to very young or start-up enterprises lacking a financial track record. It therefore might have been the case that, notwithstanding a higher failure rate of IPOs on the LSE's special settlement market, this junior market provided promising ventures with a salutary opportunity to go public promptly. Correspondingly, enough SS IPOs could have turned out to be "winners" for public investors to more than offset the failed IPOs. Hence, our fourth hypothesis is as follows:

H4: If the Special Settlement market was successful in fulfilling its "incubator" function, then we should expect "winners" to offset failed IPOs and generate long-run returns post-IPO at least in line with the market.

Section VII of the paper tests whether this might have been the case by examining the long-run performance of IPOs on the BSE and on the LSE's quoted and special settlement sectors over periods of up to 5 years post-IPO.[5]

IV. IPO Data Sources and Characteristics

To test for a relationship between regulation and IPO performance, we make use of two hand-collected datasets, one for IPOs occurring on the LSE and the other focusing on the BSE. In the case of the LSE, we first searched *The Times Book of Prospectuses* for equity issues between 1900 and 1913. In order to distinguish between an IPO and a seasoned equity offering, we then cross-checked these issuing firms with the *Stock Exchange Official Intelligence,* often referred to as Burdett's, as well as the LSE records of applications for listing.[6] We included IPOs of ordinary shares, preference shares or both but excluded shares with an offer price of 2 shillings or less on the basis these were widely known as highly speculative investments (Thomas, 1978: 37).[7] Preference shares in this period resembled ordinary shares more than debt instruments, as they carried full voting rights in approximately four of out five IPOs in our sample and participated fully in profits with the ordinary shares in two out of five instances.[8]

London IPO prospectuses varied considerably in their length and content. They normally disclosed the type of and the number of shares being issued, the number of shares outstanding and the firm's registration date or the date of establishment of the business. A prospectus also usually offered a description of the business, stipulated whether or not the issue was underwritten and indicated whether the firm was applying for an Official Quotation

[5] Even if one IPO market outperforms another it is theoretically possible that the latter may be the home of companies that contribute more to innovation and productivity growth over the long-term. However, consideration of this important question as to the broader contribution of IPOs is outside the scope of this present paper.

[6] Applications for listing files are held at the Guildhall Library, London.

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

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

or for Special Settlement only. While prospectuses sometimes disclosed the number of years of historic profits and an asset valuation of abridged balance sheet, they typically failed to indicate clearly the extent to which the public offering would yield fresh capital for the firm as opposed to generating proceeds to compensate insiders selling out partially or fully.

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.

Berlin prospectuses all contained information about the purpose of the issue, the registration date of the firm and a description of the business. The prospectuses also provided historic dividend information and the most recent balance sheet and profit and loss account. The Imperial Statistical Office published information on the number of shares outstanding, the number of shares admitted to the stock exchange, and the names of the lead and co-underwriters. Companies were not required, however, to specify the number of shares offered to outside investors, and therefore, unlike London IPOs, it is not possible to estimate gross proceeds for Berlin IPOs.

The LSE, as might be expected with its less strict listing requirements, had a larger IPO cohort than the BSE. Our UK sample comprises a total of 825 equity IPOs, divided between 262 firms obtaining an Official Quotation (OQ) and the remaining 563 going public by way of a Special Settlement (SS).[9] Our BSE sample comprises 335 IPOs. 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 most of the difference attributable to the existence of the 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 BSE case.[10]

The fact IPOs occurred with considerably greater frequency in London than in Berlin seemingly lends credence to the theory that anti-speculation measures introduced by the 1896

[9] There were 39 IPOs which applied for and received an official quotation within a few months of being granted a special settling day. We have treated these as OQ IPOs.

[10] 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.

Stock Exchange Act and dramatic increases in the taxation of securities transfers and issuance in the 1890s stunted the development of German securities markets, thereby helping to ensure Germany's economy would develop along bank-oriented lines (Coffee 2001: 55-58). On the other hand, the German IPO market was in no sense moribund, corroborating research indicating that pre-World War I German stock markets were in fact well-developed in global terms (Rajan and Zingales 2003: 7).

The LSE shows evidence of "hot" (1909-10) and "cold" (1902-04) periods of IPO activity (Table 1), whilst the fluctuation in BSE IPO activity is more muted, implying a more managed IPO process with the exchange authorities and the banks responsible for underwriting IPOs operating a queuing system. Well over half (160) of the London IPOs in the hot market of 1909-10 were of plantation companies, mainly rubber, seeking to exploit investor excitement about the prospects for motorcycle and automobile tire manufacturing.

The LSE IPO cohort was not only larger than the BSE's, it also displayed considerably greater geographic variation.[11] All but 10 Berlin IPOs involved German-based corporations, whereas only 56% of London OQ IPOs (148) and 26% of SS IPOs (146) respectively involved domestic firms (**Table 2**). The remaining LSE IPOs were split between foreign enterprises and those based in self-governing Dominions or colonies. Special Settlement IPOs were more geographically diverse than OQ IPOs, with SS IPOs involving Empire companies and foreign companies both outnumbering IPOs of domestically based companies.

In addition, LSE IPOs covered a wider range of business activities than German IPOs with Special Settlement IPOs being particularly diverse (**Table 2**). 63% of Berlin IPOs were concentrated in the commercial and industrial sector and in iron, coal & steel, as were 61% of London OQ IPOs. Only 27% of London SS IPOs fell into these sectors. In contrast, while only 5% of LSE OQ and less than 1% of BSE IPOs were mining and oil companies, 25% of SS IPOs involved firms operating in these sectors. A further 34% of SS IPOs were of firms operating in rubber, tea or coffee plantations, sectors completely by-passed by the BSE, most probably due to the economic irrelevance of Germany's colonial empire.[12] Taken together almost 60% of SS IPOs were natural resource firms.

[11] 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.

[12] In 1912, the German colonies had less than 12 million inhabitants. In 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).

LSE IPOs also exhibited more variation than BSE IPOs in terms of firm size and age. Measured in terms of the market capitalization of shares outstanding post-IPO valued at the offer price (FIRM SIZE), OQ IPOs were on average more than twice as large as SS IPOs, with Berlin IPOs 30% larger than SS IPOs (**Table 3**). There were similar disparities with firm age estimated from the date of establishment of the business or incorporation date, whichever was earlier (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 according to the prospectus. With the German Exchange Act of 1896 mandating that companies going public disclose a financial track record, it was not possible for an IPO to occur as quickly as this on the BSE, other things being equal. Nevertheless, companies going public on the BSE apparently were in operation less than half as long as OQ IPO companies.[13]

The extent of prospectus disclosure, measured in terms of the number of years of historic profits or dividends paid (TRACK RECORD) and the proportion of IPOs revealing a balance sheet or asset valuation, also displayed considerable variation (ASSET VALUE) (**Table 3**). On average, whilst BSE IPOs disclosed 8.3 years of historic profits, LSE OQ IPOs only disclosed 2.5 years and SS IPOs only 0.6 years. All IPOs on the BSE complied fully with the reforms in the Stock Exchange Act of 1896 discussed earlier and provided balance sheet data. Just under half of LSE OQ IPO companies divulged information on their assets, with the proportion falling to just one-quarter in the case of SS IPOs.

V. IPO survival

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 failed in the sense it was delisted without investors receiving any sort of pay-off (FAIL), was acquired (ACQUIRED), or was liquidated with shareholders being entitled to cash payments reflecting undistributed profits (LIQUIDATE).[14] The remaining firms were deemed as surviving (SURVIVE).[15]

[13] The figures are not fully comparable since Berlin firms typically only disclosed their incorporation date. When the prospectus also contained the earlier date when the business began, firm age increases by 5 years.

[14] Surviving firms maintain their share listing. However, since their share prices 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

The BSE survival experience was close to flawless – only 3 of the 335 companies (1%) that carried out IPOs between 1900 and 1913 "failed" in the sense they were delisted within five years of the IPO without investors receiving any pay-off (**Table 4**). Only two were acquired. The BSE's survival rate was comfortably better than the better regulated US equities market delivered later in the 20th century. Thoroughgoing federal regulation that constitutes to this day the backbone of U.S. securities law was introduced in the mid-1930s to restore the public's trust in securities markets (Zingales, 2009, 391, 401-2). Gompers and Lerner (2003) report that among 3,661 underwritten IPOs of common stock carried out between 1934 and 1972 that were executed with the services of an investment banker and were fully registered with the Securities and Exchange Commission, 451 (12%) failed, in the sense that the companies disappeared within five years of the IPO and either went bankrupt or had shares trading at very low prices. Demers and Joos (2007) found that among IPOs carried out between 1980 and 2000 17% of non-tech IPOs and 9% of hi-tech IPOs, excluding dotcom firms, failed within five years of going public. The BSE's 1900-13 failure rate was markedly better, the opposite of what H1 would predict.

Among the 825 companies that carried out IPOs on the LSE between 1900 and 1913, 114 (13.8%) failed according to our definition within five years of going public. Though the LSE's failure rate was considerably higher than the BSE's it was similar to that for post-1935 US IPOs. Overall, then, our results are inconsistent with H1 and indicate that corporate and securities law that protects investors, at least as measured by proxies popular in the law and finance literature, is not an essential pre-condition for successful IPOs.

The fact that the failure rate of LSE IPOs was over 15 times the failure rate on the BSE confirms H2, namely, that as law and finance theory would predict, the BSE IPO failure rate should be lower than that of the LSE. However, the LSE's overall failure rate conceals important differences between the officially quoted sector and special settlement companies. Despite less rigorous regulation the LSE OQ sector performed almost as well as the BSE. Only seven of the 262 companies carrying out a London OQ IPO between 1900 and 1913

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according to *Burdett's*. 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. On the other hand, where firms failed to pay dividends and were delinquent in filing company accounts followed by disappearance from the following edition of *Burdett's,* we treated them as IPO failures.

were delisted within five years of the IPO, a failure rate of just 2.7%. 10 companies, or 4%, were acquired and one was liquidated.

In contrast, 107 of 563 (19%) London SS IPOs carried out between 1900 and 1913 failed within five years, a failure rate of almost one in five even though highly speculative "penny stocks" were not included in our data.[16] A further 48 (9%) of the SS IPO companies were acquired and 12 (2%) were liquidated. The survival data therefore confirms H3, namely, that the failure rate of OQ IPOs should be lower than that for SS IPOs. Nevertheless, the high survival rate of OQ firms on the self-regulated *laissez-faire* LSE is a striking finding and runs contrary to what law and finance theory would predict.

While law and finance theory would predict IPO survival rates will be dictated by the nature and quality of legal regulation, as Section III discussed, other factors can play a role. In order to disentangle factors likely to matter, we run a logistic regression on the whole sample of 825 London IPOs (**Table 5**) that takes into account firm risk, industry risk, voluntary disclosure of asset value and a financial track record, geographic location and gaining an official quotation.[17] Our dependent variable (FAIL) takes the value 1 if the IPO fails and zero otherwise, and our explanatory variables as defined in the previous section are FIRM SIZE, TRACK RECORD, and a series of dummy variables, ASSET VALUE, OQ, NATRES, EMPIRE, and FOREIGN.

Controlling for firm size, voluntary disclosure, proxied by the divulging of asset values and past financial performance, increase the likelihood of IPO survival, other things being equal (regressions 1 and 2). We then introduce the dummy variable as to whether an IPO attains an Official Quotation or otherwise and find that OQ IPOs were 11.6% less likely to fail than SS IPOs when firm size and voluntary disclosure are controlled for (regression 3). The discrepancy cannot be accounted for by focusing on the industries in which the IPO companies operated. Notwithstanding nearly 60% of SS IPOs were natural resource companies driven by the "hot" market in rubber IPOs in 1909-10, an exposure to the natural resource sector (NATRES), among LSE IPOs actually *reduced* the probability of failure by 6.5% (regression 4). There was nothing intrinsically risky, it seems, about investing in natural resource plays. Geographic location, proxied by the two dummy variables for overseas firms (EMPIRE, FOREIGN), also did not add to the risk of IPO failure.

[16] If we count the 39 IPOs which became officially quoted within a few months of being granted a special settlement as SS IPOs (see note 9), then the OQ and SS IPO failure rates are 3% and 18% respectively.

[17] A similar regression for the BSE is impossible due to low variation of the dependent variable.

Finally, although we find that all the statistically significant coefficients decline in economic significance when we include IPO Year fixed effects in the estimated logistic regression (regression 5), the overall thrust of our results is not affected. Most pertinently for our purposes, the OQ dummy still suggests that obtaining an official quotation reduces the probability of failure by 9.% in addition to any benefits arising from other IPO characteristics and voluntary disclosure.

Taken together, the IPO survival results confirm that 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 seemingly validates the decision of German authorities to strengthen company law in the mid-1880s and bolster regulation of new listings in the mid-1890s. The lack of an equivalent to a special settlement sector on the BSE may well have insulated German investors from problematic IPOs, given that of seven companies with German connections that secured LSE special settlements between 1900 and 1913 two, Mkumbi Rubber Plantations Limited and Mombo Rubber Plantations, failed.

While regulation may have contributed to the success of BSE IPOs carried out between 1900 and 1913, the finding for London OQ IPOs indicates that detailed regulation was in fact not a necessary pre-condition for a low IPO failure rate. An investor in an OQ IPO could, as with an investor in a BSE IPO, be confident the firm would survive for at least five years, particularly if the firm was large relative to others carrying out IPOs and voluntarily disclosed information concerning its asset value and financial track record. Investors in London SS IPOs occurring between 1900 and 1913 had considerably greater cause for concern, in that with one out of every five rolls of the dice their investment was wiped out within five years. The likelihood of a seriously adverse outcome cannot be attributed to IPOs by natural resource firms or by overseas companies dominating the special settlement market. Instead, the key risk factor for investors in firms of a given size was whether post-IPO trading occurred through the main market or by way of special settlement. The odds of survival improved if a company carrying out an SS IPO voluntarily disclosed its financial track record but an official quotation was a more reliable hallmark of IPO quality and success.

Why was the failure rate of SS IPOs dismal as compared with OQ IPOs? It apparently did not matter that from 1909 onwards the LSE Rules 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.[18] More plausibly, LSE officials may have lowered the failure rate of OQ IPOs by indirectly screening out particularly risky IPOs based on the requirement that an OQ IPO had to be of "sufficient magnitude and importance" and had to comply with the two-thirds rule. These rules were primarily intended to ensure that quoted securities would generate active trading as opposed to only occasional bursts of buying and selling (Michie 1999: 96). Since there is no LSE trading volume data available for this period, it is impossible to gauge how successful the Committee of the Stock Exchange was on this count. However, a plausible side-effect of efforts made to restrict the OQ sector to actively traded securities was to reduce the failure rate for OQ IPOs. In fact, three of the 15 IPOs which were refused an official quotation and resulted in special settlements failed within 5 years. In this sense, self-regulation in this period appeared to work.

VI. Underwriter involvement

As discussed in Section III, underwriter reputation can certify IPO quality and hence act as a substitute for regulation as far as public investors are concerned. Though Chambers (2009) and Wasserfallen and Wittleder (1994) found in their respective studies of post-World War II British and German stock markets that there was no statistically reliable link between reputable underwriters and high quality public offerings there is evidence from the US going the other way (Carter *et al.*, 1998; Loughran and Ritter, 2004; Bhattacharya, Borslov and Yu, 2011). Moreover, 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). The involvement of underwriters indeed plausibly helps to explain why BSE IPOs rarely failed despite Germany scoring poorly on law and finance measures of the quality of corporate law but offers few insights with respect to LSE IPOs.

All Berlin IPOs in our sample were underwritten and each was underwritten by a third party rather that a related party (directors or vendors of the newly listed firm) (**Table 6**). Most of the underwriters were members of the Imperial Loan Syndicate, whose reputation was established by its monopoly of German and Prussian government bond issues. While a number of BSE IPOs were underwritten by private banking houses, more than half of Berlin IPOs were underwritten by large and established joint-stock credit banks, including Deutsche Bank, Dresdner Bank, Discontogesellschaft, and Darmstädter Bank.

[18] Results available upon request.

With all BSE IPOs being underwritten and with the failure rate on the BSE being close to zero we cannot statistically distinguish between the relative contribution of regulation and underwriter reputation to IPO success. Nevertheless, in the German context, the organization of underwriting in all likelihood helped to ensure Berlin IPOs were successful in a context where there were gaps in the protection afforded to investors by law.

While the prevalence of underwriting and the prestige of German underwriters plausibly contributed to the BSE's lower IPO failure rate, this was not the case with the LSE. There was no underwriter for 37% and 50% of LSE OQ and SS IPOs respectively (**Table 6**). Moreover, in contrast with Berlin, 25% and 15% of the LSE OQ and SS IPOs respectively were underwritten by a related party. Even if a third party underwriter was involved, the chances of IPO success did not improve markedly. We tested the marginal impact of having a London IPO underwritten by a third party (UNDERWRITTEN) on IPO survival by returning to our logistic regression (**Table 5**). The coefficients on UNDERWRITTEN are statistically insignificant whether run univariately or added to regressions 5 and 6, indicating that underwriting was of no benefit to an IPO's survival prospects. Hence, in the case of LSE IPOs, the involvement of underwriters did not substitute for the lack of regulation.

Given the nature of underwriting in London before WWI our results are not particularly surprising. Unlike in Berlin, the market among third party underwriters in London was highly fragmented. A total of 126 firms underwrote the 302 underwritten LSE IPOs between 1900 and 1913 and the most prolific underwriters each handled only six IPOs.

Cassis (2006: 85) has said of "the City" – London's financial district – in the late 19th and early 20th centuries "it was the merchant banks that really formed the cornerstone of the system that enabled the City to play its role as a world financial centre." However, with the leading London-based merchant banks declining to engage seriously with equity IPO underwriting until after 1945 (Chambers 2009), only four of the IPOs occurring between 1900 and 1913 were organized by first-tier merchant banks, Brown Shipley & Co, C.J. Hambro & Co., J. Henry Schroder & Co. and Speyer Brothers. Correspondingly, when intermediaries did underwrite IPOs in London, they were typically staking little reputational capital and thus had little incentive to scrutinize IPO quality carefully. Indeed, as late as 1931, the Macmillan Committee was damning in its judgment of those acting as underwriters

for public offerings occurring on the LSE, asserting that 'the public is usually not guided by any institution whose name and reputation it knows'.[19]

VII. Long-run IPO performance

Failure rates of firms going public necessarily provide only a partial picture of the overall quality of an IPO market. A "junior" market such as the Special Settlement sector can perform a salutary "incubator" function, providing timely access to risk capital to very young or start-up enterprises lacking a financial track record. From an investor perspective such a market potentially could deliver a sufficient number of "winners" to compensate for an inferior survival rate. Correspondingly, following Gompers and Lerner (2003), we estimate 3-year and 5-year total returns in both event time and calendar time for BSE and LSE IPOs where price and dividend data is available.

For officially quoted London IPOs we obtained stock prices from the digitised *Investors Monthly Manual* (IMM) database and from the *Stock Exchange Daily Official List* and compiled dividend data from IMM and from Burdett's *Stock Exchange Official Intelligence.* Berlin stock prices and dividends were derived from *Saling's Börsenpapiere* and *Berliner Börsenzeitung*, a financial daily. For each IPO, in order to estimate 5-year (3-year) returns we collected up to 11 (7) stock prices, including the end-of-the-first month post-IPO price, the 5 (3) prices on each anniversary of this month, and the 5 (3) end-December stock prices.[20]

The raw return for an individual IPO *i* for the time period *t* is given by $R_{i,t}$. The cumulative raw return for each IPO *i* is the sum of the returns in each year over a given time period *T*, in this case, 3 or 5 years defined in either calendar or event time.

We define the abnormal return of an IPO *i* for the time period *t*, assuming all IPO stock market betas are 1, as follows:

$$AR_{i,t} = R_{i,t} - R_{benchmark,t}$$

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

[20] We exclude any IPO where we cannot find a stock price within 18 months of the date of the prospectus offering. Where prices do not appear either at the required month end, we take the average price of the previous and following months. When estimating returns for those IPOs which were acquired, we use the exit price to calculate the return in that year and assume that the return on the firm and the benchmark are equal for any remaining years.

The benchmark returns in each case are the London stock market returns from Moore (2010) and the Berlin market returns from Gelman and Burhop (2008).[21] Both benchmarks are value-weighted rather than equal-weighted because in long-horizon tests equal-weighted returns tend to suffer from rebalancing bias (Barber and Lyon, 1997).

The cumulative abnormal return (CAR_i) for IPO i is then the sum of the abnormal returns in each year over a given time period *T*, again 3 or 5 years. The equal-weighted mean cumulative abnormal returns, $\overline{CAR}$, across all IPOs is given by:

$$\overline{CAR} = \frac{1}{N} \sum_{i=1}^{N} CAR_i \text{ for i = 1,.....,N}$$

We also estimate value-weighted mean cumulative abnormal returns where the weights are the market capitalisation of each IPO at the offer price.

When an IPO fails, we assume a -100% return in the year of delisting. When estimating returns for those IPOs which were acquired, we use the exit price to calculate the return in that year and assume that the return on the firm and the benchmark are equal for any remaining years.

Table 7 summarizes the long-run returns for Berlin IPOs and London OQ IPOs. Panel A covers the performance of Berlin IPOs floated between 1900 and 1908 over the 5 years post-IPO and of IPOs between 1900 and 1910 over the 3 years post-IPO in event time (ET) and calendar time (CT). We report both raw returns, estimated before adjusting for overall market returns, as well as CARs which are market-adjusted on an equally weighted (EW) and value-weighted (VW) basis. Panel B presents the same return analysis for a sample of London OQ IPOs. As discussed above, share prices for SS firms were not being available until 1916 and so our analysis only covers OQ IPOs on the LSE.[22] The truncation of our IPO samples in 1908 and 1910 reflects the fact that the BSE was closed from August 1914 until November 1917 and only traded sporadically until 1920.[23]

Our results present a mixed picture. With event time raw returns over both 3-year and 5-year time horizons, on an equally-weighted (EW) basis Berlin IPOs (+14.0%, +25.5%) exceeded those of London OQ IPOs (+10.2%, +18.7%) whilst displaying considerably lower volatility. Berlin IPO calendar time raw returns (+14.6%, +26.7%) look even more

[21] We are unable to adjust performance by using the relevant sector industry index returns since these are unavailable for this period..

[22] Of the 206 OQ IPOs between 1900 and 1910 (Table 1), share prices were not found for 15 IPOs until 18 months after listing.

[23] The LSE was only closed from August to December 1914.

favourable than London OQ returns (+4.6%, +17.2%), whilst relative risks were similar. Sharpe Ratios (SR), defined as the mean IPO return in excess of the risk-free return relative to the standard deviation of IPO returns, were 0.6 for Berlin IPOs as compared with 0.2 for LSE OQ IPOs over a five year period, measured in both calendar and event time (results not shown).[24]

To the extent that Germany's superior economic performance between 1900 and 1913 (Cheffins 2008, 193) resulted in better stock market returns in Germany than Britain, a comparison of CARs arguably is more informative than focusing on raw returns. We find evidence for modest underperformance of Berlin IPOs on an equally-weighted basis, both in event and calendar time over 3 and 5 year horizons which is statistically significant at the 1% level (Panel A). Whilst there is some suggestion of similarly modest underperformance of London OQ IPOs both in event and calendar time (Panel B), these returns are not statistically significantly different from zero other than for 3 year calendar time returns.[25]

Turning to the value-weighted (VW) results, 3-year BSE IPO raw returns in both event (ET) and calendar time (CT) (+15.8%, +16.5%) are a little higher than the equally-weighted (EW) results, whereas 5-year returns are lower (+20.5%, +20.6%). LSE OQ raw returns are higher in both event and calendar time for both 3 year (+19.4%, +25.3%) and 5 year (+12.0%, +23.5%) periods, reflecting the fact that large IPO firms performed particularly well. This same characteristic also generated positive CARs for LSE OQ IPOs (+8.2%, +8.8%, +0.8%, +7.6%), whilst the picture of modest underperformance of BSE IPOs is unchanged.[26]

The lack of share price data for firms opting for Special Settlement in London before WW I prevents our estimating 3-year and 5-year returns for these IPOs. These prices first appeared in a *Supplementary List* attached to the LSE's *Daily Official List* in July 1916. In an attempt to obtain a sense of the performance of these IPOs and hence of the "upside" potential of this junior market, we estimate for the 330 of the 563 SS IPOs occurring from 1909 to 1913 the total return as the sum of the capital gain (loss) plus the accumulated

[24] The risk-free rate is the Treasury Bill rate in the UK and money market rate in Germany (NBER series 13018).

[25] The returns for the entire sample of OQ IPOs are similar to those for the truncated sample. These figures are available on request.

[26] Imperial Tobacco of Great Britain and Ireland which went public in 1902 was by far the largest IPO among LSE OQ IPOs and accounts for 15% and 20% respectively of the VW samples. Excluding this IPO, CARs over 3 and 5 years respectively are +9.7% and +9.5% in event time and +0.8% and +7.5% in calendar time.

dividends received from its IPO date to mid-1916. We then examine both EW and VW mean returns for each of the 5 IPO cohorts from 1909 to 1913, and finally deduct the market return over the same period to obtain market-adjusted returns. Of the 330 IPOs in question, by mid-1916, 120 appeared in the first Supplementary List; 33 had graduated to the Official List; 46 were listed in *Burdett's* but were not included in the Supplementary List; 20 were acquired; 8 were liquidated for value; 65 went bust; and 38 were "living dead". 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.

Notwithstanding a few individual winners -- 14 rubber plantation IPOs floated in 1909 generated gains of between 200% and 400% -- the average performance for the annual SS IPO cohorts was very poor overall (**Table 8**). The 1910 cohort of 146 IPOs fared worst, as the companies underperformed the market by 30% and 40% on an EW and VW basis respectively, and the 1911 and 1912 cohorts were similarly poor. Only the 1909 cohort, propelled mainly by the rubber company IPOs, produced strong returns relative to the market on an EW basis (27.4%), but on a VW basis even this cohort underperformed the market (-1.3%). Hence, we reject our third hypothesis (H3). While theoretically a lightly regulated "junior" market could deliver a sufficient number of IPO "winners" to compensate for an inferior failure rate, judging by the poor performance of the 330 IPOs occurring between 1909 and 1913 the Special Settlement market did not come close to meeting this standard.

VIII. Conclusion

This comparative study of two major capital markets of the early 20th century offers three main insights concerning the interaction between law and markets while casting doubt on the influential law and finance analysis of stock market development. First, while Germany and the UK would have scored poorly during this period on corporate and securities law indices popular in the law and finance literature, contrary to the predictions of the law and finance theories, Berlin and London had between 1900 and 1913 robust IPO markets characterized by low failure rates. Indeed, the Berlin Stock Exchange and London Stock Exchange IPO failure rates for 1900-1913 compared favourably with securities markets in the U.S. operating in accordance with federal securities law reforms introduced during the mid-1930s.

Second, regulation may have contributed to the success of the Berlin IPO market relative to the London IPO market, but not in a way captured by widely-used law and finance measures of disclosure regulation and corporate law. The 1884 stock corporation law precluded, in functional terms, companies from carrying out IPOs until they had been in

business for two years and reforms introduced in 1896 imposed significant disclosure requirements on companies carrying out IPOs that were enforced with some care by stock market officials. These regulations would not have improved Germany's score on indices popular in the law and finance literature but likely contributed to the success of the BSE IPO market by discouraging "fly-by-night" operations from carrying out IPOs. The German experience correspondingly indicates that law can "matter" for securities markets, but not necessarily in ways that popular law and finance indices capture.

Third, while developments in Berlin suggest regulation can improve IPO survival, developments on the LSE lead us to conclude that it is not a necessary pre-condition for a successful IPO market. While UK company law lacked many of the regulatory features present in Germany company law and the LSE imposed only modest requirements on companies going public, IPOs on the LSE Official List between 1900 and 1913 had a survival rate almost as good as IPOs on the BSE and exhibited long-run returns as attractive as those on the BSE on an equal-weighted basis and probably higher on a value-weighted basis.

Moreover, while regulation in Germany may have protected IPO investors, it did not set the stage for stock market-oriented corporate governance. During first half of the 20th century share ownership in companies traded on German stock markets did not become more diffuse in the same way as ultimately occurred in the UK but instead was increasingly intermediated by banks casting proxy votes and by large corporate blockholders (Franks, Mayer and Wagner 2006). Regulation may have played a role here given that the Exchange Act of 1896 reputedly strengthened the control of banks over German securities markets (Emery 1898). The German experience correspondingly shows that even if legislative protection afforded to investors improves the odds that IPOs will get off the ground successfully, there is no guarantee stock markets will subsequently flourish.

Our results do not provide, however, an unqualified endorsement of deregulation. BSE IPOs delivered better risk-return trade-offs, reflected in higher Sharpe ratios, than officially quoted LSE IPOs. Furthermore, with LSE officials declining to quote companies of insufficient consequence to generate substantial trading activity, the self-regulatory IPO regime operated by the Exchange may have indirectly been part of the reason for a low failure rate of IPOs on the Official List. At the same time, the experience with Special Settlement companies demonstrates that a *laissez faire* approach could turn out badly, as its high failure showed. Moreover, the Special Settlement companies that survived, including those that graduated to the LSE's main market, were unable to deliver returns anywhere good enough to offset the failures.

Why did the special settlement system persist in its unregulated form, given the problems apparently afflicting it? One reason may have been lack of awareness of just how bad things were. As our study indicates, it was not possible to assess the overall performance of special settlement IPOs until prices were listed in 1916. As a result, neither investors in aggregate nor stock exchange officials may have realized how poorly special settlement IPOs were faring. At the same time, some investors in Special Settlement IPOs may have been "consenting adults" fully aware of the investment risks they were taking and nonetheless prepared to speculate with a portion of their capital. We currently know little about who was investing in these IPOs other than that the LSE was predominantly a retail, rather than institutional, investor market at this time.

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 a competing over-the-counter market, 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). Investors may therefore have been seriously at risk whatever stance the LSE took concerning IPO regulation. Ultimately, if LSE investors were going to be protected from themselves, it most likely would have been necessary for Britain to emulate Germany and pass legislation precluding over-the-counter dealing in shares, and the LSE, being protective of its special settlement sector, likely would have lobbied hard and successfully against enactment of the legislation. Hence, competitive pressure shaped the regulation and operation of IPO markets a century ago in a manner not dissimilar to today.

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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 £m	N	MC £m	N	MC £m	N	MC Mk m	MC £m
1900	72	39.3	40	18.5	32	20.7	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	10	5.9	17	3.8	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	19	6.5	46	8.8	43	417.5	20.4
1907	51	10.7	12	3.3	39	7.4	7	46.3	2.3
1908	32	11.9	17	7.6	15	4.3	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	262	146.3	563	137.0	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.

	Ldn OQ		Ldn SS		Berlin	
	N	%	N	Percent	N	%
(i) Geographic breakdown						
Domestic	148	56%	146	26%	325	97%
Empire	52	20%	210	37%	0	0%
Foreign	62	24%	207	37%	10	3%
(ii) *Sector breakdown*						
Commercial, Industrial	132	50%	137	24%	171	51%
Financial	32	12%	43	8%	41	12%
Iron, coal, steel	28	11%	16	3%	40	12%
Mining (Colonial & foreign)	4	2%	86	15%	0	0%
Oil	8	3%	58	10%	2	1%
Tea, Coffee, Rubber Plantations	30	12%	189	34%	0	0%
Breweries	0	0%	3	1%	17	5%
Other	28	11%	31	6%	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)		559	243	314
FIRM AGE (years)		22.5	5.9	9.7
DISCLOSURE	TRACK RECORD (years)	2.5	0.6	8.3
	ASSET VALUE	48%	24%	100%

TABLE 4: FIRM SURVIVAL OVER THE 5 YEARS FOLLOWING IPO 1900-13

	No IPOs	FAIL	ACQUIRED	LIQUIDATED	SURVIVE
London	825	114	58	13	640
		14%	6%	1%	79%
OQ	262	7	10	1	244
		3%	4%	0%	93%
SS	563	107	48	12	396
		19%	9%	2%	70%
Berlin	335	3	2	1	329
		1%	1%	0%	98%

TABLE 5: 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 (i.e. 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)	-0.073	(0.103)	-0.083	(0.072)	-0.062	(0.074)	-0.060	(0.078)
TRACK RECORD			-0.024	(0.000)	-0.013	(0.025)	-0.021	(0.002)	-0.015	(0.004)	-0.015	(0.004)
ASSET VALUE			-0.072	(0.004)	-0.059	(0.013)	-0.043	(0.069)	-0.031	(0.094)	-0.030	(0.101)
OQ					-0.116	(0.000)	-0.127	(0.000)	-0.096	(0.000)	-0.095	0.000
NATRES							-0.065	(0.011)	-0.058	(0.003)	-0.058	(0.003)
EMPIRE							-0.012	(0.694)	-0.012	(0.604)	-0.012	(0.605)
FOREIGN							-0.009	(0.780)	-0.006	(0.796)	-0.007	(0.755)
UNDERWRITTEN											0.012	(0.423)
IPO Year fixed effects	no		no		no		no		yes		yes	
pseudo-Rsqd	0.027		0.073		0.106		0.122		0.163		0.164	
#obs	825		825		825		825		825		825	

TABLE 6: 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.

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

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 7: LONG-RUN IPO PERFORMANCE

Both equally weighted (EW) and value weighted (VW) returns are reported below over 3-years and 5-years in event and calendar time of the 1900-10 and 1900-08 IPO cohorts for Berlin and London respectively. Cumulative abnormal returns (CARs) adjust for value-weighted market returns. In Berlin, there are 6 and 5 fewer event time returns of the 1900-10 and 1900-08 cohorts respectively because only end-December prices were found for these IPOs. Statistical significance is based on Johnson's (1978) skewness adjusted t-test. [a], [b], and [c] indicates significance on the 10, 5, and 1 percent level.

	EW				VW			
	ET 3-yr	ET 5-yr	CT 3-yr	CT 5-yr	ET 3-yr	ET 5-yr	CT 3-yr	CT 5-yr
IPO cohorts	'00-10	'00-08	'00-10	'00-08	'00-10	'00-08	'00-10	'00-08
Panel A: BSE								
Raw returns								
mean (%)	14.0[c]	25.5[c]	14.6[c]	26.7[c]	15.8[c]	20.5[c]	16.5[c]	20.6[c]
sd (%)	36.7	41.5	38.0	44.0	14.1	12.4	9.9	13.2
N	267	208	273	213	267	208	273	213
CARs								
mean	-1.5[c]	-0.9[c]	-1.2[c]	-3.7[c]	0.0[c]	-0.6[c]	-3.1[c]	-2.5[c]
sd	34.9	41.1	35.7	43.2	11.3	12.3	8.5	12.0
N	267	208	273	213	267	208	273	213
Panel B: LSE								
Raw returns								
mean (%)	10.2[c]	18.7[c]	4.6[c]	17.2[c]	19.4[c]	25.3[c]	12.0[c]	23.5[c]
sd (%)	60.5	74.6	60.2	72.1	27.5	36.4	21.4	32.8
N	191	142	191	142	191	142	191	142
CARs								
mean (%)	0.7	-0.3	-5.3[c]	-0.5	8.2[c]	8.8[c]	0.8[c]	7.6[c]
sd (%)	60.5	73.8	60.5	71.6	27.8	37.7	21.0	32.9
N	191	142	191	142	191	142	191	142

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.

	IPO cohort				
Performance to July 1916	1909	1910	1911	1912	1913
No IPOs	80	146	42	43	19
EW IPO returns (%)	57.3	-30.3	-36.9	-30.8	-7.3
VW IPO returns (%)	27.4	-40.4	-37.3	-33.1	-3.0
EW market-adjusted IPO returns (%)	28.7	-49.4	-51.7	-42.7	-14.9
VW market –adjusted IPO returns (%)	-1.3	-59.5	-52.1	-45.1	-10.6