Informed investors, screening, and sorting on the London capital market, 1891-1913[*]

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Abstract

Thousands of prospectuses offered shares to British investors at the turn of the twentieth century. We find evidence that there were informed investors who participated in the market at this time. Firms that attracted additional investor demand were more likely to be listed on the London Stock Exchange, survive longer, and achieve better long-run equity returns. We find that the exchange screened lower quality firms away from the main board. The lowest quality firms sorted themselves and did not apply to either the London Stock Exchange main or second board.

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1. Introduction

Rock's (1986) seminal model of the initial public offering (IPO) process suggests that there are two types of investors: informed and uninformed. Uninformed investors simply buy some of every IPO that is offered to the public. Informed investors, by contrast, have private knowledge of firm quality and only apply for underpriced—or "good"—firms. Firms themselves are assumed to not know their own quality. Therefore, the aggregate demand for an IPO should be correlated with firm quality, conditional on observable characteristics. We find that the more popular offerings (we use IPO allotment rates as a proxy for popularity) were, conditional on observable firm characteristics, more likely to survive longer and achieve better equity returns. After the IPO, more popular offers to the public were more likely to be granted an Official Quotation (OQ, the main board) or a Special Settlement (SS, the second board) by the London Stock Exchange (LSE). This practice is consistent with the idea that investor demand was used, *ex post*, by the exchange to discern lower quality firms.

Listing status and aggregate investor demand, however, are not perfect substitutes in the information they contain. We show that the aggregate demand for a firm's shares at the time of the IPO offers additional information about a firm's quality, over and above the (eventual) listing status of the firm. Conditional on a firm's listing status (OQ or SS), a larger demand for a firm's shares at the IPO is associated with a lower likelihood that the firm will be liquidated—either voluntarily by its shareholders or involuntarily by its creditors—even many years post-IPO.

We gather a randomly selected sample of 259 firms that offered shares to the public from 1891 to 1913 but did not attempt to join the London Stock Exchange's main board via an application for an OQ. We also analyze 100 OQ firms and 20 firms that applied for an OQ and were rejected. Our data are available at Fjesme, Hannah, and Moore (2023). We find a hierarchy of IPOs. The LSE admitted the best firms for an OQ (see Fjesme, Galpin, and Moore, 2021). Poorer quality firms were screened from the main board and rejected from an OQ, these firms had to be content with being restricted to the SS market. At lower firm quality levels, we demonstrate self-selection or "sorting". Many firms did not even apply for an OQ and were content to be traded via the SS market, and for (slightly) lower firm qualities some businesses avoid London entirely and chose to remain unlisted.

Only 1 percent of OQ firms failed within 5 years of the IPO. In contrast, 21.6% of SS firms and 43.6% of unlisted firms failed within 5 years. In addition, OQ firms delivered better returns

for their shareholders than SS firms. We extend the results of Fjesme et al (2021), who show that the London Stock Exchange screened lower quality firms from an OQ. SS firms live longer and achieve higher returns for shareholders than firms unlisted in London.

The LSE appears to have paid careful attention to investor demand for an IPO. The greater the demand for an IPO, the more likely the firm was to be admitted for an official quotation, conditional on firm characteristics as reported in the prospectus. Thus, the stock exchange's behavior is consistent with it acknowledging an information role from aggregate demand and using this information to screen out lower quality firms. It is difficult, however, to dismiss a counterargument that the exchange was most concerned about potential turnover, and more investor demand at the IPO was positively correlated with higher post-IPO turnover.[2]

The exchange had only two tiers: the easily accessible special settlement and the more tightly guarded official quotation. Investors in the secondary (i.e., the post-IPO) market appear to have paid attention to both the stock exchange's listing and to investor demand at the IPO. Investor demand appears to have conveyed to investors additional information about firm quality than the listing status alone transmitted. OQ firms that survived at least 5 years after the IPO had allotted more shares at the IPO than OQ firms that were liquidated or acquired during the 5 years post-IPO. Similarly, SS firms that survived for at least 5 years post-IPO had substantially higher allotment rates than firms that failed within 5 years.

Firm survival is closely related to both a firm's listing status and to IPO investor demand. We use a hazard model and find that firms that had obtained an OQ were slower to be liquidated than non-OQ firms. We also find a positive correlation between investor demand at the IPO and firm survival for all types of firms. To compare our results to Burhop, Chambers, and Cheffins (hereafter BCC) (2014), we also examine firm survival at five years. We find that obtaining an OQ or SS is positively correlated with firm survival, relative to firms with neither an OQ nor a settlement. BCC find that OQ firms survive longer than other firms, although they do not distinguish between SS firms and firms not admitted to either market by the LSE. We find that, conditional on listing status, firms that received more investor demand at the IPO were more likely to survive for five years. We interpret the positive correlation between investor demand at the IPO and future firm outcomes as evidence of informed investors.

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[2] The LSE's "two-thirds" rule required a large free-float for OQ firms (see Cheffins, Koustas, and Chambers, 2013 and Hannah and Foreman-Peck, 2014). The LSE often requested that firms applying for an OQ provide (informal) turnover data. Comprehensive data on turnover by security are unavailable in this era.

Chambers and Dimson (2009) examine British IPOs over the period from 1917 to 1986. They do not investigate whether some groups of investors are more informed than others, which is a key insight of Rock's (1986) model.

Our finding that, at the bottom end of the quality spectrum, the worst firms sorted themselves so that they did not even apply for a special settlement extends the results of BCC. BCC state that (p. 64), "[we] found no instances of refusals of Special Settlement" which is consistent with our sorting hypothesis. Fjesme, Galpin, and Moore (2019) find that some investors who worked in the same industry as a firm going public on the OQ market appear to have possessed private information about the quality of the firm. Our results are consistent with the presence of private information also in the SS market.

Our results on British IPOs stand in stark contrast to studies of German IPOs in the late nineteenth and early twentieth centuries. We find evidence generally supportive of Rock's (1986) model of IPOs. Burhop (2010) and Weigt (2005) find no evidence to support Rock's model.

The presence of informed investors in the special settlement market casts some doubt on the policy conclusions of BCC and Chambers (2010). BCC argue for tighter regulation of, and increased disclosure in, London's "second board" market in order to make the average investor (p. 73), "better off". Chambers links "weak financial regulation" (p. 51) to depressed investor appetite for "newer, riskier enterprises" (p. 51). Our results show that some investors in the special settlement market were already using private information to guide their investment decisions. The root cause of the failure of many new firms on London's second board appears to be the poor-quality IPO firms brought to the exchange, that investors could fairly accurately assess, rather than a lack of disclosure.

2. Institutional Framework

At the turn of the 20th century, the London Stock Exchange was the largest in the world (see Rajan and Zingales, 2003). The means through which information was obtained and interpreted is, therefore, a first order concern for our knowledge of the development of capital markets. The timeline of interactions between investors, firms, the LSE, and the government is critical to our understanding of information flows in this era.

The government regulated the IPOs of British-registered firms in this era via the various Companies Acts (see Chambers and Dimson, 2009), although foreign-registered firms could

also conduct an IPO in London. Firms would issue prospectuses to the public, often in *The Times*, seeking investor interest for their debt or equity offerings.

Daily newspapers such as *The Times* and the *Financial Times* published these firms' prospectuses.[3] The London capital market then determined whether the company was worthy of funding. If the firm received "enough" share applications, it would proceed to allotment whereby the shares were issued to new investors. Before 1900, the firm had complete discretion to determine if it had received enough applications to proceed to allotment. Following the Companies Act of 1900, however, the firm had to receive applications for more than a pre-specified number of shares to be legally allowed to proceed to allotment.[4]

In Figure 1 we outline how the IPO process worked in London at this time. Investors would view the prospectus which outlined the company's directors, capital structure, auditors, bankers, solicitor, and stockbroker(s). Financial details, such as past profits and a valuation of firm assets was almost always provided in the prospectus. The investor was usually informed in the prospectus of any contracts the company had signed, and with whom, but the contents of those contracts was not disclosed. An investor was typically invited to consult the firm's Memorandum and Articles of Association at the firm's office.

The public generally only had a couple of days following publication of a prospectus to decide whether to apply for the IPO. Application funds were typically sent to a commercial bank, and then the firm, in conjunction with its underwriter (if any), decided on the allotment of shares.

Only after a firm had gone to allotment could it choose to approach the LSE via a member or members of the stock exchange as intermediaries. A firm could petition the LSE to grant an OQ as well as an SS, the firm could request just an SS, or the firm could do neither. Firms that did neither could have their shares traded on a provincial exchange or informally in London or elsewhere. Some firms may not have wished to go through the administrative burden to be traded on the floor of the LSE (which either an OQ or an SS would have allowed). Hannah (2018) reports that obtaining an OQ in this era "typically involved inspecting 40 documents, special settlement only 12" (p. 1352). We list the information that firms were required to provide to the LSE for an OQ or an SS as per their 1900 rules in Appendix 1. Information on

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[3] As in other studies of historical U.K. IPOs (such as Chambers and Dimson, 2009, BCC, and Fjesme, Galpin, and Moore, 2019, 2021) we use *The Times Book of Prospectuses* to study solicitations of investors' money in London.

[4] The firm had complete freedom to choose the minimum level of applications, but it had to state the minimum level in its prospectus. Most firms chose very low minimums, such as 7 shares, thereby avoiding the potentially binding legal constraint.

allotment rates were required for both OQ applications and SS applications. Contract details, conforming articles of association, and turnover data were only required for OQ applications and presumably aided the LSE to screen out lower-quality companies (see Fjesme, Galpin, and Moore, 2021).

Firms which did not apply for an OQ sorted themselves into the SS or the non-SS categories. Non-London firms may have preferred to be traded on a provincial or an international exchange closer to their operations (Michie, 1999 p. 117; Cheffins, 2008 p. 176; and Rogers, Campbell, and Turner, 2020). Other firms (perhaps those of the lowest quality) may have believed they would not be successful in an application to the LSE for a settlement and declined to apply. In other words, some firms may have self-selected away from the LSE. The LSE could not directly protect individuals from investing in dubious firms. It had no power to prevent poor quality ventures from issuing prospectuses. It could only prevent certain firms from gaining a quotation or a settlement after investors' money had been committed.

Firms may have structured their IPOs to improve their chances of obtaining an OQ or an SS. In this way, the LSE had an indirect effect on the IPO process. Firms that wished to gain an OQ would have aimed to distribute their shares widely to comply with the exchange's "two-thirds" rule (see Cheffins, Koustas, and Chambers, 2013 and Hannah and Foreman-Peck, 2014). The two-thirds rule required at least $^2/_3$ of any security be distributed to the public. In addition, a firm's articles of association may have been drafted to conform to LSE best practice (see Acheson, Campbell, and Turner, 2019 p. 4170).

Although proceeding to allotment may appear to be an administrative procedure, it was economically important. Over the period between 1891 and 1913, 61 of our 259 firms failed to secure enough applications from the public to proceed to allotment, often after their prospectuses had received acerbic commentary in the *Financial Times*. British investors avoided many of the offers; they did not blindly invest in all firms. Even for IPOs that proceeded to allotment, there was substantial variation in aggregate investor demand. Firms that eventually received an OQ had mean allotment rates of 87.5% of the shares offered. Firms that did not receive either an OQ or an SS had mean allotment rates of 56.5% (with a standard deviation of 38.2%, see Table 1).

When a firm did not proceed to allotment, applicants' money was returned in full, and the company was often never heard from again. For example, the Homoil Trust, Limited issued a prospectus in *The Times* on June 22, 1909. Investor enthusiasm for this venture, however, was

lacking. On July 7, 1909, the *Financial Times* reported, "the Directors … have decided not to proceed to allotment, and to return subscribers their application money in full".

We define a firm as having achieved an OQ if it was admitted by the LSE to the *Stock Exchange Daily Official List* (*SEDOL*) within 2 years of the firm's prospectus date. A firm is an OQ-reject if it applies for an OQ but is not admitted to the Official List within 2 years. The same criteria were used by Fjesme, Galpin, and Moore (2021). Similarly, we define a firm as an SS firm if it was admitted to a special settlement (but was not rejected for an OQ) within 2 years of the prospectus date. The average duration between prospectus and SS admission was 220 days.[5] All other firms are defined as non-SS firms.[6]

Although we find no companies that were refused a settlement, acceptance by the LSE was not a *fait accompli*. The 1878 Royal Commission into the LSE noted that getting even an SS required "no allegation of fraud be substantiated; [and] that there has been no misrepresentation or suppression of material facts" (p. 13). The Royal Commission documented 25 SS refusals over the period from 1862 to 1877 (see their Appendix V).

The mechanical difference between an OQ and an SS is that OQ firms had their transactions and bid and ask quotes reported in the *SEDOL*. Neither the transactions nor the quotes of SS firms were reported by the LSE prior to World War One. The *Supplementary List*, which reported transactions in special settlement securities, was a result of wartime regulation. Regulation 6(1) required that "every bargain, whether in quoted or unquoted securities, must be marked and officially recorded" (*Financial Times*, December 24, 1914, p. 3). If a security had been admitted for a special settlement, all its trades after the reopening of the LSE in January 1915 were reported in the *Supplementary List*. The creation of the *Supplementary List* revealed publicly for the first time transaction prices for SS firms. Once SS prices were available, we can compute post-IPO equity returns.

Fjesme, Galpin, and Moore (2021) show that roughly 15% of all applications for an OQ were rejected by the LSE and that the rejected firms performed noticeably worse than the accepted firms. Those authors interpret their result as evidence that the LSE screened out lower quality firms from the main board. The stock exchange had access to private information concerning the firm. Fjesme et al. (p. 504) explain that the exchange would insist upon inspecting a firm's

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[5] OQ firms were, in the language of the LSE, admitted both for a "settlement" and a "quotation." In contrast, SS firms obtained a "settlement" but not a "quotation."

[6] Firms could—and did—change their listing status after the initial two years. OQ firms could be delisted, SS firms could be promoted to OQ status, and non-SS firms were admitted to a settlement. We do not follow these further changes.

contracts, as well as details about the allotment and could require statutory declarations from the firm about items of concern. However, some members of the public may have had access to other types of private information (in the spirit of Rock's, 1986 model). Potential shareholders included firm employees, relatives of company officials, customers, managers of firms within the same industry etc. Therefore, both the aggregate investor demand for shares at the IPO and the post-IPO listing decision may be correlated with firm quality.

We find no evidence of screening of lower-quality firms from the second board by the exchange in this era. The LSE employed a more cursory inspection of SS applications than OQ applications (Hannah, 2018). However, firms may have self-sorted into quality groups with lower quality firms not even attempting to obtain a special settlement.

Theory argues that both screening (by the exchange) and sorting (by firms) can take place. Chemmanur and Fulghieri (2006) show that the higher the listing standards an exchange imposes, the better the average quality of firms listed on the exchange. Their footnote 22 shows that if there are three types of firms (good, bad, and worse), application fees will mean that the "worse" firms will choose to separate (i.e., sort) by applying only to the lower listing standards exchange. The "good" and "bad" types apply first for a listing on the high listing standard exchange. Some bad firms will get screened. Both sorting and screening exist in equilibrium in their model. If their model had a fourth tier of firms (e.g., "even worse") then the even worse firms may sort by not even applying to a lower listing standards exchange (e.g., the London Stock Exchange's second board).[7]

Both *The Times* and the *Financial Times* reported applications for an OQ or an SS, as well as successful admissions to the exchange. Successful applicants were also noted in the LSE's official publication, known as *Burdett's* in the 19th century but renamed the *Stock Exchange Official Intelligence (SEOI)* in 1899.[8] In our sample, of the 198 firms that went to allotment but did not apply for an OQ, 88 were accepted for an SS, but the remaining 110 did not apply for an SS. Firm characteristics cannot explain much of the variation in applying, or not, for a

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[7] Chemmanur and Fulghieri's model cannot be directly applied to the LSE setting of the early 20th century. First, their model considers competition between exchanges—not competition within two boards of an exchange—for listings. Second, they consider three quality tiers of firms rather than four.

[8] The *SEOI* indicates which firms' shares were accepted for "quotation in the *Official List*," which had "special settling days – dd/mm/yy," and which were e.g., "quoted at Sheffield." The remaining firms in the *SEOI* appear to have been traded privately or in international venues. *The Times* and the *Financial Times* also report all applications to the LSE and the subsequent admission to quotation/settlement in their columns. Therefore, we know the precise listing status of all firms.

settlement. Hence, the lack of SS applications suggests that some firms self-sorted away from the LSE perhaps due to unobserved (to the econometrician) firm characteristics.

3. Equity IPOs

3.1 Sample and Summary Statistics

We construct a stratified random sample of 259 non-OQ prospectuses between 1891 and 1913. We select randomly (within a year) from those offerings that appeared in the *Times Book of Prospectuses* according to the relative frequency of OQ offerings from 1891 to 1911 in Figure 1 of Fjesme, Galpin, and Moore (2019) and according to the relative frequency of SS offerings from 1912 to 1913 in Figure 1 of BCC (2014). As per BCC (p. 66), we also consider firms that only offered preference shares to the public. Those authors find 561 non-OQ IPOs over the 1900 to 1913 period. Our sample, therefore, is of modest size compared to the population under study.

To these 259 companies, we add 20 randomly chosen firms that were rejected for an OQ and 100 randomly chosen firms that achieved an OQ from the 628 IPOs studied by Fjesme, Galpin, and Moore (2021). In Table 1 we present summary statistics for our firms at the time of their prospectuses. We distinguish between firms that (1) did not proceed to allotment; (2) did not obtain a special settlement; (3) obtained a special settlement but did not apply for a quotation; (4) were rejected for an official quotation; and (5) achieved an official quotation.

Almost two-thirds of the IPOs that did not go to allotment, due to deficient aggregate demand, stated an intention to apply for an OQ. Roughly a third of firms that (post-IPO) did not seek an OQ stated an intention to apply for an OQ in their prospectuses. Over three-quarters of firms that approached the LSE for an OQ stated such an intention in their prospectuses. Many firms did not reveal their listing intentions. 14% of firms that eventually obtained an OQ did not state such an objective in their prospectus. Almost half of all firms that eventually received an SS or did not obtain an SS did not state their listing intentions in the prospectus.[9]

OQ-seeking firms were more likely to be underwritten, had higher leverage, were older, offered a larger fraction of the firms' shares to the public, were less likely to mention patents in the prospectus, and were more likely to use "elite" directors.[10] There are large differences in

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[9] Firms never reported explicitly that they would not seek a settlement or a quotation, and they only very rarely stated the objective of a provincial listing. Therefore, firms that did not actively state an OQ or SS intention generally said nothing in the prospectus about the firm's listing objective.

[10] We use the same definition of "elite directors" as BCC: directors who were Members of Parliament or peers.

allotment rates between the five groups of firms. Firms that did not obtain an SS only allotted 56.5% of their offered shares on average. SS firms allotted 73.2% on average, OQ-reject applicants allotted 81.5%, and firms that obtained an OQ allotted 87.5% of the offered shares.

3.2 Stock Exchange Listing Outcomes and Allotment Rates

In Panel A of Table 2 we investigate the firm characteristics that are correlated with listing outcomes. We run logit regressions of a firm's listing outcome, using only information available in the prospectus in columns 1, 2, and 4. In column 1 we include all 379 IPOs in our sample. We examine the factors associated with a firm proceeding to allotment. A company that stated that it would seek an OQ was less likely to receive enough aggregate demand to proceed to allotment, all else equal. Potential investors may have suspected that many firms indicated an intention to seek a quotation as cheap talk to cover up a poor business proposal. For a firm with sample average characteristics, noting an intention of an OQ reduced the predicted probability that a firm would proceed to allotment from 0.879 to 0.801. A firm that had engaged underwriters, not surprisingly, found it easier to proceed to allotment—as, after all, proceeding to allotment is the objective when a firm engages underwriters. For a firm with sample average characteristics, increasing its age from the average to one standard deviation above average increased the predicted probability a firm would proceed to allotment from 0.847 to 0.910. A sample average firm that mentioned patents in the prospectus decreased the probability of proceeding to allotment by 0.097, whereas that sample average firm increased the probability by 0.066 if an elite director sat on the board. British investors appeared wary of firms mentioning patents, which stands in contrast to the situation in Germany at the time (see Lehmann-Hasemeyer and Streb, 2016).

In column 2 we examine the 198 offers of equity that resulted in a firm proceeding to allotment with a listing outcome of SS or no-SS. We determine if there are observable prospectus characteristics that could help investors distinguish between firms that sorted into SS and those that sorted out of SS. Few characteristics were important for firms' sorting decisions. Large firms were more likely to choose a settlement. For a firm with sample average characteristics, increasing market value from the average size to the average size plus one standard deviation increased the predicted probability that a firm would attain a settlement from 0.470 to 0.551.

In column 3 our sample consists of the 175 offers of equity that resulted in a firm proceeding to allotment with a listing outcome of SS or no-SS and for which we observe allotment rates.

We investigate if, post-IPO, firms that would sort into a SS were different than those that would choose to be traded on provincial exchanges or over the counter. When a firm applied for a settlement or a quotation, the stock exchange required it to disclose details of IPO allotments. Larger firms still preferred to sort onto the LSE. For a firm with sample average characteristics, increasing market value from the average size to the average size plus one standard deviation increased the predicted probability a firm would attain a settlement from 0.521 to 0.593. Foreign firms chose an SS over provincial exchanges or the over-the-counter market. All other characteristics are statistically insignificant except for the allotment rate. An increase in allotted/offered from 0.6 to 0.7, with all other characteristics at mean levels, increased the probability a firm would choose an SS from 0.486 to 0.505.

In columns 4 and 5, we investigate the firm characteristics associated with firms obtaining an OQ versus all other post-allotment outcomes. Firms that did not obtain an OQ were either screened by the LSE or sorted themselves into the SS market or provincial exchanges. Column 4 consists of our full sample of 379 offers of equity, column 5 consists of the 293 offers of equity for which we observe allotment data. Column 5 drops firms that did not proceed to allotment as well as firms for which we do not observe aggregate allotment data. Larger firms with elite directors that had stated an intention to seek an OQ in the prospectus were more likely to receive a quotation. However, allotment rates were still vital to the process, over and above prospectus details. An increase in allotted/offered from 0.6 to 0.7, with all other characteristics at mean levels, increased the probability of an OQ from 0.285 to 0.311 (column 5). A one standard deviation increase in market value from the sample mean increased the probability of an OQ from 0.291 to 0.463, and having an elite director on the board increased the probability from 0.252 to 0.424 (column 5). The positive relation between allotment rates and achieving an OQ or an SS is consistent with the idea that some of the information Basymmetry between firms, investors, and the exchange was removed following the IPO. The presence of informed investors in an IPO (i.e., a higher allotment rate) was a signal to the exchange that the firm was a "good" firm, hence more worthy of admission to the exchange.

In Panel B of Table 2 we examine the determinants of IPO allotment rates. Column 1 uses ordinary least squares (OLS) with allotted/offered as the dependent variable. Our sample in column 1 includes only IPOs that proceeded to allotment and for which we observe the

allotment rate. [11] We show that larger firms received more investor subscriptions. Use of an underwriter increases allotment rates by 10.4 percentage points.

Columns 2 and 3 use a Heckman two-step model with the dependent variable again allotted/offered. Our sample now consists of IPOs that did not proceed to allotment as well as IPOs that proceeded to allotment for which we observe the allotment rate. We assume *intended* capital raised from the IPO, the amount of cash-flow in the year before the IPO, and the total number of IPOs in the year affect the chances for observation (the likelihood of proceeding to allotment) but not the outcome under study (the allotment rate).

If a firm only needed a small amount of capital at the IPO, it may continue to allotment even if investor demand at the IPO was weak. Similarly, a company with strong cash-flow may have decided that they did not need to raise a large fraction of funds sought at the IPO in order to push on to allotment. For the third assumption we know that IPOs move in waves. A company in a "hot" IPO market may have continued to allotment regardless of subscription rates because a delay could have meant that the IPO "window" would shut. Selection effects do not appear to be a first order concern as the results in column 3 are little changed from the OLS estimates in column 1.

3.3 Firm outcomes

We now examine the post-IPO outcomes of the firms in our sample. We follow BCC's classification of firm outcomes. We follow firms over the first five years of their lives and classify them into one of four categories. FAILED equals one if the firm was wound up and shareholders had not received any cash flows from the firm (either dividends or a terminal payment). ACQUIRED equals one if the firm was acquired by another during the first 5 years. LIQUIDATED equals one if the firm ceased operations but shareholders received a terminal payment (after creditors had been paid). SURVIVED equals one if none of the three preceding conditions are met.[12] We track firm outcomes post-IPO using the *Register of Defunct Companies*, the *London Gazette* and newspaper searches of *The Times* and *Financial Times*.

A clear hierarchy of outcomes is apparent in Panel A of Table 3. Only 1% of OQ firms FAILED compared to 10% of OQ-reject firms. 21.6% of SS firms FAILED, but this share was dwarfed

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[11] A few firms went to allotment, but we do not observe the allotment rates.
[12] It is somewhat unclear how BCC classified the handful of firms that paid one or more dividends but were wound up within the first 5 years. We take their explanation literally and treat such firms as SURVIVED.

by the 43.6% figure for non-SS firms. 90% of OQ firms SURVIVED compared to 60% for OQ-reject firms, 64.8% for SS firms, and only 48.2% for non-SS firms. Although SS firms had far worse outcomes than OQ firms, they had much better outcomes than firms without a special settlement. The outcomes we calculate for SS and OQ firms are very close to those in BCC (see their Table 5), suggesting that differences in sample composition are likely to be unimportant.

In Panel B of Table 3, we report years to eventual firm death, without the five-year truncation of Panel A. OQ firms survive far longer than others, with a mean of 40.4 years and a median of 42 years. SS firms survive 23.7 years on average (median of 9.5 years), slightly longer than non-SS firms, which have a mean of 18.2 years (median of 6 years).

Rock (1986) develops a theoretical model showing that if some investors have an information advantage over others in IPOs, then better-quality firms will experience more investor demand for their shares. We collect allocation data from two sources. First, firms' applications to the LSE for an OQ almost always contained details regarding the number of shares that were allotted to the public.[13] We collect the application for listing files for OQ firms at the Guildhall Library in London. Second, if the application for listing file was not available at the Guildhall, we take the information from the *SEOI* the year after the IPO. For example, Boinsu Rubber Company, Ltd. offered 340,000 shares to the public in April 1910, with the vendors to retain the remaining 160,000 shares. The *SEOI* for 1911 reported that 468,842 shares had been issued. Therefore, we calculate that 308,842 shares were allotted to the public. The second method is not foolproof because the company may have issued additional shares (privately) after the IPO but before publication of the following year's *SEOI*. A third source of information on allotment rates is newspaper reports on a troubled company's affairs. For example, Henry Lovibond and Son, Limited issued a prospectus on October 23, 1900, which offered 5,000 ordinary shares and 32,000 preference shares to the public. Although the firm proceeded to allotment, it did so with a public allotment of just 977 ordinary shares and 2,458 preference shares. Careful investors may have determined that the £32,292 in profits claimed in the prospectus were implausible, which was confirmed at the bankruptcy trial in April 1901 when the firm reported that operating results were "a loss of between £5,000 and £6,000."[14]

If investors are incompetent or naïve, it may be reasonable to assume that over- or under-subscription occurs at random. There is ample evidence, however, that they are not (Koh and

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[13] We have not been able to locate and SS firms' application for listing files at the Guildhall library.
[14] See *Financial Times,* April 3, 1901, page 5.

Walter, 1989 and Fjesme, Galpin, and Moore, 2019). Differences in allotment rates, by listing status and 5-year outcome, are large (see Table 4). OQ firms had an allotment rate (the number of shares allotted to the public divided by the number offered to the public) of 87.5%. OQ-rejected firms allotted 81.5% of their offerings, SS firms allotted 73.2%, and non-SS firms allotted only 56.5%. Firms that would attain better listing outcomes, post-IPO, were able to sell more of their shares to the public at the time of the IPO.

Part of the reason firms with better listing outcomes obtained more investor interest is likely due to reverse causality. Table 2 shows that more popular IPOs were favored with better listing outcomes. Even conditional on a listing outcome, however, we find evidence of investor skill. Of the 87 SS firms for which we can compute allotment rates, the allotment rate was 81.9% for firms which SURVIVED. For firms which (eventually) FAILED, investors only purchased 44.6% of the offered shares. There are also differences among the non-SS firms. Firms that SURVIVED allotted 59.0% of their shares to the public, whereas firms that FAILED allotted 49.9% of the offered shares. We see similar results for OQ and OQ-rejected firms. We interpret this as evidence that within these four broad categories of firms there were investors with private information who only subscribed for 'good' IPOs as per Rock's (1986) model.

In Table 5 we investigate the extent to which firm characteristics can explain the differences in firm outcomes. We run Cox competing risk hazard models of firm death (ever, not truncated at five years) for all firms that issued a prospectus. We allow firms to die through either a merger or acquisition, a voluntary liquidation (in which shareholders generally received a distribution of funds when the firm was wound up), or an involuntary liquidation (in which creditors forced a company to cease operations and in which shareholders generally received nothing).

In columns 1 through 3 we include all firms and do not use allotment rates as an independent variable. Firms that obtained an OQ were less likely to die, all else equal. For a firm with mean characteristics, an OQ is associated with a reduction in the rate of firm death due to liquidation (voluntary or involuntary) to roughly one-quarter the rate of non-OQ firms (columns 2 and 3). Firms with an SS were voluntarily liquidated at half the rate of non-SS firms and had involuntary liquidations at roughly three-quarters the rate of non-SS firms (columns 2 and 3).

In columns 4 through 6 we include allotment rates as an independent variable to investigate if informed investors tended to place money in IPO firms with better survival chances. Neither listing status nor allotment rates are robustly associated with being taken over (column 4). OQ

firms are liquidated (voluntarily or involuntarily) at rates of only one-third the rate of non-OQ firms. This result is consistent with the LSE being able to screen. We also find strong correlations between high allotment rates and low rates of voluntary liquidations (column 5) and involuntary liquidations (column 6). Fully allotted IPOs failed at just one quarter to one-third the rates of IPO firms that failed to allot any shares. Table 5's results are consistent with evidence of informed investors, à la Rock, but they do not prove causality. It is possible, for instance, that extra funds obtained from investors at the IPO drive longer firm life.

In Table 6 we investigate the extent to which firm survival (within the first five years, to compare our results with BCC) depends on firm characteristics, allotment rates, and listing outcomes. We run multinomial probit regressions of the firm outcomes of LIQUIDATED, ACQUIRED, and SURVIVED against the outcome of FAILED. Columns 1, 3, and 5 incorporate information that was known at the time of the prospectus. Columns 2, 4, and 6 add information that came later, the firms' listing outcomes and allotment rates.[15] Since most firms either SURVIVED or FAILED within 5 years, we focus on columns 5 and 6 which compare these two outcomes. We see that larger and older firms were more likely to survive, as were firms that offered a greater proportion of their shares to the public and firms that reported a longer track record of profits (column 5). Firms that stated an intention to seek only a settlement were less likely to survive. Once we add information on allotment rates and listing outcomes (column 6), however, we see that most firm characteristics become unimportant. Firms that obtained an OQ are more likely to survive, and larger investor demand is correlated with survival. A 0.6 to 0.7 increase in the adjusted allotment rate raises the probability of survival by 0.043.[16]

3.4 Long-run equity returns

These results are consistent with the LSE screening bad firms from an OQ and informed investors subscribing for shares in IPO firms that were more likely to survive. Although informed investors appeared to be capable of picking long-lived firms, and the stock exchange was able to screen worse firms from an OQ, longevity does not by itself guarantee more money for investors. Therefore, we now examine the returns obtained by investors in IPOs to contrast our results with those of BCC. We measure the total returns to investors (capital gains plus

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[15] We drop patents from the regression because there are no patenting companies that were acquired.
[16] The adjusted allotment rate equals the allotment rate except for firms that did not go to allotment, in which case the adjusted allotment rate is set equal to zero.

reinvested dividends) from the time of the IPO until July 1916, the same time frame used in BCC.[17] We calculate both raw returns and 'market-adjusted' returns. We calculate the market-adjusted returns as the raw return less the London market return of Moore (2010), the same adjustment made in BCC. We measure the returns of all SS and non-SS firms that issued prospectuses from 1909 to 1913, the same timeframe used in BCC. Since we have a smaller sample than BCC, we also calculate the returns of firms that issued prospectuses from 1900 to 1908.

We obtain equity prices for OQ, OQ-reject, and SS firms from the *SEDOL* or the associated *Supplementary List* (for SS firms). Dividends are collected from the *SEOI* (various issues). Firms that had failed by 1916 are given a -100% return. For firms that were not traded (either OQ or SS) on the London Stock Exchange by July 1916 but were still alive, a price is imputed from their dividend yield and prices of firms in the same industry.[18]

We caution that the analysis of long-run abnormal returns (of which market-adjusting is a crude version) has been described as "treacherous" by Lyon, Barber, and Tsai (1999). Fama (1998) describes how slight changes in methodology can remove most findings of long-run abnormal returns. BCC report massive underperformance in SS IPO stocks. They find market-adjusted returns of worse than -50% for the 1910, 1911, and 1912 cohorts. Although the 1909 and 1913 cohorts perform better, performance is still far worse than that of the overall London market (see their Table 10). Their equal-weighted performance over the 1909-1913 period is -41.5%, which they describe as "disastrous." We calculate an equivalent equal-weighted figure of -45.0% for SS firms over the same period (see Table 7), albeit with a much smaller sample. However, non-SS firms did even worse, with an abnormal return of -97.2% over the 1909-13 period.[19] When we value-weight our returns by the size of the IPO, the difference in performance narrows. SS firm IPOs outperform non-SS firm IPOs by -70.4% to -106.4%.

Although BCC contrast official quotation firms to other firms, they do not calculate the returns of OQ firms and SS firms over the same time frame. For OQ firms, we calculate equal-weighted (EW) market-adjusted returns of 11.8% over the 1909-13 period. When we value-weight (VW), however, the market-adjusted returns for OQ firms drops to -32.3%. One reason for the far

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[17] Special settlement prices are available in the *Supplementary List* from January 1915, but we use the same stopping point as BCC to make our results as comparable as possible.

[18] Of the 26 non-SS firms in our sample from 1900 to 1913, 17 had failed by 1916, one had a known liquidating payment, four had eventually graduated to SS with observable prices, and for four firms we impute a price from their dividend yield.

[19] Unlike raw returns, abnormal returns are not bounded below at -100% because a failed firm (with a raw return of -100%) has the (generally positive) market return subtracted from it.

worse performance of the OQ firms in a value-weighting sense is the particularly poor performance of some of the larger IPOs in this era—Canadian and Empire Investment and the Anglo-Russian Bank. It is not, therefore, only SS IPOs that perform poorly; when we weight returns by the size of the share offering even OQ IPOs perform poorly.

As our sample size is much smaller than that of BCC, we are concerned that our results may be sensitive to an expanded sample size. In addition, the period of BCC's study unfortunately coincides with the massive boom in rubber and plantation firms in Southeast Asia (see Stillson, 1971 and Drabble and Drake, 1974). As Stillson argues, "during the booms of 1909-10 and 1919-20 almost every rubber plantation share increased in value" (p. 595). BCC's analysis of special settlement returns in this period, then, is heavily weighted toward a very small sector of the overall London market.

To address this issue, we extend our performance measures to examine firms that went public from 1900 to 1908. While there are heightened concerns of the mismeasurement of returns the differences remain stark. Non-SS firms obtained market-adjusted returns of -69.1% (EW) and -95.3% (VW). Firms traded on London did substantially better. SS firms averaged market-adjusted returns of -42.9% (EW) and -51.9% (VW), whereas OQ firms averaged 5.8% (EW) and -67.6% (VW). Again, the OQ value-weighted returns are dragged down by some major flops—the Great Northern, Piccadilly and Brompton Rail (1903), the Anglo-Japanese Bank (1906) and the Anglo-Belgian Company of Egypt (1906). The IPOs that had high long-run returns tended to be much smaller and concentrated in a single industry—Anglo Malay Rubber (1905), Tandjong Rubber (1907), and United Sumatra Rubber (1908).

Over the entire period from 1900 to 1913, OQ firms performed better than SS firms. OQ firms obtained EW returns of 9.0% compared to -44.0% for the SS firms. However, the performance differences narrow with value-weighting. OQ firms obtained VW returns of -48.1% compared to -61.7% for SS firms. Meanwhile, the SS firms manage much better returns than firms that did not obtain a settlement. These non-SS firms achieved market-adjusted returns of -78.8% (EW) and -99.2% (VW). There is, then, a clear hierarchy: the best firms obtained an OQ, lower quality firms obtained an SS, and the worst firms were not traded on the LSE.

In Table 8 we calculate mean market-adjusted returns by listing status and allotment rates (high or low). First, we sort firms into the OQ, OQ-Reject, SS, and no-SS listing categories. Then, within each category, we sort based upon allotment rates. Firms above the mean for that category are placed in the 'high' allotment group and firms at or below the mean are placed in

the 'low' allotment group. When we equally weight IPO returns (Panel A), we see that high allotment IPOs outperform low allotment IPOs, conditional on listing status. For OQ firms the comparison is 12.4% vs. 2.7%. OQ-reject firms (-15.9% vs. -105.0%), SS firms (-19.1% vs. -106.3%), and non-SS firms (-8.3% vs. -108.2%) have the same ordering. When we value-weight returns (Panel B), we obtain similar results. High allotment IPOs outperform low allotment IPOs for OQ firms (-46.3% vs. -53.1%), OQ-reject firms (-39.1% vs. -63.8%), and non-SS firms (-63.2% vs. -96.6%). Only in the SS group do low allotment firms achieve higher returns than high allotment firms.

We draw four conclusions from Tables 7 and 8. First, differences in long-run returns between OQ and SS firms are sizable, but they are very sensitive to measurement issues. Second, SS firms slightly outperformed those firms that were not traded via OQ or SS, evidence consistent with sorting. Third, there is strong evidence of informed investors. Firms favored by investors at the IPO, the high allotment firms, strongly outperformed the less favored firms. Four, IPOs on London were, on average, poor investments in the long run—even the OQ ones. Modern studies, such as Ritter (1991), Loughran and Ritter (1995), and Teoh, Welch, and Wong (1998), document the same stylized fact about long-run IPO underperformance.

4. Conclusion

The London Stock Exchange's policies and procedures led to a ranking of firms by quality. The best firms, on average, were able to receive an official quotation whereas lesser quality firms were screened from the main board by the Committee for General Purposes of the stock exchange. Even lower, on average, quality firms appear to have sorted themselves into the special settlement market (the second board) whereas the lowest quality firms chose not to apply for either a quotation or a settlement. In addition to the stock exchange's policies that led to a ranking of firms, we find evidence of informed investors. Investors tended to avoid IPOs of firms that would perform poorly. Allotment rates were lower for firms that would more swiftly fail. Firms with lower allotment rates had worse post-IPO equity returns.

The absence of strict government legislation, or stock exchange listing rules, may not have been the cause of poor performance by newly listed U.K. firms in the late nineteenth and early twentieth century. Investors appear to have been reasonably capable in interpreting the information they received from the prospectus to assess companies that came to market. In

addition, we find that some investors appear to have used non-public information to discriminate between better and worse firms.

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Figure 1

The IPO Process

Prospectus Issued

    ↓

Investors can apply for shares

    ↓

| No |
| allotment |

Company decides whether to proceed to allotment   ⟶   Company Dissolved

    ↓

| Allotment |
| made |

| No application |
| **"sorting"** |

Company decides on applying   ⟶   "No SS"
to London Stock Exchange

    ↓

| OQ application, |
| company reports |
| allotment rate |

| SS only application |
| **"sorting"** |

Stock Exchange   "SS"
decides on OQ application

    ↓

| Rejected for an OQ |
| **"screened"** |

| Approved for |
| an OQ |
| **"not** |
| **screened"** |

      "OQ"   "OQ-Reject"

Appendix 1

Documents to apply for an Official Quotation (OQ) or a Special Settlement (SS) in 1900
(Source: *Stock Exchange Official Intelligence*, 1900 p.2650-3)

OQ	SS
Certificate of Incorporation	Certificate of Incorporation
Specimens of share certificates	Specimens of share certificates
Prospectus and any circulars relating to issue of shares	Prospectus and any circulars relating to issue of shares
	Call (of capital) letters
Declaration by company secretary that shares have been issued	Declaration by company secretary that shares have been (or are ready to be) issued
Numbers of shares issued to public	Numbers of shares issued to public
Numbers of shares issued to vendors	Numbers of shares issued to vendors
Numbers of any shares issued to others (e.g., underwriters)	Numbers of any shares issued to others (e.g., underwriters)
Name of LSE broker who will represent the firm to the exchange	
Articles of Association, which confirm to exchange rules.	
Memorandum of Association	
Letters of Application for Shares	
Allotment Book of shares applied for and allotted by applicant	
Letter of Allotment	
Certificate from company bankers stating the deposits for share applications received	
Authenticated copies of any company Concessions.	
Certified printed copies of all company Contracts and Agreements	
Evidence from Company Secretary on date when fully-paid shares were allotted	
Copies of any Reports or Accounts issued by Directors	
Number of share transfers during the previous 12 months	

Table 1 - Summary Statistics at time of IPO

OQ intended equals one if the prospectus stated the firm would apply to the London Stock Exchange for an Official Quotation and zero otherwise. SS intended equals one if the prospectus stated the firm would apply for a Special Setlement (but not an Official Quotation) and zero otherwise. Underwritten equals one if the prospectus said the IPO was underwritten and zero otherwise. Market Value is the offer price of the shares multiplied by the number of IPO shares (the sum of shares offered to the public plus the shares retained by the vendors) in thousands of pounds. Debt / Equity is the book value of the debt divided by the Market Value. Age is the firm's age in years at the time of the IPO. Track Record is the number of year of pre-IPO profit reported in the prospectus. Propsold equals the value of the firm's shares offered to the public divided by the value of the firm's equity. Patents equals one if the prospectus mentions the firm's patents and zero otherwise. New firm equals one if the firm is newly created at the time of the IPO and zero otherwise. Elite director equals one if the board of directors includes a Member of Parliament or a member of the House of Lords. Tangible assets is the book value of tangible assets divided by the book value of assets (if stated). Foreign firm equals one if the firm's operations are overseas. Allotted / Offered is the fraction of the offered shares that were allotted to investors at the IPO. Capital raised is the intended capital raised in the prospectus in thousands of pounds. Profits is the annual profits, in thousands of pounds, the year before the IPO from the prospectus. N IPOs are the number of IPOs in the year of the prospectus.

	No allotment		No Special Settlement		Special Settlement		Off. Quotation Reject.		Official Quotation	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
OQ intended	0.623	0.489	0.373	0.486	0.341	0.477	0.750	0.444	0.860	0.349
SS intended	0.148	0.358	0.155	0.363	0.205	0.406	0.150	0.366	0.000	0.000
Underwritten	0.098	0.300	0.173	0.380	0.182	0.388	0.550	0.510	0.350	0.479
Market Value	197.6	181.5	142.7	201.6	173.7	233.8	158.2	163.9	484.9	604.9
Debt / Equity	0.080	0.221	0.089	0.248	0.030	0.111	0.333	1.122	0.116	0.244
Age	5.197	18.475	5.791	16.539	5.432	15.429	8.500	21.333	17.570	32.058
Track Record	0.680	1.708	0.464	1.171	0.648	1.888	0.500	1.277	1.905	3.148
Propsold	0.558	0.365	0.403	0.364	0.411	0.316	0.624	0.250	0.643	0.257
Patents	0.246	0.434	0.155	0.363	0.125	0.333	0.100	0.308	0.080	0.273
New firm	0.426	0.499	0.436	0.498	0.557	0.500	0.650	0.489	0.330	0.473
Elite director	0.279	0.452	0.291	0.456	0.239	0.429	0.650	0.489	0.680	0.469
Tangible assets	0.311	0.467	0.227	0.421	0.216	0.414	0.200	0.410	0.400	0.492
Foreign firm	0.344	0.479	0.382	0.488	0.693	0.464	0.500	0.513	0.470	0.502
Allotted / Offered	n.a.	n.a.	0.565	0.382	0.732	0.328	0.815	0.239	0.875	0.233
Capital raised	145.660	150.880	93.246	91.053	124.663	261.642	117.343	96.704	385.005	498.453
Profits	5.248	12.125	4.217	15.186	3.310	13.033	7.646	20.159	21.831	40.640
N IPOs	26.082	12.464	21.300	11.434	26.011	11.327	25.050	11.260	25.110	11.197
Observations	61		110		88		20		100	

Table 2 - Listing Outcomes

We run five logit regressions (Columns 1-5) of firm listing outcomes on information contained in the prospectus. In column 1 the dependent variable equals one if the firm proceeded to allotment and zero otherwise. In column 2 and 3 the dependent variable equals one if the IPO results in the firm obtaining a Special Settlement and zero if the firm ends up as a No Special Settlement. In columns 4 and 5 the dependent variable equals one if the firm obtained an Official Quotation and zero if the result is either No Allotment, Special Settlement, No Special Settlement, or an Official Quotation rejection. SS intended is dropped from Columns 4 and 5 because there are no companies that stated that they intended to only apply for a Special Settlement and later end up with an Official Quotation. We also condition on Track Record, New Firm, and include a constant (not shown).

	Panel A				
	Allotment=1	SS=1	SS=1	OQ=1	OQ=1
	No Allot.=0	No SS=0	No SS=0	No OQ=0	No OQ=0
	(1)	(2)	(3)	(4)	(5)
OQ intended	-0.650*	0.139	0.444	1.70***	2.200***
	(0.08)	(0.72)	(0.29)	(0.00)	(0.00)
SS intended	-0.646	0.273	0.418		
	(0.19)	(0.54)	(0.38)		
Allotted/Offered			0.891*		2.239***
			(0.08)		(0.00)
Underwritten	1.122**	-0.175	-0.443	0.609*	0.190
	(0.02)	(0.68)	(0.32)	(0.09)	(0.64)
Ln (Market value)	-0.078	0.365**	0.336*	1.021***	1.123***
	(0.62)	(0.04)	(0.08)	(0.00)	(0.00)
Debt / Equity	0.112	-2.099*	-1.805	-0.640	-0.312
	(0.84)	(0.07)	(0.15)	(0.36)	(0.51)
Ln (Age)	0.455***	0.090	0.004	0.428***	0.193
	(0.01)	(0.63)	(0.99)	(0.00)	(0.23)
Patents	-0.698*	0.183	0.381	-0.870*	-0.562
	(0.07)	(0.72)	(0.49)	(0.08)	(0.36)
Elite director	0.568*	-0.546	-0.633	1.342***	1.389***
	(0.09)	(0.14)	(0.11)	(0.00)	(0.00)
Tangible assets	-0.262	0.483	0.490	0.468	1.060**
	(0.48)	(0.30)	(0.34)	(0.23)	(0.02)
Foreign firm	0.513	1.448***	1.426***	0.591*	0.490
	(0.12)	(0.00)	(0.00)	(0.09)	(0.22)
N	379	198	175	379	293
Pseudo R^2	0.110	0.132	0.138	0.377	0.440
Marginal effects (+1 s.d. for age, size. 0.6 to 0.7 for allotted/offered. 0 to 1 for OQ, patents, elite director)					
OQ intended	-0.078			0.201	0.280
Ln (Age)	0.063			0.079	
Ln (Market value)		0.081	0.073	0.156	0.172
Patents	-0.097			-0.092	
Elite director	0.066			0.169	0.172
Allotted/Offered			0.019		0.026

We regress allotted/offered on information contained in the prospectus. We run an OLS regression (column 1) and a Heckman two step model (stage one in column 2, stage two in column 3). p values are in parentheses.

| | Panel B | | |
	(1)	(2)	(3)
OQ intended	-0.024	-0.386*	-0.036
	(0.59)	(0.07)	(0.42)
SS intended	-0.006	-0.296	-0.019
	(0.93)	(0.28)	(0.77)
Underwritten	0.104**	0.670***	0.125***
	(0.01)	(0.01)	(0.00)
Ln (Market value)	0.075***	-0.297**	0.075***
	(0.00)	(0.04)	(0.00)
Debt / Equity	0.023	-0.014	0.024
	(0.68)	(0.95)	(0.68)
Ln (Age)	0.025	0.266***	0.034**
	(0.14)	(0.01)	(0.04)
Track Record	0.009	-0.003	0.009
	(0.50)	(0.94)	(0.46)
Patents	-0.099	-0.489**	-0.121*
	(0.12)	(0.04)	(0.06)
New firm	-0.015	0.269	-0.004
	(0.76)	(0.21)	(0.94)
Elite director	-0.018	0.217	-0.008
	(0.65)	(0.27)	(0.84)
Tangible assets	0.034	-0.150	0.026
	(0.49)	(0.48)	(0.60)
Foreign firm	0.069	0.349*	0.079*
	(0.12)	(0.07)	(0.07)
Ln (Capital raised)		0.334**	
		(0.05)	
Profits		0.003	
		(0.39)	
N IPOs		-0.005	
		(0.55)	
Constant	0.288***	0.645	0.243**
	(0.00)	(0.24)	(0.01)
N	293	354	
Log likelihood		-214.4	
Pseudo R^2	0.099		

Table 3 - Firm Survival Outcomes, Summary Statistics

In Panel A we report firm survival outcomes, using Burhop, Chambers and Cheffins' classification (Failed, Liquidated, Acquired, or Survived) by listing outcome. Failed equals one if the firm ceased operations within the first 5 years and the shareholders did not receive any payment. Liquidated equals one if the IPO firm ceased operations within the first 5 years and the shareholders received a cash payment upon liquidation. Acquired equals one if the IPO firm was taken over by another firm within the first 5 years. Survived equals one if neither of the three preceding events occured within the first 5 years. In Panel B we report years until eventual firm death.

	Panel A : Survival to 5 years							
	No Special Settlement		Special Settlement		Official Quotation Rejected		Official Quotation	
	#	%	#	%	#	%	#	%
FAILED	48	43.6%	19	21.6%	2	10.0%	1	1.0%
LIQUIDATED	3	2.7%	2	2.3%	6	30.0%	4	4.0%
ACQUIRED	6	5.5%	10	11.4%	0	0.0%	5	5.0%
SURVIVED	53	48.2%	57	64.8%	12	60.0%	90	90.0%
Total	110	100%	88	100%	20	100%	100	100%

Panel B : Years until Firm Death					
	Mean	Std. Dev.	25th perc.	50th perc.	75th perc.
No Special Settlement	18.2	25.5	2.0	6.0	23.3
Special Settlement	23.7	27.7	4.0	9.5	37.5
Official Quotation Rejected	20.5	23.1	2.3	8.0	46.3
Official Quotation	40.4	27.8	15.0	42.0	57.8

Table 4 - Allotment of Shares

We report the allotment rate of shares at the IPO, defined as the number of ordinary or preference shares allotted to the public divided by the number of ordinary or preference shares offered to the public. If both classes of shares were offered to the public we report the figures for the ordinary shares. Failed, Liquidated, Acquired, and Survived, are defined in Table 3.

	No SS		SS		OQ - Reject		OQ	
	#	Allotment	#	Allotment	#	Allotment	#	Allotment
FAILED	33	49.9%	19	44.6%	2	69.8%	1	100.0%
LIQUIDATED	1	100.0%	2	100.0%	6	66.4%	4	65.6%
ACQUIRED	4	68.1%	10	73.6%	0	n.a.	4	77.5%
SURVIVED	50	59.0%	56	81.9%	12	91.0%	89	88.8%
Total	88	56.5%	87	73.2%	20	81.5%	98	87.5%

Table 5 - Determinants of Firm Death (Ever)

We run Cox competing risk hazard model regressions of firm deaths (ever, not just within 5 years) on information contained in the prospectus, OQ obtained, SS obtained, and Allotted/Offered adjusted. Allotted/Offered adjusted equals zero for companies that did not make it to allotment (otherwise it is equal to Allotted/Offered). Columns 4-6 drops the 25 companies that made it to allottment but where Allotted/Offered is not identified. Variables are defined in Table 1. p values are in parentheses.

	Merger or acquisition 1	Voluntary liquidation 2	Involuntary liquidation 3	Merger or acquisition 4	Voluntary liquidation 5	Involuntary liquidation 6
OQ obtained	0.090	-1.693***	-1.351***	0.003	-1.208***	-0.983**
	(0.75)	(0.00)	(0.00)	(0.99)	(0.00)	(0.03)
SS obtained	0.081	-0.713***	-0.308	0.048	-0.284	0.033
	(0.78)	(0.00)	(0.32)	(0.87)	(0.15)	(0.92)
Allotted/Offered adjusted				0.079	-1.461***	-1.095***
				(0.84)	(0.00)	(0.01)
Underwritten	-0.139	-0.011	-0.132	-0.142	0.241	0.117
	(0.55)	(0.95)	(0.68)	(0.55)	(0.18)	(0.72)
Ln (Market value)	0.299***	0.144*	-0.146	0.311***	0.200**	-0.080
	(0.01)	(0.06)	(0.30)	(0.01)	(0.01)	(0.57)
Debt / Equity	-0.058	-0.023	-0.008	-0.043	0.067	0.070
	(0.87)	(0.89)	(0.97)	(0.90)	(0.74)	(0.80)
Ln (Age)	0.147*	-0.311***	-0.060	0.156*	-0.263***	-0.027
	(0.08)	(0.00)	(0.67)	(0.07)	(0.00)	(0.85)
Track Record	-0.082	0.045	0.006	-0.093	0.063	0.013
	(0.16)	(0.30)	(0.94)	(0.13)	(0.12)	(0.87)
Patents	-0.035	0.015	0.503	-0.020	-0.324	0.415
	(0.92)	(0.94)	(0.17)	(0.95)	(0.16)	(0.26)
New firm	0.892***	-0.076	0.097	0.945***	-0.019	0.046
	(0.00)	(0.68)	(0.79)	(0.00)	(0.92)	(0.90)
Elite director	-0.163	0.130	0.483*	-0.162	0.022	0.456
	(0.46)	(0.41)	(0.09)	(0.47)	(0.90)	(0.12)
Tangible assets	-0.007	0.085	-0.003	0.052	0.063	-0.178
	(0.98)	(0.63)	(0.99)	(0.84)	(0.74)	(0.62)
N	379	379	379	354	354	354
Log likelihood	-479.5	-1034.9	-303.0	-468.1	-894.8	-282.6
Hazard ratios						
OQ obtained	1.094	0.184	0.259	1.003	0.299	0.374
SS obtained	1.084	0.490	0.735	1.049	0.753	1.034
Allotted/Offered				1.082	0.232	0.334

Table 6 - Firm Survival to 5 years

We run multinomial probit regressions of firm survival outcomes (to 5 years) on information contained in the prospectus. We compare (columns 1,2) firms that were liquidated ; (columns 3,4) firms that were acquired; and (columns 5,6) firms that survived; to firms that failed. Variables are defined in Tables 1 and 5. p values are in parentheses. The control patents is dropped since no patenting firms are acquired in our sample.

	LIQUIDATED		ACQUIRED		SURVIVED	
	1	2	3	4	5	6
OQ intended	0.682**	0.444	0.162	0.319	0.263	0.330
	(0.04)	(0.30)	(0.69)	(0.51)	(0.35)	(0.33)
SS intended	0.441	0.748	-0.920	-1.010	-0.742**	-0.779**
	(0.25)	(0.12)	(0.14)	(0.17)	(0.03)	(0.05)
Allotted/Offered adjusted		-2.051***		0.554		1.277***
		(0.00)		(0.43)		(0.00)
OQ obtained		-0.029		1.465*		1.337**
		(0.97)		(0.08)		(0.03)
SS obtained		-1.117**		1.130**		0.424
		(0.03)		(0.04)		(0.19)
Underwritten	-0.442	-0.103	-0.016	-0.108	0.124	-0.308
	(0.20)	(0.81)	(0.97)	(0.84)	(0.68)	(0.38)
Ln (Market value)	0.285**	0.516***	0.422**	0.304	0.273**	0.038
	(0.05)	(0.01)	(0.03)	(0.24)	(0.03)	(0.82)
Debt / Equity	-1.353**	-1.913**	-0.700	-0.193	-0.519*	-0.382
	(0.03)	(0.04)	(0.45)	(0.74)	(0.06)	(0.24)
Ln (Age)	-0.104	-0.180	0.002	0.078	0.273**	0.161
	(0.48)	(0.37)	(0.99)	(0.76)	(0.03)	(0.30)
Track Record	0.301	0.422	-0.220	-14.599	0.392**	0.457
	(0.11)	(0.17)	(0.65)	(1.00)	(0.04)	(0.13)
Propsold	0.914**	1.895***	0.403	0.525	0.270	-0.130
	(0.03)	(0.00)	(0.46)	(0.49)	(0.46)	(0.79)
New firm	-0.119	-0.177	-0.296	0.058	0.249	0.167
	(0.71)	(0.68)	(0.49)	(0.91)	(0.39)	(0.63)
Elite director	-0.029	-0.058	-0.029	0.049	0.297	0.325
	(0.92)	(0.88)	(0.94)	(0.92)	(0.25)	(0.30)
Tangible assets	0.354	0.637	-0.732	-0.522	-0.083	0.017
	(0.31)	(0.17)	(0.22)	(0.46)	(0.79)	(0.97)
Constant	-1.918***	-2.302**	-2.572***	-3.407**	-0.900	-0.344
	(0.01)	(0.02)	(0.01)	(0.01)	(0.16)	(0.67)
N	379	354	379	354	379	354
Log likelihood	-339.00	-220.41	-339.00	-220.41	-339.00	-220.41
Marginal effects						
Allotted/Offered adjusted		-0.0370				0.0446
OQ obtained				0.0297		0.1856
SS obtained		-0.1444		0.0614		

Table 7 - Long-Run Returns

We calculate for each IPO the raw returns from IPO date to July 1916. We calculate the raw returns with the capital gain/loss plus the accumulated dividends. We assume dividends paid prior to July 1916 are reinvested into the market index. Market-adjusted returns equals the raw return less the market return (of Moore (2010)) over the same time period. EW refers to equally weighting (across IPOs) the returns. VW refers to value weighting (across IPOs) the returns. The weights are given by the number of shares allotted to the public times the offer price.

	No SS	SS	OQ-Reject	OQ
Full Sample - 1900-13				
# IPOs	26	42	10	52
EW raw returns	-45.2%	-12.6%	-16.4%	41.1%
VW raw returns	-70.1%	-30.5%	-17.8%	-16.0%
EW market-adjusted returns	-78.8%	-44.0%	-51.5%	9.0%
VW market-adjusted returns	-99.2%	-61.7%	-51.1%	-48.1%
1900-08				
# IPOs	17	20	6	24
EW raw returns	-28.9%	-0.4%	-39.8%	51.1%
VW raw returns	-61.2%	-9.6%	-21.1%	-20.6%
EW market-adjusted returns	-69.1%	-42.9%	-84.9%	5.8%
VW market-adjusted returns	-95.3%	-51.9%	-61.6%	-67.6%
1909-13				
# IPOs	9	22	4	28
EW raw returns	-75.8%	-23.7%	18.7%	32.6%
VW raw returns	-87.0%	-49.2%	-11.5%	-12.2%
EW market-adjusted returns	-97.2%	-45.0%	-1.5%	11.8%
VW market-adjusted returns	-106.4%	-70.4%	-30.7%	-32.3%

Table 8 - Long-Run Returns by Allotment Rates

We measure returns in the same way as in Table 7. *Allotted/Offered low* and *Allotted/Offered high* are companies with *Allotted/Offered* below and above the group (No SS, SS, Rejected OQ and OQ) means, respectively.

Panel A: Equal weighted market-adjusted returns				
EW Market adjusted returns	No SS	SS	OQ-Reject	OQ
Allotted/Offered low	-108.2%	-106.3%	-105.0%	2.7%
Allotted/Offered high	-8.3%	-19.1%	-15.9%	12.4%
Panel B: Value weighted market-adjusted returns				
VW Market adjusted returns	No SS	SS	OQ-Reject	OQ
Allotted/Offered low	-96.6%	-55.7%	-63.8%	-53.1%
Allotted/Offered high	-63.2%	-63.8%	-39.1%	-46.3%