

Cologne Economic History Paper

Universität zu Köln

Seminar für **Wirtschafts- und
Unternehmensgeschichte**

No. 1 (2011)

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Taking Firms to the Stock Market:

IPOs and the Importance of Universal Banks
in Imperial Germany 1896-1913

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Abstract

The article offers a quantitative analysis of the impact of large Universal banks on the market for Initial public offerings and provides evidence that banks such as Deutsche Bank and Dresdner Bank which largely dominated the market for loans, did not dominate the German stock market. Indeed the stock market seemed to have been efficient: price competition between banks seemed to have been quite strong, firm loyalty depended on performance rather than reputation of banks and most firms listed on the stock market survived the first years.

Introduction

The classical view, associated with Gerschenkron (1962, 1970), is that the peculiar character of Germany's financial institutions played a critical role for her industrialisation and for the fact that Germany overtook England in the late 19th century. Many other scholars, such as Kennedy (1987), have supported this view, arguing that the German banking system in particular provided much more elaborate facilities for concentrating financial resources than either its British or US-American counterparts. One reason is, for instance, the emergence of formal relationships between banks and nonfinancial firms, a typical feature of which was the appearance of bankers in supervisory boards of non-financial firms. In this way, banks acquired a high degree of control over industrial enterprises. Their intervention improved operational efficiency, managerial and industrial efficiency and thereby profitability (Fohlin 2007).

However, one main argument against this view is that banks only became influential after the industrialisation and their impact on the actual take off was therefore limited. Also, according to Tilly (1966), private banks in the Rhineland already began to develop universal banking in the 1820s. Further, a prominent study by Neuberger and Stokes (1974) provides empirical evidence that the influence of large credit banks on economic growth was indeed negative. The results of their analysis, too, have been disputed (see for instance Tilly and Fremdling (1976) and Komlos (1978)).

However, more recent empirical research, based on better data and longer periods, found evidence supporting the hypothesis that banks had a positive impact on industrialisation. Burhop (2006a), for instance, showed that total assets of credit banks were positively correlated with capital accumulation in the industrial sector until the mid 1880s. The idea behind his approach is that banks could provide loans to the

industry below market interest rates to support industrial growth. Then, in the moment of take-off, they could increase interest rates to balance the previous subsidy. A precondition of this strategy is a sufficient concentration of market power, which diminished in the 1870s when more banks entered the market (Fohlin, 2007; Burhop, 2010).

Nevertheless, there is some support for the hypothesis that close bank-industry relationships still mattered for industrial growth in later years. For instance, Fohlin (2007) shows that if a banker was a member in the control board of a firm, its chance to get listed on the stock market increased- although only in the late 1890s. This implies that banks played an important role as lead underwriters when a firm went public. The likelihood that close bank-industry relationships were still important and necessary to overcome liquidity constraints is high. The problem about these considerations is that we know very little about underwriter services and firm-bank relationships, their possible impacts in Imperial Germany and the general efficiency of the German stock market in this period. The present paper aims at extending our knowledge in this area by focussing on three questions:

First, how did the market for underwriter services on the German stock market look like, i.e. was it as concentrated to only a few, prestigious banks as the market for loans had been in earlier years? Second, did issues of banks, with a high reputation perform differently, in the short and in the long run? And third, was the market for underwriter services and the stock market in general efficient? In terms of the market for underwriter services, we define efficiency like Krigman et al. (2001). They analyse underwriter switching patterns for the USA in the 20th century and conclude that the higher the probability of firms to switch underwriters, the more efficient the market must be.

Previous empirical research makes one point clear: the answers given to these questions – in particular to the second one – obviously depend on how reputation is defined. For modern markets, rankings based on the role in advertisements (tombstone) and market shares are quite well-established. In historical markets an adequate measure for reputation is more difficult to establish. Burhop (2010) uses the membership in the Imperial loan syndicate. This was a syndicate of banks that organised government bond issues first only for Prussia and later for all Germany (Reitmeyer 1999). Only the most prestigious joint-stock credit banks and private banking houses were members of the consortium, and membership was adjusted several times. For the observed time period, this measure can only partly be used, but this will be explained in detail in a later section¹. In this study, we focus on market shares as a measure of reputation. However, we assume that this measure is endogenous and use a two stage instrumental variable approach to account for this.

The data for this study were taken from *Vierteljahrshefte zur Statistik des Deutschen Reichs*. According to an act of the German parliament from June 1896, all IPOs and SEOs had to be published in an official statistical record. The publication includes the date of the issue, the name of the firm, that of the underwriter, the offering price and the size of the emission. For the present paper, these records have been used to compile a data set that includes detailed information about market shares for underwriter services, how they developed over time, and the frequency of activity in the market for IPOs and SEOs, their volumes and sectoral structure.

By analysing this unique dataset on all issuing activities on German stock exchanges in this period, the paper provides the first complete overview of underwriter activities of

¹ Fohlin (2010) recently introduced another measure of reputation, but it can neither be reproduced nor evaluated.

German banks not only in Berlin but also on provincial stock markets. In view of our limited knowledge about underwriter activities and influence of underwriters on historical markets, this is a particularly important contribution. The paper does not only provide the first descriptive overview of underwriter activities and the role of reputation on the performance of IPOs in the period from 1896 to 1914, but also the first analysis of underwriter switching in an historical setting. It thereby draws a clearer picture of similarities and differences between modern and historical stock markets and improves our knowledge about the development of the German stock market. The most important result is that the superiority of joint stock banks of earlier years cannot at all be found on the stock market and thus the hypothesis that close bank industry relationships still mattered for industrialisation is weakened.

The market for underwriting services

Between 1897 and 1913, a large number of banks was actively involved in underwriters' services: 188 different banks acted as lead underwriters. Most of them only appeared once or twice, others organised IPOs and/or SEOs for only one firm. The stock market was dominated by a small number of banks. Figure 1 shows a curve that visualises market concentration on the market of IPOs over the whole period. 10 percent of the banks held about 50 percent of the market share of completed numbers of IPOs.²

² We only provide the market shares on the number of IPOs, the market share on the size of IPOs is strongly correlated.

Figure 1: Percentage share of banks acting as lead underwriter and their cumulated market share of completed IPOs between 1897-1913

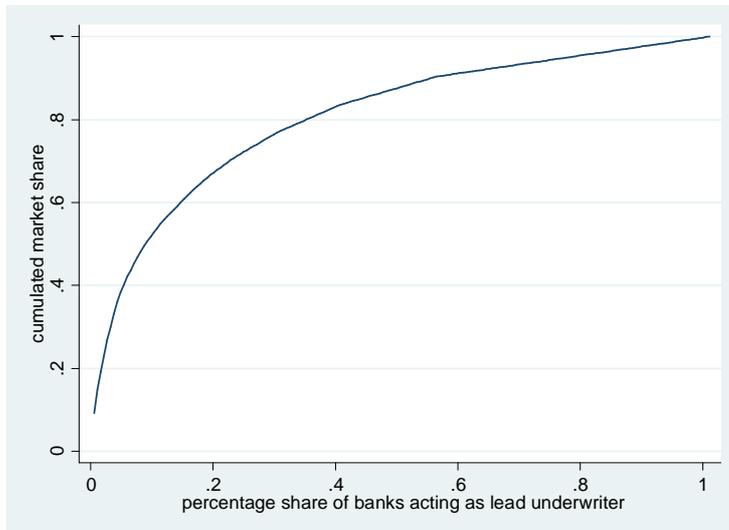


Table 1 provides the market shares in numbers of completed IPOs in the period between 1898 and 1913 and in four sub periods.³ It only shows banks with market shares above 1 percent. Only 3 banks had a market share above 4 percent. The most dominant bank was *Deutsche Bank*. This bank increased its market share from on average 4.1 percent in the years between 1898 and 1901 to around 15 percent between 1910 and 1913. *Dresdner Bank*, the bank which had on average the second largest market share between 1898 and 1913, also increased its market shares, but reached only around 8 percent in 1913. Furthermore, the total number of active banks slowly but steadily decreased over time. This indicates a slight rise in market concentration over the period, which might have reduced competition between banks. However, the Herfindahlindex, which is calculated as the sum of squared markets shares, only reaches a value of 0.04. The measure ranks from 0 to 1 and a value of 0.04 seems to indicate a very strong competition. Although values of 1 hardly ever appear, 0.04 is still low considering the fact that a value of about 0.3 is treated as an effective monopoly in banking for modern markets (Daskin and

³ In order to be able to split the sample in four four-year periods, we exclude the year 1897 in this table.

Wolken 1989). Although, as expected, the largest joint stock banks held the highest market shares speaking of a highly concentrated market would mean overstating the case.

TABLE 1: AVERAGE MARKET SHARES IN PERCENT OF MAJOR UNDERWRITERS ON NUMBERS OF IPOs

Lead Underwriter	1898-1901	1902-1905	1906-1909	1910-1913	All Years
Deutsche Bank	4.10	9.95	13.33	14.62	9.43
Dresdner Bank	4.10	7.58	5.56	7.60	5.70
A. Schaaffhausen'scher Bankv.	5.74	4.27	5.00	1.75	4.66
Direk. der Diskontogesellschaft	2.05	3.79	3.89	6.43	3.84
Berliner Handelsgesellschaft	3.28	4.27	6.11	2.92	3.84
Darmstädter Bank	2.05	4.27	3.89	3.51	3.14
Schlesinger	1.23	4.74	4.44	3.51	3.14
Allg. Deutsche Kreditanstalt	-	3.32	-	-	3.03
Deutsche Nationalbank	1.23	2.84	0.56	4.68	2.21
Mitteldeutsche Kreditbank	3.28	1.42	0.56	2.34	1.86
Fromberg	0.41	0.95	4.44	1.17	1.51
Berliner Bank ⁴	4.51	0.95	-	-	1.51
Kommerz- und Diskontobank	1.23	0.47	1.67	2.34	1.40
Breslauer Discontobank	3.69	-	-	-	1.40
Hardy	0.41	1.90	1.67	1.17	1.16
Delbrück	1.64	0.95	1.67	-	1.05
Number of active banks	101	85	74	52	184
Total number of IPOs	152	136	113	31	423

The market for SEOs looked quite similar. Only a small number of banks held a market share in numbers of SEOs exceeding 1 percent and only 5 banks more than 5 percent.

The four so-called D-banks (*Darmstädter Bank*, *Dresdner Bank*, *Deutsche Bank* and *Diskontogesellschaft*) were on average the ones with the largest market shares.

Controlled for different stock markets, the picture looks somewhat different. Most of the banks were only active at the Berlin stock exchange, which was the most important

⁴ Berliner Bank was taken over by Kommerz - und Diskontobank in 1905.

one at the time, and maybe in one more city where they kept their headquarters for traditional reasons. The Berlin stock exchange was dominated by *Deutsche Bank* with a market share of IPOs of around 12 percent. Also quite active in Berlin were *A. Schaaffhausen'scher Bankverein*⁵ from Cologne with an average market share of 7.6 percent and the *Berliner Handelsgesellschaft* with 7 percent. *Dresdner Bank* dominated Dresden's stock exchange with a market share of around 16 percent of the total number of IPOs, followed by *Gebrüder Arnolds* with a market share of on average 13 percent. Frankfurt was dominated by an oligopoly of *Pfälzische Bank*, *Deutsche Vereinsbank*, *Darmstädter Bank* and *Deutsche Effekten- und Wechselbank*, which all held market shares of around 10 to 12 percent. The Cologne stock exchange was dominated by the *A. Schaaffhausen'scher Bankverein* and *Sal Oppenheim*. Only *Deutsche Bank* was active on all provincial stock exchanges.

Altogether, large joint stock banks and in particular the D-Banks were the banks with the largest market shares, but they were far from dominating the market. This is particularly interesting in the context of the debate about the oppression of the German industry by Universal banks; also known as the hypothesis of "organised capitalism" from Hilferding (see Winkler 1974). The results make clear that banks did not have sufficient market power to suppress industry.

Reputation

Before we analyse if a bank's reputation influenced the performance of IPOs or firm loyalty, it is necessary to define more precisely what reputation means.

⁵ A. Schaaffhausen'scher Bankverein founded its branch in Berlin in 1891. Although this branch became more influential over time, the bank's stronghold remained in Cologne and the Ruhr area. It was famous for its expertise for industrial firms on which it focused (Riesser 1912, 415)

In this paper a bank with a high reputation is defined as a bank with experience in the market for underwriters, and which was also, since the stock market in Germany was still young, well known in other areas of financial service. The idea behind the second part of the definition is that firms might have had house banks, with which they worked closely in other financial services and on which they were dependent. Thus the likelihood that a firm stuck with this bank for the IPO was high.

As mentioned above, not all measures of reputation that have been used for modern data can be constructed for historical markets. The most popular measure for underwriter reputation was first used by Carter and Manaster (1990): When a firm goes public, the list of banks involved in the underwriting process is published in the tombstone advertisements. The reputation variable is constructed based on the average position a bank takes in this advertisement. Another popular measure was introduced by Michaely and Shaw (1994), according to whom firms with a higher market capitalization have a higher reputation. For banks in Imperial Germany, however, information about the capitalization of underwriters, especially for private banks, is impossible to find.

Another commonly used measure of reputation is the market share in completed IPOs. This measure, introduced by Megginson and Weiss (1991), is based on the concept that banks with a higher reputation attract more firms. This fits well our definition that banks with a higher reputation are the more experienced banks. Furthermore, it is simple to construct for our sample and seems the most appropriate approach. However, it is not completely suitable either. The problem is that this variable, which is created based on the observations, is potentially endogenous. We therefore use two instrumental variables and estimate the impact of reputation in two steps.

As mentioned in the introduction, Burhop (2010) applies the share of a bank in the Imperial Loan Syndicate. The shares varied quite often and seem not comparable over time. *Deutsche Bank* for instance held 6.5 percent of the shares from 1898 to 1900 and only 5.5 after 1900. This would imply that the reputation of *Deutsche Bank* decreased, which seems unlikely considering its increasing market share⁶. However, we will use the dummy variable for participating banks as the first instrument⁷.

The second instrument is the average size of the emissions per bank. We assume that banks, which attract IPOs with large volumes, must have a high reputation in being able to cope with such business. One might argue that this variable is not completely exogenous either, since the size of IPOs, which a bank is offered might depend on its success in previous years. However, a Hausman test ensures that this instrument is truly exogenous. Table 2 provides an overview over the development of the average size of IPOs for banks with an overall market share above 1 percent, and the autocorrelation.

Deutsche Bank, for instance, the bank with the highest overall market share, also took care of the IPOs with the highest average volume. However, although the market share increased over time, the average volume remained around 7 million Mark.

⁶ The participating banks are taken from the Archive of *Sal Oppenheim* (K/Kons/661)

⁷ Also, as mentioned in the introduction, the measure for reputation in Fohlins (2010, 645) recent paper is an ordinal scaled variable ranking from 1 to 9, but it remains unclear which bank has which rank and why.

TABLE 2: AVERAGE SIZE OF IPOs IN MILLION MARK FOR BANKS WITH A MARKET SHARE ABOVE ONE PERCENT

Underwriter	1898-1901	1902-1905	1906-1909	1910-1913	All years	Auto-correlation (lag1)
Deutsche Bank	11.95	6.51	7.07	7.77	7.77	-0.11
Bank für Handel und Industrie	1.93	4.00	19.77	2.53	6.31	-0.06
Dresdner Bank	9.77	3.66	6.53	6.19	5.78	-0.35
Berliner Handelsgesellschaft	3.88	6.43	8.09	2.30	5.50	-0.17
A. Schaaffhausen'scher Bankverein	5.91	2.55	4.61	5.75	5.18	0.01
Direktion der Diskontogesellschaft	4.31	3.93	3.96	7.51	5.08	-0.18
Mitteldeutsche Kreditbank	2.51	2.58	1.50	8.67	3.78	0.03
Breslauer Discontobank	3.68				3.55	-0.55
Allgemeine Deutsche Kreditanstalt		3.50			3.50	
Deutsche Nationalbank	5.00	2.72	3.00	2.50	3.20	0.38
Hardy	1.20	1.97	7.25	1.95	3.19	0.00
Kommerz- und Diskontobank	3.20	2.00	3.73	3.09	3.13	-0.08
Berliner Bank	3.50	1.25			3.00	0.05
Delbrück	3.50	1.00	1.48		2.37	0.11
Schlesinger	2.98	1.41	1.11	3.47	2.01	0.30
Fromberg	1.30	2.31	1.36	1.75	1.58	0.42

Short and Long Run performance

Short run performance

First, we concentrate on the short-run performance. The simplest and most often applied measure for short run performance is the initial return. This is the difference between the emission price and the first trading price.

A phenomenon typically observed in modern markets is that when an issue begins trading on the stock exchange for the first time, its price shoots up, i.e. the initial return is systematically positive. The price increase indicates that there is strong demand for

shares and that they could have been priced higher. If they had been priced higher, the company would have raised more capital. When an issue is in this way ‘underpriced’, one can say that the company or the bank has left money on the table. The phenomenon was first documented by Stoll and Curley (1970), Logue (1973), Reilly (1973), and Ibbotson (1975). For modern markets, Carter et al. (1998) and Michael and Shaw (1994) showed that IPOs issued by banks with a higher reputation had on average lower underpricing and performed better than other IPOs in the longer run.⁸

We want to understand the impact of reputation on the performance of IPOs in late 19th- and early 20th-century Germany. Two questions therefore arise: First, can we observe a similar phenomenon as in modern markets, and second, if we can observe on average positive initial returns, in which way did reputation influence the initial return? Did a bank’s positive reputation lead to underpricing that was lower or higher than that of other banks whose reputation was less good?

Empirical findings show that on other historical stock markets underpricing existed, but that it was much lower than in modern markets. In modern markets underpricing averages about 15 percent in the USA (Ritter, 2002), Germany (Ljungqvist, 1997) and France (Biais, 2002). By contrast, for the Berlin Stock exchange between the 1880s and World War I, Burhop (2006b; 2011) and Weigt (2005) documented around 5 percent. Chambers and Dimson (2009) found around 10 percent in the interwar period on the London stock exchange.

The answer to the second question, if reputation leads to lower or higher underpricing, is ambiguous. From a theoretical perspective both seems possible. The classical paper by Rock (1986) suggests that asymmetric information about the quality of an IPO among different groups of investors can induce underpricing. If the demand from the

⁸ For a review of short-run underpricing see Jenkinson and Ljungqvist (1996).

group of informed investors is insufficient to buy the whole issue, uninformed investors will have to be attracted. Informed investors buy high-quality issues only, whereas uninformed investors buy a mix of high- and low-quality issues. Realizing this, banks have to compensate uninformed investors by offering them all issues at a lower price. This implies that banks with a better reputation may not need to offer systematically below the actual value and thus that IPOs issued by those banks should have lower initial returns than others.

Moral (1914), on the other hand, speculates that asymmetric information between investors and underwriters and asymmetric information between different types of investors increases underpricing. In particular, underwriters do not exactly know the market demand, and in order to uphold their reputation and to sell the entire volume of shares, they offer them at a price below the expected market value.

Neither does empirical research provide a clear answer whether one should expect lower or higher underpricing for IPOs that were issued by banks with a high reputation. Carter, Dark and Singh (1998) report that the excess performance of IPOs underwritten by higher quality investment banks is better in the long run, not necessarily on the first day. Beatty and Welch (1996) find that the relationship depends on time. Before the 1990s, they find that the relationship between underwriter prestige and underpricing was negatively correlated, whereas it was positively correlated in the 1990s.

Chambers and Dimson (2009) (for Britain) and Burhop (2011) (for Germany) test the impact of reputation on underpricing in their sample of historical markets, but find no clear evidence that banks with higher reputation had lower or higher underpricing.

Unlike Burhop (2011), we focus on the period 1897 to 1913 and also apply a slightly different measure for initial returns. Since for this later time period a high frequency

stock market index is available, we are able to compute market adjusted initial returns, which are calculated as follows:

$$IR = \left(\frac{P_{first} - P_{offering}}{P_{offering}} \right) - \left(\frac{A_{first} - A_{offering}}{A_{offering}} \right),$$

where P_{first} is the price at the first trading day, $P_{offering}$ the offering price, A_{first} is a stock market index at the day before the first trading day, and $A_{offering}$ the same index on the first trading day of the IPO. The stock market index was taken from Gelman and Burhop (2008).

For the analysis of the short run performance, we focus on the Berlin stock exchange and take the first trading price from the *Berliner Börsenzeitung*. We also only include IPOs where the first trading price appeared within fourteen days after the official date of the admission to the market.⁹ On average we observe initial returns of 0.27 percent for all banks (see table 3), which is very low.

⁹ We tried several different time periods as cut off point - for instance, 5 days and 1 week - but the results did not change. The first trading price was only observed twice within 1 day. The decision to keep all IPOs where the first trading price could be found within 14 days is based on Burhop (2010), who chose this for his IPO sample.

TABLE 3: BERLIN STOCK EXCHANGE; INITIAL RETURNS FOR DIFFERENT BANKS (ALL IPOS ISSUED IN BERLIN, WHERE A FIRST TRADING PRICE COULD BE FOUND WITHIN 14 DAYS)

Underwriter	Number of IPOs	Initial returns in Percent	Standard Dev. Of Initial returns
Deutsche Bank	32	0.492	2.462
Schlesinger	18	0.695	1.849
Dresdner Bank	12	0.250	1.258
Fromberg	11	1.103	2.504
Direktion der Diskontogesellschaft	10	-0.147	1.760
A. Schaaffhausen'scher Bankverein	9	-3.754	5.646
Deutsche Nationalbank	8	0.635	0.643
Berliner Handelsgesellschaft	8	-1.812	7.665
Kommerz- und Diskontobank	6	0.228	0.312
Darmstädter Bank	6	1.170	2.882
Hardy	5	-0.030	0.169
Arons & Walter	5	-0.102	2.105
Kretschmar	3	-2.355	4.645
Heydt	3	-0.070	2.459
Jacquier	3	-1.093	1.645
Neuburger	3	0.028	0.056
Mitteldeutsche Kreditbank	3	0.083	0.416
Deutsche Palästinaabank	3	1.485	0.226
Cahn	3	0.289	1.059
Braun	2	0.075	0.369
Boden	2	2.203	2.542
Bleichröder	2	-0.250	0.443
Zielenziger	2	0.264	0.840
Berliner Bank	2	2.667	4.177
Fischer	2	0.115	0.375
Delbrück	2	-0.583	0.644
Landau	2	1.075	1.785
Total	197	0.279	2.22

(D-banks in bold)

In order to explain the initial returns, we estimate a two stage OLS regression. In the first regression, the average market share of banks is the dependent variable. In the second stage of the analysis, the dependent variable is the initial return, and the estimated dependent variable from the first regression is the new measure for reputation.

In this way, the new variable 'reputation' is exogenous.

Apart from the instrumental variables introduced above, we include a dummy variable 'law', which is equal to 1 for the years 1900-1913. We do this because in January 1900 a reformed version of the corporation law of 1884 came into effect. There were two main changes: first, an increased protection of shareholders and creditors mainly through an increase in transparency. For instance, incorporators were no longer allowed to sell their shares before the incorporation was registered in the commercial register. That way they could not avoid liabilities that became enforceable only after the registration. Second, it was tried to increase the responsibility of shareholders beyond their deposit by granting them additional rights such as the one to call a general meeting (Ring, 1909; Wolff, 1915: 37, 76).

The effects of the changes on the market of IPOs are not clear but we expect a structural break. There are studies about similar changes in stock market law in the USA. Stiegler (1964) and Jarrell (1981) analyse the economic effect of the 1933 Securities Act in the USA. Both studies focus on whether the increased obligatory disclosure of financial information required by the Act increased the average return earned by new-issues investors. But neither study finds evidence of a significant increase in average returns following disclosure regulation.

Furthermore I apply a dummy variable taking the value of 1 if an IPO was undertaken during a hot market. A month is defined as hot if the number of IPOs during this month was higher than the sample mean plus two standard deviations (see Burhop 2010). According to this definition, the month June 1898, June 1899 and June 1906 were 'hot'. Burhop (2010) showed in his paper that between 1870 and 1896, underpricing was significantly higher in hot issue periods, and we expect the same for our sample.

I also control for past market returns by adding the average market return of the previous year.

Another theoretical explanation for underpricing, for which we control, is based on asymmetric information between issuer and investor. If the issuer knows more about the issue than the investor, the issuer might underprice the IPO to signal its quality. If the issuers use costly underpricing as a signal, they are more likely to subsidize this by having a larger SEO later (Grinblatt, 1989; Allen, 1989; Welch, 1989). This has been rejected for modern as well as for historical data (Kennedy, 2006; Michaely, 1994a; for 1870 to 1896: Burhop, 2010). Nevertheless, we will include a dummy that is equal to 1 if there was an SEO within 5 years at all, expecting the coefficient may positive. Furthermore I collected firm-specific information such as the age of the firm, the balance sheet and profit in the year of the IPO. This data was taken from *Handbuch der deutschen Aktiengesellschaften (Handbook of German joint-stock companies)*.

The regressions are estimated with a two stage least square estimation (table 5). Regressions 1 to 3 are based on a sample of all IPOs issued in Berlin, where the first trading price could be found within 14 days. Regressions 4 to 6 are based on the IPOs of sample 1, where we could find additional firm information. Regressions 1 and 4 provide the results of an OLS regression, with the overall market share as measure of reputation. Regressions 2 and 5 provide the results of the first stage regression, and regressions 3 and 6 the results, where the measure of reputation is the estimated dependent variable of regressions 2 and 5, respectively. Overall, all models are significant and explain a large share of the variability of the dependent variable. The r-squared is much higher than in comparable studies such as for instance Burhop (2010, Fohlin 2010).

The most important result is that reputation does not seem to matter. Neither the average market share nor the estimated variable 'reputation' had an impact. The only significant variables are past market returns and the dummy for the change in law after January

1900. These results are not surprising, considering similar work for earlier time periods where reputation did not impact performance either (see Burhop 2011, Fohlin 2010).

One reason might be that the variance of underpricing is too low. All banks were very efficient in choosing the right price. The almost non-existence of mispricing indicates a high degree of market efficiency.

TABLE 4: RESULTS TWO STAGE REGRESSIONS, SHORT RUN

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	Initial returns	Market shares (Rank)	Initial returns	Initial returns	Markets Shares (Rank)	Initial returns
	Without Instruments	First Stage	Second Stage	Without Instruments	First Stage	Second Stage
Sample	All IPOs issued in Berlin, where a first market price could be found within 14 days			Sample 1, for all firms where additional firm information was available for the year of the emission		
Market Share	-2.883 (0.45)			-7.388 (1.11)		
Reputation¹⁰			-5.569 (0.76)			-11.570 (1.43)
Average size (Instrument 1)		0.010 (16.90)***			0.010 (15.29)***	
Imperial loan Syn. (Instrument 2)		0.011 (4.33)***			0.011 (3.79)***	
Size	0.016 (0.49)	0.000 (2.31)**	0.024 (0.73)	0.021 (0.72)	0.000 (2.42)**	0.033 (1.05)
SEO within 5 Years	-0.399 (0.64)	-0.002 (0.84)	-0.393 (0.63)	-0.000 (0.00)	0.000 (0.05)	0.023 (0.04)
Past market Return	-45.376 (2.15)**	0.020 (0.23)	-45.548 (2.15)**	-11.290 (1.15)	0.021 (0.22)	-10.566 (1.16)
Hot	1.154 (0.74)	0.011 (2.40)**	1.249 (0.79)	1.802 (0.84)	0.013 (2.35)**	2.016 (0.92)
Age				-0.000 (0.02)	-0.000 (0.98)	-0.000 (0.10)
Return on capital				-0.910 (18.34)***	0.000 (0.83)	-0.907 (18.06)***
Law	45.856 (2.17)**	-0.019 (0.23)	46.127 (2.18)**	9.128 (1.16)	-0.010 (0.12)	8.656 (1.19)
Industry	-0.404 (1.04)	0.004 (1.81)*	-0.387 (1.02)	-0.688 (1.62)	0.004 (1.66)*	-0.666 (1.63)
Banks	-0.034 (0.04)	-0.004 (0.64)	-0.092 (0.10)	-0.800 (1.13)	-0.008 (1.09)	-0.931 (1.30)
Railways	-4.342 (1.07)	-0.008 (1.37)	-4.319 (1.07)	-0.019 (0.02)	-0.013 (2.82)***	-0.002 (0.00)
Constant	230.255 (2.15)**	-0.119 (0.27)	231.115 (2.15)**	60.417 (1.17)	-0.136 (0.27)	56.648 (1.18)
Year dummies	yes	yes	yes	yes	yes	yes
F-statistic	1.74	12.22	1.84	2.07	7.83	3.04
P>F	0.0251	0.000	0.0149	0.0041	0.000	0.000
Observations	194	194	194	159	159	159
R-squared	0.20	0.59	0.21	0.39	0.63	0.38

Robust t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

¹⁰ The predicted variable from the previous regression

Long run performance

In order to investigate long run performance, I collected the closing price of each month for twelve month after the IPO.¹¹ Carter et al. (1998) have documented the relation between long-run performance of IPOs and underwriters and have shown that underperformance of IPO stocks relative to the market over a three-year holding period is less severe for IPOs handled by more prestigious underwriters. In general, previous research has shown that IPOs seem to underperform benchmark shares (Ritter 1991). For the USA between 1975 and 1984 Ritter (1991) report on average 29 percent for the first three years. Rajan and Servae (1997) also show underperformance of 17 to 46 percent compared to their benchmark. Work on European countries has also shown that long run market adjusted returns are negative, with the notable exception of Sweden (Loughran et al., 1994), where IPO companies outperformed the market by 1.2 percent in the 1980s. As far as the author is aware, there is no empirical study that investigates long run performance of IPOs in a historical setting, i.e. before 1950.

Theoretical explanations are not abundant either. Some researchers have put forward the price support hypothesis for explaining long-run performance. The hypothesis is based on the assumption that underwriters keep initial trading prices artificially high. Once the price support has been withdrawn, the prices adjust downwards to their true market value. Following this approach - advocated by Rudd (1993) -, Ljungqvist (1996) tested implications and found that the evidence was inconclusive.

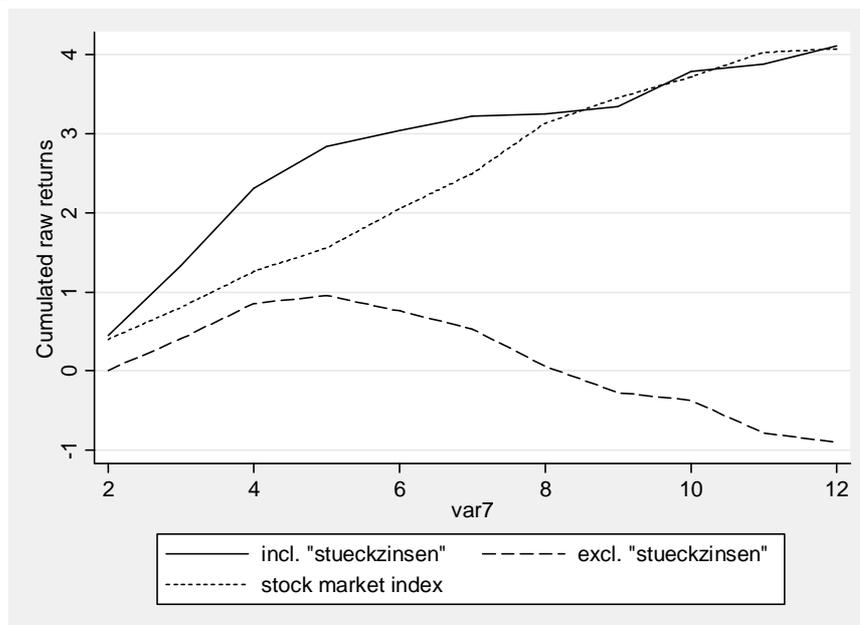
Long run returns for each the twelve months after the IPO are calculated with the following equation:

¹¹ Since for all other market activities we only have the stockmarket index by Burhop and Gelman (2008), we cannot construct an adequate bench mark sample to compare the long run returns.

$$RR_{it} = \frac{P_{i(t+1)} - P_{it}}{P_{it}}, \text{ where } p_t \text{ is the closing price of month } t \text{ for issue } i.$$

Figure 2 provides the cumulated raw returns for the whole sample, in- and excluding stueckzinsen¹² and for the market in general as measured by the stock market index. Including stueckzinsen, the average returns are positive. In the first 8 months the IPOs perform better than the general market, but after month 8 the cumulated average returns moved very closely.

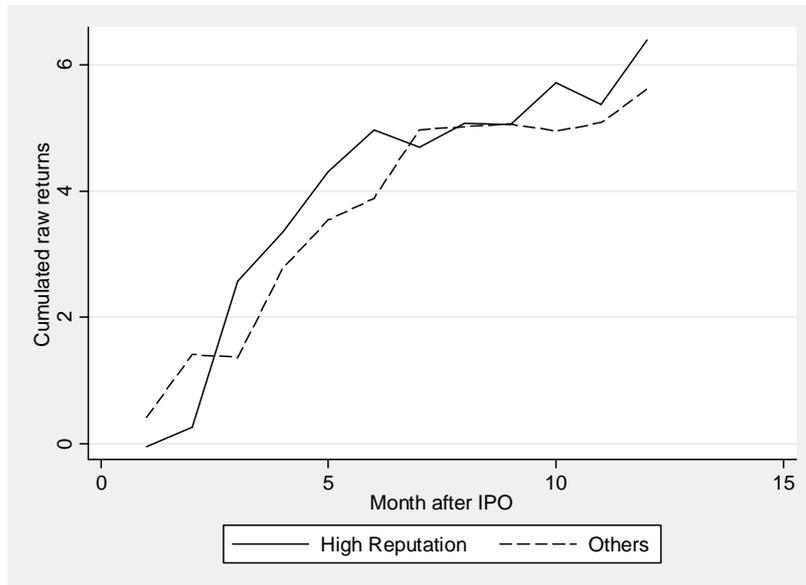
Figure 2: Cumulative average raw returns for twelve month after the IPO in percent



However, what impact did lead underwriters have? Figure 3 shows the cumulated raw returns for every month for twelve month after the IPO for two groups: For IPOs issued by the 10 percent of banks with the highest estimated reputation and for all others. The shares of banks with a higher reputation seemed to perform slightly better over the long run, but not significantly so.

¹² Stueckzinsen were a special feature of the German Stock market and are calculated as follows: if the dividend for the year of one firm was 4 percent, then we add $4/12 = 0.33$ to the price at the end of month 1. In month 2 we add $2 \cdot 4/12$.

Figure 3: Cumulative average raw returns for twelve month after the IPO in percent for the ten percent of banks¹³ with the highest estimated reputation and the others separately



Another measure for long run performance is the sharpe ratio or reward-to-variability ratio (see Sharpe 1964). This is calculated by dividing the return for the first year by the variability of the monthly returns. The higher the sharpe ratio, the higher is the return per risk and the better is the investment. Table 5 shows similar regressions to the underpricing regressions with the sharpe ratio as dependent variable. The regressions are again estimates in two stages. Again we find no significant difference for IPOs issued by banks with a higher reputation. Significant are only firm-specific variables, such as the higher the profit of a firm, the higher is its sharpe ratio. Furthermore, IPOs of banks seem to have a higher sharpe ratio.

¹³ The figure only changes marginally with different cut off points at 20, 30 and 40 percent of banks with the highest reputation.

TABLE 5: RESULTS TWO STAGE REGRESSIONS, LONG RUN

	(1)	(2)	(3)	(4)	(5)	(6)
Dependent Variable	Sharpe ratio	Market shares (Rank)	Sharpe ratio	Sharpe ratio	Markets Shares (Rank)	Sharpe ratio
	Without Instruments	First Stage	Second Stage	Without Instruments	First Stage	Second Stage
Sample	All IPOs issued in Berlin, where a first market price could be found within 14 days			Sample 1, for all firms where additional firm information was available for the year of the emission		
Market share	-0.070 (0.41)			-0.043 (0.20)		
Reputation			-0.147 (0.80)			-0.189 (0.90)
Average size (Instrument 1)		0.010 (16.90)***			0.010 (15.70)***	
Imperial loan Syn. (Instrument 2)		0.011 (4.33)***			0.010 (3.65)***	
Size	0.001 (0.99)	0.000 (2.31)**	0.001 (1.11)	0.001 (1.15)	0.000 (2.41)**	0.001 (1.41)
SEO within 5 years=1	0.012 (1.15)	-0.002 (0.84)	0.012 (1.17)	0.011 (1.02)	0.000 (0.14)	0.012 (1.09)
Past market return	0.674 (0.71)	0.020 (0.23)	0.666 (0.70)	0.712 (0.88)	0.025 (0.26)	0.738 (0.90)
HOT	0.058 (1.63)	0.011 (2.40)**	0.061 (1.71)*	0.070 (1.17)	0.012 (2.35)**	0.078 (1.31)
LAW	-0.202 (0.68)	-0.019 (0.23)	-0.198 (0.67)	-0.304 (0.72)	-0.014 (0.16)	-0.315 (0.74)
Industry	0.015 (1.74)*	0.004 (1.81)*	0.015 (1.78)*	0.005 (0.46)	0.003 (1.15)	0.006 (0.56)
Banks	0.116 (1.69)*	-0.004 (0.64)	0.115 (1.66)*	0.158 (1.62)	-0.010 (1.30)	0.154 (1.59)
Railways	0.069 (2.05)**	-0.008 (1.37)	0.067 (1.92)*	0.043 (3.42)***	-0.015 (3.13)***	0.041 (3.26)***
Age				0.000 (1.64)	-0.000 (1.11)	0.000 (1.56)
Return on capital				0.301 (3.84)***	0.000 (0.79)	0.304 (3.96)***
Constant	-3.446 (0.71)	-0.119 (0.27)	-3.403 (0.70)	-3.833 (0.89)	-0.156 (0.31)	-3.967 (0.92)
Year dummies	yes	yes	yes	yes	yes	yes
F-statistic	3.83	57.81	3.83	3.67	46.2	3.72
P>F	0.000	0.000	0.000	0.000	0.000	0.000
Observations	168	194	168	142	159	142
R-squared	0.33	0.86	0.33	0.42	0.87	0.43

Robust t statistics in parentheses

* significant at 10%; ** significant at 5%; *** significant at 1%

To summarise, reputation of banks had no impact on performance, not in the short and neither in the long run. Indeed it seems that the market was efficient. Underpricing was almost absent and long run performance of IPOs depended on firm specific variables. Furthermore we can observe a price 12 months after the IPO for all IPOs issued between 1896 and 1912. Thus, all firms that were issued survived the first year, which in the 1870s was often not the case.

Reputation, even if measured very carefully, did not at all impact performance of IPOs. The oligopoly at the top of the market for underwriter services obviously did not control the market.

Switching

So far it seems the German stock market was very efficient. In this section we analyse switching behaviour of firms between the IPO and the first SEO. If the probability to switch underwriters was high, one can conclude that the market was efficient and firms were not dependent on certain banks (see Krigman et al. 2001).

Figure 4 shows that 30 percent of the firms completing an SEO within five years of their IPO switched their lead underwriter.¹⁴ Client loyalty in the underwriting business seems to have been low in 1897 and to have improved over time, as figure 4 shows. This fits well the observation that the market became more concentrated over time. In the early years, almost half of the firms switched the lead underwriter between IPO and the first SEO, but even in 1911 it was still 20 percent. One has to note at this point that we do not observe SEOs after 1913, since the stock markets were closed during World War I.

¹⁴ In seven cases the bank that issued the IPO was still involved in the SEO, but not as lead underwriter. These observations are not treated as switching.

Figure 4: Share of firms that switched underwriter

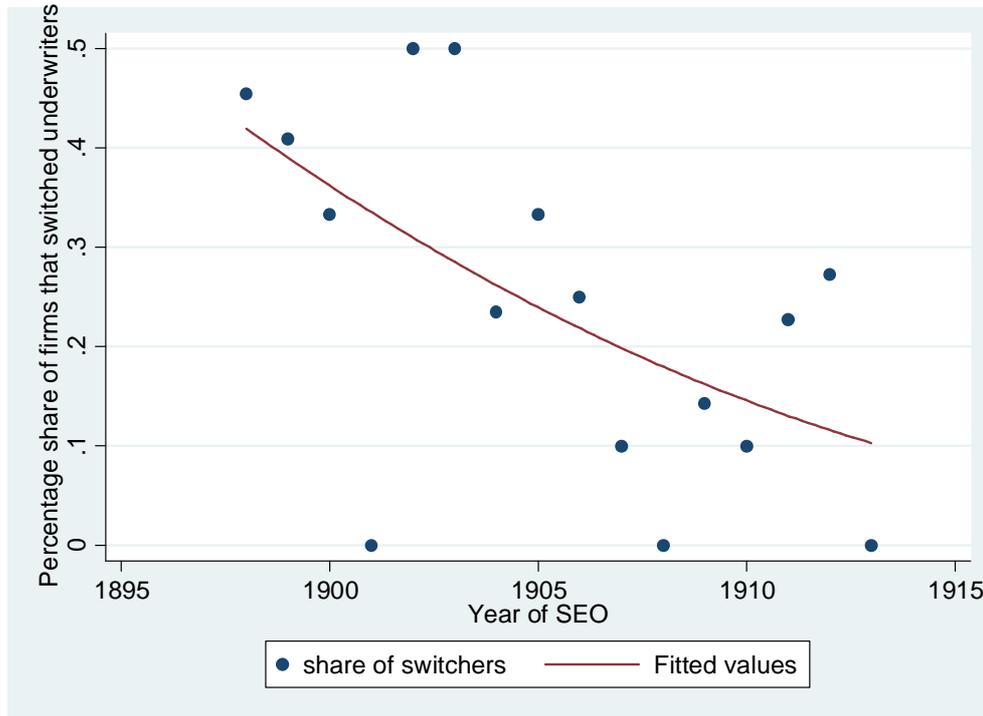


Table 6 shows the percentage share of switching for certain selected banks and bank groups. Some Banks such as *Berliner Handelsgesellschaft* and *Direction der Diskontogesellschaft* had very loyal clients. None of the firms they coached during the IPO switched to another bank for their SEO. *Deutsche Bank*, on the other hand, the most influential bank and market leader, had 16,6 percent of the firms switching.

TABLE 6: SWITCHING PATTERNS OF SELECTED BANKS

Underwriter	Percentage share of underwriter switching	Number of IPOs with SEO within 5 years	Switcher
Deutsche Bank	16.7%	24	4
Dresdner Bank	27.3%	11	3
Direktion der Diskontogesellschaft	0.0%	9	0
A. Schaaffhausen'scher Bankverein	12.5%	8	1
Darmstädter Bank	28.6%	7	2
Berliner Handelsgesellschaft	0.0%	6	0
Pfälzische Bank	0.0%	6	0
Arnold	0.0%	5	0
Weyhausen	60.0%	5	3
Hardy	0.0%	5	0
Fromberg	20.0%	5	1

There is no study for underwriter switching for the German stock market in the 19th century or any other point in time with which we could compare our results. For the American stock market, there are some studies about underwriter switching and reputation. They show that in the 1970s and before, firms commonly used the same lead underwriter for IPO and first SEO. In the 1990s, there was an increasing trend on the American stock market to switch underwriters (Krigman, Shaw and Womack, 2001). This either means that banks increased their knowledge about underwriter services and thereby their efficiency, thus reducing incentives for firms to switch underwriters. However, it could also indicate increased inefficiency in the market for underwriter services, maybe caused by the growing concentration of market power to just a few banks.

In order to understand why firms switched underwriters, we must ask how they choose their underwriter in the first place, that is, at the time of the IPO. For modern markets, there is literature on this question focussing on observable factors such as underpricing,

special ranking and measures of reputation and underwriter market shares. The results from empirical studies of modern markets are ambiguous and depend on the measure of reputation. Thus, Krigman et al. (2001) explore the reputation of banks by directly asking the decision makers, the chief financial officers (CFOs) and chief executive officers (CEOs) at the corporations that completed IPOs and later switched underwriters about their experience with the banks and their reasons to switch. They find little evidence that firms switch because the IPO lead underwriter made mistakes such as excessive underpricing or poor share placement during the IPO process. They do, however, find that the decision to change the initial underwriter appears to reflect dissatisfaction with the longer-run service aspects following the IPO.

While constructing individual data through a survey is surely a powerful approach, it is obviously impossible to ask later 19th and early 20th centuries decision makers about their choices. Hence, just like in the regression with underpricing as dependent variable, we again focus on variables which are observable in the 19th century.

Apart from reputation, there are other factors that might have influenced the underwriters' choices. James (1992) assumes that firms dedicate time and effort to choose the bank for the IPO. This creates high set up cost for the underwriter-firm relationship. Accordingly, James finds that the longer the time between the IPO and first SEO, the more likely a firm is to switch underwriter as the value of its firm specific information degrades. Therefore, I also include a variable that includes the number of days between the IPO and the SEO. Another reason to switch the bank could have had practical reasons. Sometimes the size of the SEO by far exceeded the IPO. In this case the original bank may have been not large enough to issue an SEO of this size. Thus we include the size of the SEO in percent of the IPO.

Furthermore, it is necessary to consider that the bank, which acted as lead underwriter, was more likely to issue the SEO if it had a branch in the city where the stock market was located. Therefore we include a dummy variable that is equal to 1 if the SEO took place at the same place and 0 whether it was issued at a different stock market within Germany.

As mentioned above, we use the probability to switch as an indicator for market efficiency. But it is not clear whether it really indicates market efficiency. It would be a good measure if switching was dependent on performance. We therefore include performance variables like initial returns and sharpe ratio for the Berlin issued firms. If underpricing has a positive impact on the probability to switch and the sharpe ratio has a negative impact one can conclude that the worse the performance of the IPO the higher the probability to switch. Thus the market seemed to be efficient since we observe a reasonable amount of firms switching. However, one might argue that the probability to switch might not be a good indicator for efficiency, because it is unclear whether the firms really made the decision to switch. It might have been the other way around: banks drop firms because of bad performance, which would rather indicate market power of banks. This can be tested by including the difference in average market shares at the stock market where the SEO takes place of the bank that issued the SEO and the original bank for the three years before the SEO. If the probability to switch increases with increasing difference, i.e. with dominance of the SEO bank, one can conclude that the firms made the switching decision. It is implausible to assume that a firm that was dropped because of bad performance would then move on to a bank with a higher reputation and more market power. Table 7 provides some descriptive statistics for this variable. Of all IPOs, where the firm switched the lead underwriter for the first SEO, only 14.3 percent switched to a bank with a lower market share in the last three years,

24.5 percent to a bank with the very same market share and 69.2 to a bank with a higher market share.

TABLE 8: SWITCHING TO BANKS WITH A HIGHER REPUTATION

All IPOs with SEO within 5 years		Switching			
		No	Yes		
Average market share of SEO bank in the three years before the SEO is higher	No	0.7% (1)	14.3% (7)	4.2% (8)	
	Equal	97.9% (139)	24.5% (12)	79.1% (151)	
	Yes	1.4% (2)	61.2% (30)	16.8% (32)	
	Total	100%	100%	100%	
	Only Berlin issued IPOs		No	Yes	
	No	33.3% (1)	66.7% (2)	0.7% (3)	
	Equal	95.3% (82)	4.7% (4)	97.9% (86)	
	Yes	14.3% (1)	85.7% (6)	1.4% (7)	
	Total	100%	100%	100%	

Note: Absolute numbers in parentheses

The dependent variable $Switching_i$ is equal to 1 if the firm switched underwriters between IPO and first SEO and equal to 0 if the firm used the services of the same bank. We analyse cases where the first SEO can be observed within five years after the IPO only. In the entire time period, 859 IPOs were issued in Berlin and provincial stock exchanges, 229 of which increased their capital by an SEO within five years.

Table 7 provides the results. The first three regressions are based on the whole sample, the latter three only on IPOs issued in Berlin. Regressions 1 and 4 provide the results for the probit regressions with the market shares as reputation measure. Regressions 2 and 5 provide results for the first stage regression, 3 and 6 the results for the probit regressions

with the estimated dependent variable from the previous regression as measure of reputation.

The first remarkable result is that the probability to switch underwriter for the SEO is significantly lower if the underwriter has a larger market share, but as regression three reveals, this is due to endogeneity. The estimated reputation from regression 3 has no impact. Thus, reputation does not only make no difference for the performance, it has also no impact on loyalty.

Regression 4 to 5 provide even more interesting results. The sample is reduced to IPOs that were issued in Berlin and had an SEO within 5 years. Again reputation does not matter. What matters is performance. The higher the sharpe ratio, i.e. the higher the returns compared to the risk, the less likely did firms switch banks. Furthermore, the higher the underpricing the higher was the probability to switch. Switching was directly dependent on the performance of the IPOs. The positive coefficient of the difference in market shares for the underwriters, which indicates that firms switched to banks with a higher reputation in the last three years, provides evidence that firms indeed made the switching decision. Another variable that emphasises these results is the size of the SEO in percent of the IPO. The larger the SEO compared to the IPO the higher is the probability to switch. Sometimes small banks that issued the IPO, simply could not handle the SEO, if it was too large. The probability to switch the bank for the SEO increases with the size of the SEO.

To summarize, the regressions show that loyalty was directly dependent on performance in the issuing process rather than on reputation. Since we observe a reasonable amount of firms switching one can conclude that the market for underwriter services in the IPO business seems to have been efficient.

Another result worth noticing in the first three regressions is that the location of the stock market was very important. The probability to stick to the original lead underwriter is reduced by around 63 percent if the SEO was placed at a different stock market than the IPO (see table 8).

TABLE 7: PROBIT MODEL

	(1)	(2)	(3)	(4)	(5)	(6)
	Probit	OLS	Probit	Probit	OLS	Probit
Dependent Variable	Underwriter switching	Market share	Underwriter switching	Underwriter switching	Market share	Underwriter switching
	Without Instruments	First stage	Second Stage	Without Instruments	First stage	Second Stage
Sample	All IPOs with an SEO within 5 years			Only IPOs issued in Berlin		
Market share	-11.436 (2.45)**			-9.995 (1.27)		
Reputation			-5.330 (0.87)			-2.493 (0.19)
Average Size (Instr.)		0.006 (4.30)***			0.007 (3.97)***	
Reputation (Instr.)		0.023 (5.33)***			0.017 (3.93)***	
Size of SEO in % of IPO	0.061 (0.68)	0.000 (0.13)	0.059 (0.63)	0.318 (3.26)***	-0.001 (0.98)	0.320 (2.78)***
Same stock Market	-2.077 (7.86)***	-0.004 (1.15)	-1.989 (7.66)***	-2.743 (3.59)***	0.014 (1.31)	-2.665 (3.46)***
Difference market share SEO bank and IPO bank	2.121 (1.89)*	-0.023 (2.18)**	2.282 (1.97)**	3.319 (1.22)	0.083 (1.90)*	2.680 (0.94)
Sharpe ratio				-16.065 (2.29)**	-0.039 (1.84)*	-12.726 (2.16)**
Initial Returns				0.205 (1.88)*	-0.001 (1.12)	0.200 (1.82)*
Constant	0.810 (2.69)***	-0.001 (0.28)	0.642 (2.02)**	1.281 (1.41)	-0.017 (1.53)	0.967 (1.06)
Observations	190 77.9	190	190 72.4	69 63.8	69	69 64.1
Wald chi2						
Prob > chi2	0.000		0.000	0.000		0.000
F		32.6			17.8	
Prob> F		0.000			0.000	
R-squared	0.44	0.55	0.41	0.52	0.54	0.5

* significant at 10%; ** significant at 5%; *** significant at 1%
Robust z / or t statistics in parentheses

TABLE 8: MARGINAL EFFECTS

	1	3	4	6
	Probit	Probit	Probit	Probit
Dependent Variable	Underwriter switching	Underwriter switching	Underwriter switching	Underwriter switching
	Without Instruments	Second Stage	Without Instruments	Second Stage
Sample	All IPOs with an SEO within 5 years		Only IPOs issued in Berlin	
Market share	-2.93		-0.61	
Reputation		-1.41		-0.18
SEO in days	-0.01	-0.01	-0.01	-0.01
SEO in % of IPO	0.02	0.02	0.02	0.02
Same Stock market	-0.64	-0.63	-0.71	-0.72
Difference market share SEO bank and IPO bank	0.54	0.61	0.20	0.19
Sharpe			-0.97	-0.92
IR_B			0.01	0.01

Conclusion

Reputation and concentration of market power to only a few banks were important features of German industrialisation (Burhop, 2011). However, the paper provides evidence that this was not the case on the stock markets. By analysing market shares of banks we can observe the same what one can observe for the market for loans (Burhop 2011): a pyramidal market structure with an oligopoly at the top and a large number of small banks at the bottom, and this pattern becomes stronger over time. In contrast to the oligopoly on the market for loans, the oligopoly on the stock market was weak.

We find no evidence that concentration reduced market efficiency. It rather seems that there was quite a strong price competition. Underpricing, for instance, a phenomenon

encountered on modern markets, which means that on average first market returns are positive, is almost absent¹⁵.

Furthermore, although firm loyalty increased over time we find a large number of firms that switched underwriters between the Initial Offering and the first Sequential Offering, which also supports the hypothesis that there was a strong competition between banks, although there were only a few banks at the top of the market.

However, the probability to switch underwriter between the IPO and the SEO decreased over time and the market became more concentrated. Since the stock market was closed during the war one can only guess whether the market would have remained that efficient.

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Appendix 1:

Table1 Estimated Rank after Instrumental variable estimation from table 6 for the 30 banks with the highest reputation

Underwriter	predicted reputation	MAIPOunderwriter	average size of issue	Member of the Imperial loan Syndicate
Deutsche Bank	0.08	9.44	7.77	yes
Bank für Handel und Industrie	0.06	3.15	6.31	yes
Dresdner Bank	0.05	5.71	5.78	yes
Berliner Handelsgesellschaft	0.05	3.85	5.50	yes
A. Schaaffhausen'scher Bankverein	0.05	4.66	5.18	yes
Direktion der Diskontogesellschaft	0.05	3.85	5.08	yes
Deutsche Palästinaabank	0.03	0.35	4.75	No
Mitteldeutsche Kreditbank	0.03	1.86	3.78	yes
Kommerz- und Diskontobank	0.03	1.40	3.13	yes
Deutsche Nationalbank	0.02	2.21	3.20	yes
Siemens	0.02	0.23	5.00	No
Hardy	0.02	1.17	3.19	No
Berliner Bank	0.02	1.52	3.00	yes
Heydt	0.02	0.82	2.67	yes
Breslauer Discontobank	0.02	1.40	3.55	No
Schlesinger	0.02	3.15	2.01	yes
Delbrück	0.02	1.05	2.37	yes
Bleichröder	0.01	0.58	2.14	yes
Allgemeine Deutsche Kreditanstalt	0.01	3.03	3.50	No
Fromberg	0.01	1.52	1.58	yes
Reißner	0.01	0.12	2.10	No
Zielenziger	0.01	0.35	2.37	No
Nelken	0.01	0.23	2.15	No
Jacquier	0.01	0.47	2.20	No
Feist	0.01	0.23	1.38	yes
Laupenmühlen & Co.	0.01	0.12	2.50	No
Soergel	0.01	0.82	1.86	yes
Boden	0.01	0.23	2.15	No
Neuburger	0.00	0.47	1.31	yes