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Law, Politics and the Rise and Fall of German Stock Market Development, 1870-1938

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Abstract

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Keywords: Initial public offerings, Germany, Financial History, Corporate Law, Stock Markets

JEL Classifications: N23, N24, G18, G24, K22

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Law, Politics and the Rise and Fall of German Stock Market Development, 1870-1938[1]

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1. INTRODUCTION

A quarter century ago, interest in comparing corporate governance arrangements across borders was negligible (Cheffins, 2013: 56). Much has changed since. There is now an extensive literature documenting and seeking to explain corporate governance structures across countries (Morck and Steier, 2006). This literature can provide insights for those analysing the development of markets and corporate organization through time. Conversely, historical analysis is relevant for understanding contemporary corporate governance arrangements because it provides insights as to whether variables, apparently important today, were in fact determinative. This paper follows in this tradition of historical enquiry by examining German stock market development between 1870 and the beginning of World War II with the focus being on initial public offerings (IPOs).

Historically, IPOs have been regarded as a bellwether for stock market development (Fama and French 2004). This is logical. Unless numerous public offerings occur and a large proportion of those firms go on to survive as quoted firms, a country will fail to have well-developed equity markets. More pragmatically, in the German context, due to the absence of time-series data on stock market capitalization IPO data constitute the best means of assessing stock market development on a year-by-year basis going back through time.[2] We have therefore hand-collected data regarding IPOs on the leading German market, the Berlin Stock Exchange, for each year from 1870 to 1938. We draw upon this dataset to document and then explain the rise and fall of German equity markets during this period.

Our data indicate that the relatively well-developed nature of Germany's stock market during the late 19th and early 20th centuries was due to the fact that Berlin enjoyed an active market in IPOs, with most of the companies surviving for at least their first five years. By 1913 there were 28 listed firms per million inhabitants in Germany, a figure three times larger than that of the U.S (Rajan and Zingales, 2003: 15, 17).[3] By 1938,

[2] Data required to compute aggregate market capitalization/GDP ratios is only available for a small number of individual years prior to 1951. From this point onwards annual data is available (Deutsches Aktieninstitut: 2013).

[3] Rajan and Zingales U.S. data is somewhat controversial. Other sources suggest the number of public companies per capita was larger before World War I than Rajan and Zingales indicate. See,

however, the number of listed German firms fell back to 11 firms per million inhabitants, only slightly above the US figure of nine.[4] By 1990, the German figure had declined further to a low of 6.5 firms, whereas the US figure was 26 firms per million inhabitants. This was a complete reversal of the relative positions of the two countries in 1913.

Our investigation of IPO activity indicates that law did much to influence the ebb and flow of stock market development in Germany. We show that IPO survival rates during the period we focus on can be explained to a significant extent by statutory reforms occurring in 1884 and 1896 that imposed obligations on companies going public. We are not the first to identify law as a potential determinant of stock market development in Germany. However, while Coffee (2001, 55-58) argues that reforms in 1896 had a deleterious impact our results indicate the opposite and lend support for a "law and finance" hypothesis claiming that legal factors do much to explain stock market development.

The law and finance hypothesis, which originated with papers by La Porta, Lopez de Silanes, Shleifer and Vishny (La Porta *et al.* 1997; La Porta *et al.* 1998) (LLSV), posits that the extent to which a country's laws foster investor confidence by protecting minority shareholders and constraining corporate insiders helps to explain cross-border equity market patterns (Djankov *et al*. 2008). Historical case studies have cast doubt on this claim, both in the case of equities (Cheffins, 2001; Franks, Mayer and Wagner, 2006) and bonds (Musacchio, 2008; Coyle and Turner, 2013). In contrast, our finding of increased IPO survival rates after the legal reforms of the 1880s and 1890s lends support to the law and finance claim that legal protection can help to foster stock market development. However, the fact that this development of the IPO market occurred in Germany contradicts a related law and finance claim that civil law countries are less likely than common law countries to enact the laws necessary to develop their stock markets.

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for example, O'Sullivan (2007: 449, 507, 512) (indicating that the number of listed firms per million inhabitants was 13.9 in 1910/11 and 15.8 in 1915). Even with these revised figures, however, the number of listed firms per million inhabitants was considerably higher in Germany than in the United States.

[4] Again, the Rajan and Zingales data has been questioned. See O'Sullivan (2007: 523), reporting a figure of 31.1 listed firms per million inhabitants in the U.S. in 1930.

If the German legal system supported stock markets before World War I, why do we observe a stock market "great reversal" (Rajan and Zingales, 2003) during the 20th century? Perotti and von Thadden (2006) have suggested that countries afflicted by hyperinflation during the interwar years – Germany was a paradigmatic example – suffered a legacy of weak stock market development because confidence in all but the safest investments was shattered when retail investors had their savings wiped out. Perotti and von Thadden's conjectures concerning hyperinflation and stock market development suggest that IPO activity would have been dormant following Germany's well-known bout of hyperinflation in the early 1920s. This was not the case. Our data indicates an IPO boom coincided with the hyperinflation of the 1920s, even though the survival rate was below historical norms. Moreover, IPO activity was reasonably robust throughout the remainder of the decade.

In contrast, we offer a legal explanation for the demise of the IPO market and for what ultimately proved to be the long-term reversal in German stock market development. We find that IPO activity ceased as the 1930s opened and was not rekindled by Germany's economic recovery in the middle of that decade. This was due in large measure to legal change but of a sort that was much more politicized than conventional law and finance theory contemplates.

The process began as the decade got underway. Germany's stock exchanges were closed for nearly a year as a result of government edicts which were designed to address a 1931 banking and currency crisis. While the German government issued an emergency ordinance in 1931 that strengthened shareholder rights in some respects (Manaa, 2011), overall regulatory intervention at this point was in all likelihood a blow to investor confidence.

Nazi policies had an even more dramatic impact. The Nazis treated the financing of rearmament as a top priority and restrictions they imposed on private issuers seeking to raise capital meant IPOs were unlikely to be feasible. Moreover, a new corporation statute enacted in 1937 reflected a general Nazi antipathy towards shareholders (Mertens, 2007). Roe's politically oriented argument that stock markets are weak in social democracies because of the pressure from organized labour on managers to abandon their shareholders (2003: 37) is instructive in this context. According to

Roe, when labour makes strong claims on firms' cash flows, and correspondingly shareholder returns, equity markets will tend to suffer because concentrated share ownership will be particularly valuable to shareholders. In Nazi Germany, the pressure on shareholders did not come from organized labour, but from a party treating rearmament as the top priority. The Nazi party used the power of the state to reallocate resources to achieve desired ends, with a by-product being the strangling of a stock market that had supported numerous successful IPOs for more than half a century.

In making these points, our paper yields four major results. First, we document for the first time the existence of an active IPO market in Germany not only in the late 19th century but also in the opening decades of the 20th century. Second, consistent with the claims of the law and finance literature that protection afforded to investors by corporate and securities law helps to determine the extent to which capital markets prosper (La Porta et al., 1998; La Porta et al., 2006), we reveal the positive impact of regulation enacted during the 1880s and 1890s on IPO survival. Third, we show that even where the law is providing protection to IPO investors, prestigious underwriters can further bolster the IPO survival rate. Fourth, our analysis of Germany in the 1930s indicates that politically inspired legal intervention can cripple stock markets. Thus, government policy can not only foster stock market development but also throw the process into reverse when political priorities change.

We set the stage for our analysis by offering an overview of theoretical expectations concerning regulation and IPOs (section 2). We describe next our new dataset covering all IPOs undertaken at the Berlin Stock Exchange between 1870 and 1938 (Section 3) and compare our IPO data with other salient empirical evidence concerning stock market development in pre-World War II Germany (Section 4). Section 5 discusses the evolution of regulation relevant to IPOs and assesses its impact on IPO survival rates. Section 6 investigates whether the involvement of highly reputable German universal banks in IPOs helps to explain the success of the German IPO market in the closing decades of the 19th century and opening decades of the 20th century. Section 7 considers changes occurring in the 1930s that threw into reverse the development of the stock market over the preceding decades. Section 8 concludes.

2. REGULATION AND IPOs: THEORETICAL CONTEXT

Advocates of what has been referred to as “the legal approach to corporate governance” concede “reputations and bubbles can help raise funds” but maintain that the protection of outside investors is the key mechanism underlying the functioning of a flourishing financial system (La Porta *et al.*, 2000: 4). In a country with laws that effectively protect minority shareholders from overreaching by dominant shareholders, outside investors should feel “comfortable” buying shares. Entrepreneurs, being aware of the potentially healthy demand for equity, should also be more inclined to raise capital and/or create an exit option by distributing shares to the public than they would be in a *laissez-faire* environment (Cheffins, 2008: 34).

The law and finance logic is applicable to IPOs. Fama and French (2004) argue that the market for newly listed firms is a bellwether for the development of public equity markets and the law and finance literature implies the quality of legal protection afforded to outside investors will do much to dictate the success of IPO markets (Doidge et al., 2013). If the law leaves outside shareholders unprotected, successfully launching IPOs will be problematic due to worries that the IPO proceeds will be dissipated through ill-conceived managerial initiatives or consumed in private benefits of control. In contrast, in countries with “good” corporate and securities law, investors should be well-positioned to evaluate potential IPO candidates and should have meaningful protection against egregious mismanagement. IPOs can then occur with greater frequency and those companies that go public should enjoy a higher probability of survival.

From a law and finance perspective, any form of corporate or securities law that constrains the diversion of corporate wealth by managers and/or controlling shareholders should theoretically help to foster stock market development. In the context of initial public offerings, however, rules mandating disclosure by those carrying out IPOs are likely to be of particular importance (Stulz 2009). Information asymmetry can be acute for IPOs, where issuers meet with public investors for the first time. A counterproductive market for “lemons” (Akerlof 1970) that drives out high quality IPOs can ultimately result. Lawmakers can seek to correct matters by passing legislation mandating disclosure by firms carrying out public offerings. Such

disclosure should make it easier for public investors operating in an uncertain world to distinguish higher quality shares from their less valuable counterparts, thus facilitating the financing of profitable ventures that otherwise might founder. Regulation should thereby foster IPO activity and channel funds to higher-productivity projects (Shleifer and Wolfenzon 2002; Stulz 2009).

Law and finance scholars have tested their theories on a cross-country basis using various measures of recent stock market development, including IPO activity. Previous studies have verified a positive relationship between IPO activity and tougher regulation (La Porta et al., 1997; La Porta et al., 2006; Djankov et al., 2008; Doidge et al., 2013). In a historical setting, law and finance logic implies that sustained IPO activity is most likely to occur when the law ameliorates information asymmetries and affords substantial protection to outside investors. Furthermore, IPO survival rates, all else being equal, should be higher because dubious ventures will be less likely to gain the investor support required for a successful public offering (Burhop et al. 2014). However, in the case of the United Kingdom and the United States, legal reforms did not affect capital market development in expected ways (Cheffins, 2001; Cheffins et al., 2013; Coyle and Turner, 2013).

Aside from Franks *et al.* (2006), historically oriented law and finance analysis of the German situation has been lacking. Correspondingly, a more detailed look into the German case is in order and motivates our use of a new IPO dataset in this paper. There has been empirical research conducted on of the impact of Germany's 1884 incorporation law on IPO underpricing and on the impact of 1896 stock exchange legislation on the informational efficiency of stock prices (Burhop, 2011; Wetzel, 1996: 287; Gelman and Burhop, 2008; Weigt, 2005, 51-59, 181-186, 197). To our knowledge, however, there has been no empirical research on the interrelationship between law and IPO survival rates.

3. BERLIN STOCK EXCHANGE IPOs, 1870-1938

The Berlin Stock Exchange first emerged as a market for shares in the mid-19th century (Wormser, 1919: 18-19). Given the bank-oriented nature of the modern German corporate economy and given that bank-oriented corporate governance is sometimes characterized as being antithetical to the development of robust equity

markets, it might be thought that the publicly traded company would have played a minor role in Germany's rapid economic development in the late 19th and early 20th centuries. This was not the case. Not only were nearly all large firms organized as joint-stock companies[5] but from 1870 onwards a well-developed market in publicly traded shares began to emerge in Berlin, the premier stock exchange in Germany (Gömmel, 1992: 147, 153-154, 161). This development of the Berlin stock market is confirmed by our hand-collected dataset of IPOs which took place on this exchange between June 1870 and December 1938 and which we describe in the rest of this section.

3.1 DATA SOURCES

We treat an IPO as having occurred when any stock, not previously listed and advertised by a prospectus, is issued to the general public by a AG or KGaA, and its price is quoted following the issue.[6] We identify an IPO primarily by when a company first appears in the stock market manual, *Saling's Börsenpapiere*. Given that only four issues of this manual were published before 1880, we supplement this data source for the first decade of our sample period with others described in Appendix Table A1.

Our 1870-1938 IPO dataset comprises 1,062 companies.[7] For each IPO, we collect information on firm age (number of months between incorporation and date of IPO), firm size (market value at the end of the IPO year deflated in 1913 prices), industry sector and the name of the lead underwriter. We do not calculate how much new money was raised because the majority of prospectuses did not disclose the number of shares in the newly listed firm issued to the founders and related parties.[8]

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[5] 79 (77) of the 100 largest firms in 1887 (1907) were joint-stock companies (Kocka and Siegrist, 1979: 86).

[6] *Bergrechtliche Gewerkschaften* are not included.

[7] Our original sample contains 1,155 firms. We drop several firms since we do not observe the year of incorporation (29 firms), the share capital (one firm), or the end-of-IPO-year market price (or a price close to this date, 63 cases). In total, we drop 93 observations and the final sample consists of 1,062 firms.

[8] An examination of 106 prospectuses stored in the Deutsche Bank archive revealed the relevant information for only 40 firms. In these cases, 73 percent of the shares were allocated to the original owners of the assets transferred to the newly listed firm.

Having identified the companies carrying out IPOs we then ascertain whether they survived, defined by whether or not they were still listed on the Berlin Stock Exchange five years after the IPO.[9] The five year threshold makes our results comparable to the results provided by Burhop et al. (2014) and Chambers (2010) for early 20th century IPOs on the London Stock Exchange and by Simon (1989) for U.S. stock markets at the time federal securities regulation was introduced. We treat any company acquired within five years of its IPO as a failure even though shareholders of such firms may have received consideration for their shares. We do so because of a lack of information concerning the terms of mergers and acquisitions during the period. Our methodology introduces a downward bias in our estimated survival rate but this bias should be small. Kling (2006) estimated that mergers and acquisitions were unimportant in Germany before the late 1890s.[10] During the interwar period, mergers contributed to a modest overall reduction in the number of listed firms (see section 4), but we have identified only six IPO firms in our dataset from this era that were acquired within five years of going public.

3.2. DESCRIPTIVE STATISTICS

Our aggregate total of 1,062 IPOs implies that 15 firms per year went public in Berlin between 1870 and 1938, or approximately one IPO every three weeks. This average of 15 IPOs annually conceals considerable year-on-year variation (Figure 1), since German IPOs occurred with the same wave-pattern exhibited by IPOs on modern stock exchanges (Lowry, 2003). The first major IPO wave occurred during the early 1870s, with 168 companies going public in the peak IPO year of 1872. The second major burst of activity happened during the hyperinflation of the early 1920s, climaxing in 1923 when 95 firms went public. Applying a definition of a “hot” IPO market as any year when the number of IPOs was at least two standard deviations above the sample period average, only 1872 and 1923 qualified.

[9] In any year, firms with an end-of-year share price or known to have announced a dividend (even if the dividend was zero) are treated as surviving.

[10] According to a government enquiry, only seven mergers occurred among German joint-stock companies (listed and non-listed) between 1872 and 1883 (Reichstag, 1883: 412).

Figure 1: Number of IPOs per year, 1870-1938, and their survival rate

Source: IPO database; own calculation.

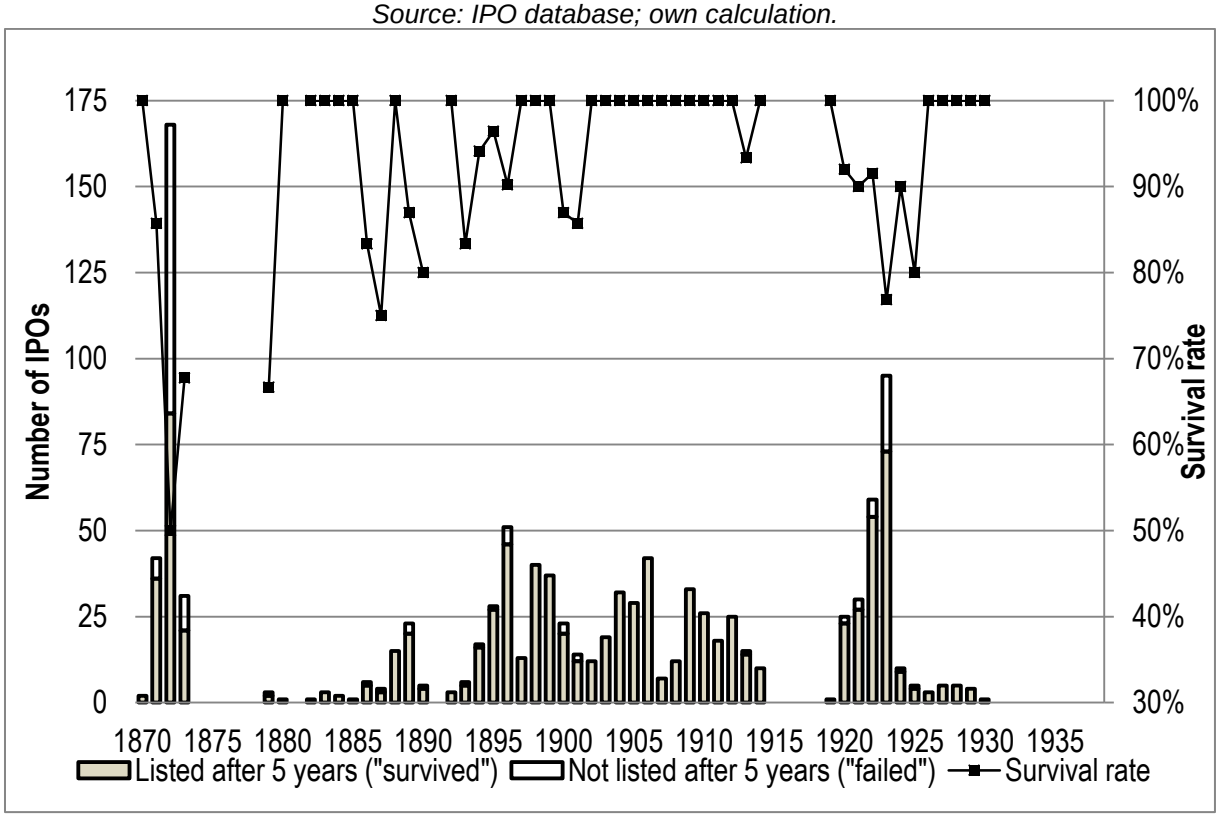


Table 1 summarizes firm characteristics, industry breakdown and survival rates of IPOs across the whole period of our study as well as for selected sub-periods. Our chosen breakpoints reflect the two major regulatory changes before World War I, namely, the overhaul of German corporate law in 1884 and the coming into force of a new stock exchange act in 1897. We discuss both these regulatory changes in detail in section 4. Our post-World War I breakpoint is the hyperinflation of 1923.

Some of Germany's leading industrial firms went public during the period of our study, such as Bayer in 1885, Siemens in 1899, and BMW in 1926. This fact reflects a broader trend. In our dataset, 54 per cent of companies carrying out IPOs came from heavy industries (electrical and mechanical engineering, chemicals, and other manufacturing). IPOs from lighter industries (textiles, clothing, food, drink, and tobacco) and the service sector (financial and non-financial) were considerably less common. Given that German firms in the heavy industrial sectors had relatively high labor productivity during the late 19th and early 20th centuries (Broadberry and Burhop, 2007: 320-321), IPO activity reflected German industrial strength in this period.

TABLE 1 : DESCRIPTIVE STATISTICS FOR BERLIN IPOs, 1870-1938

	1870-1938	1870-1883	1884-1896	1897-1914	1919-1923	1924-1938
Number of IPOs	1,062	251	161	407	210	33
Industry sector breakdown :						
Heavy industry:	54%	51%	48%	54%	60%	48%
Chemical, Electrical & mechanical engineering	21%	23%	17%	18%	26%	27%
Mining, iron & steel production	15%	18%	12%	19%	9%	3%
Other manufacturing	17%	10%	19%	17%	25%	18%
Light industry:	28%	28%	34%	27%	26%	30%
Textiles & clothing	8%	6%	8%	8%	10%	9%
Food, drink & Tobacco	11%	10%	20%	9%	10%	12%
Construction & real estate	9%	12%	6%	11%	7%	9%
Services:	19%	21%	18%	19%	14%	21%
Financial	8%	13%	7%	6%	4%	15%
Utilities & transportation	8%	6%	9%	10%	6%	3%
Other services	3%	3%	2%	3%	4%	3%
Firm Characteristics:						
Age at issue (in months)	107	2	36	111	357	284
Real market value (mil. M, 1913 prices)	6.2	4.0	5.0	7.4	7.3	6.8
Underwriter Characteristics						
Number of different lead underwriters	252	114	59	76	50	30
Market share (in number of IPOs) of five largest underwriters	27%	31%	32%	43%	60%	52%
IPO survival after 5 years:						
No. surviving firms	907	150	147	401	178	31
Survival rate	85%	60%	91%	99%	85%	94%

Source: Own calculation from IPO database.

Industry characteristics aside, the features of Berlin IPOs varied over time. One marked trend was that firms going public became older and larger. Between 1870 and 1883, the average age at issue, measured by the period between incorporation and going public, was only two months. Subsequently, the average age increased steadily and reached more than 20 years for interwar IPOs. The average size of an IPO, measured by a company's end-of year IPO market value, increased from 4.0

million Mark to 6.8 million Mark at 1913 prices.[11] As of the early 20th century, the average size of Berlin IPOs was similar to companies going public on the London Stock Exchange during the same period (Burhop et al., 2014: 67). Despite IPO firms growing in size, established public companies remained substantially larger than firms at the time of going public.[12]

Table 1 also provides a breakdown of IPO survival by sub-period. IPO survival between 1870 and 1883 was lower than it was in any other subsequent period. The pre-1914 IPO survival rate increased markedly both after 1884 and 1897. In the post-World War I period, the survival rate of 85 percent between 1919 and 1923, despite being considerably lower than the rate for the years between 1884 and 1914, was nonetheless in line with the overall average for the 1870-1938 period. After the 1923 stabilization of the currency, the survival rate increased to 94 percent, albeit with relatively few firms going public due primarily to the disappearance of IPOs in the 1930s. Hence, while the hyperinflation of the early 1920s had a modestly adverse impact initially on IPO survival, the effect was not sustained through the rest of the 1920s.

While the Berlin Stock Exchange IPO survival rate exhibited some time-variation, firms going public during the two major hot markets of the period experienced particularly low survival rates. Half of the 1872 IPO cohort failed and about one quarter of the 1923 cohort did likewise. This finding is consistent with the UK experience, at least in the interwar years (Chambers 2010: Table 5).

Overall, 85 percent of the IPOs in our dataset across the whole period 1870-1938 survived for at least five years (Table 1). This implies a failure rate of about 15 percent, similar to London Stock Exchange IPO failure rates of 13 percent between 1900 and 1913 (Burhop et al., 2014: 68) and 18 percent between 1919 and 1938 (Chambers 2010: Table 5) and slightly below the New York failure rates of 21 percent

[11] In general, inflation rates were low and averaged only about one percent annually before the War. Whenever we deflate data to 1913 constant prices, we use Hoffmann's (1965: 598-601) net national product deflator for the years 1870-1914 and 1924-38 and the official deflator of the Reichsregierung (1924: 59) for the hyperinflation period 1919-1923.

[12] Data provided by van der Borght (1883) for 1881 and by the Statistische Reichsamt for the years 1925 to 1938 indicates that established firms were about four to five times the size of newly listed firms during the 1870s and about three times the size of newly listed firms during the interwar period.

between 1926 and 1938 (Simon, 1989: 300). IPO failure rates on stock markets during the late 20th and early 21st century have been very similar (Carpentier and Suret, 2011: 104). Given that there were a substantial number of IPOs and given the high survival rate among firms that went public, the IPO market should have provided a suitable platform for German equity market development. As we see next, this was in fact the case.

4. THE STOCK MARKET IN GERMANY, 1870-1938

In this section, we briefly review the statistical evidence on German stock market development that supports our claim that a well-functioning IPO market is important for such market development. Figure 2 summarizes what we know from existing sources about the total number of firms listed at the Berlin Stock Exchange and their aggregate market value expressed in percent of German GDP. Our analysis suggests that the occurrence of IPOs with a high survival rate contributed significantly to the presence of a sizeable number of firms listed on the Berlin Stock Exchange, at least until IPO activity ceased in the 1930s.

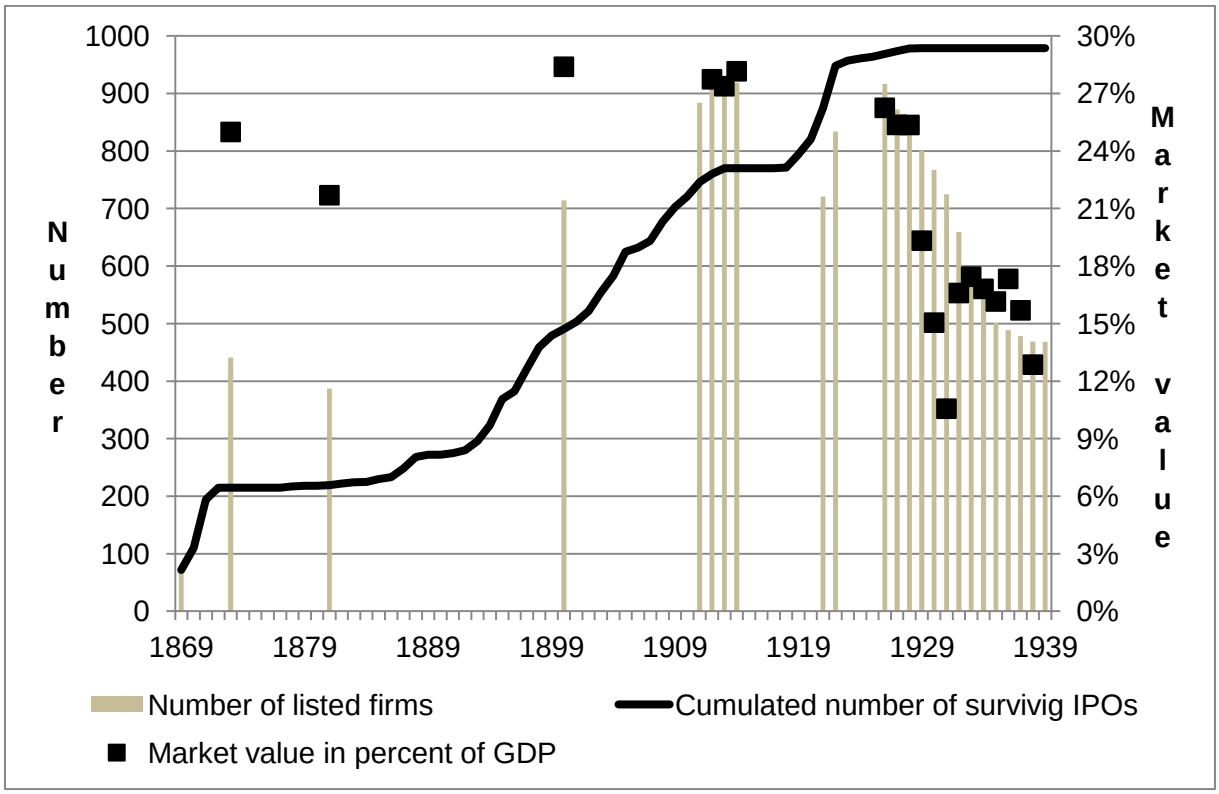
In terms of basic history, as of 1869 72 firms had their equity listed at the Berlin Stock Exchange in 1869 (van der Borght, 1883: 256-287). This number grew dramatically to 441 by the end of the 1872 IPO boom (Engel, 1875).[13] After the 1873 stock market crash, there occurred a period of decline followed by stagnation which continued until the early 1890s (Henning, 1992: 153-157,161). Subsequently, the 1896 Stock Exchange Act contained various features that were potentially detrimental to stock market development, such as barring transactions on credit for many types of securities transactions and requiring “speculators” trading on stock exchanges to register publicly. Coffee (2001: 57) has suggested this legislation set the stage for the stagnation and decline of equity markets. In fact, German equity markets remained well-developed for decades thereafter. By 1914, 919 firms having

[13] The increase was due to cross-listings from Germany’s regional stock exchanges as well as IPOs.

an aggregate market value of 14.7 billion Mark ($3.5 billion) were listed (Königlich Preussisches Statistisches Landesamt, 1915: 340).[14]

Figure 2:

Number and value of firms listed at the Berlin Stock Exchange, 1869-1939



Sources: Van der Borght (1883) for 1869 and 1881. Engel (1875) for 1873, Hannah (2007) for 1900; Königlich-Preussisches Statistisches Landesamt (1915) for 1911-14; Preussisches Statistisches Landesamt (1923) for 1921/22, Statisches Reichsamt (1939) for 1926-39.

World War I and its immediate aftermath had an adverse impact on the Berlin Stock Exchange, with the number of listed companies falling by 15 percent to 790 in 1921 (Preussisches Statistisches Landesamt, 1923: 246). Subsequently, however, this number recovered by 1926 to 917 – back to the level of 1914. Given that interwar inflation has been cited as a deterrent to stock market development, the buoyancy in the number of listed firms in the early 1920s might be surprising. IPOs, however, were fuelled partly by the belief among contemporary investors that shares could act as a hedge against inflation and hyperinflation (Henning, 1992: 219, 225-228; Feldman, 1993: 390, 606-7). Share prices did not perform well in absolute terms

[14] The second most important German stock exchange, located in Frankfurt, listed only 269 domestic firms in 1912, many of them cross-listed with Berlin (Wormser, 1919: 208). Moreover, the turnover of the Berlin Stock Exchange was about 15 times larger than the turnover of the Frankfurt Stock Exchange in the early 20th century (Wormser, 1919: 229).

during the hyperinflation but performed much better than cash and government bonds that were virtually worthless when the episode ended (Webb, 1989: 6, 59, 86).

Largely due to the delisting of firms due to mergers the number of companies listed fell from 917 to 801 in the late 1920s (Fiedler, 2002: 217; Beer, 1999: 132). A pronounced economic downturn that elicited de-listings caused a further decline to 659 firms by the end of 1932. The number of listed firms fell further to 469 in 1938 despite the robust economic growth occurring during the initial years of Nazi rule (Statistisches Reichsamt, 1939: 424).

We can further substantiate the foregoing account of the rise and fall of the publicly traded company in Germany with aggregate data we have compiled on equity finance relative to bank loans across our study period. For the periods 1884-1913 and 1925-38, we calculate the inflation-adjusted market value of newly issued shares of German companies on all German stock exchanges, including Berlin (Deutsche Bundesbank, 1976: 293), as well as changes in the stock of long-term and short-term loans made by joint-stock banks (universal and mortgage) and public banks (Deutsche Bundesbank, 1976: 56, 60-61 and 77).[15] Between 1884 and 1913, 21.6 billion and 16.3 billion Mark was raised by new loans and by issuing shares respectively, making the stock market nearly as important as commercial bank lending as a source of finance (Fig. 3).[16] Thus, during this period a strong banking sector was operating in tandem with a well-developed stock market.

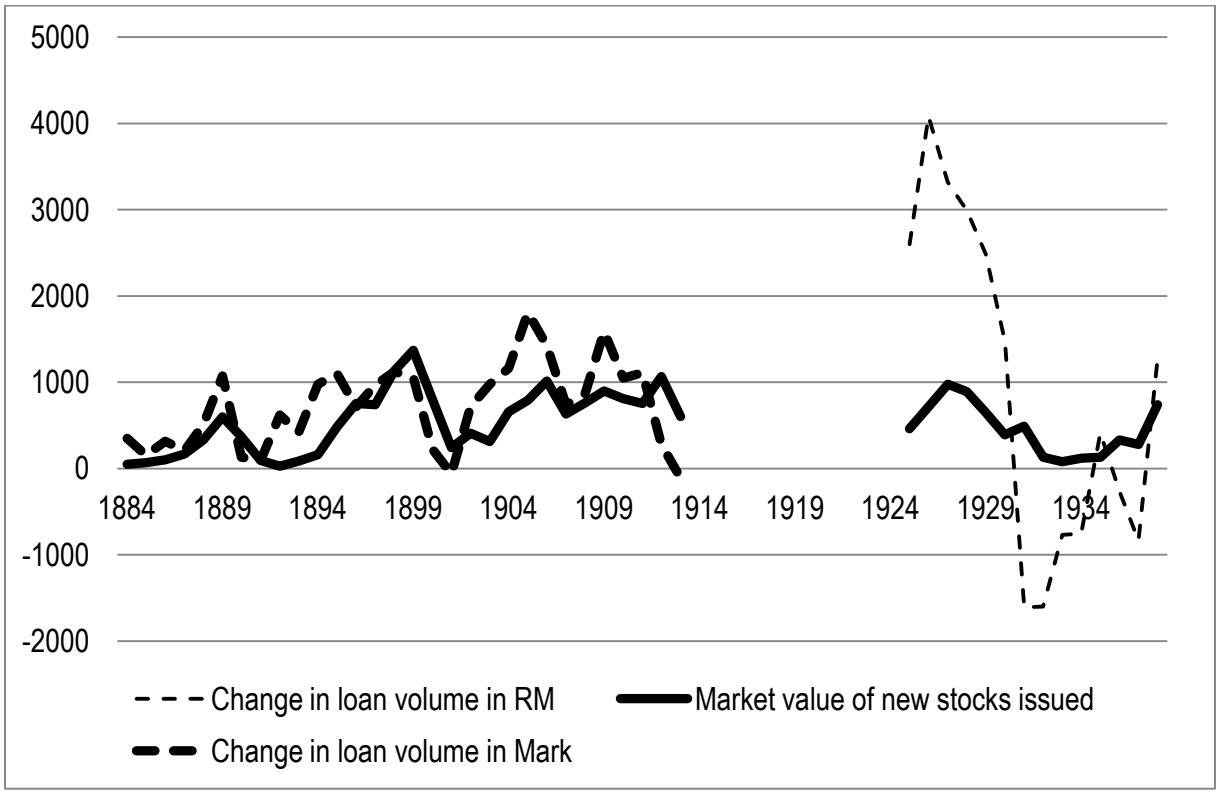
During the years immediately following the 1923 hyperinflation, borrowing became markedly more important than share issuance as a source of finance. Between 1925 and 1931 new loans totalled 15.4 billion RM as compared with 4.6 billion RM in newly issued stock. This large gap occurred primarily because German banks wanted to rebuild their loan portfolios after the hyperinflation. Nonetheless, the stock market continued to be a meaningful source of industrial finance in Germany during the

[15] Definitions change slightly over time, but in 1913, when both series are available, one series shows a level of loans of 21.5 billion Mark, whereas the other shows a level of 28.6 billion Mark. Since we are interested in flows, we calculate the first differences of both series to get a rough measure of the amount of new money raised by loans between 1884 and 1913 as well as between 1925 and 1938.

[16] A small corporate bond market existed, too. In 1913, the value of outstanding bonds has been about a quarter of the value of outstanding shares. In 1938, the ratio was only 7 percent (Beer, 1999: 329-330).

1920s. New equity issues were less important in the 1930s (1.8 billion RM between 1932 and 1938) but the decline was modest compared to that affecting bank lending.

Figure 3: New money raised by Loans and by Stock Issues (million Mark / Reichsmark, 1913 prices).



Source: Deutsche Bundesbank (1976: 56, 60-61, 77, 293), Hoffmann (1965: 599-601); own calculations

Overall, our new IPO dataset correlates well with the statistical evidence about German stock market development presented here. Our IPO dataset correspondingly appears to be a reliable proxy for general trends in stock market development. Next, we seek to explain the pattern of IPO survival over our period of study.

5. REGULATION AND THE RISE OF THE BERLIN STOCK EXCHANGE

5.1 LAW AND IPOs IN GERMANY

Before the introduction of a general corporation statute in 1870 in Prussia and some other German states incorporation was only possible by government concession.[17]

[17] See Martin (1969) and Hopt (1980) for the history of corporate law in Germany until 1870. Some smaller states (e.g., Hamburg, Bremen and Saxony) had free incorporation before 1870.

This new corporation statute became the operative law not only for Prussia but for all states shortly after the formation of the German Empire in 1871. As a result incorporation could occur throughout Germany as a matter of right if at least three shareholders agreed upon a corporate charter, paid at least ten percent of the proposed share capital in kind or in cash to the corporation, elected themselves to the supervisory board, appointed an executive board, and registered the company at the local commercial register. Generally, an incorporated company was eligible to have its shares traded on a stock market once 40 percent of the issued capital had been paid up (Gareis, 1880: 185-200).

The introduction of "modern" corporate law in Germany coincided with an initial burst of incorporation and IPO activity. 1872, as we have seen, witnessed a hot IPO market. This was accompanied by a general surge in company formation. 843 corporations were formed between 1871 and 1873, thereby increasing the total number of joint-stock companies by a factor of five within three years (Reichstag, 1884: 390).

While the IPO failure rate was high in the early 1870s (see Section 3.2), the phenomenon was not restricted to companies going public. Two out of five joint-stock companies incorporated during the early 1870s had failed by 1883 (Reichstag, 1884: 404-405, 408-409). This poor track record triggered a prolonged debate about the rules of incorporation and governance of joint-stock companies that ultimately resulted in significant reform (Engel, 1875; Reichstag, 1884).

Legislative reform was preceded by stock exchange reform. In 1882 the Berlin Stock Exchange listing rules were amended to set down for the first time the requirements for public offerings of securities.[18] Stock exchange listing rules can function as a self-regulatory substitute for statutory intervention (Mahoney, 1997), as was the case with British stock markets for much of the 20th century (Cheffins, 2001: 473-76). In contrast, stock exchange listing rules in Germany were developed under governmental auspices, with the state in which a stock exchange was based (Prussia in the case of Berlin) signing off on all listing rule amendments.

[18] The Berlin Stock Exchange overhauled its rules and regulations in 1866 but refrained from introducing rules concerning IPOs (BLHA, file Rep. 1, 456).

By virtue of the 1882 reforms, firms seeking to go public on the Berlin Stock Exchange had to have a minimum share capital of one million Mark (about $240,000) and to provide copies of its corporate constitution, its commercial register and its last annual report. Those organizing an IPO were required additionally to issue a prospectus disclosing prescribed information. The information required included the purposes of the company going public, the composition of its capital, subscription rights or specific incorporators' rights (if any), the membership of the executive and supervisory boards, the most recent balance sheet and profit and loss account, and the company's dividend track record for the five preceding years, or, for fewer years where the company had only recently been incorporated. Stock exchange officials could also demand any further information they deemed necessary to assess a public offering (Beisert, 1890).

Under the 1882 regime each application for a stock exchange listing was screened by a stock exchange admission committee. The committee had the discretion to reject even a formally complete prospectus (and thus an IPO). Berlin's stock exchange admission committee was initially composed of a small number of representatives of the leading banks, with Julius Schwabach, a co-owner of the Bleichröder banking house, acting as head until 1887, when Johannes Kaempf, board member of the Darmstädter Bank, took the leading position.

The 1884 corporation law tightened considerably the requirements for incorporating companies, regardless of whether a move to the stock market was contemplated. The Act required, for instance, that fledgling companies publish their corporate charter, a profit-and-loss account, information about asset valuation and an audited report about incorporation, including a balance sheet. If documentation associated with an incorporation was not fair and truthful the incorporators and other interested parties, such as the underwriter, could be held liable for losses suffered by initial shareholders relative to the issue price during the first two years after incorporation (Gareis, 1888: 261-262, 290-292).

As well as tightening the rules governing incorporation, the 1884 Act bolstered shareholder rights (Bayer and Burhop, 2009). For example, every shareholder was

given the right to attend shareholder meetings and every shareholder was guaranteed voting rights.[19] Moreover, each corporation had to publish not only a balance sheet (this had been compulsory since 1861), but also a profit-and-loss statement. Both documents, moreover, had to be scrutinized by a company's supervisory board, which was now elected by the shareholders (Franks et al., 2006: 540). In addition, non-shareholders, such as bank representatives, became eligible to serve on the supervisory board.

The other major regulatory reform occurring prior to changes in the 1930s was the enactment of the 1896 Stock Exchange Act, a piece of legislation described as "the most elaborate attempt ever made to regulate speculative markets" (Emery 1898: 286). A key change the 1896 legislation made was to oblige every German stock exchange to adopt admission procedures akin to the Berlin Stock Exchange's. This meant the submission of a prospectus became mandatory for all German IPOs, that other IPO rules were standardized by law and that all German stock exchanges were required to establish an admission committee (Börsenenquetekommission, 1892: 11-14; Pfleger and Gschwindt, 1897: 113, 126, 202). A government employee (Staatskommissar) was charged with monitoring each stock exchange and ensuring that all rules and regulations were applied and enforced. There correspondingly was very little room for regulatory arbitrage.

The 1896 Act did not merely oblige other German stock exchanges to adopt a regulatory system in line with Berlin's. Instead, rules applicable to Berlin were tightened as well. For instance, those who organized an IPO and underwrote it were deemed to be liable for false statements or suppression of facts, either purposely or through gross negligence, for a period of five years after issuing a security. Damages were deemed to be recoverable on the basis of the difference between the existing price and the price at which the issue was first put on the market (Emery 1898: 313). The admission board of all stock exchanges, including Berlin, also became obliged to ensure that all pertinent facts in regard to an equity offer were stated to the public as fully as possible. In fact, it was common practice for admission boards to rely on their

[19] This does not mean that a one share one vote rule has been implemented. Nearly all firms restricted the voting power of blockholders before 1884; the practice became much less common thereafter (Bayer and Burhop (2009: 472). Our IPO data indicates that multiple voting shares were popular in the early 1920s but quite rare otherwise.

powers to request additional information from those organizing public offerings (Obst, 1921, vol. 1, 385; vol. 2, 511-12). An admission board was required additionally to reject a public offering of shares which would cause the investing public to be defrauded and could only list a company rejected by the board of another German stock exchange if the latter consented (Loeb 1897: 403, 405).

5.2 IMPACT OF REGULATORY REFORM ON IPO SURVIVAL

If law matters for IPOs in the manner law and finance theory predicts, we would expect to find improvements in IPO survival rates after progressively tougher regulation was introduced in 1882, 1884, and 1896. The available evidence is generally supportive of this proposition. Among pioneering studies of the relationship between regulatory reform and IPOs focusing on the enactment of the 1933 Securities Act in the US (Stigler, 1964; Jarrell, 1981; Simon, 1989), Simon (1989) finds that this legislation substantially lowered the failure rate for non-NYSE IPOs but did not do so for NYSE IPOs. This may well have been because pre-1933 listing requirements were relatively lax for regional stock exchanges compared to those of the NYSE. More recent research on IPOs on the London Stock Exchange indicates that survival rates varied directly with the degree of regulation both before (Burhop et al 2014) and after World War I (Chambers 2010). IPOs carried out on London's unregulated Special Settlements market exhibited relatively high failure rates in comparison with the somewhat more heavily regulated Official List.

Firm age (Sutton, 1997; Caves, 1998), firm size (Audretsch and Mahmood, 1995), and the type of industrial activity (Agarwal, 1997) have been found to be important determinants of IPO survival, with smaller, younger and new industrial sector firms having a lower survival probability. Correspondingly, we control for these characteristics in our study. Similarly, because IPOs occurring during the hot markets of 1872 and 1923 exhibit a higher likelihood of failure (section 2) we control for IPO market conditions.

We model IPO survival using a probit model.[20] Our dependent variable, survival (s_i), takes the value 1 when a firm *i* is still listed five years after its IPO. Our explanatory

[20] We obtain similar results when we estimate a Cox proportional hazard rate model instead of a probit model. Results are available upon request.

variables consist of firm characteristics (size, age, and sector), and "hot market" dummy variables for the years 1872 and 1923. Hence, we estimate the following model:

$$\text{Prob}\,(s_i=1|X) = \Phi\,(\beta X')$$

with Φ denoting the cumulative density function of the normal distribution, β the vector of estimated coefficients, and $X' = \{size_i, age_i, sector_i, 1872, 1923\}$ the vector of explanatory variables.

Table 2 summarizes the results. As expected, the positive coefficients on Size and Age indicate that larger and older firms in the late 19th and early 20th century had a higher survival rate than other firms (models 1 and 2). However, industrial sector has no effect on survival probabilities and, in particular, heavy industrial firms, representative of the new industrial sector, were no more likely to fail than other companies (model 3). On the other hand, the survival rate of firms which went public during the hot markets of 1872 and 1923 were significantly lower than the survival rate of firms going public during times of normal or low IPO activity, even after firm and industry characteristics are controlled for (model 4). This is also true when we merge the two year dummies into one hot market dummy (model 5).

Models 6 and 7 provide evidence on survival rates for the years before and after World War I respectively. In the interwar period, the firm age coefficient is not statistically significant and the coefficient on firm size is only significant at the seven percent level. Nevertheless, both models work quite well and explain between 82 and 77 percent of the variation in IPO survival respectively.

Having identified hot markets, firm size and age as important determinants of the fate of IPOs, we next turn to the role of the law. To determine the effect of corporate law and stock exchange reforms on IPO survival in Germany we distinguish three regulatory regimes (Table 3). Regime 1 covers the 245 IPOs made during the period when IPOs were not regulated by way of legislation or stock exchange requirements (1870-1882). Regime 2, which is comprised of 141 IPOs occurring between 1883

TABLE 2: FUNDAMENTALS AND IPO SURVIVAL (AVERAGE PARTIAL EFFECTS)

We employ a probit regression model where the dependent variable is equal to 1 if a firm survived five years after the IPO, and 0 if it failed. Size is the log of market value of an IPO firm in 1913 prices. Age is the log of months since the IPO firm was incorporated. ***, **, * indicates significance on 1, 5, and 10 percent level, respectively. Standard errors are clustered by year of issue.

	Model 1 1870-1938	Model 2 1870-1938	Model 3 1870-1938	Model 4 1870-1938	Model 5 1870-1938	Model 6 1870-1913	Model 7 1919-38
Size	0.056**	0.056***	0.057***	0.030***	0.038***	0.041***	0.021*
Age		0.044***	0.043***	0.025**	0.031***	0.034***	0.018
Heavy industry firm			0.033	0.013	0.024	0.017	0.020
Light industry firm			0.005	-0.009	-0.004	0.005	-0.039
IPO in 1872				-0.259***		-0.206***	
IPO in 1923				-0.172***			-0.108***
Hot market (1872, 1923)					-0.146***		
Number of observations	1,062	1,062	1,062	1,062	1,062	821	241
Chi² (p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.008
Fraction correctly predicted	0.760	0.785	0.786	0.806	0.796	0.818	0.767
McFadden pseudo R^2	0.051	0.162	0.164	0.236	0.209	0.300	0.080

and 1896, focuses on the combined impact of the 1882 introduction of stock exchange admission rules regulating public offers and the 1884 corporate law reform. Regime 3 encompasses the 564 companies going public between 1897 and 1938 under the full regulatory regime, namely companies incorporated under the 1884 companies legislation and going public under the 1896 stock market reforms.

TABLE 3: IPO NUMBERS BY REGULATORY REGIME

		Year of IPO			
		pre-1882	1882-1896	post-1896	Total
Year of incorporation	pre-1870	3	0	33	36
	1870-1884	**245 (Regime 1)**	23	53	321
	post-1884	0	**141 (Regime 2)**	**564 (Regime 3)**	705
	Total	248	164	650	1,062

Source: IPO database; own calculation.

The remaining 112 IPOs in our dataset do not belong to any of these regimes. These do not constitute sufficiently large cohorts to permit meaningful statistical analysis of IPO survival. It is of particular significance that only four firms went public between 1882 and 1884. This number is far too small to get any reliable statistical results separating the effects of the 1882 and 1884 reforms. We correspondingly consider these together as a single regulatory event.

We employ the same probit regression used above when assessing the impact of size, age and industry sector on IPO survival to examine the impact of regulation. The results, set out in Table 4, provide support for the hypothesis that regulation improved the IPO survival rate in Germany and thereby fostered stock market development. The survival probability of IPOs made under the laissez faire regime in place between 1870 and 1882 (Regime 1) is statistically significantly lower (by 14.5 per cent) compared to IPOs made afterwards, even when we control for firm fundamentals and hot markets (model 1). It seems that IPOs undertaken after the 1884 corporate law reform but before introduction of the Stock Exchange Act in 1896 (Regime 2) were neither more nor less likely to fail compared to IPOs from earlier and later periods (model 2). In contrast, firms floated between 1897 and 1938

(Regime 3) had a 7 per cent better survival probability than IPOs made in earlier periods (model 3).

When we account for the institutional reforms made in the 1880s and 1890s simultaneously (model 4), we still observe a positive impact of Regime 3 on survival probability of the order of 8.5 per cent but Regime 2 is rendered insignificant. To gauge accurately, however, the impact of the regulations implemented in the 1880s allowance needs to be made for the fact that these reforms substantially affected the age and size characteristics of firms going public beyond what we capture by simply including the Regime 2 dummy variable. In particular, in 1882 the minimum size of firms to be listed at the Berlin Stock Exchange was increased to one million Mark and in 1884 the minimum period between incorporation and IPO was set at two years.

TABLE 4: REGULATION AND IPO SURVIVAL (AVERAGE PARTIAL EFFECTS)

We employ a probit regression model where the dependent variable is equal to 1 if a firm survived five years after the IPO, and 0 if it failed. Size is the log of market value of an IPO firm in 1913 prices. Age is the log of months since the IPO firm was incorporated. Regime 1 is a dummy variable equal to 1 if an IPO firm is both incorporated and has its IPO between 1870 and 1884, and 0 otherwise. Regime 2 is a dummy variable equal to 1 if an IPO firm both is incorporated and has its IPO between 1884 and 1896, and 0 otherwise. Regime 3 is a dummy variable equal to 1 if an IPO firm is incorporated after 1884 and has its IPO after 1896, and 0 otherwise. ***, **, * indicates significance on 1, 5, and 10 percent level, respectively. Standard errors are clustered by year of issue.

	Model 1 1870-1938	Model 2 1870-1938	Model 3 1870-1938	Model 4 1870-1938	Model 5 1870-1938	Model 6 1870-1913
Size	0.028***	0.030***	0.031***	0.031***	0.033***	0.047***
Age	0.012	0.025**	0.017**	0.019**	0.022**	0.030**
Regime 1	-0.145**					
Regime 2		0.003		0.042	0.259***	0.293***
Regime 3			0.069**	0.085**	0.080**	0.089**
Regime 2 * Size					-0.051*	-0.063***
Regime 2 * Age					-0.017	-0.025*
IPO in 1872	-0.149**	-0.257***	-0.231***	-0.194**	-0.178**	-0.134**
IPO in 1923	-0.170***	-0.172***	-0.175***	-0.171***	-0.171***	
Sector dummies	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	1,062	1,062	1,062	1,062	1,062	821
Chi² (p-value)	0.000	0.000	0.000	0.000	0.000	0.000
Fraction predicted	0.808	0.806	0.807	0.807	0.809	0.821
McFadden pseudo R^2	0.247	0.236	0.244	0.246	0.249	0.321

To filter out the effects of Regime 2's treatment of size and age we include two interaction terms of Regime 2 with firm size and firm age respectively as well as the Regime 2 dummy itself. Once this is done (model 5), Regime 2 has a statistically significant 26 per cent beneficial effect on the probability of survival. Moreover, we note that while the interaction effect of Regime 2 and firm age is insignificant, the interaction effect with firm size is negative and significant. This suggests that Regime 2 improved in particular the survival rates of small IPO firms relative to large IPO firms. The results are similar when we restrict the sample to the pre-1914 period and in this case Regime 2 also improved the survival rates of younger IPO firms relative to older IPO firms (model 6).

The implication of the foregoing analysis is that law "mattered" with respect to IPO survival in Germany, even after controlling for firm fundamentals and hot market conditions. We consider next whether the involvement of banks in IPO markets changes our results.

6. BANKS, UNDERWRITING AND IPO SURVIVAL

Assuming law offers sufficiently extensive protection to investors to foster stock market development, it would seem that extra-legal factors that might otherwise help to bolster equity markets would be superfluous. Did German legislation relevant to IPOs have this effect? In the German context, bank involvement in IPOs stands out as the most obvious extra-legal factor to take into account. The country is often characterized as an exemplar of a bank-based financial system (Allen and Gale, 1995; Levine, 1997; Guinnane, 2002) and banks indeed often acted as underwriters of IPOs in our dataset and began functioning as gatekeepers of the stock exchange in the 1880s via the Berlin Stock Exchange admission board established in 1882.

Some argue that equity markets suffer in a bank-dominated economy (Allen and Gale, 1995). Others suggest, however, that banks and equity markets can readily co-exist (Tilly, 1998: 18; Fohlin, 2007; Fear and Kobrak, 2010). Some, indeed, have claimed that Germany's universal banking system benefitted equity markets by fostering quicker transitions from short-term bank lending to share issuance and

keeping costs low (Calomiris, 1995: 291-295; Burhop, 2013a).[21] Correspondingly, in this section we examine whether bank involvement in IPOs helps to explain survival rates in addition to the regulatory regime in place, controlling for firm characteristics and IPO market conditions.

During the early 20th century contemporary observers, including bankers, claimed that the quality of the lead underwriter signalled the quality of German issuers (Jeidels, 1905: 128, 163; Riesser, 1911: 285; Moral, 1914: 43). Theory also suggests that due to substantial reputational costs associated with poorly performing IPOs prestigious underwriters are incentivised to sponsor higher quality public offerings than their less well-established rivals (Chemmanur and Fulghieri, 1994). It follows that in Germany during our period of study the survival rate of IPOs overseen by leading banks should have been higher than that of other IPOs. There might, however, be a time trend involved. During the 1870s, underwriters did little, if anything, to screen IPOs (Burhop 2004: 90-105, 187-194, 202-209, 217-235) but by the 1890s leading underwriters were engaging in extensive screening activities (Lehmann, 2014; Burhop, 2013b).[22]

To investigate the impact of bank underwriting on IPOs, we identify among the total of 252 underwriters who participated in the IPOs in our dataset those banks most likely to contribute positively to IPO survival due to reputational concerns. Consistent with other recent empirical studies of German securities underwriting, we focus on two definitions of bank reputation. First, we identify over our period of study those IPOs underwritten by the six largest joint-stock credit banks, namely, *Deutsche Bank, Dresdner Bank, Discontogesellschaft, Darmstädter Bank für Handel und Industrie, Berliner Handelsgesellschaft,* and *Schaaffhausenscher Bankverein* (Lehmann, 2014; Fohlin, 2010). Second, we identify IPOs handled by members of the Imperial Loan Syndicate (Burhop, 2011), which was comprised of a growing group of 14 to 29 leading joint-stock stock banks, including the six largest, and private banking houses entrusted with the placement of Imperial government bonds.

[21] Caroline Fohlin has challenged the claim of cheap equity finance in late 19th century Germany (Fohlin, 2010).

[22] Some large German banks developed in-house screening technologies (Lehmann, 2014: 110), while other banks founded specialised auditing firms to differentiate between bad and good IPO candidates (Riesser, 1911: 722-723, 738).

TABLE 5: REPUTATION AND IPO SURVIVAL (AVERAGE PARTIAL EFFECTS)

We employ a probit regression model where the dependent variable is equal to 1 if a firm survived five years after the IPO, and 0 if it failed. Imperial Loan Syndicate is a dummy variable which is 1 if the underwriting bank is a member of the syndicate, and 0 otherwise. Large joint stock bank is a dummy variable which is 1 if the underwriting bank is a one of the size large banks, and 0 otherwise. Size is the log of market value of an IPO firm in 1913 prices. Age is the log of months since the IPO firm was incorporated. Regime 2 is a dummy variable equal to 1 if an IPO firm both is incorporated and has its IPO between 1884 and 1896, and 0 otherwise. Regime 3 is a dummy variable equal to 1 if an IPO firm is incorporated after 1884 and has its IPO after 1896, and 0 otherwise. ***, **, * indicates significance on 1, 5, and 10 percent level, respectively. Standard errors are clustered by year of issue.

	Model 1	Model 2	Model 3	Model 4
Size	0.030***	0.032***	0.032***	0.031***
Age	0.018*	0.018*	0.020*	0.021**
Imperial Loan Syndicate	0.055**	0.042*		
Imperial Loan Syndicate * IPO in 1872		-0.029		
Imperial Loan Syndicate * IPO in 1923		0.080***		
Large joint-stock bank			0.036	0.005
Large joint-stock bank * IPO in 1872				0.149***
Large joint-stock bank * IPO in 1923				0.072***
Regime 2	0.259***	0.259***	0.259***	0.259***
Regime 3	0.075**	0.078**	0.077**	0.080**
Regime 2 * Size	-0.065**	-0.063**	-0.063**	-0.051**
Regime 2 * Age	-0.017	-0.017	-0.016	-0.016
IPO in 1872	-0.175**	-0.168**	-0.175**	-0.186**
IPO in 1923	-0.191***	-0.280***	-0.182***	-0.248***
Sector dummies	Yes	Yes	Yes	Yes
Number of observations	1,062	1,062	1,062	1,062
Chi² (p-value)	0.000	0.000	0.000	0.000
Fraction predicted	0.809	0.811	0.809	0.811
McFadden pseudo R^2	0.256	0.259	0.251	0.258

Comparing the survival rates of IPOs handled by reputable underwriters with the average failure rate of 15 percent suggests that the largest underwriters supported

high quality IPOs on average. Of the 363 IPOs underwritten by the six largest joint-stock credit banks, only 23 (6.3 percent) failed within five years. However, this high survival rate was not exceptional when compared with the aggregated record of those underwriters who were also members of the Imperial Loan Syndicate. The members of this group organized 465 IPOs between 1870 and 1938, of which only 6.7 percent failed within five years. The track record of the underwriters outside the Syndicate, which were collectively responsible for organizing the remaining 597 IPOs, was much worse. Taken together, these IPOs exhibited a markedly higher failure rate of 21 percent.

We next undertake probit regressions to investigate further the impact of our two measures of underwriter reputation on IPO survival, controlling for firm characteristics, hot market effects and regulatory regime in all models reported in Table 5. We adopt the regression model 5 from Table 4 as our baseline model and add each of our two variables proxying for the reputation of the IPO underwriting bank. The results show that underwriter membership in the Imperial Loan Syndicate improved the probability of survival by approximately 5 percent (model 1) and was particularly beneficial during the hot market of 1923 (model 2). If an underwriter was one of the six large joint stock banks, this generally did not affect survival rates (model 3) but did have a substantial beneficial impact during both hot market years (model 4).

Finally and perhaps most important, the inclusion of underwriter reputation variables in the baseline regression model does not affect the coefficients and significance levels of our law regime dummies in all the models in Table 5. Hence, while it was not the case that underwriter reputation was rendered irrelevant in Germany by the introduction of tougher regulation, conversely law was a meaningful determinant of IPO success when proxies for underwriter quality are taken into account. Our main empirical result correspondingly remains unchanged: law mattered.

7. GERMANY'S GREAT REVERSAL

7.1 HYPERINFLATION

Rajan and Zingales (2003) include Germany as one of the countries that suffered a financial sector "great reversal" between World War I and World War II but do not provide a detailed analysis of the German case, ignoring, for example, the potentially detrimental impact of the hyperinflation of the early 1920s. Perotti and von Thadden (2006) have suggested, however, that among developed countries differences in present-day stock market development can be explained at least partly on the basis of whether a country suffered a historically sharp acceleration in inflation following World War I. Countries so afflicted, they maintain, have poorly developed stock markets in comparison with countries where inflation remained within historical norms.

Perotti and von Thadden's hypothesis implies a collapse in IPO activity on the Berlin Stock Exchange following the hyperinflation of the early 1920s. In fact, as Figure 2 showed, IPO activity not only was robust in the midst of the hyperinflation but was not far off historically normal levels throughout the remainder of the decade. It is true that hyperinflation and the resulting social disorder pushed the country toward the ultra-nationalism that underpinned the rise of the Nazis (Tooze, 2006: 2). Our findings on the robustness of both IPO activity and survival in the 1920s indicates, however, that the hyperinflation in and of itself was not decisive in bringing about Germany's great reversal.

7.2 THE 1930s

While hyperinflation did not deal a mortal blow to IPO activity in the 1920s, IPOs disappeared in Berlin in the following decade. The process commenced with a banking and currency crisis occurring in 1931-32 but changes after the Nazis came to power in 1933 were decisive (Mertens, 2007; Hof, 2008: 48-50). The absence of IPOs in the 1930s precludes any econometric analysis. Instead, we dissect the legal and regulatory reforms of this decade to explain the disappearance of the IPO market.

The July 1931 bankruptcy of the Darmstädter- und Nationalbank (Danatbank) and of the Dresdner Bank – the second and the third largest German banks – set off a chain of events and decisions by public officials that would damage the credibility of German equity markets. The bankruptcy of the two banks prompted the government to close all German stock exchanges on 13 July 1931, followed shortly by the prohibition of publication of securities prices so as to discourage off-market trading (Beer, 1999: 225). The government was eager to have the stock exchanges re-open and they recommenced operations in early September 1931 (Beer, 1999: 225) but reversed course later that month to help to protect the currency when Britain left the gold standard (Beer, 1999: 225).

The German government sought to counter the blow to investor confidence which the stock exchange closures would engender by introducing an emergency order on 19 September 1931. This law bolstered shareholder protection by making it easier for shareholders to amend the corporate constitution, by compelling shareholder appointment of the auditors and by introducing new requirements relevant to the preparation of a balance sheet and a profit-and-loss statement. The 1931 emergency legislation would soon be overtaken, however, by events that would ultimately damage investor confidence more than the 1931 stock market closures. Foreign investment in German shares was crippled by foreign exchange controls introduced between November 1931 and April 1932 that made it virtually impossible for foreigners to transfer money out of Germany (Beer, 1999: 259-260, 277).[23] The stock exchanges themselves remained closed until April 1932 (Beer, 1999: 225). Despite some informal share trading between banks via telephone at unpublished prices investors now knew that exchange-listed shares were not necessarily a liquid investment (Beer, 1999: 253, 257, 283).

The 1931-32 closure of the stock market precluded IPOs during this period. Investor confidence and the IPO market perhaps could have subsequently recovered if government intervention was perceived as a crisis-driven necessity. However, the Nazis' rise to power in January 1933 led the government to seek to restrict private access to capital to finance rearmament. The regulatory changes associated with this

[23] Exchange controls were bolstered during the 1930s and 1940s. They were abolished in 1958.

shift in policy would have a pronounced effect on IPOs and German equity markets more generally.

The Nazi economy has been characterized as being a "directed market economy" (Buchheim and Scherner, 2006: 411): The state provided incentives to direct resources towards rearmament, whilst management decided the most efficient use of resources inside firms. The allocation of capital was one key area of government involvement (Temin, 1991: 576, 580; Buchheim and Scherner, 2006: 390). The frist step taken under Nazi capital market regulation was the replacement of elected Berlin Stock Exchange officials with government appointees. All members of the stock exchange then had to re-apply for membership and market participants not favoured by the Nazis, including many "Jews", were excluded (Beer, 1999: 302-305; Hof, 2008: 102-107). Then, to help the government to finance rearmament the Nazis put in place between May 1933 and February 1935 rules requiring all security issuances, including equity IPOs, to be approved by the Ministry of Finance, the Ministry of Economics and the Reichsbank (Spoerer, 1996: 165).[24] This meant there was only very modest public issuance of shares over the rest of the decade (Fig. 2). Moreover, only firms deemed important for the preparation for war could, in practice, obtain permission to issue securities. Hence, to the extent the stock market was used for raising capital it was providing support for militarization (Beer, 1999: 267-268, 290-291; Hof, 2008: 131-132).

The bias in favour of rearmament impacted adversely on German companies in another significant way. Legislation introduced between March 1934 and February 1935 required all joint-stock companies with rising profits or a return on equity in excess of six percent to invest part of their "excess profits" in government bonds. Companies in this position retained ownership of the bonds but management of them was entrusted to a government agency, the *Golddiskontbank* (Beer, 1999: 293-295; Hof, 2008: 125-131).[25] The only way to circumvent this regulation was a change of the legal form of enterprise. Consequently, over two-fifths of existing joint-stock companies, many of them listed, were wound up between 1933 and 1938 and

[24] Japan took similar steps prior to World War II and, as was the case in Germany, this may have had an enduring impact on corporate governance (Yao, 2009).
[25] This rule was tightened in 1941 and abolished in 1952 (Mertens, 2007: 107, 110).

reformed as partnerships or private limited companies (Beer, 1999: 295; Mertens, 2007: 106).[26]

Nazi rule dealt other serious blows to German equity markets. The stock market was side-swiped, for instance, by tax reform on three fronts in October 1934. First, a wealth tax imposed on shares was doubled from 0.5 to 1 percent of market value. Second, the minimum period for an investor to hold securities to avoid taxes on "speculation" was extended from three months to one year. Finally, capital gains on the sale of corporate securities became taxable; only government bonds were exempt (Beer, 1999: 301; Hof, 2008: 133-134).

More generally, although "big business was an active partner in many key facets of Hitler's National Revolution", the primary beneficiaries were established companies operating in industries benefitting from rearmament (Tooze, 2006: 134). Investors, on the other hand were losers, as "the Nazi regime made pariahs of shareholders and tried to keep key corporate information secret" (Fear and Kobrak, 2006: 7). While Germany's GDP had returned to and even surpassed pre-Great Depression levels by 1935, share prices never returned to the pre-Great Depression levels throughout the 1930s (Statistisches Reichsamt, 1939: 440; Ritschl, 2002: Table B.9; Beer, 1999: 330, 337).

The Nazis turned their attention to corporate law as well, culminating in legislation enacted in 1937 that expanded managerial authority at the shareholders' expense (Levy, 1950: 215). Preparations for a new corporate law started in 1934 and a draft Act was presented for discussion the following year, meaning the general tenor of the legislation was known and may have had adversely affected potential IPO activity (Mertens, 2007: 90-91). When the new corporate law was enacted in 1937, the shareholder-friendly measures in the 1931 emergency order discussed above were codified. Overall, though, the new corporate law was shaped by Nazi ideology in a way that could detrimentally affect investors whose support would be required for successful IPOs.

[26] During the years 1935-38, only 142 new joint-stock companies were established in Germany, while 3,869 corporations were dissolved (Statistisches Reichsamt, 1939: 455).

A key theme in the 1937 Act was to shift powers from shareholders acting collectively by way of resolutions and from the supervisory board to the head of the management board (Kessler, 1938). This was done in accordance with the tenets of *Führer-prinzip*, with the idea being to have companies run by a strong leader, undistracted by shareholder intervention, to the benefit of employee welfare, the people, and the Reich (Mertens, 2007).[27] For instance, the head of the management board was vested with the sole right to represent the company in dealings with third parties and rights the supervisory board and the shareholders formerly had to direct the management board were abolished (Mertens, 2007: 95). In addition, shareholders lost the right to vote on dividend policy and on the dismissal of directors (Mertens, 2007: 96). Moreover, the government was empowered to dissolve any corporation deemed to endanger the national welfare without the need to compensate shareholders (Mertens, 2007: 101). Finally, incorporating companies became more costly because the minimum share capital required for incorporation to occur was increased ten-fold.[28]

The changes in the 1930s that discouraged IPOs were legal in nature but, due to the political situation, were considerably different to those contemplated by the "law and finance" literature. In this context, work by Roe (2003) on politics and stock market development is instructive. Roe argues that "social democracies and the public firm (mix) badly" (Roe, 2003: 14), saying that countries with "left-wing" governments fray the ties between managers and shareholders necessary for diffuse share ownership to develop.

While the Nazi party had a strong socialist faction in its formative stages (Evans, 2006: 31-41), it ultimately was a fascist organization rather than a social democratic movement. Still, Roe's thesis is relevant to the reversal of German stock market development in the 1930s as reflected in the disappearance of IPOs. The Nazis regarded finance as an activity dominated to an unwelcome extent by "Jewish" interests and as a largely unproductive activity that failed to contribute to national

[27] *Führer-prinzip* was not an entirely novel idea in the 1930s but instead was inspired partly already established corporate practice (Gelter 2011: 691).

[28] After the hyperinflation (28 December 1923), the government specified a minimum capital for joint-stock companies of 50,000 RM and a minimum face value of shares of 100 RM. The 1937 act specified a minimum size of 500,000 RM for a corporation and a minimum face value of 1,000 RM for a share (Mertens, 2007: 105-106).

wealth. They correspondingly sought to drive, in the manner Roe associates with social democracies, a wedge between investors and companies, and in so doing undermined German equity markets that had developed substantially over the previous sixty or so years. Roe, it must be emphasized, made his points in relation to social democracies mainly concerned with the distribution of surplus between labor and capital. In contrast, the Nazi government's top priority was rearmament and they organized employees and employers together into the German Labor Front (Deutsche Arbeitsfront) to achieve the desired result. Nevertheless, Roe's "wedge" metaphor proves helpful when explaining the decline of German equity markets in the 1930s.

7.3 THE LEGACY

Due to chronology the 1937 corporation law was in a sense a footnote to our study of IPOs ending in 1938. Nevertheless, its legacy endured, like many rules, regulations, and laws enacted during the Nazi period (Ritschl, 2005). The 1937 German Stock Corporation Act continued to operate largely unamended until 1965. Hence, as the German economy recovered after World War II, its company legislation was not shareholder-friendly in the manner the "law and finance" thesis would suggest is conducive to stock market development (Mertens, 2007: 110-115). Indeed, Germany's equity market, declined still further in the aftermath of World War II as the overall number of firms listed in Germany declined from 661 in 1953 to 442 in 1983 (Deutsches Aktieninstitut, 2013).

We are not arguing that developments occurring in the 1930s explain in isolation Germany's modest present-day level of stock market development. There indeed were features of post-World War II Germany that may well have been detrimental to stock market development that were of little importance during our period of study. For instance, Germany was a social democracy in the decades following World War II and, according to Roe's "wedge" logic this would have been antithetical to stock market development. In addition, Germany's post World War II "stakeholder economy", buttressed by supervisory board-based employee codetermination, may well have compromised the ability of German companies to cater to shareholder preferences (Roe, 2003: 71-76, 79-80; Tirole, 2006: 56-64). While provision was

made for some employee representation on German workers councils from 1920 to 1934, the current codetermination regime only became a feature of German corporate life after World War II (Abelshauser, 2004: 352-358).

Our analysis does cast doubt, however, on other explanations that have been offered for Germany's modest present-day equity markets. As mentioned, a bank-based financial system reputedly can be antithetical to the development of robust equity markets. The law and finance literature suggests that civil law countries such as Germany are less likely to introduce laws protecting minority investors and as such are less hospitable to stock market development than are common law countries (La Porta et al., 1998). Coffee (2001: 55-58) claims that paternalistic regulation and high taxes not only essentially closed down securities markets during the mid-1890s but also argues that this had a deleterious impact lasting to the present day. In fact, powerful banks and the civil law were features of a pre-1940 German corporate economy which had a reasonably well-developed stock market. Moreover, our data shows that German equity markets did not become moribund after the mid-1890s. It correspondingly seems likely that the legal and political developments we have documented here contributed more to the modest size of post-World War II German stock markets than other explanatory variables which have been identified.

8. CONCLUSION

In this paper, we examine by way of a study of IPO activity and survival rates several hypotheses explaining the rise and fall of German stock markets. Capital markets are expected to flourish when they are supported by a legal system conducive to shareholder interests. While the popular law and finance school puts forward the idea that common law systems serve financial development better than civil law systems, we provide evidence by way of the German case that a major economy with a civil law system had well-developed equity markets for a number of decades. More specifically, we show that reforms to corporate and securities market law contributed to a much improved survival rate of IPOs in Germany from the 1880s onwards. This improvement was supported by reputable underwriting banks belonging to the Imperial Loan Syndicate. The IPO market worked sufficiently well that in the years

preceding World War I the number of listed firms per million inhabitants in Germany was greater than in the United States.

This finding of a well-developed stock market in Germany in 1913 stands in contrast to what we observe in post-1945 Germany. Since World War II, Germany's stock market has been mostly an after-thought, despite a highly successful economy. Some have suggested that this great reversal in stock market development can be attributed to the destruction of physical and financial capital during World War I and the following 1923 hyperinflation (Perotti and von Thadden, 2006). We demonstrate, however, that numerous firms went public during the early 1920s, that most of these companies survived and that IPOs occurred throughout the remainder of the 1920s.

Our analysis indicates that, to the extent history explains the also-ran status of German stock markets in the post-World War II era, the 1930s were crucial. The banking and currency crisis of 1931-32 would have been a blow to investor confidence but policies the Nazi government introduced after 1933 in all likelihood had an even more traumatic effect. The Nazi's wanted to allocate as much capital as possible towards rearmament. Consequently, access to the stock market was tightly regulated and IPOs disappeared. Moreover, Nazi ideology did not look favorably upon the joint-stock company. Thus, incorporation became more difficult and corporate governance became much less shareholder friendly. Hence, we contend that it is the legal changes engendered by politics which largely explains the disappearance of IPOs and which dealt German equity markets a blow that would be felt for decades thereafter.

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TABLE A1 - DATA SOURCES

	1870-1879	1880-1938
Name of the IPO, Share capital, end-of-IPO year share price, firm age, industry branch	Prospectus: Berliner Börsenzeitung (1870-79), Historical Archive Deutsche Bank, Frankfurt City Record Office, Bethmann archive, Sal. Oppenheim jun. & Cie Archive; Stock market manuals & Statistical publications: Meyer (1873) Saling's Börsenpapiere, Vol. 3 (1875), Engel (1875), van der Borght (1883)	Saling's Börsenpapiere, Part 2, Vol. 4 (1880) to 64 (1941)
Name of the lead underwriter	Meyer (1873), Berliner Börsenzeitung (1870-79), Historical Archive Deutsche Bank, Frankfurt City Record Office, Bethmann archive, Sal. Oppenheim jun. & Cie Archive, Saling's Börsenpapiere, Vol. 3 (1875), Engel (1875), van der Borght (1883)	Saling's Börsenpapiere, Part 2, Vol. 4 (1880) to 64 (1941), Börsenenquetekommission (1892), Christians (1893), Vierteljahrshefte zur Statistik des Deutschen Reichs, Vol. 6 (1897) to 23 (1914)
IPO survival over five years	van der Borght (1883), Saling's Börsenpapiere, Part 2, Vol. 4 (1880) to 8 (1884)	Saling's Börsenpapiere, Part 2, Vol. 4 (1880) to 64 (1941)
Cross-listing with provincial market	n.a.	Saling's Börsenpapiere, Part 3, Vol. 1 (1900) to 32 (1932)

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