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The persistence of ownership inequality: Investors on the German stock exchanges, 1869-1945

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THE PERSISTENCE OF OWNERSHIP INEQUALITY – INVESTORS ON THE GERMAN STOCK EXCHANGES, 1869-1945

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Research Area INEPA

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The persistence of ownership inequality – Investors on the German stock exchanges, 1869–1945

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September 2018

Abstract

We study the ownership structure of joint-stock firms for the period of 1869 to 1945 based on a unique hand-collected data set. The data covers a selection of 785 general meetings of 276 firms, including details of more than 10,000 investors. We show that after the hyperinflation of 1923, when shares became cheaper, the ownership share among lower social classes rose significantly. Moreover, with the rise of women rights after 1919, the number of shares owned by women also increased significantly. However, despite these shifts, the majority of shares remained in the hands of institutional investors and investors from the upper class, who mainly constituted and controlled the general meetings. Thus, despite the increased participation of women and the lower social classes, a stark inequality of opportunities persisted.

JEL Codes: Keywords: Stock exchanges, Investors, Characteristics, Investment behaviour

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1 Introduction

Rising inequality is one of the most recognised and debated issues of our times, and this debate tends to focus on income inequality (see, for instance, Piketty & Saez, 2003; Piketty, 2015). Capital, however, was always more unequally distributed than labour in all countries and periods for which data is available. Piketty (2014, p. 244) gives some idea of the order of magnitude: The upper 10 per cent of the labour income distribution generally receives 25–30 per cent of total labour income, whereas the top 10 per cent of the capital income distribution always owns more than 50 per cent of all wealth, and in some societies, this is as much as 90 per cent. While the bottom 50 per cent of the wage distribution always receives a significant share of the labour income, the bottom 50 per cent of the wealth distribution mostly owns nothing at all.

Yet, the interwar period saw great changes in wealth distribution: The capital/income ratio and the share of private capital as a percentage of the national income were higher before World War I than they are today (Piketty, 2014, pp. 144–146). In the interwar period, both rates declined severely, and capital worth nearly a year and a half of national income was destroyed. The budgetary and political shocks of two wars proved far more destructive for capital than the actual combat. According to Piketty (2014, p. 148), the main factors explaining the fall in the capital/income ratio were the collapse of foreign portfolios, low savings rates, and the Great Depression, during which many stock- and bondholders were ruined as firm after firm went bankrupt. Moreover, low growth, repeated recessions, and the high inflation resulting in the hyperinflation of 1923 led many wealthy people to lose vast amounts of their assets even before the Great Depression unfolded.

However, it also brought about new opportunities for people from lower social classes because shares became cheaper in the interwar period. The ubiquitous characteristic of shareowners shortly before the outbreak of World War I was their wealth: Before 1884, the minimum face value of a share was 300 marks – only 40 per cent of which had to be paid before the IPO. With offerings below par being prohibited, the minimum investment to buy one share was thus 120 marks. Stock market shares were therefore still well within the reach of the middle classes. After 1884, however, the corporate law increased the minimum face value of a share to 1,000 marks, and an IPO was only possible for fully paid shares. Thus, the minimum investment increased by a factor of eight (Burhop, 2011, p. 16). This can be compared to the average annual wage of a German industrial worker in 1913 of 1,300 marks (authors' calculation based on Bry, 1960). Thus, it is unlikely that workers or even middle class employees held shares in this period. However, the post-war inflation dramatically changed

access to stocks. The journalist Sebastian Haffner (2002, p. 56) describes in his memoirs that with hyperinflation and the fading away of savings, mortgages and other conservative investments, many people started to buy shares on the stock market. He describes how shares seemed to be an island of security able to maintain pace with inflation. He writes that low-level civil servants, ordinary employees and even shift workers became shareholders. The whole population was following the exchange reports. Stock market recommendations were exchanged in shops, factories and schools. However, Aron (1927) showed that although about 53 per cent of capital of joint-stock companies were shifted among groups of investors, firms made sure that most shares were traded among large shareholders by granting them special conditions such as buying shares on account.

Thus, motivated by research on wealth inequality, we aim at contributing to this literature by extending the term ‘inequality’ to ‘equality of opportunities’ by studying capital ownership among different social groups in the period of 1869 to 1945. Therefore, we hand-collected a new data set, covering all shareholder lists from general meetings available at the archives of Deutsche Bank, Commerzbank, the Hessian Economic Archive, the Baden Wuerttemberg Economic Archive and the Bavarian Economic Archive. Altogether, we collected 785 shareholder lists from 276 companies, covering basic information for 10,017 individual investors. Especially after 1913, usually more than 50 per cent of capital was represented at the meetings. Thus, although we only observe the characteristics of investors that attended the general meetings, we observe a substantial part of all investors and especially those that influenced the company’s fate. Thus, our research also contributes to the literature on corporate governance.

Based on our unique data set, we are able to show that while, in the German Empire, shares of joint-stock companies were only available to a small group of rich investors, after the hyperinflation of 1923, shares became more widely available to the middle class. Lower social classes, however, did not own shares in our observation period. Moreover, we are particularly interested in the gender perspective. Women’s rights drastically improved in 1919. In the constitution of the first German democracy, women officially received equal rights, which is mostly reflected in the fact that they were now allowed to vote (Art. 109 Abs. 2 Weimar Constitution). However, the National Socialists again restricted these rights. After 1933, women were confined to the roles of mother and spouse and were excluded from all positions of responsibility, notably in the political and academic spheres. These developments are also reflected in the ownership structure. During the Weimar Republic, women had had a much stronger representation at general meetings than before, but their overall ownership of shares

remained low, and 98 per cent of female investors that we observe were engaged in only a single firm. Overall, despite our observation of greater participation among women after 1919, their increased political power was clearly not equally accompanied by a rise in economic power. It is also possible that the higher attendance of women at general meetings does not actually represent a larger share of capital ownership but rather the fact that women started to use their power by attending the meetings. This may be supported by our observation that, after 1919, we observe more women holding smaller numbers of shares.

To our knowledge, our work is the first that provides insights into investors' characteristics, such as their social class and gender, in the period of 1869 to 1945. While surveys provide good information about who holds and trades shares nowadays, very little is known about investors in earlier periods and how the composition of investors changed over time. Occasionally, we find published lists of applicants for shares – such as, for instance, the list of the first buyers of shares of Deutsche Bank (Pohl, 1987; Bol, 2018) or other selected samples (Fohlin, 2007, pp. 120–124). Franks et al. (2006) provide the largest sample. They collected 156 lists of general meetings during the same period we cover, but they focus on ownership concentration and the share of founding-family ownerships. Burhop and Lehmann-Hasemeyer (2016) also provide some insights from lists of general meetings. They studied the geography of German stock exchanges and showed that there seemed to be a preference for local shares on regional stock exchanges. Neumayer (2018) also studied the home bias based on a selected sample, showing that the home bias disappears if a general meeting did not take place close to the headquarters of the firm. However, none of the research above studies investors' social characteristics.

Learning more about the shareholders is important not just in terms of inequality and social history, it is also interesting from a finance perspective. As Markowitz (1952) already pointed out in the 1950s, portfolio theory assumes that investors form expectations about returns and risks of securities, and they select portfolios according to their expectations and risk preferences. In consequence, rational economic actors should diversify portfolios and trade very little. However, at least for modern periods, private investors have been shown to hold under-diversified portfolios (Goetzmann and Kumar, 2008), to trade frequently (Odean, 1998; Barber and Odean, 2000), to take on high idiosyncratic risk (Calvet et al., 2007), and to gamble (Kumar, 2009). Clearly, socioeconomic characteristics matter a great deal here. Goetzmann and Kumar (2008) have shown, for instance, that the level of under-diversification of portfolios is greater among younger, low-income, less-educated, and less-sophisticated investors. Barber and Odean (2011) have shown that men take higher risks than women, and younger investors take more

risks than older ones. Studies testing reactions to historical events on stock markets can therefore only infer whose reactions they are actually testing.² However, knowing who actually traded on the stock market, who influences decisions of joint-stock firms and how the composition of investors changed over time is crucial for the understanding of stock market development and determinants of the success and failure of firms.

2 Overview of sources and shortcomings of the data³

Information on share ownership of investors is, in large parts, unavailable, because most of the shares were bearer shares (Burhop, 2011, p. 15). Furthermore, there are also no complete shareholder records of firms, which we could use for our analysis. Therefore, we take another source of shareholder information into account using the fact that under the Stock Exchange Act of 1896, companies were legally bound to submit information about their shareholder structure to the respective stock exchange on which their shares were listed (Franks et al., 2006, pp. 542 and 554). Besides a company's prospectus, extracts from the register of commerce, the current company status and the annual management reports, lists of shareholders attending the general assembly had to be provided to the stock exchange operator of the respective stock exchange. For example, this was often the case if the general assembly voted to increase or reduce equity.

The data on individual firms were collected from the Hessian Economic Archive (Hessisches Wirtschaftsarchiv), the Bavarian Economic Archive (Bayerisches Wirtschaftsarchiv) and the Baden-Wuerttemberg Economic Archive (Baden-Württembergisches Wirtschaftsarchiv), as well as from the Historical Archive of Deutsche Bank AG and from the Historical Archive of Commerzbank AG.⁴ The data includes filings of the Berlin, Hamburg, Cologne, Düsseldorf, Essen, Augsburg, Frankfurt, Munich, and Stuttgart stock exchanges. We extract the name of the company, the industrial sector, the location of the headquarters and the place where the general assembly took place. Data on the share capital of a company and the stock exchanges on which the company's shares were listed is from the *Handbuch der deutschen Aktiengesellschaften*. The *Handbuch der deutschen Aktiengesellschaften* only exists since 1896, but based on the included information, we are able to calculate the share capital for earlier periods for general meetings that took place before 1896.

² To name a few, Thorsten Lübberts (2008) and Kling (2006) studied investor reaction to firm mergers in the 19th century and the interwar period, Lehmann-Hasemeyer et al. (2014) studied how suffrage extensions to the working class affected stock market prices, and Opitz (2017) tested reactions to riots and wars.

³ The following paragraph draws heavily on Neumayer (2018).

⁴ For an overview and a description of the data and the signature, see appendix.

The information of the shareholder data includes gender or institution, name of every shareholder and his/her city of residence. In the vast majority of cases, however, these hand-collected databases of shareholder information are incomplete due to different protocols and layouts, which reduces the number of usable observations depending on the requested information. In many cases, only the name and residence of the shareholders are reported, and furthermore, there is no information on occupation or branches of shareholders. In some cases, the address was left blank. For 4,175 shareholders, we also have information on title and occupation. For those observations, we classify the investors into social classes.⁵ Data on the number of shares, the share capital of the investors and how many votes were cast are also taken from the shareholder attendance lists. In addition, we calculate the distance between a company's headquarters and the residences of every single shareholder to obtain a distance measure. Distances are calculated as straight lines.

Another bias in the data is that the information only covers investors attending the meetings or general assemblies. Those investors who did not attend the assemblies remain unknown. In addition, many investors are represented in these meetings and assemblies by, for example, banks or bank directors. In many cases, there is only information on the authorised representative, but not on the represented investors. There is also no data on how shareholders exercised their voting rights, only information on how many votes are cast. We did not use lists in which we observe too many outliers or missing values. Furthermore, the probability of investors attending such assemblies is higher for those who live in the same region in which the general assembly took place (see Neumayer, 2018). However, since we observe the characteristics of investors that attended a general meeting, we observe those that actually influenced a company's fate.

Table 1, Panel A reports the number of companies, the number of investors and the number of investors distributed into six time periods, where the economic conditions and/or the political system significantly changed. The period of 1869 to 1913 covers the meetings that took place during the Empire, 1914 to 1918 covers the meetings during World War I, and 1919 to 1923 covers the meetings in the first years of the Weimar Republic, with high levels of inflation resulting in the hyperinflation of 1923. The period of 1924 to 1928 covers the meetings that took place during the middle period of the Weimar Republic, which was characterised by relative economic and political stability but ended with the Great Depression in the subsequent years of 1929 to 1933. Our last period covers the dictatorship of Adolf Hitler and World War

⁵ The classification into social classes follows Schüren (1989) and is discussed in more detail in chapter 4.

II. We did not treat World War II separately, because trading became very restricted during the Nazi regime until 1945.

Table 1: Sample characteristics

Panel A: Distribution by period						
Decade	Number of companies	Number of general assemblies (GAs)	Number of investors	Average share of present capital		
1869–1913	44	112	1,858	36.51		
1914–1918	16	27	340	53.03		
1919–1923	139	277	3,127	51.15		
1924–1928	103	152	3,360	70.76		
1929–1933	85	144	1,958	71.03		
1934–1945	39	73	804	64.85		
Total	276	785	10,017	59.75		
Panel B: Distribution of general meetings by industry						
Industry⁶	1869–1913	1914–1918	1919–1923	1924–1928	1929–1933	1934–1945
Banking	47	8	19	19	8	5
Insurance			5	6		1
Mining	4	2	12	3	7	3
Heavy Industry	2	2	29	11	19	17
Light Industry	23	8	93	36	53	29
Food Processing	23	3	47	11	13	6
Transportation	1	1	6	12	8	6
Chemical Industry	3		3	4	1	
Public Utility	5		18	23	13	3
Diverse	4	3	45	26	22	3
Total	112	27	277	151	144	73
Panel C: Descriptive statistics						
	Mean	SD	Median	Min	Max	
Number of general meetings per company	2.84	3.31	2	1	24	
Duration for which firms are included in the sample	4.19	6.42	1	0	35.06	

Source: Various, please see Appendix.

⁶ The heavy industry category contains: engineering firms, metal working, and railway requirements. Light industry contains: textile sector, paper industry, glass industry, and rubber industry. Food processing contains: breweries and mills. Public utility contains: electricity, and gas and water. Diverse contains: hotel companies, terrain companies, and mortgage banks.

Overall, our sample contains 276 companies with 10,017 investors attending 785 general assemblies. The number of meetings in our data set varies with periods. In the first period, we observe 112 general assemblies of 44 firms with 1,858 investors. The number of general meetings drops in the period of World War I and rises to 103 firms, with information on 3,360 investors attending 152 general assemblies, in the period of the Golden Twenties. This number drops again after 1933 to 39 firms, with information on 804 investors and 73 general assemblies. Overall, about sixty percent of the share capital was represented at the meetings.

However, in the Empire years, the attendance was much lower than in the period of the Weimar Republic. This fits the observations by Fohlin (2007, pp. 122–124) and Franks et al. (2006). However, the attendance significantly increased during the Weimar Republic after 1923, when, on average, more than half of the capital was represented. Fohlin (2007, p. 124) also cites Richard Passow (1922), a contemporary observer, who lists some explanations for the low attendance rates at shareholder meetings. She summarises his ideas as “rational apathy” among small shareholders: cost of travelling to locations where the meetings took place, insufficient time to attend, the sense that news coverage provided sufficient information for the small shareholders, and the presumption among small shareholders that their influence was limited. Passow (1922) also mentioned that women would not attend the meetings, since they were not believed to be able to handle them. Thus, the fact that more investors attended the meetings during the Weimar Republic could be driven by a higher concentration and therefore a lower share of smaller shareholders, cheaper transport costs, a greater desire for first-hand information and an increasing acceptance of female capital owners. Panel B provides information about the branches of the firms in our sample. The branches are divided into 10 categories: banking, insurance, mining, heavy industry, light industry, food processing, transportation, chemical industry, public utilities and diverse. Our sample consists mainly of banks, firms from the heavy and light industries, and breweries. The highest number of firms comes from the light-industrial sector. This category includes textiles, paper, glass and rubber. Furthermore, there is a high number of hotel companies, terrain companies and mortgage banks in the sample. Table 1, Panel C reports some further descriptive characteristics about the number of meetings we observe per firm. Overall, we observe, on average, 2.84 meetings per company over an average period of 4.19 years.

3 Concentration

In this section, we examine the concentration of ownership. There are only few studies on ownership and control in historical perspective. For Germany, the pioneering study is from Franks et al. (2006), which analyses the ownership structure of 55 companies based on 156 shareholder lists and finds that ownership concentration was quite high and even increased slightly over time. Their findings are in strong contrast to the UK. Acheson et al. (2015) analyse corporate ownership in their comprehensive historical study for the second half of the 19th century in the UK, and they find evidence that, first, ownership tends to disperse over time and that firms headquartered in London and with shares listed at multiple stock exchanges had more widely dispersed ownerships. Second, generally, ownership concentration was lower in the Victorian Britain of 1900 than in modern Britain. Foreman-Peck and Hannah (2012) studied the divorce of ownership and control in pre-World War I Britain. They looked at the ownership structure of 337 listed companies and found evidence of a divorce of ownership and control. Manager-owners and board members controlled little capital and few votes.⁷

Table 2: Number of shareholders attending the meetings

Panel A	Mean	Median	Min	Max	Per cent of capital present	Number of general meetings
1869–1913	26.6	20	2	248	36.51	112
1914–1917	18.3	13	2	153	53.03	27
1918–1922	17.3	12	2	249	51.15	277
1923–1928	29.3	13	2	582	70.76	152
1929–1933	20.3	10	2	282	71.03	144
1934–1945	17.9	10	2	97	64.85	73
Total	21.6	13	2	582	59.75	785

Source: Various, please see Appendix. Note: This table reports the number of shareholders in the sample.

Table 2 shows the descriptive statistics of our sample. In contrast to Franks et al. (2006), our values do seem particularly stable over time. Before 1913, the mean number of shareholders was 26.6. This falls to 18.3 for the meetings during World War I, rising again in the period after the hyperinflation and before the Great Depression, before dropping to about 18 under the Nazi reign. However, the median did not change much over time, remaining between 10 and 20 over

⁷ Further studies by Franks et al. (2009) and Hannah (2007) also deal with the development of the ownership structure of British companies over time. For US corporations, there is still debate regarding the extent to which ownership and control were separated (for a review, see Cheffins and Banks, 2009). Moreover, several studies analyse ownership and control for the US in more detail (see, for instance, Hilt, 2008, and Holderness et al., 1999).

the whole period, which is equal to Franks et al.'s (2006) calculations. Similar to Franks et al. (2006), the maximum number of investors is mostly above 100, showing that the method is perfectly capable of identifying large numbers of shareholders. The largest number of shareholders appeared at the 1932 general meeting of *Mannesmannröhren-Werke*, a large steel producer headquartered in Berlin and with a share capital of 6 million Reichsmark. At this meeting, 582 investors were present, representing 46 per cent of the company's share capital. In Table 3, we report different measures of ownership concentration. We use the same measures as Franks et al. (2006) in their seminal article. These are C1, C3, and C5 – the combined votes of the largest, the three largest, and the five largest shareholders, respectively. Cthreshold is defined as the minimum number of shareholders necessary to cast 25 per cent of the present votes, and Herfindahl is the overall distribution of represented capital/votes cast. For a better comparison with the findings of Franks et al. (2006), we include their calculations (Panel C) and our calculations grouped into the similar periods (Panel B). Similar to Franks et al. (2006), we find no reduction of concentration over time. Indeed, if anything, concentration seems to slightly increase. On average, the largest shareholder held about 47 per cent of shares, which means that, in most cases, this investor alone could provide more than 25 per cent of the votes. The Herfindahl index also increases from 32 to 35 during the Weimar Republic. Overall, however, we find a much lower rise than Franks et al. (2006), but higher overall values. The average Herfindahl calculated by Franks et al. (2006) ranges between 23 and 29 in the period 1900–1920, whereas we measure average levels of 33.5 per cent. Given that the median number of investors is fairly stable, the fact that more capital was represented at the shareholder meetings rather reflects the rising concentration in the form of rising shares of the attending investors, not a rise in the number of smaller shareholders attending the meetings.

Table 3: Ownership concentration over time

	C1	C3	C5	Cthreshold	Herfindahl	Number of general meetings
Panel A: Periods according to historical structural breaks						
1869–1913	0.45	0.66	0.75	1.40	0.32	112
1914–1917	0.46	0.60	0.72	1.04	0.31	27
1918–1922	0.47	0.70	0.81	1.18	0.34	277
1923–1928	0.48	0.69	0.80	1.12	0.35	152
1929–1933	0.48	0.70	0.78	1.27	0.35	144
1934–1945	0.46	0.71	0.82	1.28	0.32	73
1869–1945	0.47	0.69	0.79	1.22	0.34	785
Panel B: Periods in decades according to Franks et al. (2006)*						
1870	0.28	0.65	0.79	1.50	0.18	2
1890	0.46	0.79	0.89	1.17	0.34	6
1900	0.42	0.66	0.76	1.55	0.31	45
1910	0.46	0.64	0.73	1.26	0.32	68
1920	0.47	0.70	0.81	1.17	0.35	353
1930	0.47	0.69	0.78	1.23	0.34	280
1940	0.49	0.76	0.86	1.23	0.35	30
all	0.28	0.65	0.79	1.50	0.18	785
Panel C: Calculations from Franks et al. (2006, p. 564)						
1890	0.33	0.60	0.71	1.88	0.18	8
1900	0.42	0.70	0.80	1.32	0.23	19
1910	0.46	0.73	0.83	1.21	0.27	29
1920	0.47	0.75	0.86	1.32	0.29	41
1930	0.44	0.75	0.86	1.22	0.23	36
1940	0.58	0.82	0.90	1.00	0.37	17
1950	0.51	0.76	0.86	1.00	0.31	6
all	0.46	0.74	0.84	1.26	0.27	156

Source: See Appendix, authors' own calculations, *Firm observations are allocated to the nearest corresponding decade.

4 Gender, Social Classes and Institutional Investors – Descriptive Statistics

In this section, we provide information about how many men, women and institutional investors were present at general assemblies and how this composition changed within the nearly 50 years of our observation period. Further, we analyse the distribution of investors categorised into social classes over time. This is the first study that investigates social classes and gender distribution of investors on German stock exchanges before 1945. Despite rare studies on individual investors, such as those by John Maynard Keynes (Chambers et al., 2013, 2015, 2016) and Joseph Frisch (see Lehmann-Hasemeyer and Neumayer, 2018), the only comparable studies covering our observation period were for England (Rutterford et al., 2017; Sotiropoulos and Rutterford, 2018).

We define gender and whether it was a private or institutional investor primarily named on the list. Following this procedure, we observe a total of 647 female investors, of which 24 were classified as widows. Furthermore, we observe 8,334 male investors and 992 institutional investors (see Table 4). In four cases, married couples were mentioned as investors. We assigned these cases to female investors, assuming that the women had a say if they were mentioned. In 44 other cases, we only have information that a representative of a group of heirs or communities acted as investors. These are summarised in the category ‘unspecific’.

These total numbers certainly underestimate the impact of institutional investors, since while most other investors only appeared once or twice, some institutional investors appeared every year for more than one firm and held larger shares. This is better reflected in the shares per period (Panel B). The share of male investors fell from 87.9 per cent to about 67.9 per cent under the Nazi reign. In comparison, the share of women drops from the first to the second period (3.7 per cent to 1.5 per cent), rising then to 9.8 per cent in the period after the hyperinflation, but then falling again to about 4.2 per cent in the period under the reign of the National Socialists. Regarding the institutional investors attending the meetings, we obtain a constant rise from 7.5 to 27.5 percent. Panel C shows the average share of votes for the different groups. In most cases, we have the number of votes for each investor. If we do not have the vote, we assume that the share of capital equals the share of votes. The share of female votes seems to have been lowest for all groups. The average share of men was the largest. However, this distribution is highly skewed. Panel D shows the average impact of women, if we include the meetings in which no woman was present with a zero vote. Thus, it reflects the actual average impact of women per period. As one can see, the share is very low and never reaches more than 5 per cent. It is interesting that especially in the period 1924–1928, where we observe

Table 4: Gender – Descriptive statistics

	Women	Men	Institutional investors	Unspecific	Total
Panel A: Totals					
1869–1913	68	1634	139	17	1858
1914–1918	5	307	27	1	340
1919–1923	155	2694	276	6	3131
1924–1928	330	2598	424	10	3362
1929–1933	80	1602	269	8	1959
1934–1945	34	548	222	2	806
Total	647	8334	992	44	10017
Panel B: In per cent					
1869–1913	3.66	87.94	7.48	0.91	100
1914–1918	1.47	90.29	7.94	0.29	100
1919–1923	4.95	86.04	8.82	0.19	100
1924–1928	9.82	77.28	12.61	0.30	100
1929–1933	4.08	81.78	13.73	0.41	100
1934–1945	4.22	67.99	27.54	0.25	100
Total	6.46	83.20	9.90	0.44	100
Panel C: Average share of votes per person					
1869–1913	5.79	2.92	9.48	0.94	
1914–1918	5.20	3.78	11.19	59.87	
1919–1923	3.94	4.51	11.06	1.52	
1924–1928	0.77	2.55	7.85	0.13	
1929–1933	3.40	4.01	9.30	2.04	
1934–1945	6.91	5.71	5.12	10.28	
Total	10.85	58.06	45.25	6.69	
Panel D: Average share of the whole group at general meeting (0 vote if nobody from the group present)					
1869–1913	4.60	63.95	25.83	0.14	
1914–1918	1.73	52.64	28.59	2.22	
1919–1923	2.51	58.86	29.31	0.05	
1924–1928	1.66	48.69	41.76	0.01	
1929–1933	2.43	52.21	36.31	0.08	
1934–1945	4.17	54.27	36.47	0.42	
Total	2.76	55.77	33.14	0.17	

Source: Various, please see Appendix. Authors' own calculations.

most women, the share declines. that especially in the period 1924–1928, where we observe most women, the share declines. More women attended the meetings, but with smaller shares, whereas in the Empire years, only women with large shares attend. Any hesitations about attending a meeting seem to have declined, although the individual impact was low. Panel A

reveals another interesting feature: While men obviously appear in more than one period, the women seem to have appeared in one or two periods only, since the sum of individual investors per period nearly adds up to 647. However, this could be driven by a financial engagement in just one firm over a number of years, and thus we further investigate not just the number of meetings at which investors appear, but also the number of firms with which investors were engaged (see Table 5). Clearly, most of our investors invested in just one firm over time. However, while we observe that about 9 per cent of the male investors and about 20 per cent of the institutional investors invested in more than one company, almost all of the women invested in a single firm, and only eight held shares of two different firms.

Table 5: Degree of involvement by gender

Number of firms in which investors invested	Women	Men	Institutional investors	Unspecific	Total
Panel A: Totals					
1	639	7588	797	43	9067
2	8	559	102	1	670
3	0	115	25	0	140
4	0	38	12	0	50
5	0	15	13	0	28
More than 5	0	19	43	0	62
Totals	647	8,334	992	44	10,017
Panel B: In per cent					
1	98.76	91.05	80.34	97.73	90.52
2	1.24	6.71	10.28	2.27	6.69
3	0	1.38	2.52	0	1.40
4	0	0.46	1.21	0	0.50
5	0	0.18	1.31	0	0.28
More than 5	0	0.23	4.33	0	0.62
Panel C: Average engagement in years					
Mean	0.31	0.58	0.92	0.62	
Median	0	0	0	0	
Max.	22.04	35.06	26.06	35.06	

Source: Various, please see Appendix. Authors' own calculations.

Furthermore, we took a closer look at the female investors to understand why they held shares of the particular companies. However, due to the lack of information, we can only study few cases. It seems, however that the female investors were often members or the founding family. Anna Langheinrich, for instance, held shares of Graphitwerke Kropfmühl AG in 1925. In this year she was also the official director of this company and therefore one of the few

female entrepreneurs of the time (see Deutsches Aktienhandbuch, 1925, p. 549). Two further, cases were the female shareholders of the Papierfabrik August Koehler AG in Oberkirch and the Papierfabrik Wilhelm Euler in Bensheim. With Anna Maria Goetz and Wilhelmine Rettner, it happened that two women of the founding family were members of the supervisory board of both companies, since both companies held holdings together (Krämer, 2007).

To get a better idea of who the institutional investors are, we look at them in more detail in Table 6. Here, we divide the investors into different industrial branches following Lehmann-Hasemeyer and Opitz (2017). The branches are divided into 11 categories: banking, insurance, mining, heavy industry, light industry, food processing, transportation, chemical industry, public utilities, diverse, and not assignable if we could not assign the investors to a certain category. The highest percentage (70.26) of institutional investors comes from the banking sector. This does not necessarily mean that banks were the owners of the shares, as before WWI, banks held only a few major, long-term direct stakes in non-financial firms (Fohlin, 2007, p. 120). However, they held substantial control over joint-stock firms through proxy voting. In the pre-war era, proxy voting was established in two ways. The first is irrelevant to our study: a shareholder could transfer his/her voting rights to a bank (Stimmrechtsermächtigung), allowing the bank to cast votes in the shareholder's name. In these cases, the shareholders had to reveal their identity, and these details are available in the lists of the general meetings. The second way, which was more important in practice, was the so-called *Bankenstimmrecht* or *Depotstimmrecht*. This is much trickier and explains the large share of banks as institutional investors in our sample. According to Fohlin (2007, p. 122), many banks required their customers to transfer their votes automatically upon opening securities accounts, granting the banks a widespread ability to control rights of equity stakes they did not own. Banks could do more or less whatever they wished with these voting rights (see Fohlin 2007, pp. 122–124). As one can see, the influence of large banks was indeed high with on average more than 50 percent.

Table 6: Institutional Investors – Descriptive Statistics

Sector	1896–	1914–	1919–	1924	1929	1934–	Total	
	1913	1918	1923	1928	1933	1945	N	in percent
Panel A: Totals								
Banking	82	22	126	184	123	160	697	70.26
Insurance	1	1	4	14	0	3	23	2.32
Mining	0	1	5	14	11	3	34	3.43
Heavy industry	6	3	18	18	18	9	72	7.26
Light industry	10	0	13	32	10	9	74	7.46
Food processing	7	0	6	8	12	1	34	3.43
Transportation	2	0	3	4	6	5	20	2.02
Chemistry	0	0	4	6	2	0	12	1.21
Public utility	1	0	8	26	19	15	69	6.96
Diverse	9	0	77	92	59	13	250	25.20
Not assignable	21	0	10	26	8	2	67	6.75
Total	143	27	274	427	268	220	992	
Panel B: In per cent								
Banking	57.34	81.48	45.99	43.09	45.90	72.73	70.26	57.34
Insurance	0.70	3.70	1.46	3.28	0.00	1.36	2.32	0.70
Mining	0.00	3.70	1.82	3.28	4.10	1.36	3.43	0.00
Heavy industry	4.20	11.11	6.57	4.22	6.72	4.09	7.26	4.20
Light industry	6.99	0.00	4.74	7.49	3.73	4.09	7.46	6.99
Food processing	4.90	0.00	2.19	1.87	4.48	0.45	3.43	4.90
Transportation	1.40	0.00	1.09	0.94	2.24	2.27	2.02	1.40
Chemistry	0.00	0.00	1.46	1.41	0.75	0.00	1.21	0.00
Public utility	0.70	0.00	2.92	6.09	7.09	6.82	6.96	0.70
Diverse	6.29	0.00	28.10	21.55	22.01	5.91	25.20	6.29
Not assignable	14.69	0.00	3.65	6.09	2.99	0.91	6.75	14.69
Total	100	100	100	100	100	100	100	100

Source: Authors' own calculation.

Note: The sectoral classification is from Lehmann-Hasemeyer and Opitz (2017, p. 15). The heavy industry category contains: engineering firms, metal working, and railway requirements. Light industry contains: the textile sector, paper industry, glass industry, and rubber industry. Food processing contains: breweries and mills. Public utility contains: electricity, gas and water. Diverse contains: hotel companies, terrain companies and mortgage banks.

We then classify the investors into social classes depending on occupation and academic title. Thereby, we follow the existing classification of Schüren (1989).⁸ Schüren analyses the history of social mobility in Germany in the 19th and 20th centuries, using a broad data set of thousands of occupational details. His work represents one of the largest and most comprehensive investigations of the socio-economic ascent and descent possibilities in two centuries of German social history. His classification is intertemporal valid and has consensus among social historians such as Hartmut Kaelble or Jürgen Kocka (see Schüren, 1989, pp. 313ff.). Since we have information about the occupations of the investors, we can easily follow the existing classification of Schüren and classify our occupational investors' data into these social classes. Table 7 reports the classification scheme used by Schüren. He distinguishes the working class, the lower middle class, the higher middle class and the upper class based on occupations. The working class contains skilled workers, craftsman, skilled industrial workers, and lower civil servants and employees. The lower middle class contains small farmers, merchants, masters/hosts and middle civil servants and employees. The higher middle class contains full-time farmers, medium-sized entrepreneurs and senior civil servants and top officials. The upper class contains mostly landowners, large manufacturers, academics and upper senior officials.

We are aware of the fact that during our period of interest, political changes, wars and financial depressions, for example, led to changes in the social structure and occupational system of society. Therefore, occupations may have to be assigned to different social classes for different times. This is also already covered in the classification of Schüren. In instances where we only have information about the title of an investor (e.g., Prof., Dr., Ing.), we try to classify their occupation based on the title. For most cases, this was relatively easy, because most of the titles are academic titles that we can easily assign to the group of academics and the upper class. We also assign investors with a title of nobility (e.g., Exzellenz, Graf, Freiherr von) to the upper class, even if there was no indication of their profession in our data. Some of the investors owned an honorary title such as, for example, *Geheimer Kommerzienrat*, *Geheimer Regierungsrat* or *Geheimer Medizinalrat*. These investors were also assigned to the upper class, since these titles were awarded only to high-level personalities in the economy and after significant achievements for the common good of society.

⁸ For the whole text of Schüren's classification scheme, see Schüren (1989, pp. 313ff.).

Table 7: Social Classes – Classification Scheme

Social classes⁹
I. Working Class
1. Skilled Workers
2. Craftsman
3. Skilled Industrial Workers
4. Lower Civil Servants and Employees
II. Lower Middle Class
1. Small Farmers
2. Merchants
3. Masters and Hosts (Master Craftsmen, Innkeepers, Shopkeepers, etc.)
4. Middle Civil Servants and Employees (Foremen, Assistants, etc.)
III. Higher Middle Class
1. Full-time Farmers
2. Medium-sized Entrepreneurs (incl. Men of Private Means, Wholesalers)
3. Senior Civil Servants and Top Officials (Engineers, Inspectors, Authorised signatories)
IV. Upper Class
1. Landowners, Large Manufacturers, Academics, Upper Senior Officials

Source: Schüren (1989, p. 35).

Table 8 shows the descriptive statistics of the investors divided into social classes. In total, the sample contains 4,175 investors for which we have information on their occupation. The majority come from the upper class (89.99 per cent). About 7.16 per cent come from the higher middle class, 2.78 per cent from the lower middle class, and only 0.07 per cent from the working class. Looking at the changes over time, in the first period, we find 94.72 per cent of investors from the upper class. In the second period, this rises to 96.70 per cent, but then it continuously falls to 88.45 per cent in the last period. In comparison, the share of the investors from the higher middle class drops from the first to the second period (3.57 per cent to 2.75 per cent), before rising to 8.81 per cent in the last period. We obtain a similar picture for the share of the lower middle class, where we see a rise from 0.55 per cent from the second period to 3.25 per cent in the fifth period, but then falling to 2.74 per cent in the sixth period. The proportion of the working class is very low, and only in the third and fifth periods is it slightly

⁹ Originally, Schüren distinguished six social classes. We have omitted the subdivision of the working class into the lower, middle and higher working class, because there are few observations of the working class.

higher than 0 (0.07 per cent, and 0.22 per cent). The table reveals that in the 19th century, most shares were in the hands of the men of the upper class. However, this slightly changes in the 1920s, when ownership became more and more available to lower social classes, which is also reflected in the higher shares of investors from the middle and working classes.

Table 8: Social Classes – Descriptive Statistics

	Share of upper class	Share of higher middle class	Share of lower middle class	Share of working class	Total
Panel A: Totals					
1869–1913	664	25	12		701
1914–1918	176	5	1		182
1919–1923	1294	102	46	1	1443
1924–1928	1184	102	36		1322
1929–1933	793	68	29	2	892
1934–1945	291	29	9		329
Total	3757	299	116	3	4,175
Panel B: In per cent					
1869–1913	94.72	3.57	1.71	0.00	100
1914–1918	96.70	2.75	0.55	0.00	100
1919–1923	89.67	7.07	3.19	0.07	100
1924–1928	89.56	7.72	2.72	0.00	100
1929–1933	88.90	7.62	3.25	0.22	100
1934–1945	88.45	8.81	2.74	0.00	100
Total	89.99	7.16	2.78	0.07	100
Panel C: Average share of the whole group at general meeting (0 vote if nobody from the group present)					
1869–1913	38.48	10.95	8.99	0.00	
1914–1918	45.07	3.72	0.49	0.00	
1919–1923	38.94	8.00	13.13	0.03	
1924–1928	34.50	3.92	5.36	0.00	
1929–1933	39.92	8.20	6.13	0.05	
1934–1945	44.71	15.87	2.42	0.00	
Total	38.99	8.43	8.37	0.05	

Source: Authors' own calculation. The classification scheme is from Schüren (1989, p. 35).

Altogether, rising democracy and price disturbances after the period of hyperinflation seem to be accompanied by a rising share of female investors and a rising share of investors from lower social classes. However, the shares of female investors and lower social classes remain relatively low, and we observe a rise in concentration at the same time. Thus, while these observations confirm our hypothesis, they also show that the joint-stock firms were still firmly

in the hands of few investors from the upper class and institutional investors, which were mostly banks.

5 Correcting for selection bias

The descriptive statistics confirm our hypothesis that the rising democracy and the price disturbances of hyperinflation go together with a rising share of other social classes as well as a rising share of female investors. However, these descriptive statistics might be biased by selection of available information on general meetings. In some periods, we observe more general meetings than in others, as well as different branches and different firm sizes. Thus, we aim at establishing our observations from the descriptive statistics in a more elaborate way.

First, we construct a data set at the level of investors and years. Few investors appear more than once in the data set. If, for instance, investor X attends a general meeting in 1900 and a meeting of the same firm in 1905, we would observe her twice. However, since we are interested in the probability of certain characteristics over time and most investors do not appear more than once, we stick with simple ordered logit and logit regressions and cluster the standard errors by investors. The dependent variables are social class rankings from 1 to 4 (regression 1 and 2), equal to one if the investor was a woman (regression 3 and 4) or an institution (5 and 6). Since we are mostly interested in how the probability of these characteristics changed over time, and especially in the period between 1924 and 1933, we add dummy variables for certain periods. We further control for the share of extraordinary meetings, because the incentive to attend these meetings might have been different. We also control for the average distance between an investor's residence and the location of the general meeting as a measure of transport cost as well as the total number of investors per year to account for potential selection bias. The results, shown in Table 9, clearly confirm our descriptive statistics. The probability of coming from a lower social class rises declined during World War I, but increases significantly after 1923 and 1933. The likelihood that women became investors also rises after 1923. The presence of institutional investors, however, seem to rise constantly over the whole period of observation.

Table 9: Probability of appearance of an investor's characteristics

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	Socialclass		Women=1		Institutional investors=1	
	Ordered logit			Logit		
1914–1917	-1.006**		-0.445		-0.272	
	(0.460)		(0.668)		(0.254)	
1918–1922	0.420		-1.015***		0.416***	
	(0.266)		(0.302)		(0.138)	
1923–1928	0.818***		0.190		0.813***	
	(0.249)		(0.224)		(0.142)	
1929–1933	1.040***		0.111		0.790***	
	(0.261)		(0.235)		(0.147)	
1934–1945	0.635**		0.142		1.539***	
	(0.294)		(0.297)		(0.139)	
1924–1933		0.627***		0.747***		0.327***
		(0.129)		(0.114)		(0.0855)
Share of extraordinary meetings	0.0839	0.0697	0.958***	1.005***	-0.168**	-0.136**
	(0.115)	(0.116)	(0.0972)	(0.0990)	(0.0669)	(0.0656)
Distance from investor's residence to location of GM	-0.228***	-0.221***	0.0290**	0.0313**	0.0236**	0.0290**
	(0.0780)	(0.0771)	(0.0128)	(0.0131)	(0.0114)	(0.0135)
Number of investors per year	6.92e-05	0.000230**	0.000972***	0.000485***	-0.000313***	-0.000367***
	(0.000145)	(0.000117)	(0.000156)	(9.97e-05)	(8.01e-05)	(6.39e-05)
Share of large firms	-0.667***	-0.626***	-0.368***	-0.371***	0.0187	0.0128
	(0.157)	(0.159)	(0.107)	(0.107)	(0.0919)	(0.0893)
Constant	2.488***	2.363***				
	(0.239)	(0.160)				
Constant cut2	3.775***	3.646***				
	(0.242)	(0.170)				
Constant cut3	7.576***	7.447***				
	(0.643)	(0.623)				
Constant			-3.808***	-3.951***	-2.210***	-1.701***
			(0.192)	(0.190)	(0.134)	(0.0955)
Observations	6,354	6,354	14,032	14,032	14,032	14,032

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, clustered by investors.

One might argue that a logit is not able to trace the actual impact, since vote shares might have been very different. Thus we run OLS regressions in which the log of the vote share is the dependent variable. We control for gender and whether the investor was institutional. We also add dummies for the time periods and control for the share of extraordinary meetings, distance and number of investors per year, as above. The results are shown in Table 10. One can clearly see that the share of votes for men and women did not significantly differ. However,

unsurprisingly, institutional investors had significantly more votes than ordinary investors. If we include the variable of social class, ranking from 1 (upper class) to 4 (lower middle class), it seems that the vote share of the lower class declined significantly. However, if we only add a dummy for investors from the middle class (the one that we used in the logit regressions), the voting share is not significantly different.

Table 10: Vote shares

VARIABLES	(1)	(2)	(3)	(4)	(5)
Sample	All investors that could be categorised		ln(vote share) Only male and female investors	All investors that could be categorised	
Women	-0.321** (0.154)	-0.0692 (0.152)	-0.0924 (0.155)		
Institutional investors			1.545*** (0.114)		
Social class				-0.172* (0.104)	
Social class below upperclass (<3)					-0.157 (0.234)
1914–1917	-0.0460 (0.200)	-0.139 (0.210)	-0.0198 (0.196)	-0.316 (0.290)	-0.309 (0.290)
1918–1922	2.027*** (0.108)	2.261*** (0.112)	1.970*** (0.107)	2.414*** (0.165)	2.414*** (0.165)
1923–1928	0.0783 (0.102)	-0.0939 (0.106)	-0.0570 (0.0991)	0.291* (0.161)	0.287* (0.160)
1929–1933	0.110 (0.106)	0.0243 (0.114)	0.000436 (0.104)	0.326* (0.168)	0.318* (0.168)
1934–1945	0.0239 (0.138)	0.484*** (0.163)	-0.342** (0.153)	0.814*** (0.216)	0.805*** (0.216)
Share extraordinary meetings	-0.354*** (0.0588)	-0.189*** (0.0611)	-0.333*** (0.0578)	-0.157* (0.0806)	-0.156* (0.0806)
Number of investors per year	-0.00155*** (7.15e-05)	-0.00177*** (7.50e-05)	-0.00151*** (7.10e-05)	-0.00167*** (9.86e-05)	-0.00167*** (9.87e-05)
Distance from investor's residence to location of GM	0.0158* (0.00880)	0.0183* (0.00941)	0.00925 (0.00959)	-0.0195* (0.0115)	-0.0184 (0.0115)
Constant	-5.034*** (0.0800)	-5.163*** (0.0792)	-5.193*** (0.0761)	-4.829*** (0.167)	-5.013*** (0.122)
Observations	12,911	11,142	12,911	5,886	5,886
R-squared	0.084	0.119	0.122	0.098	0.098

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, clustered by investors.

In a second step, we aggregate the data at the level of general meetings. More precisely, since we observe, on average, about six general meetings per firm, we construct an unbalanced panel, where the ID variable is the firm and the time variable is the date of the general meeting.

Here, we focus first on the measures of concentration from section II and show whether they changed over time if we control for meeting specific characteristics and, additionally, for time-invariant firm characteristics with firm fixed effects. The results confirm the findings of the descriptive statistics and are shown in Table 11. Overall, the level of concentration is remarkably stable. Only C1 seems to significantly increase in the period of 1923 to 1933. However, the coefficients slightly increase over time. Thus, we re-estimate the regressions including only one time dummy for the period of 1924–1933. As Table 12 reveals, this time dummy is significant for the Herfindahl index and the share of the largest investors. Thus, concentration did rise significantly in the period after hyperinflation until the Nazis took over.

Table 11: Concentration over time, Panel

VARIABLES	(1) ln(herfindahl)	(2) ln(c1)	(3) ln(c3)	(4) ln(cthres)	(5) ln(herfindahl)	(6) ln(c1)	(7) ln(c3)	(8) ln(cthres)
	pooled				FE			
1914–1917	-0.00838 (0.0833)	0.110 (0.230)	-0.0591 (0.0788)	-0.354*** (0.126)	0.0998 (0.0881)	0.444** (0.223)	0.0717 (0.0912)	-0.434*** (0.119)
1918–1922	-0.0439 (0.0700)	-0.154 (0.220)	-0.00271 (0.0674)	0.0831 (0.157)	-0.00139 (0.0721)	0.126 (0.236)	0.0167 (0.0878)	-0.0672 (0.132)
1923–1928	-0.00332 (0.0715)	0.0351 (0.218)	0.00577 (0.0634)	-0.161 (0.141)	0.0973 (0.0618)	0.359* (0.189)	0.0688 (0.0702)	-0.194* (0.117)
1929–1933	0.00109 (0.0683)	0.0353 (0.213)	0.0172 (0.0608)	0.000305 (0.181)	0.0797 (0.0676)	0.327 (0.209)	0.0780 (0.0753)	-0.165 (0.125)
1934–1945	-0.00511 (0.0687)	0.0796 (0.223)	0.0372 (0.0680)	-0.0673 (0.151)	0.0297 (0.0777)	0.214 (0.254)	0.0445 (0.0891)	-0.0414 (0.146)
Extraordinary meetings (=1)	-0.0186 (0.0218)	-0.0477 (0.0691)	-0.0574* (0.0310)	0.0753 (0.102)	0.00157 (0.0266)	0.0375 (0.0764)	5.79e-05 (0.0210)	-0.0777 (0.0623)
Overall share capital per year	0.00782 (0.00884)	0.0253 (0.0348)	0.00172 (0.0133)	0.00233 (0.0241)	-0.0169 (0.0115)	-0.00999 (0.0356)	0.00308 (0.0123)	-0.00162 (0.0316)
Number of GMs per year	0.000740 (0.000827)	0.00381 (0.00269)	0.000846 (0.00108)	-0.00505** (0.00219)	0.00193** (0.000847)	0.00304 (0.00288)	0.00130 (0.00107)	-0.00118 (0.00220)
Constant	0.300*** (0.0525)	-1.503*** (0.175)	0.660*** (0.0530)	1.411*** (0.116)	0.297*** (0.0625)	-1.578*** (0.206)	0.590*** (0.0751)	1.397*** (0.116)
Firm fixed effects	n	n	n	n	y	y	y	y
Observations	721	721	760	720	710	710	749	709
R-squared	0.012	0.019	0.016	0.032	0.033	0.037	0.029	0.045
Number of firms	257	257	272	257	257	257	272	257

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1.

Table 12: Concentration over time, 1924–1933

VARIABLES	(1) ln(herfindahl)	(2) ln(c1)	(3) ln(c3)	(4) ln(cthres)
1924-1933	0.0716** (0.0305)	0.201** (0.1000)	0.0505 (0.0334)	-0.115 (0.0809)
Extraordinary meetings (=1)	0.000655 (0.0258)	0.0331 (0.0716)	-0.00189 (0.0205)	-0.0763 (0.0606)
Overall share capital per year	-0.0163 (0.0123)	-0.0197 (0.0348)	-0.000431 (0.0105)	0.00190 (0.0307)
Number of GMs per year	0.00148* (0.000815)	0.00280 (0.00236)	0.00128* (0.000699)	-0.000837 (0.00198)
Constant	0.325*** (0.0360)	-1.395*** (0.0963)	0.627*** (0.0280)	1.302*** (0.0591)
Firm fixed effects	y	y	y	y
Observations	710	710	749	709
R-squared	0.022	0.020	0.024	0.015
Number of firms	257	257	272	257

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, clustered at firm level.

We then run the same model, using the share of women and the mean of social class as dependent variables. The results are shown in Table 13. This regression reveals some interesting new aspects. First, the share of lower social classes does not change significantly over time; in fact, it seems to decline. Furthermore, the share of women rises after 1919, similar to our new aspects. First, the share of lower social classes does not change significantly over time; in fact, it seems to decline. Furthermore, the share of women rises after 1919, similar to our previous findings, if we estimate the panel without firm fixed effects. If we include firm fixed effects, the share of women falls significantly in our observation period. Since 98% of the women were only engaged in one firm, this reveals that some of these women withdrew their engagement in this period.

Table 13: Panel

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	socialclass		Share of women		socialclass		Share of women	
1914–1917	0.0227 (0.0917)	0.0427 (0.0792)	0.00640 (0.0166)	-0.0133 (0.0185)				
1918–1922	-0.0189 (0.0429)	0.00277 (0.0626)	0.0368* (0.0188)	0.0195 (0.0179)				
1923–1928	-0.00445 (0.0315)	-0.0149 (0.0325)	0.0252 (0.0163)	0.000770 (0.0132)				
1929–1933	0.00395 (0.0344)	-0.00934 (0.0385)	0.0269* (0.0142)	-0.00444 (0.0121)				
1934–1945	0.0274 (0.0404)	0.00592 (0.0627)	0.0298* (0.0157)	0.0151 (0.0158)				
1924–1933					0.000382 (0.0189)	-0.0188 (0.0270)	0.00487 (0.0132)	-0.0135** (0.00585)
Share of extraordinary meetings	0.00261 (0.0205)	0.00574 (0.0191)	-0.00715 (0.00921)	-0.000375 (0.00574)	0.000968 (0.0209)	0.00516 (0.0193)	-0.00726 (0.00944)	-0.000207 (0.00568)
Number of GMs (year)	0.000471 (0.000577)	-0.000207 (0.000920)	-0.000397 (0.000298)	-0.000229 (0.000202)	9.80e-05 (0.000397)	-0.000310 (0.000549)	-4.24e-05 (0.000144)	-4.81e-05 (0.000142)
Herfindahl	-0.0510 (0.0571)	0.0607 (0.0735)	-0.0765*** (0.0193)	-0.0415*** (0.0133)	-0.0499 (0.0571)	0.0651 (0.0820)	-0.0774*** (0.0195)	-0.0430*** (0.0147)
Constant	1.086*** (0.0412)	1.068*** (0.0273)	0.0504*** (0.0157)	0.0482*** (0.00801)	1.096*** (0.0365)	1.076*** (0.0296)	0.0610*** (0.0172)	0.0541*** (0.00785)
Firm fixed effects	n	y	n	y	n	y	n	y
Observations	674	663	721	710	674	663	721	710
R-squared	0.007	0.013	0.058	0.068	0.004	0.010	0.048	0.053
Number of firms	244	244	257	257	244	244	257	257

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1, clustered at firm level.

6 Conclusion

We studied the ownership structure of joint-stock firms for the period of 1869 to 1945 based on a unique hand-collected data set. The data covers a selection of 785 general meetings of 276 firms, covering the information of 10,017 individual investors over the period of 1869 to 1945. We can show that after the hyperinflation of 1923, when shares became cheaper, ownership among the lower social classes and women increased significantly. These results are robust to different approaches that aim at controlling for a potential selection bias. However, despite the greater participation of women and the lower social classes after 1923, there remained a vast inequality of opportunities in terms of capital ownership and control. Thus, regardless of the political changes and new economic conditions, the control of the joint-stock firms largely remained in the hands of investors from the upper class and large banks.

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Handbuch der deutschen Aktien-Gesellschaften. Ein Hand- und Nachschlagebuch für Bankiers, Industrielle, Kapitalisten, Behörden etc., Band I-II, Berlin: Verlag für Börsen- und Finanzliteratur AG, 1914/15)

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Handbuch der deutschen Aktien-Gesellschaften. Band I-VI, Berlin: Hoppenstedt & Co, 1943.

Appendix

A1: Archive Sources and Signatures

Baden-Wuerttemberg Economic Archiv (WABW)

Signature	Name of the firm
B 26 / 50-67	Bleicherei, Färberei und Appreturanstalt GmbH, Uhingen
B 30 / 153	A. Stotz AG, Stuttgart
B 40 / 17, 226	Koehler AG, Oberkirch
B 40 / 228	W. Euler Maschinenpapierfabrik AG, Bensheim
B 49 / 228	Koehler AG, Oberkirch
B 150 / 1744-1749, 2347, 2371	Salamander AG, Kornwestheim
B 150 / 2371	J. Sigel & Cie. Schuhfabrik AG, Kornwestheim
B 2001 / 10, 136	Elektrizitätswerke Argen AG, Wangen im Allgäu
B 2007 / 263	Kraftwerke Untere Mindel AG, Burgau
B 2023 / 15-16	Württembergische Sammelschienen AG, Stuttgart

Bavarian Economic Archive (BWA)

Signature	Name of the firm
V 5 / 3	Aktienbrauerei zum Löwenbräu, München
V 5 / 8	Deutsche Lebensversicherungsbank Arminia AG, München
V 5 / 16	August Riedener Ballonfabrik AG, Augsburg
V 5 / 17	Aktienbrauerei Augsburg AG, Augsburg
V 5 / 19	Paulanerbräu Salvatorbrauerei AG, München
V 5 / 22	Allgäuer Baumwollspinnerei und Weberei (vorm. Heinrich Gyr), Blaichach
V 5 / 26, 504	Ziegelei Augsburg, Augsburg
V 5 / 29	Artes-Verlag AG, München
V 5 / 49	Buntpapierfabrik AG, Aschaffenburg
V 5 / 51	AG für Maschinenpapierfabrikation, Aschaffenburg
V 5 / 52	Niederrheinische Zellstoff AG, Walsum am Rhein
V 5 / 66-67	Nationalbank für Deutschland, Berlin
V 5 / 70	Deutsch-Asiatische Bank, Shanghai
V 5 / 74	Bayerische Notenbank, München
V 5 / 84I, 82, 84I	Barmer Bankverein, Barmen
V 5 / 87	Bayerische Bodenkreditanstalt, Würzburg
V 5 / 90	Bayerische Celluloidwarenfabrik (vorm. Albert Wacker AG), Nürnberg

V 5 / 91	Bayernwerke für Holzverwertung AG, München
V 5 / 96	Balnea AG für Reiseandenken und Fotochrombilder, Nürnberg
V 5 / 101	Schuhfabrik E. Heimann Aktiengesellschaft, Schweinfurt
V 5 / 104, 997	Bayerisches Portlandzementwerk Marienstein AG, München
V 5 / 107	Bayerische Rumplerwerke AG, Augsburg
V 5 / 110	Bürgerliches Brauhaus, Ingolstadt
V 5 / 111	Bayerische Wolldeckenfabrik Bruckmühl AG, München
V 5 / 128, 132	Bamberger Mälzerei AG (vorm. Carl J. Dessauer), Bamberg und Mälzfabrik Stuttgart AG, Stuttgart
V 5 / 129	Bürstenfabrik Erlangen AG (vorm. Emil Kränzlein), Erlangen
V 5 / 130	Brauerei Geismann AG, Fürth
V 5 / 135	Bleistiftfabrik vorm. Johann Faber AG, Nürnberg
V 5 / 139	Bayerische Bauindustrie AG, München
V 5 / 141-143	Bayerische Granitaktiengesellschaft, Regensburg
V 5 / 151, 153-154	Gebrüder Bing AG, Nürnberg
V 5 / 155, 157	Bürstenfabrik Pensberger & Co. AG, München
V 5 / 158, 160	Bruckmann AG, München
V 5 / 163-164I, 166	Bergmann Elektrizitätswerke AG, Berlin
V 5 / 169	Bayerische Aktiengesellschaft für Energiewirtschaft, Bamberg
V 5 / 171	Continental Gesellschaft für elektrische Unternehmungen, Nürnberg
V 5 / 172-173	Chemische Werke Brockhues AG, Niederwalluf am Rhein
V 5 / 175	AG für chemische Produkte (vorm. H. Scheidemandel), Landshut
V 5 / 217	Deutsch-Luxemburgische Bergwerks- und Hütten AG, Berlin
V 5 / 219	Druckerei und Kartonagen (vorm. Gebrüder Obpacher AG), München
V 5 / 221, 745	Direction der Disconto-Gesellschaft, Berlin
V 5 / 222	Danubia AG für Mineralölindustrie, Regensburg
V 5 / 224, 245I, 245II	Elektrizitäts-AG (vormals Schuckert & Co.), Nürnberg
V 5 / 227-228	Elsenthal Holzstoff- und Papierfabrik AG, Grafenau
V 5 / 241	Grünerbräu AG, Fürth
V 5 / 248-249	Polyphonwerke AG, Leipzig
V 5 / 250, 252	Graphitwerk Kropfmühl AG, München
V 5 / V253	Aktiengesellschaft für Gasindustrie, Augsburg
V 5 / 258-260	Gesellschaft für elektrische Unternehmungen Ludwig Loewe & Co AG, Berlin
V 5 / 263	Solenhofer Aktienverein AG, Altendorf bei Sonhofen
V 5 / 265	Julius Sichel & Co. Kommanditgesellschaft a. Aktien, Mainz
V 5 / 266	Süddeutsche Metallwerke AG, München
V 5 / 271	Schlossbrauerei Planegg AG, Planegg
V 5 / 278-279	Süddeutsche Holzindustrie AG, München
V 5 / 280-298	AG für Seilindustrie (vormals Ferdinand Wolff), Mannheim-Neckarau
V 5 / 294, 295I, 295II	AG Eisenwerk-Gesellschaft Maximilianhütte, Rosenberg
V 5 / 305	Hotel Aktiengesellschaft, München
V 5 / 308	Hauser & Sobotka Getreide AG, München
V 5 / 309-310	F. H. Hammersen Aktiengesellschaft, Osnabrück
V 5 / 312-313, 316, 318	Johannes Haag Maschinen- und Röhrenfabrik AG, Augsburg
V 5 / 333	Georg Müller Verlag AG, München
V 5 / 334	Mohr & Co. AG, München

V 5 / 336	Mandruck AG, München
V 5 / 348	Mechanische Baumwoll- Spinnerei und Weberei, Kaufbeuren
V 5 / 349	Minimax AG, Berlin
V 5 / 350-351	Münchener Export Malzfabrik München AG, München
V 5 / 361	Mannheimer Versicherungsgesellschaft AG, Mannheim
V 5 / 374	Spinnerei und Weberei Kottern, Kottern
V 5 / 441	Mechanische Flachs-Spinnerei Bayreuth, Laineck
V 5 / 501-502	Aktiengesellschaft Zuckerfabrik, Offstein
V 5 / 505	Zwirnerei und Nähfadenfabrik Göggingen
V 5 / 539	Lobers Fleischwerke AG, Augsburg
V 5 / 541-542	Aktiengesellschaft für Lederfabrikation, München
V 5 / 545I	Landshuter Keks- und Schokoladenfabrik AG, Landshut
V 5 / 549	Localbahn AG, München
V 5 / 551	Lux´sche Industriewerke AG, Ludwigshafen am Rhein
V 5 / 555-557	Lithoponefabrikation, Triebes
V 5 / 559	Ulmer Brauereigesellschaft, Ulm
V 5 / 587	Aktiengesellschaft Waggonfabrik Jos. Rathgeber, München-Moosach
V 5 / 589I	Eisenwerkgesellschaft Maximilianshütte, München
V 5 / 613, 2015-2016	Lech-Elektrizitätswerke AG, Augsburg
V 5 / 626	Wollwarenfabrik Mercur, Liegnitz
V 5 / 627-628, 630	Wayss & Freytag AG, Frankfurt am Main
V 5 / 696	Vereinigte Zwieseler & Pirnaerfarbenglaswerke AG, München
V 5 / 718	Vereinigte Fabriken landwirtschaftlicher Maschinen (vormals Epple & Buxbaum), Augsburg
V 5 / 726	Vereinigte Landsberger Pflug- und Münchener Eggenfabriken AG, München-Pasing
V 5 / 728	Lithographisch-Artistische Anstalt, München
V 5 / 740	Ostbayerische Stromversorgung AG, München
V 5 / 754	Vereinigte Glaswerke AG, Augsburg
V 5 / 756-757	AG Verlagsanstalt, München
V 5 / 814, 822, 833	Terraingesellschaft Neu-Westend AG, München
V 5 / 815	München-Pasinger Terraingesellschaft AG, München
V 5 / 821	Aktiengesellschaft Petuel'sche Terrain-Gesellschaft, München-Riesenfeld
V 5 / 824-829	Teisnacher Papierfabrik, Teisnach
V 5 / 836	Terrain-Aktiengesellschaft Herzogpark-München-Gern, München
V 5 / 837	Terraingesellschaft München-Friedenheim AG, München
V 5 / 844I	Phoenix AG für Bergbau und Hüttenbetrieb, Düsseldorf
V 5 / 862-865	Vereinigte Schuhfabriken Berneis-Wessels AG, Augsburg
V 5 / 867	Vereinigte Fränkische Schuhfabriken, Nürnberg
V 5 / 875	Aktiengesellschaft für Bleicherei, Färberei, Appretur & Druckerei, Augsburg
V 5 / 844I	Gelsenkirchener Berkwerksgesellschaft, Essen
V 5 / 906	Kunstmühle Tivoli AG, München
V 5 / 959	Oberpfalzwerke AG für Elektrizitätsversorgung, Regensburg
V 5 / 961, 963	Ostbayerische Überlandzentrale AG, München
V 5 / 964, 966	Ostwerke AG, Berlin
V 5 / 984	Prinzregentenplatz AG, München
V 5 / 988, 990	Papierfabrik Hegge, Kempten

V 5 / 994	Porzellanfabrik Tirschenreuth AG, Tirschenreuth
V 5 / 998	Bayerische Trasswerke AG, München
V 5 / 1001	Süddeutsche Bank, Mannheim
V 5 / 1023, 1025	Aktiengesellschaft Jesuitenbrauerei, Regensburg
V 5 / 1028	Rhein-Main-Donau AG, München
V 5 / 1588	Deutsche Hypothekenbank, Weimar (Meiningen)
V 5 / 1619	Diamalt AG, München
V 5 / 1709	Fränkische Überlandwerk AG, Nürnberg
V 5 / 1746	Grosskraftwerk Franken AG, Nürnberg
V 5 / 1763	Hackerbräu AG, München
V 5 / 1771	Hanfwerke Füssen-Immenstadt AG, Füssen
V 5 / 1913, 1915	Ampferwerke Elektrizitäts-AG, München
V 5 / 2022	Leonische Drahtwerke AG, Nürnberg
V 5 / 2084	Mannesmannröhren-Werke, Düsseldorf
V 5 / 2111	Gesellschaft für Markt- und Kühlhallen, Hamburg

Hessian Economic Archive (HWA)

Signature

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Name of the firm

Nassau-Selterser Mineralquellen AG, Oberselters (Nassau)
Hartmann & Braun AG, Frankfurt am Main
Zellstofffabrik Waldhof, Mannheim-Waldhof
Illkircher Mühlenwerke AG (vorm. Baumann freres), Strassbourg
Vereinigte Schuhfabriken Berneis-Wessels AG, Augsburg
M. Melliand Chemische Fabrik AG, Mannheim
Emil Herminghaus AG, Velbert
Metallwerke Unterweser AG (Friedrich-August-Hütte), Oldenburg
Deutsche Gold- und Silber-Scheideanstalt
(vorm. Roessler), Frankfurt am Main
Dampfkesselfabrik (vorm. Arthur Rodberg), Darmstadt
Rheinische Stahlwerke Essen, Duisburg-Meiderich
Rhenser Mineralbrunnen Fritz Meyer & Co. AG, Rhens am Rhein
Kahlgrund-Eisenbahn AG, Schöllkrippen
Messingwerke AG, Elberfeld
Zuckerfabrik Offstein AG, Offstein
Zementfabrik Bernhard Löhr, Frankfurt am Main
Maschinenbaugesellschaft, Karlsruhe
Uhrenfabrik (vorm. L. Furtwängler Söhne AG), Furtwangen
Union Aktienbrauerei (vormals C. Ueberle & E. Charlier), Trier
Hansa Loyd Werke AG, Bremen
Süddeutsche Zucker AG, Mannheim
Salzwerk Heilbronn, Heilbronn
Hüttenwerk Niederschöneweide AG
(vorm. J.F. Binsberg), Berlin-Niederschöneweide

HWA 115 / 194	Sachtleben AG für Bergbau und Chemische Industrie, Köln
HWA 115 / 196	Verein chemischer Fabriken, Mannheim
HWA 115 / 197	Vereinigte Königs- und Laurahütte, Berlin
HWA 115 / 199	Kalle & Co AG, Wiesbaden-Biebrich
HWA 115 / 201	Lämmerspieler Metallwaren und Schraubenfabrik Melber & Co AG, Lämmerspiel
HWA 115 / 203	Verein deutscher Oelfabriken, Mannheim
HWA 115 / 205	Kasseler Verkehrsgesellschaft (vorm. Große Kasseler Straßenbahn AG), Kassel
HWA 115 / 207	H. Hildebrand & Söhne Rheinmühlenwerke AG (vorm. Rheinmühlenwerke AG), Mannheim
HWA 115 / 208	Mitteldeutsche Stahlwerke AG, Riesa
HWA 115 / 219	Westdeutsche Jutespinnerei und Weberei, Beuel am Rhein
HWA 115 / 222	C.H. Knorr AG, Heilbronn
HWA 115 / 237	Helios Elektrizitäts AG, Köln
HWA 155 / 240	Vereinigte Strohstofffabriken AG, Dresden
HWA 115 / 250	Vereinigte Stahlwerke AG, Düsseldorf
HWA 115 / 254	Danziger Elektrische Straßenbahnen AG, Danzig
HWA 115 / 262	Löhnberger Mühle AG, Siegen
HWA 115 / 271	Deutsche Vereinsbank, Frankfurt am Main
HWA 115 / 279	Klöckner Werke AG, Berlin
HWA 115 / 293	Lothringen Portland-Cement Werke, Metz
HWA 115 / 311	Schultz-Grünlack AG, Rüdesheim am Rhein
HWA 115 / 318	Schaffner & Albert AG, Frankfurt am Main
HWA 115 / 333	Darmstädter Herdfabrik und Eisengießerei Gebrüder Roeder AG, Darmstadt
HWA 115 / 336	Harpener Bergbau AG, Dortmund
HWA 115 / 338	Vereinsbank Filiale Hamburg
HWA 115 / 344	Dresden-Leipziger Schellpressen Fabrik AG, Kötzschenbroda-Naundorf
HWA 115 / 350	Gesellschaft für Lindes Eismaschinen AG, Wiesbaden
HWA 115 / 358	Lüdenscheider Metallwerke AG (vorm. Jul. Fischer & Basse), Lüdenscheid
HWA 115 / 361	Mannesmannröhren-Werke, Düsseldorf
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