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JEL Classification: N/A

Keywords: Financial crises, Real effects, extremism, Polarisation, Nazi Party, Great Depression, Germany

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Abstract

Do financial crises radicalize voters? For identification, we analyze the canonical case of Germany in the 1930s exploiting a large bank failure in 1931 caused by fraud, foreign shocks and political inaction. We use detailed bank-firm connections on banks that (unlike the US) served the whole country. We provide causal evidence from banking crisis to economic distress and extreme radical voting, while the literature in general has found no clear effect of economic distress on Nazi Party support. We show that, first, the failure of Jewish-led Danatbank induced a strong reduction in the wage bill for connected firms. This led to increasing city-level unemployment in cities with more Danat-connected firms. The effects are notably stronger in cities with a higher share of non-exporting firms, where local demand spillovers are higher. Second, Danat exposure significantly increased Nazi Party support between 1930 and 1933 elections, but not between 1928 and 1930 —before the banking crisis but after the start of the Great Depression and high unemployment. The financial crisis increased support for the Nazi party the most in areas with both deep-seated historical anti-Semitism, and more net savers than borrowers. Not only did the banking crisis help the Nazis rise to power, but cities with higher Danat exposure saw fewer marriages between Jews and gentiles after the banking crisis. Also, after 1933, there were more attacks on Jews and their property in Danat-exposed cites, and deportation rates were higher.

Keywords: financial crises, real effects, Great Depression, democracy.
JEL codes: E44, G01, G21, N20, P16.

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I. Introduction

Can a financial crisis fan the flames of fanaticism? The belief that major downturns create political instability is widespread. Anti-establishment parties have surged at the polls after 2008, with radical voting increasing more in countries that were harder-hit by the global financial crisis after 2008 (Algan et al 2017).[1] Historical cross-country studies similarly appear to bear out this prediction (De Bromhead et al 2013; Funke et al 2016). Despite this suggestive evidence across time and space, there is a startling shortage of well-identified, micro-based evidence documenting a causal effect of financial shocks on political radicalization.

In this paper we examine the canonical case of a radical party coming to power amidst economic distress and financial disaster – the rise to power of the Nazi Party and the fall of Germany's first democracy in 1931. Until now, research has focused mainly on the link between unemployment and radical voting. Radicalization there was, but the mass army of six million unemployed overwhelmingly turned to the Communists to vent their grievances, not the Nazis (Falter 1991, King et al 2008). Economic distress, however, took many forms. Shortened work hours and a reduction in wages were major sources of income losses, as were disruptions to the flow of credit and a collapse of demand from newly under- and unemployed workers. Instead of focusing on voting by the unemployed themselves, we examine the economic and electoral impact of a large banking crisis during the Great Depression.

We analyze the German banking crisis that began in the summer of 1931 with the collapse of Danatbank, led by prominent Jewish banker Jakob Goldschmidt. After the failure of the Austrian Credit-Anstalt in May 1931, there were runs on foreign bank deposits in Germany.[2] Danatbank faced unsustainable losses in the spring of 1931 because one of its borrowers, a large textile firm, defaulted due to fraud and ill-fated speculation (Born 1967, Kindleberger 1978, Ferguson and Temin 2003, Schnabel 2004). The unanticipated large losses were unrelated to Danat's other industrial lending activities, but led to its collapse. Danat was the second-largest bank in Germany, and – as some leading historians, e.g. Evans (2004) and Kershaw (2016), argue— its demise triggered a general banking crisis that tipped

[1] Anti-establishment parties include far-right parties such as the Front Nationale in France, the Alternative for Germany (AfD) in Germany, Freedom Party in Austria, Golden Dawn in Greece, Jobbik in Hungary, Legga in Italy, Law and Justice in Poland, the Swedish Democrats, and the U.K. Independence Party, but also populist movements as Podemos in Spain or Five Stars in Italy. Related research has examined the effect of trade shocks on polarized voting (Dippel et al 2016, Autor et al 2017).

[2] The absence of an effective political response was partly due to French opposition to an international rescue package. Cf. Schnabel 2004.

the country from recession into depression. Danat's scandal-ridden collapse increased anti-Semitic sentiment in many parts of German society (Schäffer n.d., Goodman 2015); it also allowed the Nazi party to exploit in its propaganda a seemingly clear example of economic ills caused by prominent Jews. As Dresdner Bank experienced similar problems to Danat and the German government eventually forced Dresdner to buy Danat, we use both banks to analyze the impact of bank failures on the real economy and voting.[3] The reduction in lending by both banks was substantially greater than by the other banks in Germany (see Figure 1).

To identify the effect of bank failures on the real economy and voting, we use newly-collected data on firm-bank pair lending relationships from a contemporary directory of listed firms. Information on bank connections was recorded prior to the bank failure. We analyze the firm-level change in the wage bill after the banking crisis, comparing firms connected to Danat and Dresdner (Danat henceforth) with those firms borrowing from other banks. We also exploit pre-crisis variation in the extent to which firms in different areas of Germany had connections with Danat. Importantly, during the Great Depression, banks in Germany were not local as in the US, but national with different exposures to different regions. Hence, in contrast with US-based studies, we can control for local demand effects (i) at the city level for firm-level real effects, exploiting firms in the same city with different banks, and (ii) at the region level for city-level unemployment and voting, exploiting different cities' exposures to different banks within a region.

We first document that firms exposed to Danatbank contracted their wage bill more sharply after 1931, compared with both firms connected to other banks in general and to only those firms connected with another big universal German banks. There are strong negative effects for Danat-connected firms despite the fact that these firms were not riskier before the banking crisis than firms connected to the other banks, nor are they different in size, age, or leverage compared with firms connected to other large German banks. Moreover, we also show that cities where firms had a higher exposure to Danatbank in 1929 experienced a more rapid increase in unemployment. This provides additional evidence that declines in credit availability have repercussions beyond the firms immediately affected. Interestingly, the increase in city-level unemployment was substantially higher in cities with more Danat-connected non-exporting firms. In these cities, the decline in wage bill of Danat borrowers had local demand spillovers on firms in the same area even if they were not directly borrowing from Danat.

[3] Dresdner also had a high share of Jews at the board level.

Second, we show that cities with more firms borrowing from Danatbank before the banking crisis experienced a significantly larger increase in Nazi Party support between the 1930 and 1933 elections. The effects are also statistically and economically significant between elections in 1930 and the two elections in 1932; however, there are insignificant effects between the 1928 and 1930 elections, i.e. before the banking crisis but after the start of the Great Depression and a rapid increase in unemployment.[4]

Figure 1 illustrates our main results. The left-most panel shows the strong decline in lending by the two banks most affected by the German banking crisis of 1931, Danat and Dresdner. While loan volume declined by 10% at Commerzbank and Deutsche Bank, lending at Danat and Dresdner declined twice as much. Accordingly, the wage bills at firms connected with Danat and Dresdner also contracted more rapidly than elsewhere, as illustrated by the middle panel. While the average firm saw a reduction of 15% in labor costs (expenditures on wages and salaries), at Danat-connected companies the wage bill collapsed by 40%. The right-most panel shows the distribution of changes in votes for the Nazis, for cities with high and low exposure to Danatbank (measured by the assets of connected firms). There is a clear shift to the right for cities with positive exposure; cities with more exposure Danat also experienced the biggest increases in support for the Hitler movement.

Our evidence suggests that in early 1930s Germany, financial distress induced economic distress. Because Jews were overrepresented in finance at the time, it was easier for Nazi propaganda (e.g. in 1932 speeches by Goebbels, Reich Minister of Propaganda of Nazi Germany, or cartoons in *Der Stürmer*)[5] and "hate entrepreneurs" to blame Jews for Germany's economic ills. The reason we propose is that the financial crisis made anti-Semitism acceptable in bourgeois circles in a way that it was not previously; diaries from the time, such as the one by the leading German-Jewish civil servant Hans Schäffer, point to a general surge in anti-Semitic sentiment after the banking collapse because of the wide-spread

[4] Our results are robust to a variety of alternative specifications and tests. Effects from Danat exposure to city level unemployment is higher in years when there was a stronger decline in aggregate countrywide lending by Danat and Dresdner. In addition to the lack of link between support for Nazis and Danat lending relationships prior to Danat's collapse, we also perform a placebo exercise with another shock that hit the German economy – the collapse of world trade. Areas with more export-oriented industries saw sharper declines in employment after 1930, as one would expect. Nonetheless, we do not find any particular effect of the trade-induced distress on Nazi voting. There is also some – weaker – evidence that bank distress increased support for the Communists; support for the status quo in general leaked away. However, for the Communists, there is no interaction with previous levels of anti-Semitism.

[5] See, for example, Figure B1 in the appendix as well as articles such as "Nazis blame Jews for failure to come into power; anti-Jewish agitation renewed" (*Jewish Telegraphic Agency*, September 8, 1932, https://www.jta.org/1932/09/09/archive/nazis-blame-jews-for-failure-to-come-into-power-anti-jewish-agitation-renewed) and "Goebbels asks Papen bluntly whether he conferred with Goldschmidt on dissolution" (*Jewish Telegraphic Agency*, September 28, 1932, https://www.jta.org/1932/09/28/archive/goebbels-asks-papen-bluntly-whether-he-conferred-with-goldschmidt-on-dissolution).

involvement of Jews in leading German banks. We argue that where the suffering from financial distress was more intense, a political agenda centered on pushing out Jewish influence was more readily accepted.

To demonstrate that this interpretation is correct, we need to show that anti-Semitism increased *differentially* – that cities hit more by the financial crisis because of their exposure to Danat became more anti-Semitic more quickly than the rest. To this end, we assemble data on Jewish mixed marriages by city. While a rare event and indicative of deep involvement between Jews and gentiles, we consider it as a 'canary in the coalmine', reflecting not only romantic attachment but also the social acceptability of marrying across ethnic lines. Cities with more Danat exposure saw a sharper decline of mixed marriages, with a sudden change shortly after the outbreak of the banking crisis. Moreover, not only did the banking crisis help the Nazis rise to power and increase anti-Semitic sentiment, but it also led to more radical action. After 1933, cities with more links to Danat before the crisis (that were hence more affected by the banking crisis) witnessed markedly higher deportation rates of Jewish citizens to concentration camps, and more violent attacks on synagogues, Jews, and their property during the 1938 pogroms ("Reichskristallnacht").

Our conclusions are strengthened when we stratify our sample by earlier levels of anti-Semitism. In areas where anti-Semitic parties had already received support in the 1890s and 1900s, damage induced by the financial crisis translates into major electoral gains for the Nazis; in areas with historically low support for them, higher unemployment due to Danat's collapse did not spell more votes for the Hitler movement, but for the Communist party. In other words, where pre-existing attitudes made it plausible to blame the Jews for Germany's economic misfortunes, support for the Nazi Party due to Danat exposure surged particularly after 1930.

Contemporary banking statistics also allow us to contrast areas with a surplus of deposits with those where loans dominated. Net creditor regions saw the biggest increases for the Nazis in response to Danatbank exposure, suggesting that savers were especially susceptible to their message after the banking crisis.[6]

Contribution to the literature. We relate to three literatures – the real effects of banking crises, the effects of economic shocks on conflict and instability, and the history of the Nazi Party's rise to power in Germany.

[6] In the end, depositors (including those of Danat) did not lose money, since their funds were guaranteed by the government. Nonetheless, for some time in the summer of 1931, the possibility of losses loomed large. The mere prospect of financial losses can change behavior in important ways (Koudijs and Voth 2016).

Since Bernanke's (1983) classic paper, a growing literature has documented the effects of financial crises. After the 2008-09 financial crisis, there is clear evidence that firms suffered from a credit crunch -- a bank credit crunch as in Ivashina and Sharfstein (2010), or Jiménez et al (2012). In addition, firms with bonds that matured when financial markets shut down also suffered more (Almeida et al. 2009). More recent evidence shows the real effects of the 2008 financial crisis (Chodorow-Reich 2014; Jiménez et al. 2017; Huber 2018).[7] Benmelech et al (2017) use an empirical strategy similar to Almeida et al (2009), and demonstrate a link from the 1930s US banking crisis to firm employment.[8] Our main contribution is to show the impact of a banking crisis on political extremism, not just on real effects of unemployment and a credit crunch, which brings long-term costs associated to the banking crisis.[9]

The conflict literature has investigated the effects of a variety of adverse economic shocks, such as rainfall variation or commodity price shocks. Results typically show that exogenously induced economic distress makes civil war and other forms of conflict more likely (Collier and Hoeffler 1998; Miquel et al 2004).[10] Autor et al (2016) use exposure to trade with China as a source of identification and demonstrate that US electoral districts were more likely to support extreme candidates the more adverse the trade shock was. Similarly, Dippel et al. (2016) argue that negative trade shocks increased support for radical right-wing parties in Germany in recent years. However, Funke et al (2016), analyzing financial crises over the past 140 years covering 20 advanced economies and more than 800 general elections, find that political extremism does not increase during normal recessions or after severe macroeconomic shocks that are not financial in nature. We provide well-identified micro-evidence showing how a banking crisis lead to political extremism, the rise of the Nazi power in 1933, and strong anti-Semitism.

The rise of the Nazi Party has attracted extensive scholarly attention over the last 80 years. Initial analysis emphasized either class-based theories (Lipset 1960, Hamilton 1983) or theories of the masses (Ortega-y-Gasset 1932, Arendt 1973). The findings based on voting records have largely superseded this earlier literature, demonstrating that, far from being a party dominated and supported principally by members of the lower middle class, it was a

[7] See also Jimenez et al (2014).

[8] For an analysis of the US Great Depression and its banking crisis, see Calomiris (1993) and Calomiris and Mason (2003).

[9] Financial crisis can bring medium- or long-term costs by leading to the wrong (economic) policies thereafter (Mian et al 2014). In the case of Germany in the 1930s, there is no doubt that the rise of the Nazi party to power ultimately triggered one of the worst catastrophes of history, the Second World War, with over 60 million casualties.

[10] At the same time, democratic transitions also appear to become more likely during periods of exogenously low income (Lipset 1960; Brückner and Ciccone 2009).

"catch-all" party that drew support from all walks of German society instead (Falter 1981; Childers 1983). Nonetheless, some differences in the cross-section emerge: Research using district-level voting results shows that Protestants were much more likely to offer support than Catholics, that the better to-do increasingly turned towards the Nazis after 1930, and that the unemployed overwhelmingly supported the Communists instead. King et al (2008) use ecological inference to show that while a broad-based shift underpinned the Nazi's rise to electoral success, some groups were more susceptible. This is especially true of the self-employed from high-unemployment areas, and domestic employees from low- to medium-unemployment areas. While few would doubt that the rise of the Nazis was facilitated by the Great Depression, there is as of now no clear compelling evidence that areas of Germany more affected by economic distress turned to the Hitler movement at the polls.[11]

We proceed as follows. We first provide historical context and background, then describe our data and empirical strategy. Next, we present our main empirical results, before discussing the robustness of our findings. Finally, we offer some concluding remarks.

II. Historical background

In this section, we briefly describe three aspects of the historical context – the Great Depression in Germany, the banking crisis of 1931, and the rise of the Nazi Party to power.

A. The Great Depression in Germany

Three features distinguish Germany's Great Depression – its early onset, origin, and severity. While the US downturn began in 1929, Germany's industrial output had already begun to contract in 1927. In contrast to the US experience, German investment began to fall first; consumption only began to fall later. In the US, 'autonomous' declines in consumption kick-started the depression (Temin 1976, Romer 1990, Olney 1999). After 1929, declines in German output accelerated. Peak-to-trough, German industrial output fell by 40%, while the corresponding figure in 20% in Britain and 10% in Japan (Figure 2). The only other major industrialized country with a similarly severe decline in economic activity was the US. At its peak, Germany counted 6 million unemployed, equivalent to one third of the workforce.

Unemployment spelled misery, as elsewhere. While the unemployment insurance system looked after those losing their jobs, benefits became progressively smaller. After 20-

[11] One notable exception is Galofré-Vilà et al (2018), who argue that austerity in the form of higher taxes was a key reason for pro-Nazi voting.

27 weeks, the unemployed only qualified for emergency aid, which offered only minimal support.[12] Unemployment was only the most visible manifestation of economic misery. While some wage earners benefitted from rapid deflation, many small owners and small entrepreneurs suffered severe income declines. The wages of civil servants were repeatedly cut, as were pension payments, in desperate bid to balance the budget.

Fiscal austerity was a distinguishing feature of the German slump. The federal government, states, and municipalities had borrowed heavily before 1929. A good share of the money raised came from abroad. Once international debt markets froze, authorities had to try and balance their books, by raising taxes and cutting expenditure.

Germany's export industries were not helped by the surge of protectionism after 1929. While already saddled with relatively high labor costs, new tariffs and difficulties in encountering export financing translated into rapidly falling sales of German products abroad. By 1933, German exports had declined by 70 % relative to their 1929 value.

B. The banking crisis of 1931

Germany's 1931 banking crisis began in Austria. In May of the year, the Austrian Credit-Anstalt revealed large losses. When it collapsed, foreign deposit withdrawals accelerated in other countries, including Germany (Kindleberger 1978). While the Austrian banking crisis unfolded, huge losses at a German textile firm, Nordwolle, came to the attention of its bank, the Darmstädter Nationalbank (Danat). Nordwolle management had dabbled in ill-timed speculation, and also in fraud. Losses on the loans to the textile firm were large, equivalent to 80% of Danatbank's equity – and accordingly, threatened the bank's survival.

Once Danatbank realized the scale of its losses, it turned to the German central bank, the Reichsbank. A bank holiday was declared for two days in July; transfers and other transactions remained barred for over a month (Ferguson and Temin 2003). While the Reichsbank attempted to offer support, its ability to do so was severely circumscribed by its commitment to the gold standard (James 1985, Schnabel 2004).

International politics did not help. International support for the Reichsbank – by the Bank of England and the Banque de France, say – could have helped its attempts to shore up the banking system, and to stay on the gold standard. However, conflict between Germany and France had been brewing since the German government announced its plans to pursue a customs' union with Austria. Lingering international tensions, one of the Versailles Treaty's

[12] At the height of the depression, unemployment benefits became means-tested.

repercussions, undermined any bid for multilateral support. In the end, the Reichsbank failed to rescue the banks and it had to suspend convertibility of the Mark into gold.

C. The rise of the Nazi Party

From relatively obscure beginnings in post-war Munich, the Nazi Party began to rise to a position of power and influence during the hyperinflation. In 1923, it made a violent bid for power, in the so-called Beerhall Putsch. After its bloody collapse, Nazi leaders were tried and sent to prison, Hitler most prominently among them; the party was declared illegal.

Using his time in prison, Hitler wrote *Mein Kampf* ("My Struggle"), about his political vision and experiences so far. A growing number of prominent right-wing politicians beat a path to the door of his prison cell. After an early release from internment, Hitler returned to politics at the head of the newly-legalized party. While membership continued to grow, it had paltry success at the polls. In the Reichstag election in 1928, the Nazi Party received a mere 2.6% of the vote. During Weimar's "Golden Years", this right-wing fringe party was languishing in obscurity.

All of this changed after 1929. As the Great Depression took an ever greater hold in the German economy, politics turned acrimonious. The last democratically elected Chancellor Müller resigned in 1930, after a row over the rapidly rising cost of unemployment insurance. Thereafter, Chancellor Brüning governed without a parliamentary majority, supported by the emergency powers of President von Hindenburg.

After its poor showing at the polls in 1928, the Nazi Party had changed its tune. Anti-Semitism was toned down. It no longer advocated a violent overthrow of the established democratic order; instead, Hitler emphasized that only legal means would be used to come to power. As the party seemingly moved towards the political middle, it made itself acceptable to middle and upper classes. Hitler increasingly gave talks in front of gatherings of businessmen. In the September 1930 election, the Nazi Party scored its first big success, winning 18.3% of the vote. Between 1928 and 1930, the party had gained 4.6 million voters. Its success was in large part due to the agitation against the Young Plan, a rescheduling of Germany's reparations obligations. While it lowered the annual payments, in exchange for a loan for abroad, it also lengthened the debt maturity. While the plebiscite against the ratification of the Young Plan was ultimately defeated, it provided a platform for the Nazis to argue that Germany was being enslaved for generations to come.

After the 1930 election, the ranks of the Nazi Party continued to grow, as did its streetfighting group of paramilitaries, the *Sturmabteilung* (SA). The worse the depression became, the more violent Weimar Germany's politics was. Street fighting between the Communists, Nazis, and Republican paramilitaries became commonplace, especially in the large cities. The police frequently intervened, often with deadly results.

The big electoral breakthrough of the Nazi Party came in March and July 1932, some 9 to 12 months after the banking crisis. In two rounds, von Hindenburg defeated Hitler for President of the German Reich; the Nazi Party's candidate polled 11 million votes in the first round and 13 million in the second. In the July 1932 election, the Nazi Party received 13.7 million votes, its highest share in a fully democratic election. The Nazi Party had become the largest party in parliament, receiving more votes than the social democrats and communists combined. Fully confident of his claim to the chancellorship, Hitler negotiated his entry into the government – and failed to convince the aging President von Hindenburg. By November 1932, in another round of elections, electoral support began to slip away from the Nazis. Their vote count fell by 2 million. By late 1932, many political commentators confidently predicted that the Nazis were on their way out.

Barely a month later, after lobbying from arch-conservative advisors around him, President von Hindenburg finally appointed Hitler as Chancellor, in a cabinet where leading Nazi politicians were in a minority. Nonetheless, within two months, the Nazis had staged another set of (partially free) elections, and taken over effective power in all of the country.[13]

III. Data and main variables

A. Data

This study uses various sources of data for interwar Germany, several of them collected and digitalized for the first time.

The main hurdle is to establish the connection between firms and banks in a systematic way. Historical data on individual loans are unavailable. Another proxy for a bank-firm connection is the lead bank in equity issuances for stock companies. Prospectuses on equity issuances would allow us to identify lead banks, but only infrequently and only for firms that issued equity in the years leading up to the banking crisis. Yet the lead bank does not only organize stock issuances, but also dividend payments. Each year, investors can

[13] See Figure 3 for a comparison of the outcomes of the elections in 1930 and 1933

receive their dividends at the branches of the main bank for each stock company (so-called "Zahlstellen"). This information is provided in the "Handbook for German stock companies", a yearly 4000-pages compendium of basic balance sheet information for each German stock company. We use yearbooks for 1929 and 1934 to collect firm-level data on bank connections and balance sheet items.

We begin our analysis on the firm level. In a first step, we collect data on 5,251 firms that report total assets in 1929. We collect data on total assets, total capital, as well bank connections in 1929. For each firm, we record whether "Zahlstelle" lists Danatbank or Dresdner bank, or at least one of the other Great Berlin Banks (Deutsche Bank, Commerzbank, BHG). We then identify all firms reporting their wage bill in 1929 and 1934. For this sample we collect additional information on founding date, industry, city, as well as total wage bill in 1929 and 1934.[14] We end up with a sample of 386 firms in 239 cities and 20 industries. 59 firms list either Danatbank or Dresdner Bank as "Zahlstelle", 63 firms list any of the other Great Banks, and 17 borrowed from Danat/Dresdner and at least one other Grossbank.[15] For what follows, whenever we use the term "Danat" it will stand for Danatbank and Dresdner Bank unless explicitly stated otherwise. We also use the terms *connected* and *borrowing* interchangeably.

In a second step, we move to the city level. We use the universe of listed firms in the 1929 Handbook to collect data on city level exposure to Danat (explained in detail below). For 247 cities, we collect information on city population and unemployment from 1930 to 1934 from the Statistical Yearbooks of German Cities ("Statistisches Jahrbuch deutscher Städte"), as well as total city labor force from the 1933 census. We gather data on major German federal elections in May 1928, September 1930, July 1932, November 1932, and March 1933. For each election, we record the number of votes for the different electable parties at the city level from Statistik des Deutschen Reichs (ICPSR 42). In addition, we collect information on destroyed and damaged synagogues (Alicke 2008) and deportations (Bundesarchiv). The 1925 census provides information on the share of blue-collar workers, Protestants, and Jews for each city.

To shed light on the underlying mechanism and control for pre-existing trends, we also collect data on votes cast for anti-Semitic parties in elections at the end of the 19th and

[14] While today data sources like Compustat provide easy access to comparable information across firms, historical handbook data does not. While for some firms we have information on the dividend-paying bank, assets, and wages, other firms provide none of this information. There are no filing requirements or any consistent form of balance sheet across firms.

[15] Firms that report a wage bill in 1929 can be missing in 1934 for several reasons: they do not report the wage bill anymore; they exited the market; they delisted; or they merged. Unfortunately, we can only verify the first of these points and thus analyze the intensive margin only.

beginning of the 20th century; whether a city had a pogrom in 1349; as well as information on whether a city is in a net-debtor or net-creditor area.[16] In total, we end up with a sample of 193 cities for which we have data on elections, unemployment, and exposure to Danat. Table A1 in the Appendix provides a comprehensive overview of variables used in our analysis and the sources of the data.

B. Measures of bank-firm connections and city exposure

In the first part of our analysis, we look at firms' responses to the collapse of Danat. To measure a firm's connection with a bank, we create two dummies. *danat* equals 1 if in 1929 a firm's bank affiliation is Danatbank or Dresdner Bank, and zero otherwise; *grossbank* equals 1 if the firm is connected to any of the other Great Banks. As dependent variable we use the growth in total wage bill from 1929 to 1934. As controls we use firm age and firm size (log of total assets).

In the second part, we analyze the aggregate effects of a credit crunch and move to the city level. To study the effects of Danat's failure and subsequent credit reduction on cities in Germany, we establish a measure of city exposure to these two banks. In each city, we sum across firms connected to Danatbank or Dresdner Bank. Each firm is weighted by its reliance on external (bank) financing and its relative size in a city. In our main analysis, we proxy a firm's external credit needs by a firm's leverage ratio (defined as liabilities[17] over capital). City c's exposure to Danatbank is calculated as

$$exposure_c = \sum_f I_{fc} \left(\frac{liabilities_f}{capital_f}\right) * \left(\frac{assets_f}{assets_c}\right) * danat_f \qquad (1)$$

I_{fc} is an indicator for whether firm f is located in city c. Each observation is then weighted by firm f's share of assets in all firms' assets of city c in our sample.

Our main outcome variables are the change in the unemployment rate from 1930 to 1933, and the change in NSDAP votes. In baseline specifications we define the unemployment rate as yearly unemployment over total labor force in 1933. For robustness, we also standardize unemployment by yearly population. The change in NSDAP votes is defined

[16] The 1933 "Enquetekommission zur Untersuchung der Bankenkrise" published detailed information for 100 local areas (called "Bankbezirke) on whether they had a surplus or deficit of deposits over loans in 1929. We categorize each city as *debtor* if it is located in an area with a deficit, and *creditor* if it is in an area with a surplus. In general, rural areas are creditors, and industrial areas debtors.
[17] Excluding capital

as the change in the share of votes from September 1930 to March 1933. To further measure radicalization, we define the dummy *synagogues* that takes value 1 if a synagogue was damaged or destroyed in a city after 1933; as well as total deportations from 1933-1945 over total Jewish population in 1933.

We also measure city exposure to exports as an additional exogenous shock to unemployment. From 1929 to 1934, Germany's total exports declined by almost 70% from 13,486 billion Reichsmark to 4,178 billion Reichsmark.[18] While most of the decline happened prior to 1932, the fall in export volume likely contributed to the increase in unemployment. To measure a city's exposure to the decline in exports, we first aggregate firm assets to the city-industry level. We then match total industry exports in 1929, provided by the *Statistisches Jahrbuch des dt. Reiches 1930,* to each town-industry cell. Finally, we aggregate to the city level, where we weight each industry *i* by its share of assets in the respective city.[19] Thus, exposure of city *c* to industry exports is given by

$$exports_c = \sum_i \left(\frac{assets_i}{assets_c}\right) * total\ exports_i \qquad (2)$$

For our analysis, we define exports as log(1+exports). The assumption is that cities' industrial structure is exogenous, or at least predetermined, to the causes of the recession. To further shed light on the mechanism connecting the banking crisis to unemployment, we define tradable and non-tradable industries as industries in the top and bottom tercile in terms of export shares. Similarly, we define cities as *high exports* and *low exports* cities if they are in the top and bottom tercile of variable *exports.*

C. Descriptive statistics

Our firm-level analysis compares firms affected by Danat's failure with other firms. This comparison is only valid if the two groups of firms are otherwise similar after controlling for observables. Table 1 provides descriptive statistics for our main firm-level variables. To highlight the differences in firm characteristics across Danat and non-Danat borrowers, we split the sample into groups and report mean and standard deviation (sd) for each group. The first group comprises 59 firms that borrow from Danatbank or Dresdner Bank (*Danat borrowers*). The second group comprises the remaining 327 firms that do not borrow from

[18] Sozialgeschichtliches Arbeitsbuch III, 1978.
[19] We omit industries with less than 1 % of total exports.

Danatbank or Dresdner Bank (*All other borrowers*). The final group focuses on the 63 firms that do not borrow from Danat or Dresdner, but from at least one other large bank (*grossbank borrowers*). For the latter two groups we report t-values of differences in mean relative to the Danat sample. Comparing Danat and all other borrowers shows that the average Danat borrower is older and larger, but has a similar wage-to-asset ratio. Yet these differences are to be expected; firms connected to a large national bank are larger and more established. Once we compare Danat and Grossbank borrowers, all differences are statistically insignificant. In our regressions we will compare exposure to Danat and exposure to other Grossbanken. As the sample between both groups is balanced, this alleviates concerns about self-selection of firms and banks.

Figure 4 shows that our firm sample is representative of the total population, and that Danat borrowers were not riskier prior to the crisis. Figure 4, panel A, compares the distribution of log assets for the sample of firms that report a wage bill in 1929 (386 observations) and the universe of listed firms in 1929 (5,251 observations). While the full sample shows slightly more dispersion, both distributions are similar. This suggests that our sub-sample of firms reporting a wage bill is representative of the average listed firm and there is no significant sample selection. Panel B shows firm leverage, defined as liabilities over capital, for firms borrowing from Danat, a Grossbank, and from other banks, for the full 1929 sample. While Danat and Grossbank borrowers are almost identical, firms that borrow neither from Danat or Dresdner, nor any other Grossbank, have higher leverage. As highly leveraged firms tend to perform worse during financial crises. Danat borrowers' lower leverage reassures us that Danatbank did not systematically lend to riskier firms before the crisis.

Finally, Figure 5, Panel A, shows the geographical distribution of firms connected to Danat. No region has a significant bias toward Danat firms or non-Danat firms, although northeast Germany has no Danat borrower in the wage bill sample.

Similar to Table 1 on the firm level, Table 2 compares cities with positive Danat exposure to all remaining cities, and cities with positive Grossbank exposure. By construction, cities differ in their exposure, but cities more exposed to Danat are on average larger and have a lower share of blue-collar workers than cities with zero exposure. Danat cities also have a higher share of Jews, but the difference is less than 0.5 % in absolute terms. In terms of 1930 unemployment rate, share of votes cast for NSDAP, as well as the share of Protestants, there are no significant differences. These differences and similarities persist when we limit the sample to cities with positive exposure to Grossbanken, although differences narrow.

Figure 6 shows the distribution of city exposure to Danat borrowers. 84 firms have zero exposure, while mean (median) exposure equals 0.08 (0.03), and the standard deviation equals 0.12. Figure 5, Panel B, shows the geographical distribution of cities with exposure to Danat-firms. Cities with and without exposure are evenly distributed across Germany. Figure 7, Panel A, ranks industries by export shares (defined as industry exports over total exports). Industries with highest export shares are clothing (textile, silk, shoes, and apparel), trade (trading companies, department stores, and *konsumvereine*), and metal (equipment, aviation, cars, ships). Panel B shows the distribution of city log(exports). Six cities have zero trade exposure, mean (median, sd) log trade exposure equals 6.17 (6.52, 1.57). The correlation between city exposure to Danat and log(exports) is 0.13. We now lay out our empirical strategy and then present results.

IV. Empirical strategy

At the firm level, we model the effect of Danat's collapse on firms' wage bill as:

$$\Delta w_f = \alpha + \beta * Danat_f + \gamma_f X_f + \epsilon_f \qquad (3)$$

Δw_f is the change in firm f's total wage bill between 1930 and 1933. The main right hand side variable is $danat_f$, which is a dummy that equals 1 if firm f is connected to Danat or Dresdner in 1929 and 0 otherwise. The coefficient vector (γ_f) estimates the effects on firm-specific control variables, collected in vector X_f. Controls are a firm's log total assets, firm age, and whether a firm was connected to another Great Bank. We expect that a contraction in loan supply by Danat leads to a decline in firms' wage bill if they borrow from Danat, so $\beta < 0$. We cluster standard errors at the city level.

Our research design relies on three main assumptions. First, the German banking crisis was exogenous to borrower characteristics and loan demand. Second, firms' connections to banks were sticky and firms' options to obtain credit from other sources were limited. Third, to link the failing banks to cities, we assume that firm-bank connections at the city level are a good proxy of a city's exposure to the banking crisis. We discuss each assumption in turn.

Banking crises and recessions often go hand in hand and it is difficult to establish causality (Reinhard and Rogoff 2009; Schularick and Taylor 2012). If some banks lend to riskier firms, deteriorating firm performance and bank failures coincide (Kiyotaki and Moore 1997; Khwaja and Mian 2008; Jimenez et al 2012). Disentangling changes in banks' loan

supply from changes in firms' loan demand thus poses a major identification challenge. The German Banking crisis offers a unique setting to address these issues. First, the reduction in credit by Danatbank and Dresdner Bank was exogenous to all but one single firm in Germany. Nordwolle, a large textile company, had been expanding at a rapid rate during the latter part of the 1920's. Their stocks were rising, and Danatbank and Dresdner Bank were not hesitant to lend ever larger sums. In 1931, Danat had a sizeable loan to Nordwolle outstanding, equal to 80 percent of Danat's equity. In May 1931, Danatbank discovered that Nordwolle had forged their books and a large bet against wool prices delivered large losses to Nordwolle. When news broke in June of the same year, investors saw that the failure of Nordwolle was imminent. Already thinly capitalized, Danat's equity was in peril and things were equally dire at Dresdner Bank. As both banks faced the thread of an insurmountable loss, depositors started to run. Danatbank and Dresdner Bank saw massive outflows from domestic and foreign depositors.

On July 12, Danatbank's liquidity was depleted and it could no longer open its branches. The national bank holidays imposed by the government did not ease the problems and Danatbank's and Dresdner Bank's businesses experienced a major disruption. As Figure 8 shows, loan supply to their borrowers decreased substantially. Crucially for identification, this shift in loan supply was unanticipated: similar to Enron in the 2000s, the sudden discovery of accounting fraud had unanticipated negative consequences. The unexpected default of a local borrower, Nordwolle, ultimately led to the failure of Danatbank and near-failure of Dresdner Bank, and thereby affected firms all over Germany.

Even if a shock that leads to a banking crisis is exogenous to firms' loan demand, swift government intervention often disrupts demand and supply simultaneously in the immediate aftermath of a banking failure. Yet neither the German government nor the central bank interfered in a substantial way. The government's fiscal position was too weak to save a bank. The central bank's gold reserves were at historic lows and liquidity provision was not an option. This resulted in a prolonged crisis; it took over one year to merge Danatbank and Dresdner as a minimal response to the crisis.

With government help unavailable and bank lending distressed, firms often turn to alternative sources of funding. However, the German economy was based on close-knit ties between banks and firms. Bank directors often sat on a firm's supervisory board and banks held a substantial equity stake in connected companies. As a result, switching costs were often prohibitive, making firms' bank relationships sticky. On top, other banks in the German economy also experienced deposit withdrawals, although to a lesser extent. Given the overall

economic conditions in 1931, other banks would have had difficulties to meet a sudden increase in credit demand from firms leaving Danat or Dresdner.

A second challenge is to establish a clear linkage between banks and the real economy. During the Great Depression in the US, banks only operated in often disjoint local markets. This makes it difficult to compare the performance of borrowers of a failed bank with nearby borrowers of a different bank. In contrast, the largest banks in Germany operated on a national scale. Deposits were taken across all regions, and lending was done in major cities and smaller towns across the country. This allows us to compare firms that depended on Danatbank or Dresdner Bank with other firms in other areas, while controlling for heterogeneity at the local level.

Did bank failures help to radicalize voters? To address this question, we aggregate firm connections to the city level. Our main specification at the city level is:

$$y_c = \alpha + \beta * exposure_c + \gamma_c X_c + \epsilon_c \qquad (4)$$

y_{ct} is a an outcome variable such as the change in unemployment or votes for the NSDAP in city c. $exposure$ is our main explanatory variable of interest; it is city c's exposure to Danatbank's failure, calculated from firm-level data. To further control for confounding factors we include a city's longitude and latitude, its log population in 1930, as well as its Protestants, Jews, and blue-collar workers in 1925, all as share of its total population. In some regressions we will also control for city exposure to other Grossbanken, as well as its exposure to exports. Standard errors are cluster-robust. We expect that cities with a higher exposure to Danat-borrowing firms see a stronger contraction in bank lending and thus an increase in unemployment and votes for the NSDAP. That is, $\beta > 0$.

This specification relies on two main assumptions. First, cities with more firms connected to Danatbank or Dresdner Bank are more affected by the failure of those banks than other cities. Second, bank failures have a larger impact on a city if connected firms are larger or have a higher need for external financing.

When firms lay off workers or cut their wages as a result of a banking crisis, local economies suffer. Suffering worsens as the number of affected firms grows. Our sample of firms covers the universe of listed firms in 1929 and thus represents a significant share of a city's economy. The average city has 30 listed firms. All firms are stock companies and therefore represent the largest firms of the German economy. So while the number of firms

may be low for some cities, it is a sensible assumption that our firm sample represents a significant part of each city's labor market.

To measure a city's exposure, we focus on banks' assets side—the impact of changes in lending on firms in a given city. Yet it is not only the sheer number of firms that makes a city suffer, but also how important connected firms are for the local economy and how they can cope with a loss in credit. We take this into account by weighting firms by their size and their external financing needs.

In alternative specifications, we run panel regressions of the following form

$$y_{ct} = \alpha + \beta * exposure_c * \log(loans)_t + city\ FE + time\ FE + \epsilon_{ct} \quad (5)$$

Outcome variables are the unemployment rate or number of firms in city c in year t. We interact city exposure with log loan volume of Danat and Dresdner over time. As controls, we include log city population. The panel specification allows us to control for common shocks through time fixed effects, as well as unobservable city characteristics through city fixed effects. A decline in loan volume should lead to a stronger increase in unemployment if a city has higher exposure to Danat. The next section presents our main results.

V. Main results

A. Firm-level results

This section presents results for firm-level regression equation (3). Table 3 shows that firms that borrowed from Danat see a significantly stronger decline in their total wage bill. In column (1), Danat borrowers' wage bill falls by 25 % more compared to firms that do not have connections with Danatbank or Dresdner Bank. The coefficient is significant at the 1% level. Column (2) adds firm characteristics to control for the fact that Danat borrowers are on average larger and older. After controlling for firm size and age, as well as connections to other large banks, Danat borrowers still have significantly lower wage bill growth (-20.4 %). The coefficient on *grossbank*, a dummy indicating whether a firm borrows from any other large bank besides Danat or Dresdner, is negative, but insignificant. As we showed in section XX, firms borrowing from Danat or other Grossbanken are similar in terms of size, age, and leverage. The insignificant coefficient on *grossbank* reassures us that we capture loan supply effects induced by Danat's failure.

Columns (3)-(7) introduce different fixed effects to control for unobservables. Column (3) introduces firm size-bin fixed effects, where we create quintiles based on firm size. As Danat borrowers are larger, regressions with size-bin fixed effects effectively compare firms with similar size. Column (4) employs industry fixed effects for 20 distinct industries to absorb any unobservable characteristics that affect all firms within an industry, for example changes in exports. In both specifications, the coefficient on *danat* remains significantly negative. Wage growth is 19.5 % and 15.8 % lower for Danat borrowers.

Column (4) introduces city fixed effects. This leads to a decline in sample size, as some cities in our sample report only one firm with wage bill. Column (5) repeats our baseline specification without city fixed effects for the smaller sample. Borrowing from Danat leads to a similar effect on wage bill growth as in our baseline specification with the larger sample in column (2) (-23.4 % vs -20.4 %). Once we introduce city fixed effect to control for common citywide shocks, the coefficient increases by around one third (column (6)). Comparing two firms within the same city, borrowing from Danat decreases wage bill growth by 32.3 % in relative terms. Note that the coefficient on *grossbank* turns positive now, but remains insignificant. Finally, column (7) jointly uses city, industry, and size fixed effects. The size of the coefficient on *danat* remains stable and similar to results without fixed effects in columns (1) and (2). It is now less precisely estimated, yet still significant at the 10 % level. The loss in significance is likely due to the demanding fixed effect structure, which leaves little variation. Overall, results in Table 3 show a strong negative effect of connections to Danatbank on firms' wage bill growth.

In the next section, we will show that the negative effects of Danatbank's collapse on firms also lead to higher citywide unemployment. However, before we turn to city level regressions, we first show that changes in firms' wage bill map into city unemployment. For each city, we compute the total change in wage bill from 1929 to 1933. Figure 9, panel A, shows that cities with higher exposure, i.e. a higher share of firms borrowing from Danat, have a stronger decline in total wage bill. Panel B, in turn, shows that cities with a smaller decline in their wage bill also see a smaller rise in unemployment from 1930 to 1933. Table 4 confirms these findings with regressions for the 81 cities for which we have wage bill data and unemployment data.[20] Columns (1)-(2) show that higher exposure leads to lower wage bill growth, columns (3)-(4) report that higher wage bill growth is correlated with a smaller

[20] When we collect data on all listed firms, we restrict our data-gathering to cities that report unemployment values. Instead, for the wage bill sample of firms, we impose no restriction on the set of cities. In consequence, the overlap of cities that report unemployment and firms with wage bill values equals 81,

increase in unemployment. All regressions use robust standard errors, columns (2) and (4) the full set of city controls.

B. City-level results

We now show that firms' reactions to the banking crisis had significant effects on local economies. We analyze how unemployment responded at the city level and how voting patterns became more radicalized in cities hit by Danatbank's failure.

Danat's failure and the subsequent credit crunch for related firms led to a significant increase in unemployment. Table 5 provides the results of a regression of the change in the unemployment rate between 1930 and 1933 on a city's exposure to Danatbank. The difference between a city with no exposure to Danatbank and a city with average exposure (0.15) was an additional increase in unemployment by 1.37%. The effect is slightly smaller when controlling for city size (column 2) or heterogeneity between regions (column 3). Focusing on cities with positive exposure, a one standard deviation increase in exposure led to an additional 0.65% increase in unemployment (column 4).[21]

More exposed cities not only saw their unemployment rate rise relatively more (or decline slower), but they also experienced a stronger move of their voters to the extreme right. Figure 11 plots the distribution of changes in vote shares for the NSDAP between the elections in 1930 and 1933. Cities are divided whether they have zero ("low") or positive ("high") exposure to Danat. Cities with high exposure to Danatbank saw on average larger gains for the Nazis in the election in 1933 compared to the election in March 1930.

Table 6 confirms these findings. The table reports regression results for the change in the NSDAP's share of the electoral vote between 1930 and 1933 on a city's exposure to Danat. When not controlling for covariates, estimates are not precise enough. Yet when we control for city characteristics, a city with average exposure is associated with an additional gain of 1.15% for the NSDAP in the 1933 election relative to a city with no exposure (column 2). The effect strengthens when heterogeneity between regions is taken into account (column 3). Note that the effect of exposure on unemployment and Nazi votes are close. In terms of standard deviations, a one standard deviation increase in exposure increases the change in unemployment by 0.172 standard deviations, the change in NSDAP votes by 0.168 standard deviations.

[21] For a graphical representation of the results, see Figure 10

Columns (4) to (6) look at the effect of a city's exposure to Danatbank on the likelihood that the NSDAP won the majority in the 1933 election. Being exposed to Danat (with exposure equal to 0.15) increases the probability of a Nazi win by around 6.5% (column 5 and 6).

C. Mechanism

A popular explanation for voter radicalization is that an increase in discontent drives voters to the extremes—with unemployment as a large factor for dissatisfaction. However, studies on the Weimar Republic do not find conclusive evidence of a significant relationship between unemployment and voting for the NSDAP. While unemployment meant hardship for millions of Germans, it did not trigger directly a movement of voters to the extreme right. The banking crisis changed that. It provided an "easy" explanation for everyone's job loss and a scapegoat: The crisis was triggered by a bank with a prominent Jewish CEO. Nazis exploited this message and for parts of the society it became more acceptable to vote for Hitler.

Table 7 provides evidence for this mechanism. Column (1) confirms that unemployment and voting for the NSDAP are not significantly related. However, the part of unemployment explained by the banking crisis is associated with significantly larger voter movement to the extreme right. Column (2) uses the predicted unemployment from the previous regression of the change in unemployment on Danatbank exposure as independent variable. An increase in unemployment due to Danat's failure relates almost one-to-one to an increase in voting for the NSDAP. Residual unemployment is unable to explain a significant increase in Nazi voting (column 3). When using a horserace between predicted unemployment and its residual, the crisis-related increase in unemployment leads to a significant increase in gains for the NSDAP (column (4)).

Blaming Jews for the banking crisis may have been easier in some cities than in others. Table 8 looks at the heterogeneous response of voters to the banking crisis depending on a cities' existing (hostile) stance toward Jews. Prejudices toward Jews can persist for a (very) long time (Voigtländer and Voth 2012). A voter with an existing negative perception of Jews is more likely to follow the Nazis' siren calls.

Columns (1) and (2) divide the sample based on a cities' existing anti-Semitism, proxied by election outcomes at the end of the 19th century. While less anti-Semitic cites did not see a significant increase in Nazi voting due to Danat's failure, cities with high anti-Semitism and high exposure to Danat voted significantly more for the NSDAP. The effect of

Danat exposure is almost twice as large as in the baseline specification. This finding persists when we use a different measure of a city's latent anti-Semitism, the existence of pogroms in 1349. Voters in cities that had experienced pogroms against Jews over 600 years ago could be more easily convinced that Jakob Goldschmidt was to blame for their unemployment (column (3)-(4)).

The results so far suggest that the credit channel is important for unemployment and voter radicalization. Yet bank failures may have also radicalized voters in their role as depositors. Although depositors did not lose their savings, the long lines during the bank runs in 1931 were fresh on peoples' minds when they went to the polls in 1933. Columns (5) and (6) use a measure of how large a city's depository base was relative to the loans made in a given city. If a city had more deposits than outstanding bank loans in 1929, it is labelled as creditor, and if the opposite was true as debtor. The results suggest that the effect of the banking crisis on depositors amplified the effect of the bank-lending channel on extreme voting.

These results show that pre-existing anti-Semitism mixed with the experience of the banking crisis gave the Nazis an electoral advantage. But did the banking crisis intensify anti-Semitism? To investigate this question, we use data on inter-racial marriages between Jews and non-Jews. Table 9 provides the results for a difference-differences specification, where we regress monthly data on the log number of interracial marriages in a city on an interaction term whether the city was exposed to Danat's failure and whether the month was after July 1931. Columns (1) and (2) support our explanation that the banking crisis increased anti-Semitism. Cities more exposed to the bank failures experienced a significant shift in inter-racial marriages—such marriages declined by 11% compared to pre-crisis times. This effect is not driven by an overall decrease in the frequency of Jews to marry. Columns (3) and (4) use the log number of Jewish marriages as a placebo test. Cities exposed to the crisis did not see a significant change in Jewish marriages.

In an alternative explanation of our findings, negative trade shocks led to unemployment and voter radicalization. Cities with higher exports most likely have larger firms. If firms related to Danatbank also suffered from decreased foreign demand, our regressions may exhibit unobserved variable bias. To control for this alternative mechanism, Table 10 includes a city's log exports in 1929 as a measure of a city's exposure to the large decline in international trade. Columns (1) and (2) show that cities more exposure to trade did see a larger increase in unemployment. However, those cities did not experience a significant radicalization of voters (columns (3)-(4)). When including a city's exposure to Danatbank and

to trade shocks, both are positively associated with unemployment. Yet only the exposure to Danatbank explains a significant part of voting for the Nazis. Further, while unemployment predicted by a city's exposure to Danat can explain the change in NSDAP votes, unemployment predicted by a city's exposure to trade shocks cannot (Table 11).

The preceding results suggest that the banking crisis intensified pre-existing anti-Semitism in certain cities. Yet to a somewhat lesser extent, voter radicalization also occurred in cities where the Nazis had a harder time blaming Jewish bankers. Table 12 reports our baseline regression, using the 1930-1933 change in the vote share of the communist party, the KPD, as the dependent variable. As for Nazi votes, cities with a higher exposure to Danatbank saw a larger increase in voting for the communists (columns 1 and 2). In contrast to the NSDAP, the KPD largely won votes in cites with high exposure to Danat, but relatively lower anti-Semitic sentiment (columns 3 to 6).

Table 13 moves to the relationship between unemployment and communist voting. Column (1) shows that unemployment is not a significant predictor of radical voting on neither side of the aisle—not only is it unrelated to Nazi voting, but also to voting for the KPD. Yet as before, the part of unemployment predicted by Danat's failure is positively and significantly associated with the communists' gains in the 1933 elections (column 2). The residual part of unemployment cannot explain variation in KPD voting (column 3), and in a joint regression only the banking-crisis induced part of unemployment is important for radical voting on the left (column 4).

D. Aftermath

In 1933, voters put the NSDAP into power in what would be the last (mostly) free nation-wise election in Germany until the 1950s. Voters' behavior was partly driven by the results of the banking crisis, which Nazis squarely blamed on Jews. In cities hit by the banking crisis, hostility toward Jews did not end with the election; it took several turns for the worse. Table 14 shows that the anti-Semitic sentiment triggered by the banking crisis had dire consequences even years after Danat's failure. Columns (1) and (2) indicate that the probability of a damaged or destroyed synagogue during the 1938 pogrom is significantly greater if a city had more exposure to Danatbank. Further, these cities deported a significantly higher share of Jews during the Holocaust (columns (5)-(6)).

VI. Robustness

A. Firm-level

This section reports robustness checks for firm-level regression equation (3). To get a better sense which part of the wage bill distribution is driving our results, Table 15 runs quantile regressions with wage bill growth as dependent variable. Across the distribution, firms with Danat connections have lower wage bill growth. In each column, connections to Danat reduce firm wage bill growth. The effect is particularly strong and significant at the tails of the distribution (columns (1) and (7)). All regressions control for firm size and age and use robust standard errors.

While the collapse of Nordwolle triggered the decline of Danatbank, other major events happened contemporaneously. Shortly before the failure of Danatbank, Austrian bank Credit-Anstalt declared bankruptcy on May 11, 1931. While Credit-Anstalt primarily served the Austrian and Eastern European market, contagion effects could nonetheless affect our results. To ensure that our coefficient is not picking up the negative effects of Credit-Anstalt's bankruptcy, we exclude all firms close to the Austrian border (63 observations). Table 16, column (2) shows that the coefficient on Danat changes only marginally (column (1) shows the baseline coefficient for comparison). Another potential source of bias is Nordwolle's collapse. Danat's main borrower employed around 20,000 workers, making it one of the major employees in the Bremen area. In column (3) we thus exclude all firms in a 50 km radius around Bremen to avoid that spillover effects of Nordwolle's bankruptcy on firms in the vicinity drive our results. The coefficient declines by around 8 % in magnitude compared to column (1). However, borrowing from Danat still leads to a significant decline in total wage bill by 18.8 %. Finally, we exclude firms in Germany's industrial heartland, the Ruhrgebiet. The Ruhr area contains industries producing raw materials and metals, which were hard-hit during the collapse in export volume. Excluding firms in the Ruhr area (54 observations) does not change the coefficient.

Table 17 and Figure 12 show that our estimation is robust to different levels of clustering as well as excluding individual cities. Each column in Table 17 clusters on a different level. Column (1) replicates our baseline regression with clustered standard errors on the city level. Column (2)-(5) use robust standard errors, or standard errors clustered on industry level, 40 firm size bins, as well as two-way on the city and industry level. Robust standard errors are the most conservative method, while higher levels of clustering increase

the precision of our estimates. Panel A of Figure 12 plots coefficient and t-value for regression equation (3), where we exclude each of our 386 firms one-by-one. Coefficients and t-values are stable across the range of firms, so no individual firm is driving our results. Finally, we run regression equation (3) for each main industry in our sample separately. Main industries are required to have at least 20 firms. Panel B of Figure 12 plots coefficients and 90 % confidence intervals on *danat* for the seven main industries. Except for clothing, it is negative and of similar magnitude in all industries.

B. City-level

This section shows that the results of Danatbank's failure on unemployment are robust to alternative specifications. We use a different measure for unemployment and use quantile regressions as alternative specifications. Panel regressions further confirm our findings. The same tests are employed to check robustness of our voting results.

Our baseline specification normalizes the number of unemployed in 1930 and 1933 by city population in 1933. This normalization potentially underestimates the unemployment rate in 1930 for a city with relatively higher growth between 1930 and 1933. If a growing city is associated with larger firms related to Danat, our results could be biased. To alleviate this concern, Table 18 shows that the results are robust to using an alternative measure of unemployment, where the number of unemployed is normalized by a city's current population. Coefficients are similar in sign and significance, albeit smaller in magnitude, as total population is greater than total labor force.

To show that our results are robust to outliers and possible non-linearities, Table 19 reports quantile regressions of unemployment on a city's exposure to Danatbank. Except for the 25^{th} percentile, point estimates are similar to the OLS point estimates.

Our initial results are based on several cross-sectional regressions. As an alternative, panel regressions allow to control for heterogeneity across cities as well as common time trends. We interact Danat exposure with dummies for the years from 1931 to 1935 and regress yearly unemployment on these interactions. Year 1930 is the omitted category and constitutes the base year. Figure 13 plots the estimated coefficients on interaction terms. The figure shows that our results are not driven by pre-existing trends toward growing unemployment in cities with high exposure. Danat's collapse has the strongest effect on unemployment in 1933 and is still significant 1934. The effect disappears in 1935.

Table 20 turns to the effect of a city's exposure to Danat on voting for the NSDAP without assuming a linear relationship. The table reports quantile regressions. As for unemployment, the coefficients are relatively stable across the different specifications, with the strongest effect occurring for the cities with the highest exposure.

In our main specifications, exposure of a city to Danatbank does not vary over time. Does this measure truly capture the effects of the 1931 banking crisis or does it simply proxy other measures of persistent anti-Semitism or a city's propensity to vote extreme? To address this concern, we perform a placebo test using election results from before the banking crisis. Table 21 provides the results of regressions with the change in votes for the NSDAP between the elections in 1928 and 1930 as the dependent variable. While exposure to Danat is positively associated with increased Nazi voting after 1930, this relationship does not hold for elections right before the banking crisis.

Building on this exercise, Figure 14 shows that the banking crisis was the defining moment that changed the relationship between a city's exposure to Danatbank and NSDAP voting. The figure plots the coefficients from regressions of exposure on changes in the vote share of NSDAP. While there was no effect of higher exposure to Danat borrowers on NSDAP votes from 1928 to 1930, there is a significant positive effect from 1930 to later elections in 1932 and 1933. Exposure to Danatbank only becomes a positive and significant predictor of extreme voting once a city got hit by the banking crisis. Panels A in Figure 13 and Figure 14 show that our results are robust to excluding individual cities. Coefficients and t-values of exposure on unemployment or NSDAP votes remain stable if we drop cities one-by-one.

Finally, Table 22 shows that the effect of exposure to Danat on unemployment is stronger in cities with non-tradable industries. Columns (1)-(2) are on the firm level. We classify firms as tradable if they belong to an industry in the top tercile in terms of exports, and non-tradable if they belong to the bottom tercile. While borrowing from Danat leads to lower wage bill growth, the interaction effect is positive. Firms in non-tradable industries suffer more from a reduction in loan supply, although the effect is insignificant. Columns (3)-(4) move to the aggregate city level. We assign cities the dummy *high exports* with value 1 if its log(exports), as defined in equation (2), are in the top tercile of the distribution, and 0 if they are in the bottom tercile. If there are local spillover effects, we expect that cities with a strong non-tradable sector (*low export cities*) are harder hit by Danat's default. The direct effect on connected firms is compounded by spillover effects to firms that depend on local demand by Danat borrowers. In line with this hypothesis, we find a significant negative effect

on the interaction effect of Danat exposure and the *high export* dummy. Cities with high exports suffer much less from a decline in loan supply to Danat-connected firms, as local spillover effects are less important.

VII. Conclusion

This paper documents three main empirical facts. First, we show that firms that were connected to Danatbank – Germany's second-largest bank in 1929 – suffered more when it collapsed. In particular, we show that employment and wages declined more sharply in firms that had previously paid their dividend through offices of Danat, which we argue is a reliable indicator of firm-bank linkages.

Second, we show that distress originating in the financial sector led to increases in aggregate unemployment, and the more so in locations with stronger links to banks' in distress. We create a measure of city-level exposure to Danat and demonstrate that unemployment surged more where larger and more numerous firms were exposed to its collapse.

Third, economic distress induced by the banking collapse provided a major boost to the electoral fortunes of the Nazi Party. Unemployment changes after 1930 in Germany as a whole have no predictive power for radical voting – but in towns and cities affected by Danat's collapse, this is radically different. We also offer evidence that these effects were sharper where the Nazis could tap into pre-existing anti-Semitic sentiment. Finally, we demonstrate that the severity of local persecution of Jews after 1933 was greater where Danat's bankruptcy had caused the greatest economic harm.

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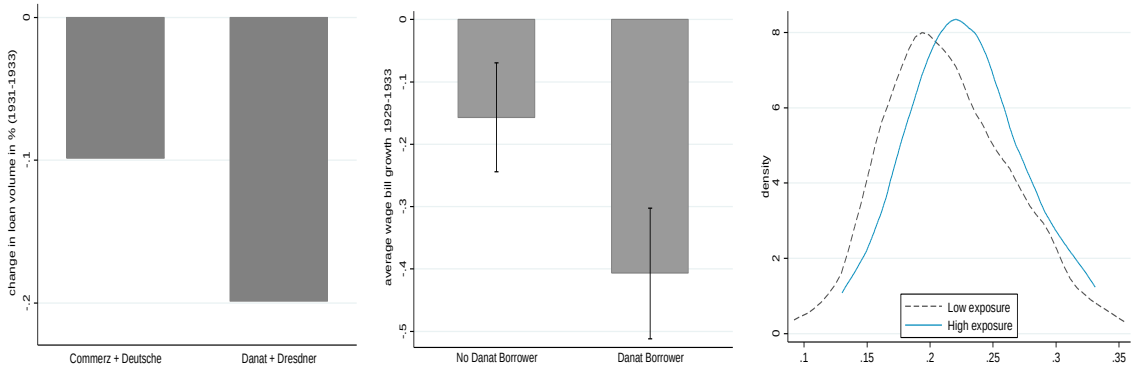
Figures and tables

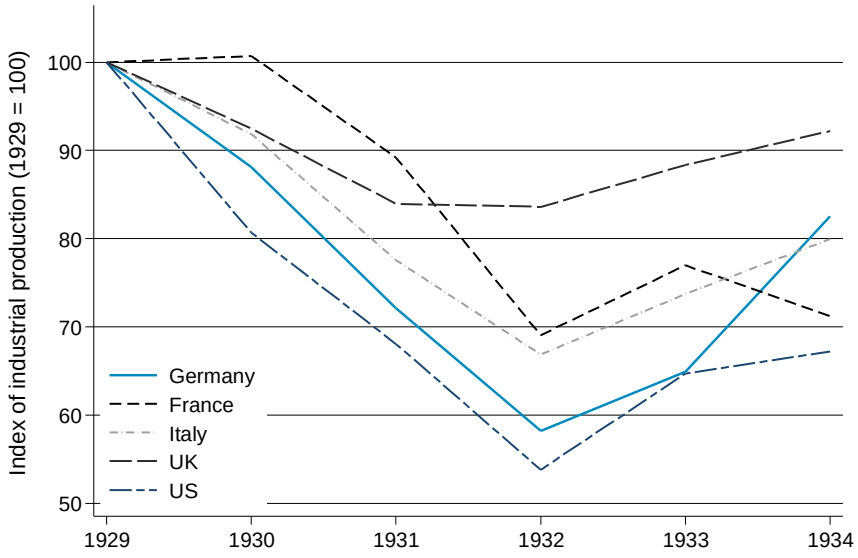
Figure 1: Bank loans, firm wages, and Nazi votes

Panel A: Bank loans Panel B: firm wage bill Panel C: NSDAP votes



Note: Panel A shows change in total bank loans from 1931 to 1933 by bank group. Panel B shows average change in firm wage bill from 1929 to 1933 for firms not connected (*No Danat Borrower)* and connected (*Danat Borrower)* to Danatbank. Panel C shows change in NSDAP vote shares from 1930 to 1933 for cities with zero (*low)* vs positive (*high)* exposure to Danat borrowers.

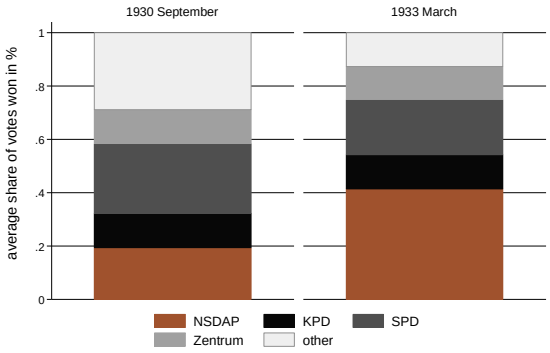
Figure 2: Industrial production 1929-1934



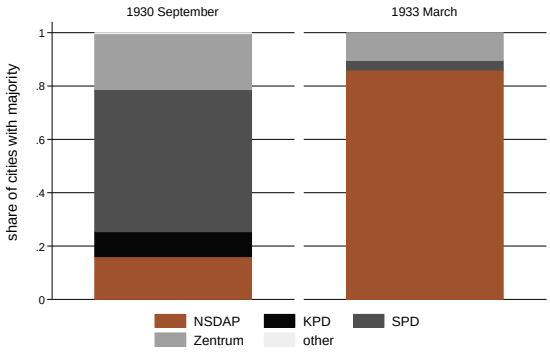
Note: Index of industrial production for selected countries, standardized to 100 in 1929 for all countries. Source: Statistisches Jahrbuch für das Deutsche Reich 1937.

Figure 3: NSDAP election outcomes

Panel A: Share of votes



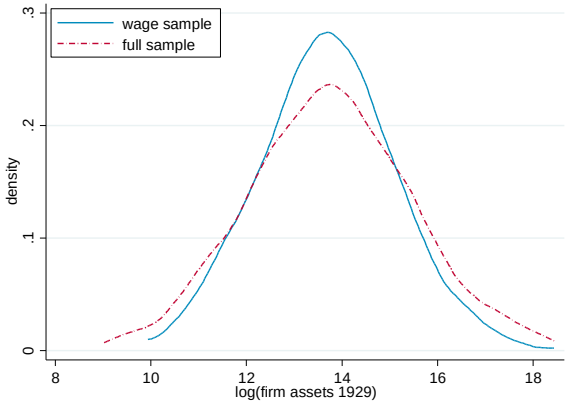
Panel B: Cities with majority



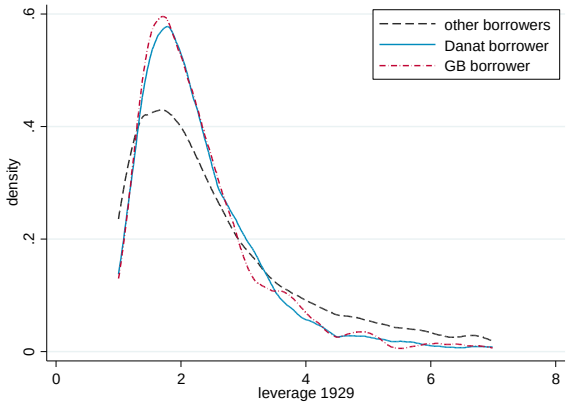
Note: Panel A shows change in share of total votes for selected parties in 09/1930 ad 03/1933 elections. Panel B shows percentage of cities in which party won majority of votes for the same election dates.

Figure 4: Firm assets and leverage

Panel A: Firm assets



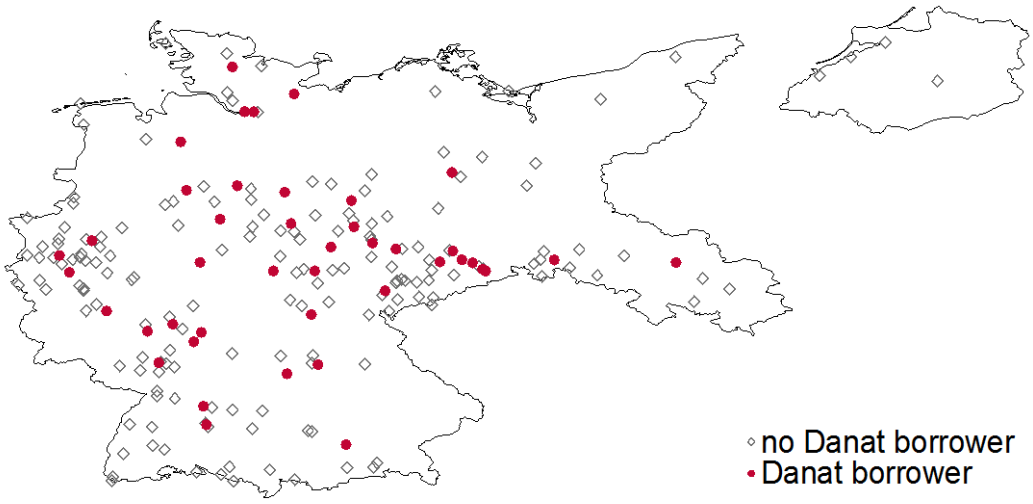
Panel B: Firm leverage



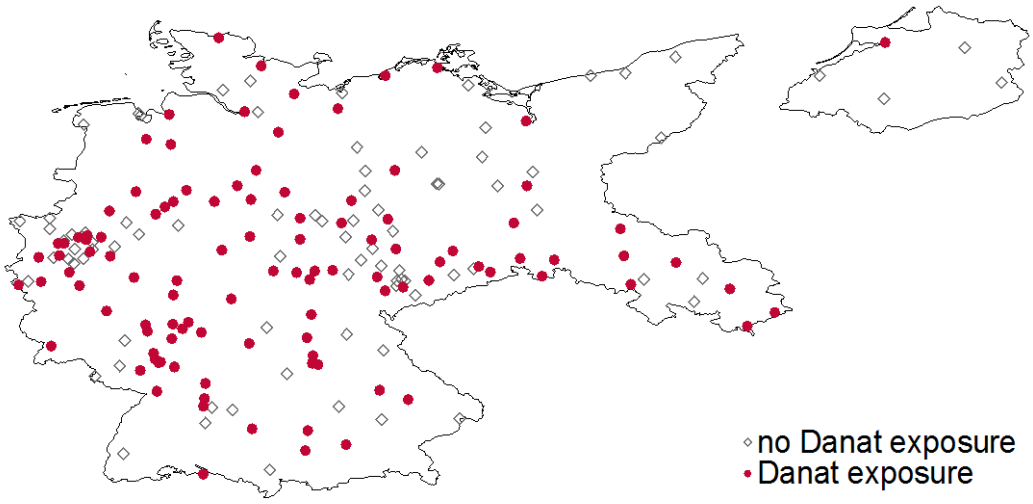
Note: Panel A shows distribution of log assets for wage bill sample of firms, as well as for full sample of firms in 1929. Panel B shows firm leverage (defined as total liabilities over capital) for the full 1929 sample of firms, split into Danat, Grossbank, and other borrowers.

Figure 5: Geographical distribution of Danat borrowers

Panel A: Firm level

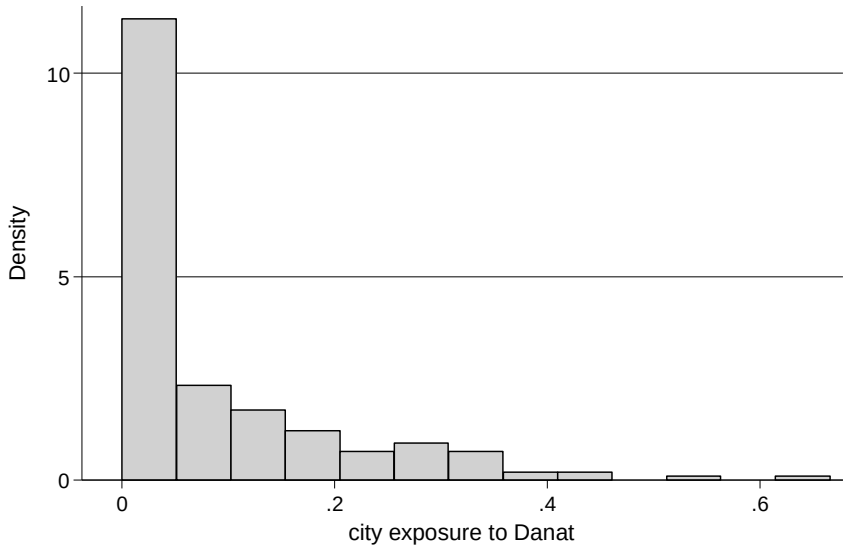


Panel B: City level



Note: Panel A shows geographical distribution of firms with and without Danat connection, Panel B distribution of cities with positive and zero Danat exposure. Red dots indicate firms/cities with Danat exposure, grey diamonds those with no Danat connection.

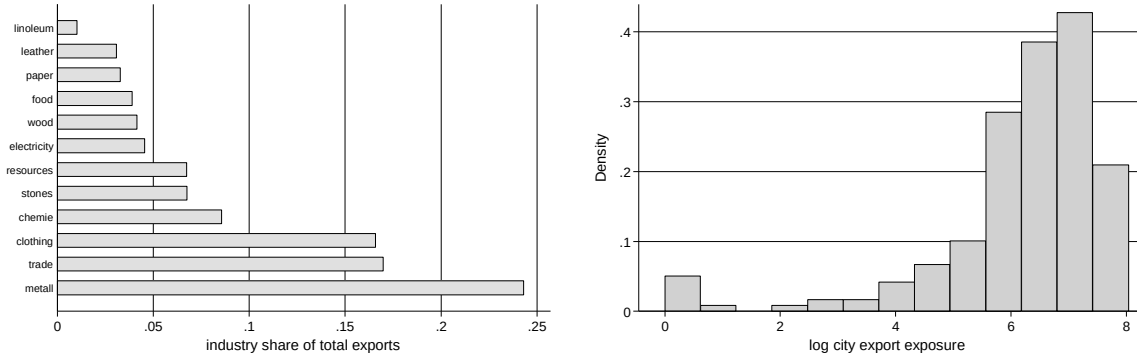
Figure 6: City exposure to Danat borrowers



Note: city exposure denotes cities' exposure to Danat-connected borrowers in 1929 as defined in equation (1).

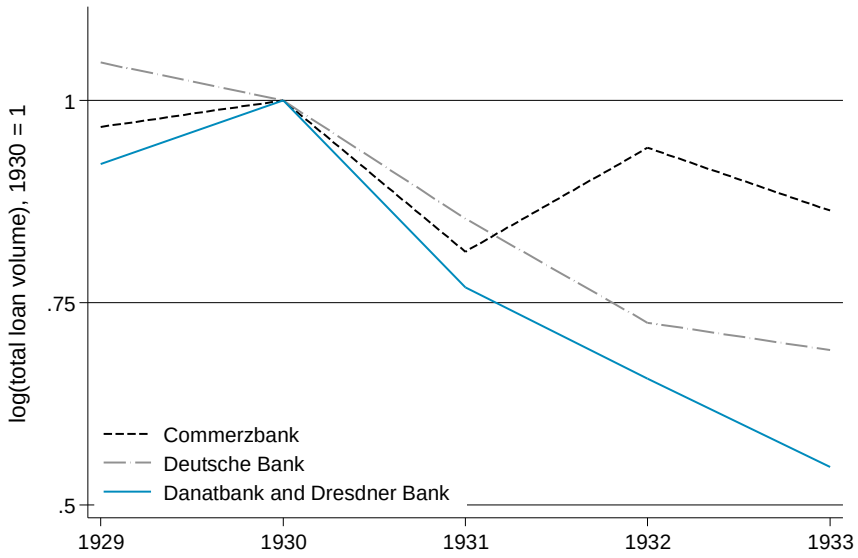
Figure 7: Industry exports and town export exposure

Panel A: Industry export shares Panel B: Town exports



Note: Panel A ranks industries by export share out of total exports in 1929 (industries with export share > 1 % only), panel B shows the distribution of city log export exposure as defined in equation (2).

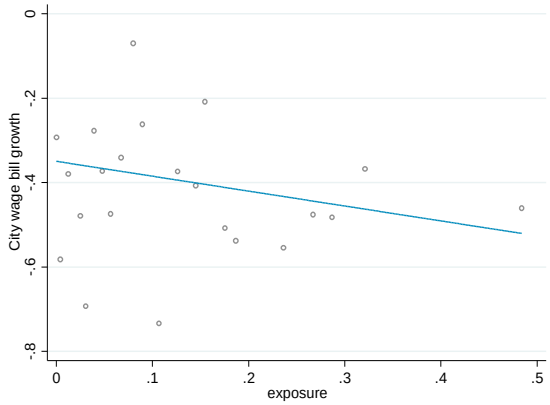
Figure 8: Bank loan growth 1929-1933



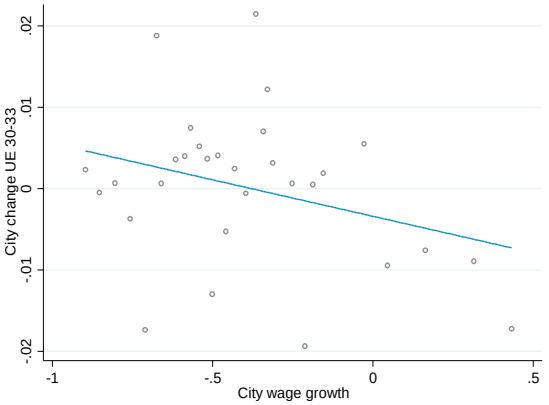
Note: Change in log total loan volume for selected banks, standardized to 1 in 1930. Danatbank and Dresdner Bank denote aggregate loan volume for both banks. Source: Handbuch deutscher Aktiengesellschaften 1934.

Figure 9: Exposure, wage bill, and unemployment

Panel A: Wages and exposure



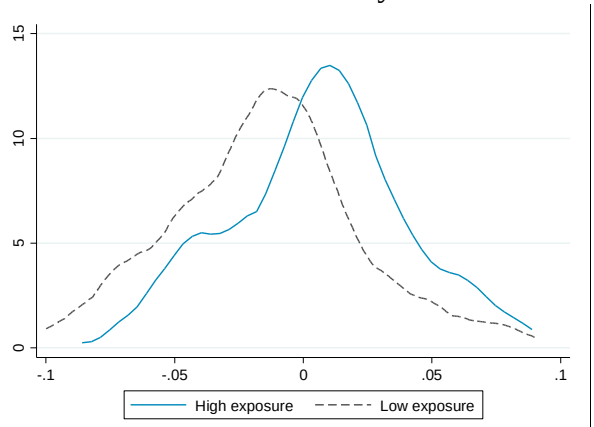
Panel B: Unemployment and wages



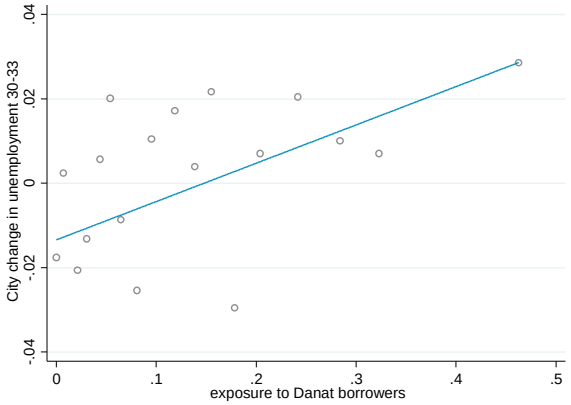
Note: Panel A shows binscatter plot of total change in city wage bill vs city exposure to Danat borrowers. Panel B shows binscatter plot of city change in unemployment (UE) against total city wage bill growth.

Figure 10: City exposure and unemployment 1930-1933

Panel A: Density



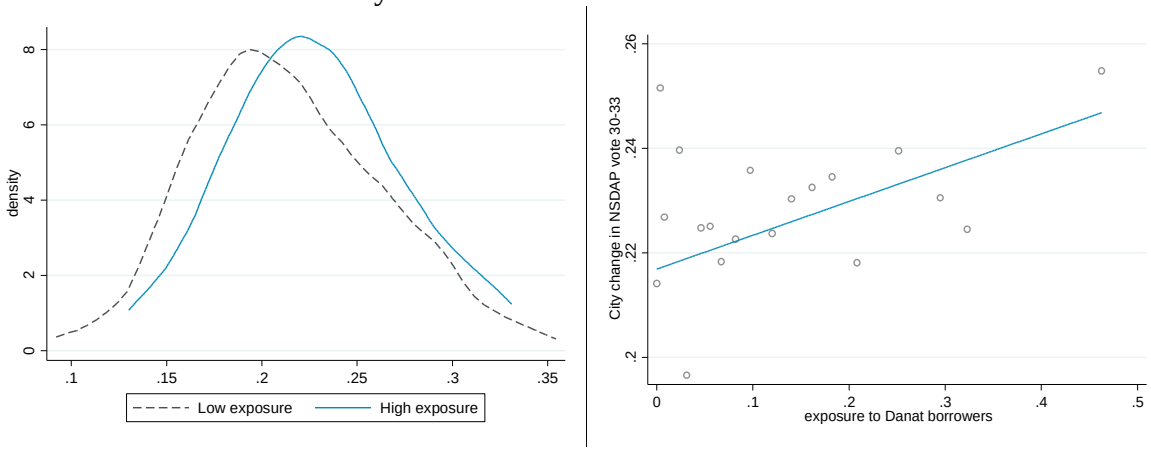
Panel B: Binscatter



Note: Panel A show density of change in unemployment rate from 1930 to 1933 for cities with positive (*high*) and zero (*low*) exposure to Danat connected firms. Panel B is a binscatter plot of change in unemployment against exposure.

Figure 11: Change in NSDAP vote 1930/09 to 1933/93

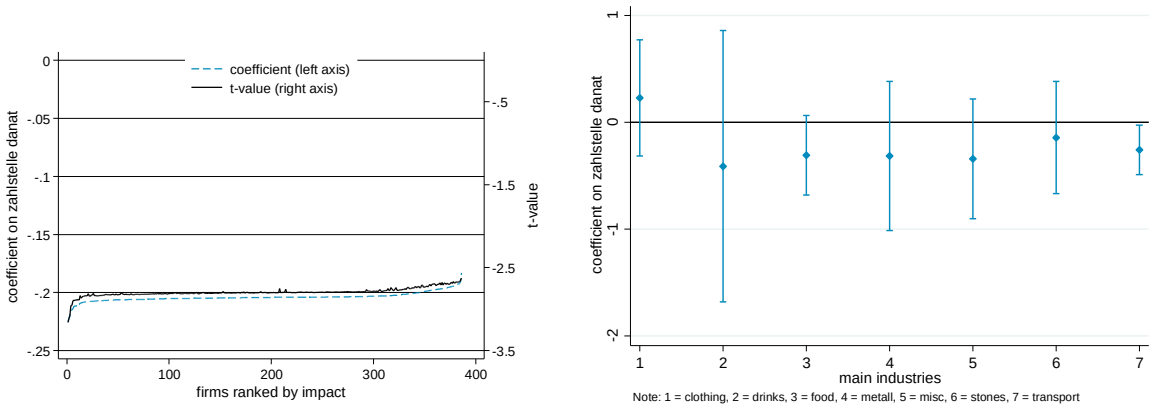
Panel A: Density Panel B: Binscatter



Note: Change in NSDAP share of votes from September 1930 election to March 1933 election. Panel A: Low exposure are cities with no exposure to Danat borrowers, High exposure those with positive exposure. Panel B: binscatter against city exposure to Danat borrowers.

Figure 12: Firm level stability of coefficient and selected industries

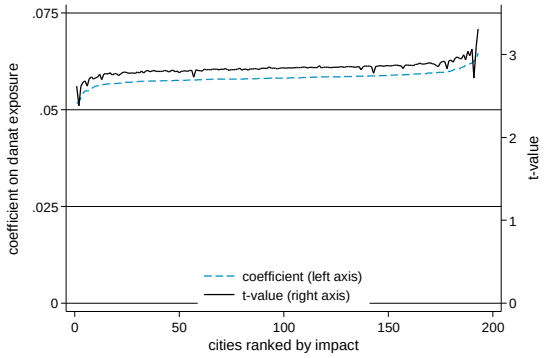
Panel A: Stability of coefficient Panel B: Selected industries



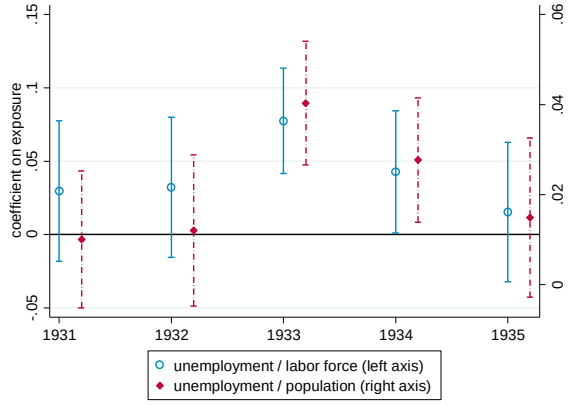
Note: Panel A plots coefficient and t-value of coefficient on danat in regression equation (3) on the y-axis. Dependent variable is growth in firm wage bill from 1929 to 1933. The x-axis ranks firms according to their impact on the coefficient, from highest to lowest. All regressions include controls grossbank, firm age, and log(assets). Standard errors clustered on the city level. Panel B plots coefficient and 90 % confidence intervals of coefficient on danat in regression equation (3) on the y-axis, for the seven main industries in our sample. The average main industry has 35 firms. Dependent variable is growth in firm wage bill from 1929 to 1933. The x-axis lists each industry. All regressions include controls grossbank, firm age, and log(assets). Standard errors clustered on the city level.

Figure 13: City level stability of coefficient and effect over time, unemployment

Panel A: Stability of coefficient



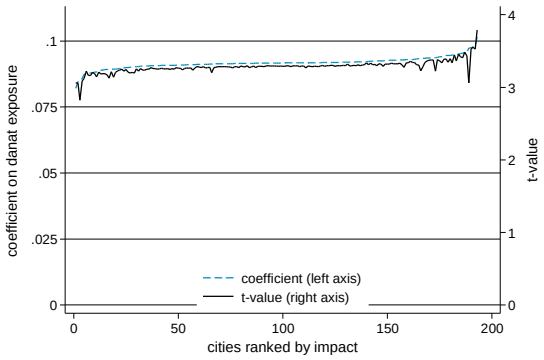
Panel B: Effect over time



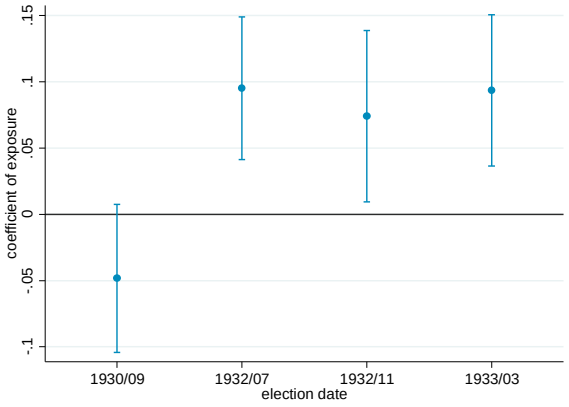
Note: Panel A plots coefficient and t-value of coefficient on exposure in regression equation (4) on the y-axis. Dependent variable is change in city unemployment rate 1930 to 1933. The x-axis ranks cities according to their impact on the coefficient, from highest to lowest. All regressions include standard city controls and robust standard errors. Panel B plots coefficient and 90 % confidence interval of a panel regression of city unemployment rate on exposure interacted with yearly dummies (all relative to 1930 unemployment rate). Unemployment standardized by labor force on left axis, standardized by yearly city population on right axis.

Figure 14: City level stability of coefficient and other elections, voting

Panel A: Stability of coefficient



Panel B: Effect over time



Note: Panel A plots coefficient and t-value of coefficient on exposure in regression equation (4) on the y-axis. Dependent variable is change in city NSDAP votes 1930 to 1933. The x-axis ranks cities according to their impact on the coefficient, from highest to lowest. All regressions include standard city controls and robust standard errors. Panel B plots coefficients and 90 % confidence interval for different elections. 1930/09 denotes change in votes from 1928/5 to 1930/09, the remaining dates the change from 1930/09 election to the respective election.

Table 1: Firm level summary statistics

	Danat borrowers		**All other borrowers**			**Grossbank borrowers**		
	mean	sd	mean	sd	t	mean	sd	t
firm age	40.90	(36.67)	27.81	(26.08)	-3.31	45.06	(36.27)	0.63
log assets	14.78	(1.34)	13.68	(1.34)	-5.80	14.51	(1.36)	-1.10
log wages	13.15	(1.66)	12.09	(1.65)	-4.52	13.15	(1.63)	-0.44
wage-asset ratio	0.31	(0.26)	0.35	(0.54)	0.62	0.32	(0.24)	0.30
Observations	59		327		386	63		122

Note: Danat borrowers are firms borrowing only from Danat or Dresdner. All other borrowers are firms not borrowing from Danat and Dresdner. Grossbank borrowers are firms borrowing from any great bank other than Danat or Dresdner. sd denotes standard deviation, t the t-value of the difference in mean of the respective group relative to Danat borrowers.

Table 2: City level summary statistics

	Danat exposure		no Danat exposure			Grossbank exposure		
	mean	sd	mean	sd	t	mean	sd	t
exposure	0.15	(0.12)	0.00	(0.00)	-10.97	0.00	(0.00)	-6.86
unemp. rate 1930	0.06	(0.02)	0.06	(0.02)	-0.57	0.06	(0.02)	-0.83
NSDAP votes 09-1930	0.19	(0.06)	0.19	(0.08)	0.29	0.19	(0.07)	-0.12
log population 1930	4.39	(0.99)	3.56	(0.46)	-7.15	3.80	(0.55)	-3.27
share blue collar	0.40	(0.08)	0.45	(0.10)	3.90	0.43	(0.10)	1.83
share jewish	0.01	(0.01)	0.01	(0.00)	-4.47	0.01	(0.01)	-2.72
share protestant	0.65	(0.29)	0.68	(0.29)	0.86	0.71	(0.27)	1.08
Observations	109		84		193	33		142

Note: Danat exposure are cities with positive exposure to Danat-connected firms. No Danat exposure are cities with zero exposure to Danat-connected firms. Grossbank exposure are cities with zero exposure to Danat-connected firms, but positive exposure to any other Grossbank. Sd denotes standard deviation, t the t-value of the difference in mean of the respective group relative to Danat borrowers.

Table 3: Firm wage bill and Danat connection

Dependent variable is firm wage bill growth							
	(1)	(2)	(3)	(4)	(5) city sample	(6) city sample	(7)
danat	-0.250***	-0.204***	-0.195***	-0.158***	-0.234***	-0.323***	-0.251*
	(0.062)	(0.061)	(0.059)	(0.059)	(0.076)	(0.118)	(0.144)
grossbank		-0.074	-0.063	-0.069	-0.024	0.077	0.054
		(0.100)	(0.102)	(0.104)	(0.135)	(0.107)	(0.130)
firm age		-0.001	-0.001	-0.000	-0.002	-0.001	-0.001
		(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.003)
log(assets)		-0.021	-0.026	-0.030	-0.024	-0.022	-0.007
		(0.025)	(0.061)	(0.026)	(0.036)	(0.038)	(0.066)
Observations	386	386	386	384	197	197	194
R-squared	0.014	0.022	0.034	0.076	0.031	0.359	0.421
City FE	-	-	-	-	-	Yes	Yes
Size FE	-	-	Yes	-	-	-	Yes
Industry FE	-	-	-	Yes	-	-	Yes
Cluster	City	City	City	City	City	City	City

Note: dependent variable is growth in firm wage bill from 1929 to 1933. danat (grossbank) denotes dummy variable with value 1 if firm is connected to Danatbank or Dresdner Bank (any other Grossbank). firm age and log(assets) denote firm age as of 1934 and log of total firm assets. Standard errors are clustered on the city level. *** p < 0.01, ** p < 0.05, * p < 0.1.

Table 4: Wage bill and unemployment

VARIABLES	(1) wage bill	(2) wage bill	(3) unemployment	(4) unemployment
exposure	-0.470	-0.559**		
	(0.310)	(0.261)		
wage bill growth			-0.009*	-0.008*
			(0.005)	(0.005)
Observations	81	81	81	81
R-squared	0.032	0.118	0.037	0.206
City Controls	-	Yes	-	Yes

Note: dependent variables are growth in city wage bill from 1929 to 1933 and change in city unemployment rate 1930 to 1933. exposure denotes city exposure to Danatbank borrowers. City controls include log population, share of protestants, Jews, and blue collar workers, as well as city coordinates. All regressions use robust standard errors. *** p < 0.01, ** p < 0.05, * p < 0.1.

Table 5: City unemployment

Dependent variable is city change in unemployment 1930-33

	(1)	(2)	(3)	(4)	(5) exposure > 0
exposure	0.091***	0.058***	0.059***	0.042*	0.054**
	(0.019)	(0.021)	(0.021)	(0.024)	(0.026)
log pop 1930		0.011***	0.005	0.007***	0.009***
		(0.003)	(0.007)	(0.003)	(0.003)
share blue collar		-0.021	-0.016	-0.072**	0.002
		(0.029)	(0.029)	(0.029)	(0.046)
share jewish		-0.166	-0.118	0.237	0.061
		(0.282)	(0.287)	(0.395)	(0.274)
share protestants		-0.015	-0.015	-0.007	-0.029*
		(0.009)	(0.009)	(0.015)	(0.015)
city latitude		-0.007***	-0.007***	-0.007	-0.005*
		(0.002)	(0.002)	(0.006)	(0.003)
city longitude		-0.000	0.000	-0.006**	0.001
		(0.001)	(0.001)	(0.003)	(0.001)
Observations	191	191	191	186	108
R-squared	0.072	0.260	0.277	0.453	0.232
City Size FE	-	-	Yes	-	-
Province FE	-	-	-	Yes	-

Note: dependent variable is change in city unemployment rate from 1930 to 1933. exposure denotes city exposure to firms connected to Danatbank or Dresdner Bank. Standard errors are cluster-robust. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 6: City NSDAP votes

VARIABLES	(1) NS 30-33	(2) NS 30-33	(3) NS 30-33	(4) NSDAP maj.	(5) NSDAP maj.	(6) NSDAP maj.
exposure	0.033	0.077***	0.093***	0.301	0.414*	0.452*
	(0.033)	(0.029)	(0.029)	(0.270)	(0.248)	(0.235)
log pop 1930		-0.006	-0.006*		0.111***	0.093***
		(0.004)	(0.004)		(0.030)	(0.034)
share blue collar		0.017	0.007		0.827**	1.059***
		(0.045)	(0.041)		(0.385)	(0.382)
share jewish		0.590	0.386		-3.638	2.996
		(0.536)	(0.610)		(4.057)	(5.385)
share protestants		0.063***	0.069***		0.418***	0.616***
		(0.016)	(0.020)		(0.141)	(0.191)
city latitude		0.001	-0.015*		-0.048*	-0.238***
		(0.003)	(0.008)		(0.025)	(0.071)
city longitude		0.005***	0.007*		0.005	0.031
		(0.001)	(0.004)		(0.012)	(0.038)
Observations	189	189	189	189	189	189
R-squared	0.005	0.284	0.399	0.006	0.119	0.222
Province FE	-	-	Yes	-	-	Yes

Note: dependent variable is change in city NSDAP votes from 1930 to 1933 in columns (1)-(3), and dummy equals 1 if NSDAP won majority in city in columns (4)-(6). exposure denotes city exposure to firms connected to Danatbank or Dresdner Bank. Standard errors are cluster-robust. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 7: City NSDAP votes – predicted

Dependent variable is change in NSDAP votes 30-33				
	(1)	(2)	(3)	(4)
UE 30-33	-0.038			
	(0.074)			
UE 30-33 (predicted)		0.939*		0.148**
		(0.515)		(0.064)
UE 30-33 (residual)			-0.093	-0.069
			(0.073)	(0.068)
Observations	187	187	187	187
R-squared	0.269	-0.460	0.266	0.293
City controls	Yes	Yes	Yes	Yes

Note: dependent variable is change in city NSDAP votes from 1930 to 1933. UE 30-33 denotes change in city unemployment from 1930 to 1933. predicted is unemployment change predicted by city exposure to Danat, residual the residual of the first stage. Standard errors are cluster-robust. *** p < 0.01, ** p < 0.05, * p < 0.1.

Table 8: City NSDAP votes – heterogeneity

Dependent variable is change in NSDAP votes 30-33						
	(1)	(2)	(3)	(4)	(5)	(6)
	low AS	high AS	no pog	yes pog	creditor	debtor
exposure	0.009	0.123***	-0.111	0.122**	0.130***	0.051
	(0.090)	(0.043)	(0.146)	(0.059)	(0.042)	(0.041)
Observations	40	42	25	37	88	99
R-squared	0.364	0.338	0.552	0.373	0.446	0.194
City controls	Yes	Yes	Yes	Yes	Yes	Yes

Note: dependent variable is change in city NSDAP votes from 1930 to 1933. exposure denotes city exposure to firms connected to Danatbank or Dresdner Bank. low/high AS denotes ares with low/high vote share for anti-Semitic parties in elections around 1900. no/yes pog denotes areas that did not and did have a pogrom in 1349. creditor/debtor denotes areas where deposits exceed (are less than) loans. All regressions include basic city-level controls. Standard errors are cluster-robust. *** p < 0.01, ** p < 0.05, * p < 0.1.

Table 9: Inter-racial marriages 1930-1933

VARIABLES	(1) jewish/non-jewish	(2) jewish/non-jewish	(3) jewish/jewish	(4) jewish/jewish
danat * post-July31	-0.0816**	-0.116**	-0.00247	-0.00513
	(0.0362)	(0.0481)	(0.00472)	(0.00460)
grossbank * post-July31		0.209		0.0645**
		(0.177)		(0.0325)
log pop 1930		0.194		-0.0318
		(0.520)		(0.0428)
Observations	2,234	1,970	2,234	1,970
R-squared	0.675	0.667	0.101	0.107
City FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes

Note: This table reports the results of a regression of the log number of marriages in a city on a city's exposure to Danatbank or Dresdner Bank and a dummy post-July31, which is 1 after July 1931 and 0 otherwise. The dependent variable in columns (1) and (2) is the log number of marriages between a jewish and a non-jewish person. The dependent variable in columns (3) and (4) is the log number of marriages between two jewish persons. Standard errors are clustered on the city level.c

Table 10: City exposure and exports

VARIABLES	(1) UE 30-33	(2) UE 30-33	(3) NS 30-33	(4) NS 30-33	(5) UE 30-33	(6) NS 30-33
exposure					0.052**	0.071**
					(0.022)	(0.029)
log exports	0.004**	0.004**	0.002	0.004	0.003*	0.004
	(0.002)	(0.002)	(0.003)	(0.003)	(0.002)	(0.003)
Observations	191	191	189	189	191	189
R-squared	0.030	0.251	0.004	0.272	0.272	0.293
City Controls	-	Yes	-	Yes	Yes	Yes

Note: dependent variable is change in city unemployment (UE) and NSDAP votes (NS) from 1930 to 1933. exposure denotes city exposure to firms connected to Danatbank or Dresdner Bank. Standard errors are cluster-robust. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 11: City exposure and exports, predicted unemployment

Dependent variable is change in NSDAP votes 30-33			
	(1)	(2) predicted by danat	(3) predicted by exports
UE 30-33	-0.052		
	(0.101)		
UE 30-33 (predicted)		1.284*	1.490
		(0.705)	(1.212)
Observations	187	187	187
R-squared	0.269	-0.460	-0.703
City Controls	Yes	Yes	Yes

Note: dependent variable is change in city NSDAP votes from 1930 to 1933. UE 30-33 denotes change in city unemployment from 1930 to 1933. predicted is unemployment change predicted by city exposure (column (2)) and log exports (column (3)) to Danat. Standard errors are cluster-robust. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 12: City KPD votes – heterogeneity

Dependent variable is change in KPD votes 30-33								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
			low AS	high AS	no pog	yes pog	creditor	debtor
expsoure	0.032*	0.053***	0.046	0.035	0.201***	0.023	-0.011	0.069***
	(0.016)	(0.016)	(0.039)	(0.030)	(0.066)	(0.034)	(0.014)	(0.024)
Observations	188	188	39	41	25	37	88	98
R-squared	0.022	0.163	0.222	0.350	0.475	0.060	0.254	0.273
City Controls	-	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Note: dependent variable is change in city KPD votes from 1930 to 1933. exposure denotes city exposure to firms connected to Danatbank or Dresdner Bank. low/high AS denotes ares with low/high vote share for anti-Semitic parties in elections around 1900. no/yes pog denotes areas that did not and did have a pogrom in 1349. creditor/debtor denotes areas where deposits exceed (are less than) loans. All regressions include basic city-level controls. Standard errors are cluster-robust. *** p < 0.01, ** p < 0.05, * p < 0.1.

Table 13: City KPD votes – predicted

Dependent variable is change in KPD votes 30-33				
	(1)	(2)	(3)	(4)
UE 30-33	-0.051			
	(0.088)			
UE 30-33 (predicted)		1.044*		0.160**
		(0.625)		(0.075)
UE 30-33 (residual)			-0.113	-0.085
			(0.093)	(0.083)
Observations	186	186	186	186
R-squared	0.109	-0.780	0.106	0.138
City controls	Yes	Yes	Yes	Yes

Note: dependent variable is change in city KPD votes from 1930 to 1933. UE 30-33 denotes change in city unemployment from 1930 to 1933. predicted is unemployment change predicted by city exposure to Danat, residual the residual of the first stage. Standard errors are cluster-robust. *** p < 0.01, ** p < 0.05, * p < 0.1.

Table 14: Other outcome variables

VARIABLES	(1) synagogue	(2) synagogue	(3) dep/pop	(4) dep/pop
expsoure	0.960***	0.435**	0.226**	0.146*
	(0.189)	(0.217)	(0.096)	(0.081)
Observations	193	193	192	192
R-squared	0.069	0.264	0.029	0.220
City Controls	-	Yes	-	Yes

Note: dependent variable is dummy equals 1 if synagogue was damaged or destroyed in 1938 pogrom in columns (1)-(2), and total deportations as share of Jewish population in columns (3)-(4). exposure denotes city exposure to firms connected to Danatbank or Dresdner Bank. Standard errors are cluster-robust. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 15: Firm level quantile regression

Dependent variable is firm wage bill growth

	(1) 5%	(2) 10%	(3) 25%	(4) 50%	(5) 75%	(6) 90%	(7) 95%
danat	-0.075***	-0.058	-0.042	-0.090	-0.051	-0.425	-1.017**
	(0.019)	(0.041)	(0.063)	(0.062)	(0.105)	(0.308)	(0.436)
Constant	-0.821***	-0.639***	-0.181	0.348	0.818*	1.880	0.785
	(0.108)	(0.160)	(0.181)	(0.275)	(0.471)	(1.648)	(1.989)
Observations	386	386	386	386	386	386	386
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Robust	Robust	Robust	Robust	Robust	Robust	Robust

Note: dependent variable is growth in firm wage bill from 1929 to 1933. danat denotes dummy variable with value 1 if firm is connected to Danatbank or Dresdner bank. All regressions include controls grossbank, firm age, and log(assets). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 16: Firm level regions

Dependent variable is firm wage bill growth

	(1) full sample	(2) no austria	(3) no bremen	(4) no ruhr
danat	-0.204***	-0.196***	-0.188***	-0.209***
	(0.061)	(0.062)	(0.062)	(0.065)
Observations	386	323	375	332
R-squared	0.022	0.022	0.019	0.022
Firm controls	Yes	Yes	Yes	Yes
Cluster	City	City	City	City

Note: dependent variable is growth in firm wage bill from 1929 to 1933. danat denotes dummy variable with value 1 if firm is connected to Danatbank or Dresdner bank. All regressions include controls grossbank, firm age, and log(assets). No REGION excludes firms in REGION from estimation. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 17: Firm level clustering

Dependent variable is firm wage bill growth

	(1)	(2)	(3)	(4)	(5)
danat	-0.204***	-0.204***	-0.204***	-0.204***	-0.204***
	(0.061)	(0.073)	(0.051)	(0.066)	(0.033)
Observations	386	386	386	386	386
R-squared	0.022	0.022	0.022	0.022	0.022
Firm controls	Yes	Yes	Yes	Yes	Yes
Cluster	City	Robust	Industry	Size	City and Industry

Note: dependent variable is growth in firm wage bill from 1929 to 1933. danat denotes dummy variable with value 1 if firm is connected to Danatbank or Dresdner bank. All regressions include controls grossbank, firm age, and log(assets). *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 18: City unemployment

Dependent variable is city change in unemployment 1930-33 over population

	(1)	(2)	(3)	(4)	(5)
					exposure > 0
exposure	0.041***	0.026***	0.026***	0.017*	0.025**
	(0.008)	(0.009)	(0.009)	(0.010)	(0.011)
log pop 1930		0.005***	0.003	0.004***	0.004***
		(0.001)	(0.003)	(0.001)	(0.001)
share blue collar		-0.005	-0.003	-0.028**	0.014
		(0.013)	(0.013)	(0.013)	(0.019)
share jewish		-0.066	-0.045	0.123	0.080
		(0.135)	(0.138)	(0.188)	(0.143)
share protestants		-0.004	-0.003	0.002	-0.007
		(0.004)	(0.004)	(0.006)	(0.007)
city latitude		-0.003***	-0.003***	-0.003	-0.002*
		(0.001)	(0.001)	(0.002)	(0.001)
city longitude		-0.000	0.000	-0.003**	0.000
		(0.000)	(0.000)	(0.001)	(0.001)
Observations	193	193	193	188	109
R-squared	0.076	0.259	0.273	0.462	0.216
City Size FE	-	-	Yes	-	-
Province FE	-	-	-	Yes	-

Note: dependent variable is change in city unemployment rate, standardized by population, from 1930 to 1933. exposure denotes city exposure to firms connected to Danatbank or Dresdner Bank. Standard errors are cluster-robust. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 19: City level quantile regression

Dependent variable is city change in unemployment 1930-33

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	5%	10%	25%	50%	75%	90%	95%
exposure	0.050	0.043	0.081***	0.050**	0.056***	0.049	0.046
	(0.046)	(0.029)	(0.027)	(0.021)	(0.021)	(0.044)	(0.050)
Constant	0.281	0.339***	0.276***	0.232**	0.360**	0.239	0.387**
	(0.179)	(0.104)	(0.099)	(0.108)	(0.142)	(0.151)	(0.180)
Observations	191	191	191	191	191	191	191
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Robust	Robust	Robust	Robust	Robust	Robust	Robust

Note: dependent variable is change in city unemployment rate from 1930 to 1933. exposure denotes city exposure to firms connected to Danatbank or Dresdner Bank. Standard errors are cluster-robust. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 20: City level quantile regression

Dependent variable is city change in NSDAP vote share 1930-33

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
VARIABLES	5%	10%	25%	50%	75%	90%	95%
exposure	0.084	0.041	0.071	0.068*	0.064*	0.041	0.094***
	(0.054)	(0.042)	(0.044)	(0.036)	(0.037)	(0.034)	(0.018)
Constant	-0.141	0.091	0.159	0.121	0.070	0.128	0.100
	(0.183)	(0.144)	(0.183)	(0.131)	(0.193)	(0.183)	(0.166)
Observations	189	189	189	189	189	189	189
Firm controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Cluster	Robust	Robust	Robust	Robust	Robust	Robust	Robust

Note: dependent variable is change in NSDAP vote share from 1930 to 1933. exposure denotes city exposure to firms connected to Danatbank or Dresdner Bank. Standard errors are cluster-robust. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 21: City level placebo election

Dependent variable is city change in NSDAP vote share 1928-30				
	(1)	(2)	(3)	(4)
exposure	-0.046	-0.037	-0.048*	-0.042
	(0.031)	(0.027)	(0.028)	(0.031)
exposure (GB)				0.010
				(0.029)
Observations	193	193	193	193
R-squared	0.009	0.303	0.359	0.303
City Controls	-	Yes	Yes	Yes
Wahlkreis FE	-	-	Yes	-

Note: dependent variable is change in NSDAP vote share from 1928 to 1930, prior to the default of Danat. exposure (exposure (GB)) denotes city exposure to firms connected to Danatbank or Dresdner Bank (other Grossbanks). Standard errors are cluster-robust. *** p < 0.01, ** p < 0.05, * p < 0.1.

Table 22: Tradable industries

	(1)	(2)	(3)	(4)
	firm level		city level	
VARIABLES	wage bill	wage bill	UE 30-33	UE 30-33
danat	-0.255***	-0.202**		
	(0.086)	(0.084)		
tradable industry	0.104	0.067		
	(0.113)	(0.117)		
danat X tradable industry	0.152	0.127		
	(0.189)	(0.183)		
exposure			0.175***	0.101**
			(0.043)	(0.042)
high exports			0.015*	0.013
			(0.009)	(0.008)
exposure X high exports			-0.191***	-0.154**
			(0.061)	(0.062)
Observations	272	272	128	128
R-squared	0.021	0.033	0.105	0.319
Controls	-	Firm	-	City
Cluster	City	City	Robust	Robust

Note: dependent variable is wage bill growth in columns (1)-(2), and change in unemployment rate from 1930 to 1933 in columns (3)-(4). Danat denotes firms borrowing from Danat or Dresdner, exposure denotes city exposure to firms connected to Danatbank or Dresdner Bank. Tradable industries are firms in top tercile of industries by export shares, high exports are cities in to tercile of city export exposure. Standard errors are cluster-robust. *** p < 0.01, ** p < 0.05, * p < 0.1.

Appendix A: Data

Table A1: Variables and data sources

Variable	Source	Type
Firm-level variables		
Assets	Handbook of German Stock Companies	in Reichsmark
Wages bill	Handbook of German Stock Companies	in Reichsmark
Bank-affiliation	Handbook of German Stock Companies	dummy
Firm age	Handbook of German Stock Companies	in years
City-level variables		
Exposure	Handbook of German Stock Companies	[0,1]
Exports	Statistisches Jahrbuch des Deutschen Reichs	in Reichsmark
Unemployment	Statistisches Jahrbuch Deutscher Städte	in thousand
Population	Statistisches Jahrbuch Deutscher Städte	in thousand
Labor force	1933 census	in thousand
Share of protestants	1925 census	%
Share of Jews	1925 census	%
Share of blue collar workers	1925 census	%
Election outcomes	Statistik des Deutschen Reiches (ICPSR 42)	
Debtor/creditor	Enquetekommission zur Untersuchung der Bankenkrise	dummy
Anti-Semitic votes	Statistische Jahrbücher des dt. Reichsamts für Statistik	
Pogrom in 1349	Germania Judaica	dummy
Synagogues damaged or destroyed	Alicke (2008)	dummy
Total deportations	German federal archive (Bundesarchiv)	in thousand

Note: This table lists main variables, data sources, and units. For details, see text.

Appendix B: Additional figures

Figure B1: "Der Stürmer" caricature

Note: This figure shows a caricature out of pro-Nazi newspaper "Der Stürmer" in May 1931 around the beginning of the German banking crisis. The caption says "The Jew banker and the German business man", suggesting that Jewish-led banks are to blame for the dire economic situation of the German people.