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BANKING FAILURES?  
EVIDENCE FROM THE 1931 GERMAN BANKING CRISIS

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# Were Universal Banks More Vulnerable to Banking Failures? Evidence From the 1931 German Banking Crisis

Müge Adalet\*

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## Abstract

This paper examines the 1931 German banking crisis using a bank-level data set. It specifically focuses on the link between banking structure and financial stability. The universality of banks, a key characteristic of the German banking system, is shown to increase the probability of bank failure after controlling for other bank-level characteristics and macroeconomic variables.

*Key Words:* Banking Crises, Great Depression, Universal Banking  
*JEL:* N24, E44, G01

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# 1 Introduction

Many countries have abolished regulations limiting the range of activities in which their banks can engage in recent years. In the United States, the Glass-Steagall Act restricting commercial bank involvement in investment banking was abolished in 1999. One rationale for these regulatory reforms is that allowing financial institutions to engage in universal banking allows them the diversification of assets and liabilities needed to withstand shocks to the economy.

However, this repeal has been cited as one cause of the recent global crisis. According to Eichengreen (2008), the deregulation of commissions for stock trading in the 1970s and the repeal of the Glass-Steagall, which separated commercial and investment banking, in 1999 unintentionally created a regulation vacuum that contributed to the crisis. Germany's experience in the 1930s also sits uneasily with this view. Germany had universal banks, and it was destabilized by a major banking crisis. The literature on the German banking crisis have generated many hypotheses about the experience of the universal banks in the interwar era. Universal banks could have suffered due to their reliance on foreign deposits, the extent of their industrial commitments or contagion from Austria.

Conducting a cross-country analysis, Adalet (2009) finds a negative link between universal banking and experiencing a banking crisis. Given these results and the availability of bank-level data, Germany which had a severe depression, universal type of banking, and a banking crisis in 1931, is analyzed as a case study.

The experience of the German economy during the Great Depression is said to have had wide repercussions throughout the world economy. Many committees convened by the Bank of International Settlements (BIS) and the League of Nations recommended that international cooperation was necessary in order to prevent the collapse of the German economy, and that the rescue of the German economy was crucial in maintaining the health of a world

economy bounded by the rules of the gold exchange standard. Although the central role of the German crisis in transmitting the Great Depression is undisputed, the literature is very much divided on the nature and causes of the German crisis itself.<sup>1</sup>

The German Depression was unusually severe — see Figure 1 for a comparison across countries. In 1932, real per capita income was 24% lower than its 1913 level and unemployment levels reached 31%. The role of the banking crisis in its development is contested. The financial crisis increased the severity of the Great Depression, but it is not clear whether it was a cause or the consequence of the depression. In this paper, the universal banking literature is linked with the crisis in Germany during the Great Depression by examining the banking sector in Germany at a deeper level.

The paper will be organized as follows. Section 2 presents a literature review. Section 3 describes the data and presents some summary statistics. Section 4 presents some results on the relationship between universal banks and the crisis. Section 5 concludes.

## 2 Literature Review

The large literature on the central role of universal banking in the industrialization of countries such as Germany dates back to the work of Alexander Gerschenkron. The close relationship between industry and banks was established in most of continental Europe with the exception of France. The excellent book edited by Teichova, Gourvish and Pogány (1994) consists of case studies of the evolution of universal banking in Central and Eastern European countries. All of these countries have a version of universal banking, but the German banks are the most typical definition of a universal bank as pointed out by Benston (1994, p. 121), who states that “Germany today and before the Second World War offers the best example of universal banking.” Saunders and Walter (1994, chapter 4) also discuss types of banking in Germany, Switzerland and the United Kingdom.

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<sup>1</sup>See Priester (1932), Born (1967), James (1986), and Balderston (1994).

German commercial banks, the so-called universal banks, were founded between 1840 and 1870. They broadened the short-term credit business and made “mixed banking” the customary banking procedure in Germany. Universal banks combine short-term banking, capital market operations, broker services and property management (Pohl 1986). It is assumed that such industrial banking allows banks to have considerable influence over firms through voting powers, representation on supervisory boards and many other ways. Riesser (1910), Hilferding (1910) and Jeidels (1905) are all contemporary works stressing the large role of universal banks in the industrialization of Germany before World War I. It is this aspect of universal banking that Gerschenkron’s famous theory rests on. According to his theory of “economic backwardness”, financial institutions play a critical role in late industrializing countries, the most prominent example being Germany. The need for large scale investment, heavy industry, and economies of scope in late industrializers combined with a lack of credit market resulted in universal banking in Germany.<sup>2</sup> The dominance of banks over industry is a much stressed point in the analysis of banking system of Germany itself and in comparison to types of banking systems in other countries such as England and the U.S.<sup>3</sup>

Cameron (1972) and Rudolph (1972) challenge the Gerschenkronean view by looking at the timing of industrialization and development of joint stock banking in Germany and Austria respectively. They claim that industrialization in Germany precedes 1870 when most of the joint stock banks were founded. Good (1973) also finds little quantitative evidence supporting Gerschenkron’s hypothesis. Tilly (1967) is also skeptical, but supports Gerschenkron more than disputing him. Neuburger and Stokes (1974) claim that universal banks actually had an adverse effect on industrialization because the banks misallocated

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<sup>2</sup>Neuburger (1977) compares credit banks to other types of banks, especially the private banks that were gradually replaced by them.

<sup>3</sup>Gerschenkron (1962), Schumpeter (1939), Whale (1930), Chandler (1990), Calomiris (1995) and Weber (1902) all stress this point.

credit to heavy industrial sectors. Fremdlin and Tilly (1976) dispute this by challenging the aggregate method and data used by Neuberger and Stokes.

Recent papers use the recent economics literature on information asymmetry and agency theory to address this issue. Calomiris (1995) focuses on how universal banks are able to exploit their resources to gather information. Fohlin (1994) suggests that the role of universal banking in promoting growth in Germany was not as important as once thought by analyzing the links between banks and industry through supervisory boards. Da Rin (1996) shows how a country can get locked into a certain financial system due to its economic and political conditions. Hauswald (1995) uses the economics of information and concludes that the development of the German banking system was a process of learning.

Another line of the literature attempts to answer questions about the effects of universal banks on the whole economy in general and the credit market in particular: Benston (1994) addresses some of these such as “Do universal banks deploy capital as effectively as the stock market? Do they crowd out other financial institutions? Do they create an unhealthy concentration of power? Do they increase the risk of financial instability?”<sup>4</sup>

This paper attempts to answer this last question by analyzing the 1931 financial crisis in Germany. The effect of universal banking on the stability of financial system has been the subject of some theoretical and empirical literature. The most obvious is that banks’ equity stakes in firms may make them vulnerable to fluctuations in the stock market and business downturns.

Francke and Hudson (1984) claim that universal banks’ close relations to industry makes them more susceptible to a crisis, and the spillover of this effect to the whole banking system was inevitable. White (1986), on the other hand, shows that for the case of the United States, bank involvement in securities activities actually stabilizes an economy in times of

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<sup>4</sup>Benston (1990) gives a more detailed of a discussion of universal banking in the U.S. and the Glass-Steagall Act.

crisis. Saunders and Walter (1994, chapter 5) also show that the activities universal banks are involved in are not riskier than ordinary commercial bank activities. Kroszner and Rajan (1994) show that in the period before the Glass-Steagall Act, U.S. universal banks neither abused their power into fooling the public into purchasing low quality securities nor performed worse than other types of financial institutions in the securities market. If universal banks do not add to financial instability, this might be due to their reluctance to engage in risky projects in order to protect their deposits. However, this argument contradicts the “too big to fail” idea that most of the big universal banks took risks thinking that they would have to be bailed out, as the Credit Anstalt was in Austria.

The relationship between banking structure and banking stability has been analyzed in cross-country studies such as Bernanke and James (1991) and Grossman (1994). Bernanke and James (1991) do a cross-country study on the effect of the gold standard on having a crisis during the Great Depression. Deflation affects banks adversely since they have nominal liabilities and real assets. As a result, they have to call in their loans or are unable to make new ones. Ultimately, there will be depositor’s run, crippling the credit market as banks fail or a banking holiday is declared by the authorities. They conclude that unit banking as in the United States and universal banking as in Germany and Austria, dependence on short term foreign liabilities, and past hyperinflation experience made countries more vulnerable to a full scale banking crisis. Grossman (1994) also addresses the different experiences of European countries during the Great Depression according to the structure of their banking system. Branching, non-concentrated banking, and large banks size all brought more stability than banking systems without these characteristics. Good macroeconomic indicators added to the health of the banking system by decreasing exchange rate uncertainty, and the ratio of non-performing loans. The existence of a lender of last resort also made a difference.

The role of universal banking deserves special attention in the analysis of the interwar banking systems of Central Europe. Universal banks suffered both direct losses and indirect



losses due to their industrial ties. This double effect was one of the factors that caused the Credit Anstalt crisis. Schubert (1991) uses the recent financial crisis literature to shed light on the internal and external causes of the Austrian crisis. Unlike Austria, where one large bank, the Credit Anstalt, clearly dominated the banking system, the German banking system was much more diversified. The different types of banks can be used to test whether the great shock of the Great Depression hurt the universal banks more than the other types of banks that were less closely related to industry and served other purposes.

Many studies in the literature on the interwar banking systems of Austria and Germany reveal a close relationship between banking and industry in the two countries. Universal banks differed from other types of banks in the German system since they diversified by spreading over a great range of clients and geographic locations. This would protect them from large losses in the face of a local or a sectoral business downturn, but when a general economic shock such as the Great Depression hit the economy, they could be much more vulnerable. Since they were very exposed to industrial firms in trouble, they could lose money both due to frozen loans and the deterioration of the value of their portfolio of industrial stocks. Relating business cycle variables and macroeconomic indicators to banks failures can test this *Great Depression effect* on the crisis.

## **3 Data Description and Summary Statistics**

### **3.1 The German Banking System in the Interwar Period**

The German banking system consisted of a wide variety of banks: joint-stock banks, private banks, state banks, savings banks and credit cooperatives. At the center was the Reichsbank (RB) that was founded in 1875 as Germany's first central bank.<sup>5</sup> Besides the RB, there were four other note-issuing banks until 1935: The Badische Bank, the Bayerische Bank,

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<sup>5</sup>Northrop (1938) is an excellent source for the role of central banking in Germany between 1924 and 1933.

Sächsische Bank and the Württembergische Bank. These banks had no control over monetary policy despite their note issuing privileges.

The most common type of banking was joint-stock credit banks, i.e., universal banks. These banks had close ties with industry. They would arrange mergers and acquisitions, underwrite stock and bond issues, trade securities and offer brokerage services. Another type of private banks was mortgage banks. These banks provided real estate credit, but were not allowed to do short-term commercial banking.

Communal banks included savings banks and cooperative credit societies. Savings banks accepted savings from low and middle income classes and invested them in mortgages or government credit. They competed with credit banks as their deposits were guaranteed by the municipalities and they had a tax-exempt status. They were linked through a system of clearing banks that facilitated giro and cheque transactions. Cooperative banks were local institutions (agriculture and trade oriented) and extended credits to their members. These banks were more liquid than other types of banks. They were important in the modernization of German agriculture.<sup>6</sup>

Public banks included state banks founded by provincial governments. Their primary purpose was to fund local government projects. They had branches throughout their corresponding states. In the 1930's, credit banks made up the largest percentage of banks, followed by mortgage banks, savings banks, state and clearing banks and credit cooperatives in terms of asset size. More details on the structure of the banking system can be found in Pohl (1993) and Hardach (1984). Whale (1930) specifically focuses on joint-stock banking in Germany before World War I.

The German banking system underwent some drastic changes during World War I and the following period of hyperinflation. First, in 1924, total assets of the banking sector

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<sup>6</sup>Guinnane (2002) is a detailed study on these two types of banks.

declined to 21% of their 1913 level.<sup>7</sup> Second, during the inflationary period, as the capital markets collapsed, banks had gotten rid of small accounts. Banks regretted this decision as they competed for deposits after the currency reform. Although the volume of business had gone down, by the end of the stabilization, the number of banks exceeded that of the prewar era except for the case of savings banks. The savings banks were the worst hit as they had mainly long-term deposits, and their savings deposits shrunk from 64% to 11% of their total liabilities. Besides the savings banks, mortgage banks were also hurt as their assets, which were mainly long maturity mortgages with fixed interest rates, lost value due to the inflation. Mortgage banks never regained their prewar prominence again and were less affected by the 1931 crisis than other types of banks due to the long term nature of their assets and liabilities. On the other hand, the market share of credit banks and credit cooperatives increased after the inflation. Third, dependence on foreign capital increased dramatically after stabilization. By the end of 1930, foreign indebtedness had increased to 25.5 billion RM and almost half of this consisted of short-term debts. Universal banks were the most willing participants in this new system of foreign credit. In 1929, foreign deposits of universal banks were 40% of their deposits. Furthermore, in 1930, foreign short-term assets were only 40% of their liabilities.<sup>8</sup> As the banking system increased its assets from 1925 to 1930 (at incredible rates), banks failed to address a fundamental issue: They did not take the necessary measures to insure themselves against bank runs. One measure of this fact is that their liquidity ratios declined. Credit banks reduced their ratio of cash and Reichsbank balances to deposits from 7.3% in 1913 to 3.8% in 1929. Likewise, the ratio of capital and reserves to assets declined from 22% to 7%.<sup>9</sup> Before the war, universal banks would make loans to industry by later converting this industrial debit into a bank credit by floating bonds in the capital market to cover the bank debt and to supply the firm with more long-

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<sup>7</sup>Hardach (1995).

<sup>8</sup>Ausschuss Untersuchung der Erzeugungs-und Absatzbedingungen der deutschen Wirtschaft (1930).

<sup>9</sup>*Enquete-Ausschuss* (1933).

term credit. The banks depended on a successful floating of securities to provide them with enough credit to meet their liabilities. This relationship between industry, credit banks and the capital market broke down as the hyperinflation destroyed the capital market. Universal banks, however, continued to supply customers with loans and depended upon foreign funds to make these loans possible and the Reichsbank to rediscount their bills in the case of a need for liquidity. As a result, the role of the Reichsbank as a lender of last resort became the most important aspect of the banking system. It is important to understand why banks acted in this manner and became vulnerable to bank runs. Possible explanations include the lack of good banking regulation by today's standards, and the banks' belief that they would receive assistance from the government in the event of runs. This can be used as an indicator of whether universal banks took on riskier projects or not.

## 3.2 Data

The data set include the balance sheets of 187 major German banks. These banks include 140 joint stock credit banks (*Kreditbanken*), 20 state banks (*Staats und Landesbanken*) and 25 savings & loans clearing banks (*Girozentralen*) and 2 mortgage banks (*Hypothekenbanken*). The first type of banks represents the universal banks in the sample. The state banks are owned by the governments of the *Länder* and the clearing banks are owned by savings banks and serve as regional clearing houses for savings banks. The data series was published monthly by the statistical department of the Reichsbank in the *Deutscher Reichsanzeiger und Preußischer Staatsanzeiger*. This sample represents 60 percent of all German banking assets in 1930.<sup>10</sup> These data have been used by Petri (1998) and Schnabel (2004) and (2005) and Adalet (2005) to analyze the determinants of the German banking crisis. This has created a new debate on the relative importance of currency and banking sector factors in the German depression.<sup>11</sup> This study analyzes a different aspect of the issue, concentrating

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<sup>10</sup>Deutsche Bundesbank, *Deutsche Geld und Bankwesen in Zahlen 1876-1975*, 1976, p. 121.

<sup>11</sup>See Ferguson and Temin (2004) and Ritschl and Sarferaz (2006).

on how different types of banks fared during the banking crisis of July 1931.

The Reichsbank was concerned throughout the 1920's in improving banking standards, especially the banks' liquidity position.<sup>12</sup> Until 1928, the balance sheets were published bi-monthly. Then, a joint conference between the Reich Minister of Economics and the representatives of the Reichsbank and the other banks resulted in an agreement to publish monthly balance sheets, and to improve the contents to make the balance sheets more uniform and informative. In addition to these reports of the balance sheets, the banks also had to declare to the Reichsbank the percentage of their deposits that were of foreign nationality. The Reichsbank, in turn, agreed to publish these figures only as an aggregate amount (MacKenzie 1932).

The balance sheet data were collected in the state library in Berlin. The balance sheet data were complemented by detailed weekly information from financial magazines such as *Die Bank*, *Magazin der Wirtschaft*, *Wirtschaft and Statistik*. These magazines offer both quantitative and qualitative accounts of the real state of the economy as well as the sentiments of people. The library also had yearly statistical yearbooks of Germany that provided monthly macroeconomic variables.

The data cover the period January 1925 to November 1932. These dates include the post-stabilization era after the 1923 hyperinflation, the reparation crisis of 1929 that led to the introduction of the Young Plan, the September 1930 election crisis, the May 1931 Austrian crisis, the July 1931 banking crisis and the first part of recovery from the Great Depression after the imposing of exchange controls in July 1931.

The macroeconomic variables include an index of industrial production, the consumer price index, the stock market index, the number of corporate bankruptcies, unemployment rate. These variables are taken from *Wagemann, Konjunkturstatistisches Handbuch 1933 and 1936*.

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<sup>12</sup>See *Annual Reports of the Reichsbank, 1924-1934*.

### 3.3 Definition of Banking Trouble

The German banking crisis differs from other banking crises in the sense that not many banks fail and disappear from the sample. A banking holiday was declared in Germany on July 15, 1931. Therefore, it is necessary to find another way to determine the experience of individual banks in the summer of 1931. The balance sheets do not include information on the fate of banks. This information was collected using *Die Bank*, a weekly banking magazine that gives detailed information on what happened to individual banks. These data was complemented by the *Handbuch der deutschen Aktiengesellschaften*, which has information about the liquidation of banks and firms for joint-stock banks. The *financial distress* variable is defined to include banks that were closed, failed, merged or experienced financial difficulty.

### 3.4 Summary Statistics

In order to generate results, the means and standard deviations of some variables are compared according to bank type, experiencing distress, and location.<sup>13</sup>

Table 1 shows summary statistics by bank type.<sup>14</sup> The ratio of securities over total assets is used to measure the liquidity of assets. Foreign deposit growth is compared across banks because the withdrawal of foreign deposits is claimed to be one of the precipitating factors of the crisis. The results show that the clearing banks were the most liquid of all banks in the sample. Universal banks do not seem to hold as much liquidity as clearing and mortgage banks. One possible explanation for this is that universal banks thought of themselves as too big to fail and expected bailouts by the Reichsbank similar to the one given by the ANB to the Credit Anstalt. Another possibility is that these banks believed

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<sup>13</sup>The variables are chosen given the large roles liquidity and foreign deposits played in the German banking system after the war.

<sup>14</sup>First order liquidity is defined as sum of cash and deposits at central banks over deposits and acceptances. Second order liquidity adds checks and bills and inter-bank loans to the numerator.

themselves to be diversified enough against idiosyncratic deposit withdrawals. The liquidity ratios are high for clearing banks because savings banks held most of their liquidity reserves at these banks, since the clearing banks facilitated clearing between various savings banks within a region.

The most important aspect of the table is that foreign deposit growth does not seem to differ significantly across types of banks. This is significant because the literature suggests that the big credit banks would be more likely to face withdrawals as foreigners perceived them more likely to fail due to their industrial ties.

The upper part of Table 2 shows the same variables with the sample divided between banks that experienced distress and those that did not. The no-distress banks have a higher liquidity ratio as expected and the distress banks experience foreign deposit withdrawals unlike the rest of the sample.<sup>15</sup> The second order liquidity is lower for failed banks, but the first order liquidity is higher. This suggests that it is the cheques and bills (discountable at the Reichsbank) and balances at other banks that drove the low liquidity of universal banks.

The lower part of Table 2 divides the banks according to their location, specifically whether they were in Berlin or not. Berlin was the financial center of Germany in the 1930s and the six big Berlin banks held 22.9% of the banking sector's total assets in 1931. A negative or positive significant Berlin effect is not observed. Berlin banks seem to have higher securities to assets ratio, but experience higher withdrawals of foreign deposits. Splitting the Berlin banks further into the big six and the other banks reveals that the big Berlin banks had a much lower ratio of securities to assets and the high number for the whole sample of Berlin banks is driven by the smaller Berlin banks.<sup>16</sup>

Given these summary statistics, whether the experience of universal banks differed from other types of banks during the crisis is examined. Graphing average deposits according to

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<sup>15</sup>These results are not changed significantly when the sample is cut off in May 1931 before the crisis hit.

<sup>16</sup>This is in line with the results of Schnabel (2005).

the different bank types, Figure 2 shows that before the crisis the average total deposits was highest for universal banks in Berlin and they decreased dramatically after the crisis.

Finally, a  $t$ -test is conducted to see whether there is a relationship between the probability of failure and whether banks are universal. The results in Table 3 indicate that being a universal bank increases the probability of failure significantly.<sup>17</sup> The next step is to determine what are the characteristics of universal banks that drive this result. One expects universal banks to be more diversified due to their size and more extensive branching networks compared to other types of banks. This should, in theory, make them more stable in the face of a crisis. However, they suffered more due to their close ties to industry which was hit particularly hard by the Great Depression. They lost money due to the decline in the stock market and loan defaults.

## 4 Empirical Methodology and Results

### 4.1 Are Universal Banks More Likely to Experience Distress?

Given the summary statistics, the likelihood of failure is investigated further by considering a logit model, using the bank distress defined in Section 3.3 as the dependent variable. Specification (1) in Table 4 is the baseline model that only includes a few fundamental bank level variables.<sup>18</sup> Most importantly, being a universal bank increases the probability of failure. Given this result, the different channels through which universality made banks more vulnerable to financial shocks are explored.

Foreign deposit withdrawals are cited as a large reason for the trouble German banks experienced during the Great Depression. Foreign deposit growth decreases the probability of failure; that is, if banks are not experiencing withdrawals, they are naturally more likely

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<sup>17</sup>When the state banks are excluded from the sample (given that they enjoy state guarantees and none of them fail), the results are slightly weaker, but still hold.

<sup>18</sup>Given the prominent role of the big Berlin banks in the German banking system, these regressions are repeated without these banks and the results are robust.



to survive.<sup>19</sup> However, it is not sufficient just to look at the liability side of a balance sheet without considering the asset side. In specification (3), the ratio of reserves held against foreign deposit liabilities to foreign deposits is also included and it is negative and significant. Having reserves on the asset side to back up foreign liabilities protects banks from the consequences of heavy foreign deposit withdrawals. Including variables to control for these two channels of bank distress, the ratio of foreign reserves to deposits and the ratio of current account advances to firms to assets, decreases the effect of the universal banking coefficient. However, universality is still significant, so other characteristics that differentiated these banks should also be considered.

A higher securities to assets ratio decreases the likelihood of failure since this is a measure of the liquidity of assets. This result is not significant, though, so logits are ran using different measures of liquidity such as first and second order liquidity. These measures decrease the sample size and results are not reported here, but second order liquidity is significant and decreases the probability of failure. Illiquid banks are much more vulnerable to shocks than liquid ones. In Germany, this result could be due to a number of reasons. Banks might have had to sell their assets in times of distress or the Reichsbank refused to discount securities and this increased the illiquidity of banks. In order to differentiate the leading cause of this decline in liquidity, bills re-discountable at the Reichsbank are also included. This variable is expected to strengthen a bank in normal times, but the crisis had dwindled the reserves of the Reichsbank and they were reluctant to discount bills in fear of going off the gold standard. As a result, a large number of bills may indicate a higher vulnerability to crisis as banks might have made riskier loans thinking that the Reichsbank would act as a lender of last resort. The results indicate a positive effect, i.e., having a large amount of bills increases the likelihood of failure.

The log distance from Berlin is also used and being away from Berlin increases the

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<sup>19</sup>See Adalet (2005) for the role of foreign capital in the German banking crisis.

probability of survival. This is in line with results from Table 2 where Berlin banks had lower liquidity and experienced higher foreign deposit withdrawals.

In specification (2) of Table 4, macroeconomic variables such as corporate failures, stock market index (1928=100), the number of new firms in the economy and the unemployment rate, are included to capture the aggregate economic stability that was prevailing at the time. Corporate failures and the unemployment rate should increase the probability of bank failure and stock market index and the number of new firms should decrease it. Percentage changes in some of the macro variables-stock market index and unemployment rate-are used rather than levels because it is the change in economic activity that should impact bank failures. One month lags are used for variables that are more immediate to observe such as the stock market index and six month lags are used for the unemployment rate because they should influence banks with a time lag.

Among the macroeconomic variables, the stock market index is not significant, whereas corporate failures and unemployment are significant. This may be explained by the fact that changes in the macroeconomic variables lead to changes in bank specific variables, especially deposit growth and liquidity and their significance might be captured by these bank specific variables. The bank variables are still significant with the expected signs, so bank characteristics still matter after controlling for the macroeconomic environment. The sign of the stock market index is negative as expected. A higher stock market index decreases the probability of distress. Given that universal banks held a lot of industry stocks, this was another channel through which their balance sheet was affected during the Great Depression. An increase in the number of business failures increases the probability of bank distress. This is expected given the theory that the inability of firms to repay their loans worsened bank balance sheets.<sup>20</sup>

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<sup>20</sup>Given that macroeconomic variables might affect banks with a lag, different lag structures are considered, but the results do not change.

In specification (3), bank loans to industry is included to control for the most important role of universal banks. This variable is positive and significant, implying that higher loans to industry increase the probability of distress.<sup>21</sup> Including variables to control for the two channels of bank distress, the ratio of foreign reserves to deposits and the loans to firms, decreases the effect of the universal banking coefficient. However, universality is still significant, so other characteristics that differentiated these banks should also be considered.

## 4.2 Are Branch Banks More Likely to Experience Distress?

A different aspect of the banking system, namely the existence of branches, is also explored. There is an enormous literature concerning the effect of branch banking on the likelihood of a bank surviving in the face of a banking crisis. Bordo (1985) and Grossman (1994) find that countries with more branch banks experience fewer crises. Likewise, Wheelock (1992) and Mitchener (2001) conclude that the U.S. states that allowed branch banking had lower rates of bank failures. The data from the *Handbuch der deutschen Aktiengesellschaften* (various years) and the study by *Enquete-Ausschuss* (1933) was used to determine whether banks had branches or not.

Among the big Berlin banks, the Deutsche Bank und Disconto-Gesellschaft, Darmstädter und Nationalbank, Dresdner Bank and Commerz und Privat Bank had branches while the Reichs Kredit Gesellschaft and the Berliner Handels Gesellschaft did not. The non-branch banks worked with a small number of clients and had a higher average deposit and average loan rates. The branch banks had a bigger base of clients and the majority of their loans were to the industry.

First, a simple test is conducted to establish a relationship between having branches and bank failure. The results in Table 3 suggest that branching does not make a difference in protecting a bank from failure. Branching was more common in Germany than the U.S., but

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<sup>21</sup>This variable is also included as a ratio of assets and the results are similar, but insignificant.

it was not as prevalent as in the United Kingdom. Banks also diversified through forming so-called bank groups where the big Berlin banks indirectly controlled smaller banks in other provinces rather than having regular branches throughout the country.<sup>22</sup>

Next, given the role of deposit withdrawals in the German crisis, an analysis is conducted by using a threshold mean of growth of deposits for the whole banking sector as the dependent variable, rather than whether a bank failed, to test whether branch banks were hit harder by the crisis. The short-term debt of Germany declined from 10.3 billion RM in December 1930 to 7.4 billion in July 1931. Of this decline, 0.3 billion was from the debts of public authorities and 2.6 billion was due to the debts of the banks. In addition to this, foreigners also sold some long term investments and mortgage bonds and Germans invested abroad.<sup>23</sup> Table 5 gives the percentage of banks that fall below the mean. This table examines banks for the whole sample, as well as splitting the analysis into pre- and post-crisis periods. Branch banks appear to have been hit worse throughout the sample.

Then, the foreign deposit growth difference between branch and non-branch universal banks is explored in Table 6. Splitting the universal banks into groups according to the existence of branches and averaging foreign deposits for the two groups shows that there is a significant drop in the average foreign deposits in the branch-universal banks, while there is no significant drop in non-branch universal banks. A similar analysis for the non-universal banks gives opposite results around the crisis period (June and July 1931). One explanation for this is that these banks were more locally oriented and their branching network was not as extensive as that of universal banks. As a result, having a branch makes a difference for the experience of universal banks during the depression. When the branching *t*-test is repeated only for universal banks, one sees that branching makes universal banks more vulnerable.

Table 7 reports logit results including a branching variable. This reduces the sample size

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<sup>22</sup>These bank groups were replaced by branching networks over the interwar years as the big banks absorbed the provincial banks that they had control over.

<sup>23</sup>Report of the Committee appointed on the recommendation of the London Conference, 1931.

since branching information is only available for a sub-sample of the banks. Including this variable does not change the results in Table 4 that universality increases the probability of bank distress. The branching variable is significant in specifications (1) and (2). Having branches increases the probability of failure. This is in contrast to the common view in the literature that branching decreases the probability of distress. This can be explained by the fact that branches were used to gain control of different industries in Germany rather than geographic diversification. The 1920s were an era of mergers and acquisitions in the banking industry, driven by a need for becoming bigger by the already big Berlin banks. The acquired banks were at times converted into branches to expand their business. It is possible that banks with branches did not feel the need for high liquidity and thus suffered when a big shock hit the economy.

## 5 Conclusion

The role of universal banking in interwar Europe has been the topic of a lot of research, such as Teichova et al. (1994). However, these studies concentrate either only on case studies of individual banks or a comparison of aggregate banks across countries. This paper analyzes the role of banking structure in the largest economic crisis of the twentieth century by using a bank-level data set.

The main results in this paper show that the type of bank, the size and the location of a bank were influential in determining whether it experienced distress or not. In agreement with earlier studies on banking crises, illiquidity increases the probability of failure. A result more specific to the structure of the German banking system is that universal banking decreased financial stability during the German depression. Loans to industry and foreign deposit exposure are discussed in the literature as the main channels that caused the banking crisis in Germany. An analysis of these balance sheet items shows that they increased the probability of failure.

The findings are robust to including other bank-specific variables as well as common macroeconomic variables such as corporate failures and the stock market index. Also, including a dummy for branches shows that branching made banks more vulnerable to failure. This is in contrast with studies such as Grossman (1994) that conclude that branching brought stability to a banking system.

This paper points to interesting avenues for future research. The bank balance sheet data can be supplemented with firm level data to establish further links between industry and banks. These issues are important given recent reforms that have pushed banking systems towards universality; e.g., the repeal of the Glass-Steagall Act in the U.S. Furthermore, research on recent crises in Asia have highlighted the important link between banks and firms in increasing financial instability. Examining Germany's past experience may give new insight on different banking mechanisms and characteristics that play roles in the propagation of crises and help explain the experience of emerging markets that share the same problems today.

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Figure 1: Industrial Production and Unemployment Across Countries

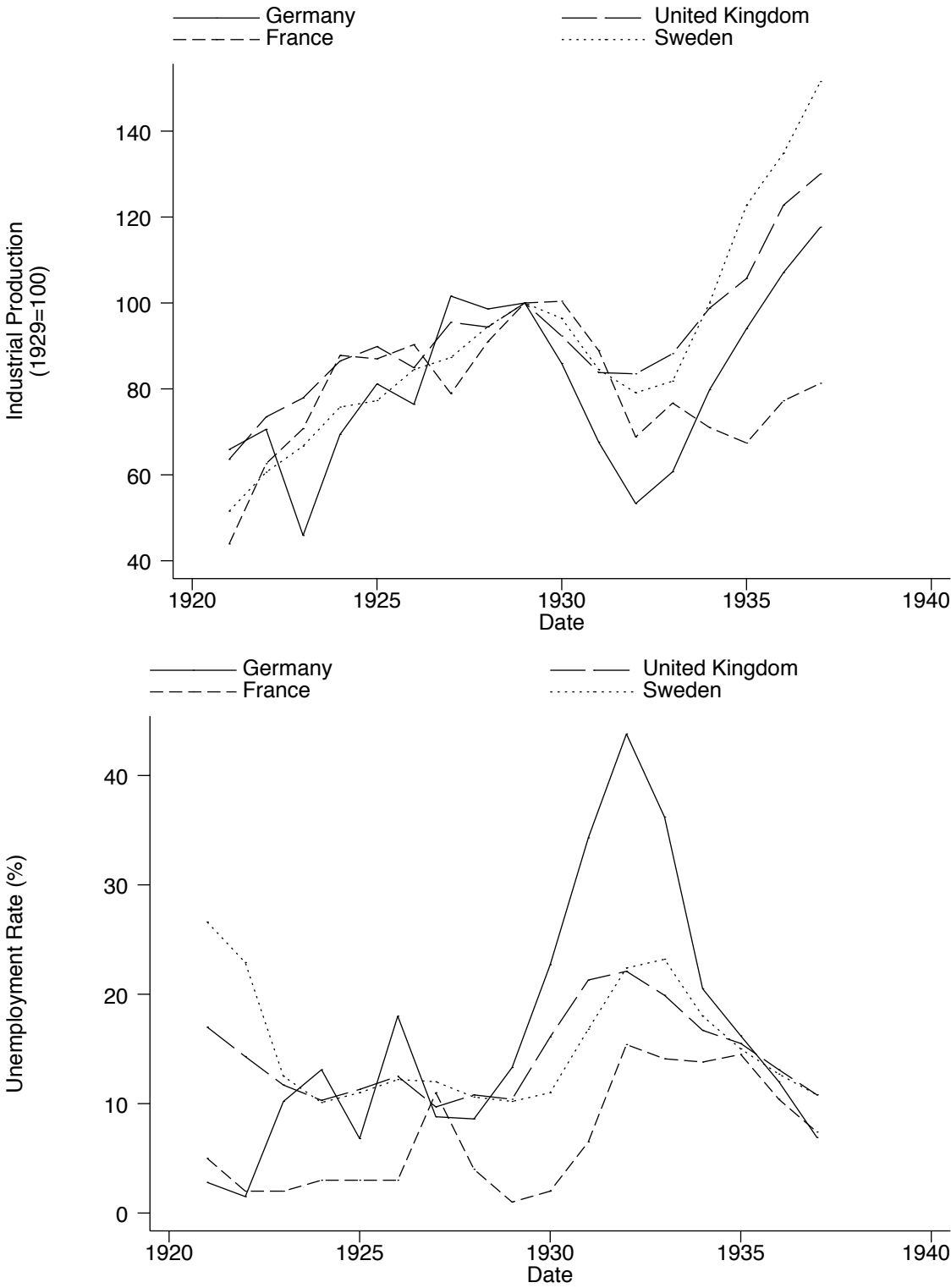


Figure 2: Average Deposits by Bank Types

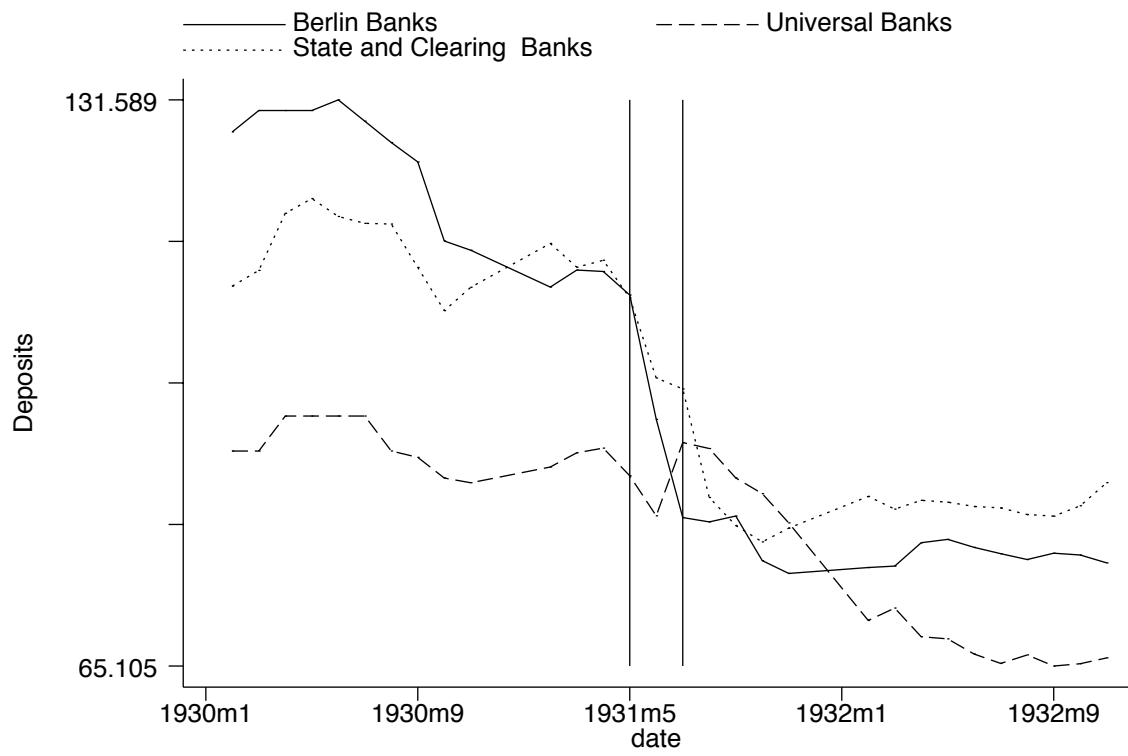


Table 1: Summary Statistics by Bank Type

Variable	Bank Type			
	Universal	State-Owned	Clearing Banks	Mortgage Banks
Number of Banks	140	20	25	2
1st Order Liquidity	2.79 (2.06)	1.65 (2.37)	7.63 (19.59)	3.67 (1.56)
2nd Order Liquidity	31.95 (13.67)	34.44 (14.18)	41.33 (85.32)	30.98 (6.35)
Securities/Assets	0.05 (0.09)	0.03 (0.03)	3.35 (26.59)	0.04 (0.01)
Foreign Deposit Growth	0.00 (0.37)	0.01 (0.30)	-0.02 (0.23)	-0.01 (0.11)

Table 2: Summary Statistics

Variable	Distress	No Distress
Number of Banks	35	152
1st Order Liquidity	2.30 (1.45)	3.09 (6.17)
2nd Order Liquidity	17.86 (6.72)	33.32 (27.62)
Securities/Assets	0.07 (0.06)	0.41 (8.82)
Foreign Deposit Growth	-0.10 (0.32)	0.003 (0.35)
Variable	Berlin	Outside Berlin
Number of Banks	29	158
1st Order Liquidity	2.25 (2.02)	3.26 (6.66)
2nd Order Liquidity	33.46 (15.00)	32.84 (29.53)
Securities/Assets	1.24 (15.25)	0.26 (7.04)
Foreign Deposit Growth	-0.02 (0.44)	0.004 (0.32)

*Notes:* Number of banks given for beginning of the sample. Average values taken over sample period February 1925–November 1932. Standard deviations listed in parentheses.

Table 3: Percentage of Bank Distress by Type: A Comparison

Bank Type	Observations	Percent Failed	Standard Deviation	$t$ -Statistic
Universal	140	22.86%	42.14%	3.25*
Non-universal	47	6.38%	24.71%	
Branch	51	21.57%	41.54%	-0.25
Non-branch	42	23.81%	43.11%	

Notes:  $t$ -statistics reported for two-sided null hypothesis of equality of percent failed. A \* indicates a rejection of the null hypothesis at the 1% level.

Table 4: Determinants of Bank Distress: Logit Regressions Using Monthly Data on German Banks, 1925-1934

	(1)		(2)		(3)	
	Estimates	Marg Eff	Estimates	Marg Eff	Estimates	Marg Eff
Universal Bank	1.298*** (0.341)	0.018	1.363*** (0.345)	0.016	0.969*** (0.371)	0.006
For. Dep. Growth	-0.573* (0.315)	-0.009	-0.515 (0.360)	0.009	-0.749* (0.386)	0.000
Securities/Assets	-0.683 (1.827)	-0.011	-0.783 (1.870)	-0.007	0.017 (1.667)	0.000
For Reserves/For Dep					-4.782*** (1.058)	0.030
Log Loans					0.681* (0.382)	0.022
Log Distance	-1.412*** (0.237)	-0.024	-1.417*** (0.241)	-0.020	-0.915*** (0.251)	-0.006
Corporate Failures			0.001*** (0.000)	0.000	0.001*** (0.000)	0.005
Stock Index Growth			-3.892 (2.542)	-0.057	-4.009 (2.589)	-0.036
Unemployment Growth			3.052*** (1.165)	0.044	2.900** (1.177)	0.000
Constant	-4.080** (1.592)		-6.128*** (1.683)		-8.443*** (1.909)	
Observations	3025		3025		3022	
Log-likelihood:	-334.52		-322.71		-300.43	
pseudo-R <sup>2</sup> :	0.10		0.14		0.19	

Notes: Standard errors in parentheses, \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

Table 5: Deviation From Mean Deposit Growth by Branching

Bank Type	Observations	Deviation Below Mean Dep. Gr.	Standard Deviation	<i>t</i> -Statistic
<i>Whole Sample</i>				
Branch	2945	27.88%	44.85%	4.74***
Non-branch	2259	22.18%	41.55%	
<i>Before Crisis Sample</i>				
Branch	2767	48.50%	49.99%	4.44***
Non-branch	2019	42.05%	49.38%	
<i>After Crisis Sample</i>				
Branch	2720	76.18%	42.61%	3.90***
Non-branch	1883	71.00%	45.39%	

Notes: *t*-statistics reported for two-sided null hypothesis of equality of percent failed. A \* indicates a rejection of the null hypothesis at the at the 10% level, a \*\* at the 5% level and a \*\*\* at the 1% level.

Table 6: Foreign Deposit Growth by Branching

Date	<i>Universal Banks</i>		<i>Other Banks</i>	
	Non-branch	Branch	Non-branch	Branch
Mar-31	-5%	-1%	9%	-6%
Apr-31	-1%	3%	11%	2%
May-31	-2%	-3%	-1%	-2%
Jun-31	-4%	-9%	-40%	-13%
Jul-31	-4%	-11%	-43%	-16%
Aug-31	-5%	-7%	23%	-6%
Sep-31	-4%	-6%	-1%	2%
Oct-31	-2%	-6%	-13%	-5%
Nov-31	-2%	0%	8%	2%
Mar-32	-3%	-2%	4%	-2%

Table 7: Determinants of Bank Distress: Logit Regressions Using Monthly Data on German Banks, 1925-1934, Including Branching

	(1)		(2)	
	Estimates	Marg Eff	Estimates	Marg Eff
Universal	0.800** (0.369)	0.015	0.841** (0.373)	0.015
Foreign Deposit Growth	-0.827* (0.452)	-0.019	-0.756 (0.494)	-0.016
Securities/Assets	1.810 (1.741)	0.042	1.726 (1.814)	0.037
Log Distance	-1.002*** (0.281)	-0.023	-1.001*** (0.284)	-0.021
Branch	0.728* (0.415)	0.015	0.739* (0.420)	0.014
Corporate Failures			0.001*** (0.000)	0.000
Stock Index Growth			-5.216* (2.859)	-0.111
Unemployment Growth			2.919** (1.245)	0.062
Constant	-3.043* (1.801)		-4.370** (1.894)	
Observations	1968		1968	
Log-likelihood:	-265.44		-259.98	
pseudo-R <sup>2</sup> :	0.07		0.09	

Notes: Standard errors in parentheses, \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.



Table 8: Logit Model Results, Including Regional Dummies

	(1)	(2)	(3)	(4)	(5)
Universal Bank	1.037*** (0.385)	1.032*** (0.391)	2.815*** (0.603)	2.364*** (0.614)	1.035** (0.441)
Log Assets	0.876*** (0.131)	0.899*** (0.133)	2.187*** (0.253)	2.251*** (0.260)	0.934*** (0.131)
For. Dep. Growth	-0.437 (0.326)	-0.426 (0.341)	-0.669* (0.369)	-0.513 (0.349)	-0.565 (0.360)
Securities/Assets	1.768 (1.597)	1.497 (1.582)	1.265 (2.636)	0.653 (2.798)	1.636 (2.120)
Capital/Assets	7.561*** (1.509)	7.767*** (1.532)		4.543*** (1.642)	7.714*** (1.559)
Log Distance	-3.443*** (0.948)	-3.527*** (0.962)	-4.450*** (0.965)	-4.384*** (0.991)	-3.699*** (0.962)
Current Acc./Assets			1.252* (0.667)	1.297* (0.686)	0.042 (0.552)
Log For. Reserves					-3.509*** (1.019)
For. Reserves/For. Dep			-1.195*** (0.152)	-1.083*** (0.155)	
Unemployment growth		2.068* (1.125)	2.399* (1.258)	2.292* (1.252)	2.833** (1.301)
Corp. failure growth		-4.309*** (1.307)	-3.864*** (1.423)	-3.921*** (1.421)	-6.655*** (1.746)
Stock index growth		-5.143* (2.883)	-2.690 (2.844)	-3.048 (2.885)	-4.964* (2.969)
Constant	6.588 (5.773)	6.581 (5.854)	6.361 (5.717)	4.152 (5.902)	8.276 (5.831)
Observations	2005	2005	2042	2002	2002
Log-likelihood:	-272.03	-263.00	-236.53	-232.61	-250.25
pseudo- $R^2$ :	0.20	0.22	0.31	0.31	0.26

Notes: Standard errors in parentheses, \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%.

# A Balance Sheet Variables for German Banks

## Assets

1. Unpaid Capital
2. Cash, foreign currency and interest coupons due

### **Balances at note issuing and clearing banks**

3. Total
4. Of this total, at German note-issuing banks only

### **Checks, bills and non-interest bearing short-term treasury bills**

5. Checks and bills (without items (a), (b), 6-8)  
non-interest bearing short-term treasury bonds and treasury bills issued by the Reich  
and the Länder
  - (a) Total
  - (b) Of these rediscountable at the Reichsbank
6. Own acceptances
7. Own drawings
8. Promissory notes drawn by customers payable to bank's order
9. Total (5, (a), 6-8)

### **Balances at other banks due in less than 3 months**

10. Total
11. Due in less than 7 days

### **Reports and Lombard loans against quoted stock exchange securities**

12. Total
13. Of this, Reports only

### **Advances on shipped or stocked goods**

14. Acceptance credits
  - (a) secured by shipping and warehouse warrants
  - (b) secured by other securities
  - (c) without real security

(d) total (items (a)-(c))

15. Other short-term credits on pledge of defined marketable goods

16. Total ((d) and 15)

### **Own Securities**

17. Loans and interest bearing T bonds of Reich and Lander

18. Other securities pledgeable at the Reichsbank or other central banks

19. Other quoted securities

20. Other securities

21. Own securities total (items 17-20)

22. Participations in issuing syndicates

23. Permanent Participations in other banks

### **Current Account Advances**

24. Total

(a) Credits to banks, savings banks and other credit institutions

(b) of total covered by the stock market tradable securities

25. Covered by other securities

26. Long-term loans against mortgage backing or communal backing

27. Bank buildings

28. Other buildings

29. Other assets

30. Sum of assets (1-3, 9, 10, 12, 16, 21, 22-24, 26-29)

31. Claims as guarantor

## **Liabilities**

1. Share capital

2. Reserves

### **Due to Creditors (Deposits, Current Account Balances)**

3. Credit to customers obtained from other banks

4. due to German banks, savings banks and other German credit institutions
5. Due to other creditors
6. Sum due (items 4 and 5)
7. Total sum due (items 3 and 6)

**Of the total under item 6 are due**

- (a) within 7 days
  - (b) 8 days to 3 months
  - (c) more than 3 months
8. Acceptances

**Long-term Borrowings**

9. Mortgages and local government bonds outstanding
10. Other long-term borrowing
11. Total long-term borrowing (items 9 and 10)
12. Other liabilities
13. Sum of liabilities (items 1, 2, 7, 8, 11, 12)
14. Guarantees given (bills outstanding on which the bank has a liability as drawer)

**Contingent liabilities on indorsement**

15. From bank acceptances passed onto third parties
16. From bills drawn on customers to the order of the bank
17. From other rediscounts
18. Total (items 15-17)
19. Of the total (item 18), due within at most 14 days

**Liabilities on own drawings**

20. Total
21. Of those on behalf of third parties