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The German Twin Crisis of 1931

Schnabel, Isabel*

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*Department of Economics, University of Mannheim, email: isabel@econ.uni-mannheim.de

Universität Mannheim
L 13,15
68131 Mannheim

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Abstract

Using information on banks' balance sheets, we analyze the causal links between the banking and the currency problems in the German financial crisis of 1931. We find that the currency problems were caused by political shocks, while the problems in the banking sector were the result of excessive risk-taking by banks that were "too big to fail". Due to the high levels of foreign debt in the banking system, the run on the currency and the deposit withdrawals reinforced each other in a vicious circle and resulted in a banking panic and the abandonment of the gold standard.

1 Introduction

The twin crisis of 1931 hit the German economy with an unprecedented fierceness, at a time when the country was facing a deep recession with more than 4 million people being unemployed and increasing political tensions, both within the country and in the international sphere. German banks experienced several weeks of heavy deposit withdrawals, seriously impairing their liquidity positions. At the same time, the Reichsbank suffered from huge reserve losses due to a run on the German currency. The crisis culminated in the breakdown of Danatbank, the second largest German bank, and a subsequent general banking panic, which was only stopped through the declaration of a bank holiday. Little later, the Reichsbank also suspended the free convertibility of the Reichsmark into gold and set an end to the gold standard in Germany. For several weeks, the payments system operated on a restricted scale. The largest banks were reconstructed, helped by public capital injections. Negotiations with foreign creditors resulted in a moratorium on part of the international debt. The crisis gave rise to the creation of a national banking supervision and to a new banking law that turned the banking sector into one of the most regulated sectors in the German economy. Capital flows remained restricted for years, and the full convertibility of the currency was not reached until long after the war.

The simultaneous occurrence of disturbances in the banking sector and currency turmoil is one striking feature of the German crisis. This phenomenon has been named "twin crisis" when it gained some prominence in connection with the Scandinavian and Asian crises. The reasons for the lively interest in twin crises are their particular severity and their high incidence in recent years, as has been pointed out by Kaminsky and Reinhart (1999) and Bordo et al. (2001). The latter authors show that there was only one period in the last 120 years with an even higher incidence of twin crises, namely the interwar years, with the German

crisis of 1931 being one of the most prominent examples from that period. This paper makes an attempt to reinterpret the German crisis on the basis of the theoretical work on twin crises, which has grown explosively over the past few years.

Due to its two different origins, the theoretical literature on twin crises is quite complex: One strand is based on the literature on currency crises and tries to integrate a banking sector into these macroeconomic models, while the other strand starts from microeconomic models on bank runs, placing them into an open-economy context. This whole literature has been subsumed under the name "third-generation models", as a continuation of the well-known first- and second-generation models of currency crises.

Broadly, the literature contains four explanations for the observed interdependence of banking and currency crises, which are complementary rather than mutually exclusive: a conflict of goals at the central bank, the coincidence of capital flows, balance sheet effects, and common third factors. A central bank that wants to stabilize the exchange rate and at the same time act as a lender of last resort to the banking system faces a *conflict of goals*: While the defence of a fixed peg in case of a speculative attack requires a tight monetary policy and higher interest rates, which is harmful for banks, the rescue of troubled banks requires the provision of liquidity and lower interest rates, which is not consistent with maintaining the fixed peg.[1] Typically, these models predict that the central bank has to choose between the rescue of the banking system and the maintenance of the fixed peg if both the banking system and the currency are under pressure. Hence, the central bank should always be able to maintain either the banking system or the currency. However, if deposits are denominated in foreign currency, the scope for lender-of-last-resort activities is limited, such that the rescue of banks is not always feasible.[2] In other models, banking and currency crises are linked through a *coincidence of capital flows*: While a banking crisis implies an outflow of funds from the banking system, a currency crisis entails the conversion of domestic into foreign currency, often in connection with capital outflows from the domestic country. These two types of capital movements can be intertwined: A run on the currency can translate into a run on banks if agents withdraw their deposits from banks to convert them into foreign currency. Similarly, a run on banks translates into a run on the currency, if depositors decide to reinvest their funds abroad.[3] Alternatively, a devaluation can directly impair the condition of banks through *balance sheet effects*: If banks have net foreign currency liabilities, a devaluation erodes bank capital directly through the revaluation of assets and liabilities and through rising interest payments on foreign currency debt (in terms of domestic currency). In addition, banks are affected indirectly through an increase in the default rates of non-financial firms with net foreign currency liabilities.[4] These models have important implications for the timing of crises as the currency crises should precede the banking crises. Finally, the coincidence

[1] Velasco (1987), Chang and Velasco (2000).
[2] Dooley (2000), Flood and Marion (2001).
[3] Miller (1996), Goldfajn and Valdés (1997).
[4] There is a large new literature that integrates these balance sheet effects. Examples are Krugman (1999), Buch and Heinrich (1999), Burnside et al. (2000), Schneider and Tornell (2000), and Aghion et al. (2001).

of banking and currency problems might be explained by *common third factors*: This could be a real asset shock as in Allen and Gale (2000a) where crises are modeled as risk-sharing devices. Another "third factor" could be financial liberalization, paired with some type of explicit or implicit government guarantee and poorly regulated banking systems, which lead to excessive capital inflows. In fact, moral-hazard arguments have figured prominently in the recent literature on twin crises.[5]

The most well-known empirical paper on twin crises is the influential paper by Kaminsky and Reinhart (1999). The authors establish a number of stylized facts about twin crises by analyzing the timing of banking and currency crises and their relationship to the movement of different macroeconomic variables. Their main results are that banking and currency crises became more closely linked after financial liberalization in the 1980s, and that banking crises typically preceded currency crises.[6] This is somewhat at odds with the models stressing balance sheet effects, whereas it lends some support to the moral-hazard type explanations mentioned above. In addition, the authors point out that causality runs in both directions and that there is evidence of a vicious spiral between the two phenomena. However, it is very difficult to establish causal patterns, as already the timing of crises poses severe difficulties and as the inference of causalities from correlations is always problematic. Moreover, it is not clear whether an econometric cross-country analysis, which presupposes certain regularities of different crises, does justice to a phenomenon as diverse as twin crises.

In this study we focus on one particular crisis, namely the German crisis of 1931. While there exists an abundant literature on the German crisis, most of it appeared well before the emergence of the theoretical literature on twin crises.[7] Therefore, it is not surprising that the existing studies stress other facets of the crisis. In particular, most of the literature has paid little attention to the "twin" aspect of the crisis. The older literature refers to the crisis as a banking crisis and focuses on problems in the banking sector, like faulty credit policies and insufficient liquidity provision, in explaining the 1931 crisis.[8] The introduction of exchange controls is treated as a consequence of the banking crisis. In fact, this was also the view of contemporary observers.[9] In an illuminating analysis, Hardach (1976) challenged the traditional view by shifting the focus towards the currency crisis. He claims that the banking crisis was mostly caused by the currency crisis while the currency problems were not related to the banking problems, but to political issues. Most of the work that has appeared ever since, shares Hardach's interpretation.[10] The only study analyzing the relationship between the banking crisis and the currency crisis in a systematic way is Balderston (1994)

[5] The moral-hazard argument was introduced into the discussion by Diaz-Alejandro (1985). The argument became a popular explanation for the Asian crisis, see for example Krugman (1998), Corsetti et al. (1999), Bordo et al. (2001), and Dooley (2000). In fact, many of the above-mentioned models also contain some kind of government insurance.

[6] Similar results have been found by Glick and Hutchison (1999).

[7] The classic reference is Born (1967), which contains a thorough account of the crisis. Other important references are Hardach (1976), James (1984, 1985, 1986), Kindleberger (1986), Temin (1989), Balderston (1991, 1993, 1994), Borchardt (1991), and Eichengreen (1992). Recent contributions include Petri (1998) and Ferguson and Temin (2001).

[8] Born (1967) called his famous narrative about the crisis "The German Banking Crisis of 1931". Similarly, Priester (1932), Lüke (1958), and James (1984, 1985, 1986) typically refer to the crisis as a banking crisis.

[9] See, for example, Enquête-Ausschuß (1933).

[10] A notable exception is the work by James (1984, 1985, 1986).

who concludes – similar to Hardach (1976) – "that the crisis was primarily an exchange rate and foreign liability crisis, which would have occurred, because of the reparations and fiscal crises, even if the banks had acted with exemplary caution in the 1920s" (p. 64). This is also the bottom line of a recent paper by Ferguson and Temin (2001).[11] The disregard of the currency problems surely was a major shortcoming of the early literature on the German crisis, but it seems that the literature has gone to the opposite extreme. Banks are now characterized as innocent victims of a macroeconomic shock, which stands in such a stark contrast to the early literature that these conclusions are suspect.

Our findings suggest that neither of the unidirectional views outlined above can explain the German crisis of 1931 in a satisfactory way. We find that the origins of the banking and currency problems were largely independent. The currency turmoils were caused by political shocks, which shattered investors' confidence in Germany's ability and willingness to service its foreign debt and into its commitment to the gold standard. The problems in the banking sector were caused by some banks' excessively risky business policies, which can be explained by an implicit guarantee to banks that were "too big to fail", namely the great branch banks. Through the attraction of high levels of short-term foreign debt, the fates of these banks and of the gold standard were tied together. The Reichsbank could not credibly commit to the gold standard without at the same time committing to support those banks holding huge amounts of foreign debt. However, the credibility of these commitments hinged on the availability of foreign support in case of a crisis. Political shocks made this support unlikely, rendering the German financial system inherently unstable. Over the course of the crisis, the banking and currency problems became increasingly intertwined, as the run on the currency and the withdrawals at German banks were reinforcing each other. The vicious circle was fed by the Reichsbank's generous liquidity support to basically insolvent banks, which contributed to the exhaustion of the Reichsbank's reserves. In July 1931, the Reichsbank had no choice but to abandon both the banking system and the currency in the absence of international support. Still, the Reichsbank has to be blamed for laying the foundations to the German crisis by allowing – or even promoting – the build-up of high levels of short-term foreign debt in the banking sector.

In summary, our findings are supportive of the strand of the recent literature that stresses the importance of moral hazard in the explanation of twin crises. However, we will also see that the conflict of goals of the central bank and the coincidence of capital flows played an important role, while balance sheet effects were not prominent in the German crisis. In addition, our results stress the mutual reinforcement of currency and banking problems, which result in a vicious circle similar to the one described by Kaminsky and Reinhart (1999). It is this reinforcement which seems to be responsible for the particular severity of twin crises.

The paper proceeds as follows: In section 2, we describe the data underlying our analysis as well as the employed methodology. Section 3 contains a short description of the German banking sector, paying

[11] Our paper is complementary to theirs in that it puts more emphasis on the analysis of economic factors, while Ferguson and Temin stress the fiscal and political sides of the problem.

particular attention to the changes taking place in the 1920s and to the special role played by the great branch banks. In section 4, we analyze the episodes of currency turmoil and banking problems that preceded the actual crisis, while section 5 is devoted to the analysis of the twin crisis itself. Section 6 concludes.

2 Data and methodology

The most important data sources used in this study are the balance sheets of German banks before and during the crisis of 1931.[12] The balances were published monthly – with the exception of December and January – according to a balance sheet scheme prescribed by the Reichsbank. The high frequency of balance sheets permits a detailed analysis of deposit flows at the times of crisis. Monthly reporting banks included approximately 100 credit banks and all of the publicly owned *Staatsbanken*, *Landesbanken*, and *Girozentralen*. The data covers almost one half of the German banking system with respect to total assets (table 1).

Bank group	Number of banks	Total assets Million Reichsmark	% of all banks
Monthly reporting banks	135	26,606	44.2%
1. Credit Banks	96	18,114	30.1%
(a) Berlin great banks	6	13,765	22.9%
– Deutsche Bank & Disconto-Gesellschaft		5,534	9.2%
– Danatbank		2,622	4.4%
– Dresdner Bank		2,513	4.2%
– Commerz- und Privat-Bank		1,877	3.1%
– Berliner Handels-Gesellschaft		503	0.8%
– Reichs-Kredit-Gesellschaft		717	1.2%
(b) Other credit banks	90	4,349	7.2%
2. Staatsbanken, Landesbanken, Girozentralen	39	8,492	14.1%
Other selected bank groups			
Savings banks	2,609	12,149	20.2%
Mortgage banks	39	5,823	9.7%
Cooperative banks, Zentralkassen	20,305	6,098	10.1%
Private bankers	1,100	3,556*	5.6%*

Table 1: Total assets at monthly reporting banks and other selected bank groups, December 1929. Sources: Deutsche Bundesbank (1976), Enquête-Ausschuß (1933). Notes: *December 1930.

They do not include savings banks, mortgage banks, and cooperative banks, as well as smaller credit banks. The data is supplemented by monthly figures on the aggregate evolution of deposits at savings banks and by annual data on all major bank groups. However, as the focus will be on the interaction of banking and currency problems, most of the paper concentrates on the credit banks who were holding most of the banking sector's foreign debt.[13] Other aspects of the German crisis, such as the particular problems of public banks, will be mentioned only incidentally. The balance sheet data has hardly been used in the literature. In particular, the literature has completely neglected the individual balance sheet information on banks

[12] The data sources are described in detail in the appendix.
[13] Information on the other bank group with high foreign debt, the private bankers, is very fragmentary.

other than the Berlin great banks.[14] So far, most studies on the German crisis have either concentrated on the Berlin great banks or have treated the banking sector by and large as a monolithic block, which is inappropriate as the analysis will show. In addition, the individual data allows us to correct the data on different bank groups for changes in composition, which is crucial in the analysis of balance sheets over time.

Another obstacle in the analysis of the German crisis has been the lack of data on banks' foreign debt, which cannot be extracted from the monthly balance sheets. However, monthly reporting banks had to report their levels of foreign debt confidentially to the Reichsbank on a quarterly basis. We have collected this data from the Reichsbank's archive. The data proves to be crucial for the understanding of the nature of the German crisis, since the interpretation of deposit withdrawals hinges on the distinction between domestic and foreign debt. In the existing literature, it has been common to use medium-term deposits, which can be read from banks' balance sheets, as a proxy for foreign debt.[15] However, this is only a very crude measure of foreign debt.

The analysis of the twin crisis is complicated by the simultaneity of events. Therefore the central question is how to determine the direction of causality between the currency and banking problems if these two occur at the same time. This problem is tackled from two directions: first, by comparing the currency and banking problems in the years before the 1931 crisis with the turbulences during the crisis itself, and second, by exploiting the heterogeneity of different banks and bank groups. The analysis of the early crises will help us to identify the causes of the 1931 crisis because they can more easily be identified as either banking or currency events. Therefore, we can establish certain patterns of deposit and reserve changes, which can then be compared to the patterns observed in the crisis itself. The heterogeneity of different banks and bank groups is exploited to separate macroeconomic shocks from idiosyncratic developments. This is important for assessing whether the crisis was purely macroeconomic in scope, sweeping over the country and causing the failure of otherwise solvent banks, or whether part of the blame has to be attributed to the banks themselves. We will see that the balance sheets of the great branch banks evolved differently from those of other bank groups, such as the great non-branch banks and the large provincial branch banks. These differences cannot be explained by macroeconomic shocks, which should have hit all banks more or less in the same way.

3 The German banking sector

3.1 Structure of the German banking sector

The German banking sector was dominated by the great banks in Berlin, which accounted for more than 20 percent of the banking sector's total balance sheet in the 1920s (table 1).[16] Another important group were the public banks, namely the savings banks as well as the *Staatsbanken, Landesbanken,* and *Girozentralen*,

[14] One notable exception is Petri (1998). Balderston (1993, 1994) also makes extensive use of the monthly balance sheet data, but he neglects the individual data on banks other than the great banks.

[15] Examples are Balderston (1994) and Petri (1998).

[16] See Guinnane (2002) for an interesting account of the evolution of different bank groups in Germany until 1914.

which together held more than one third of the banking sector's total assets. The mortgage and cooperative banks each had market shares of around 10 percent, the private bankers of 6 percent. The rest consisted mainly of provincial and other credit banks.

The Berlin great banks were universal banks: Besides the "traditional" banking activities, such as taking in deposits and extending loans, they were participating in investment banking activities and in the international finance business. While *Deutsche Bank und Disconto-Gesellschaft* (hereafter Deutsche Bank), *Darmstädter und Nationalbank* (Danatbank), *Dresdner Bank*, and *Commerz- und Privat-Bank* (Commerzbank) maintained widespread networks of branch offices, *Berliner Handels-Gesellschaft* (BHG) and the publicly owned *Reichs-Kredit-Gesellschaft* (RKG) did not maintain branch offices. The great branch and non-branch banks also differed substantially in their deposit and loan structures: While the clientele of the branch banks was mixed due to their presence in both large towns and rural areas, the great non-branch banks worked mostly with a relatively small number of wealthy and rather homogeneous clients on both the asset and the liability sides of their balance sheets. Thus, average deposits and average loans were much higher at the non-branch than at the branch banks.[17] The loan portfolios of the great branch banks were dominated by industry loans, while the great non-branch banks also conducted a considerable part of their loan business with other banks. This was because provincial and other credit banks often preferred to conduct business with banks not standing in direct competition with them. The balance sheet structure of the large provincial banks, who often maintained regional branch networks, was similar to the structure of the great branch banks, while the structure of large private bankers resembled the one of the great non-branch banks. In fact, some of the large provincial banks, such as Bayerische Hypotheken- und Wechselbank, Bayerische Vereinsbank, Barmer Bankverein, and Allgemeine Deutsche Credit-Anstalt (ADCA) and possibly also some large private bankers had total assets comparable in size to the ones of the great Berlin banks. Therefore it is not justifiable by economic significance to neglect these banks in an analysis of the banking crisis of 1931.[18]

The portfolios of small private bankers, cooperative banks, and savings banks were completely different: These banks were small and locally orientated and their average deposits and loans were small. The "little saver" was rather to be found at these banks than at the larger banks, even though the competition for these customers increased in the 1920s. The savings banks had their own central institutes, the *Girozentralen*, which managed the savings banks' mandatory liquidity reserves, served as central clearing organizations, and helped in the provision and investment of funds. *Staatsbanken* and *Landesbanken* belonged directly to the German states. Since their activities were similar to the ones of the *Girozentralen*, we will subsume the three bank groups under one group called *SLGs*. The clientele of the SLGs consisted mainly of public non-banks and public or private banks. Only at the public banks, the business with public entities played a significant role.

[17] Enquête-Ausschuß (1930).

[18] In the following analysis, these four banks will be subsumed under the name "4 large provincial banks".

3.2 Major changes in the 1920s

After the dramatic shrinkage of the banking system during the First World War and the following hyperinflation, the second half of the 1920s saw a rapid expansion of the banking sector: Total assets increased by a factor of 5 between 1924 and 1930. This expansion had three noteworthy characteristics: First, it took place in an environment of intensifying competition, second, it was to a large extent financed by foreigners, and third, it was accompanied by increased risk-taking by banks, particularly the great branch banks. We will describe each of these factors in turn before showing the links between them in the next section.

Competition The intensification of competition in the banking sector was a consequence of the First World War and the following hyperinflation: By 1925, the total balance sheet of all banks had shrunk to one fourth of the 1913 level (in real terms). Not all banks groups had been hit equally strong: Assets at mortgage and savings banks had fallen by more than 90 percent, resulting in sharply reduced market shares.[19] In contrast, the Berlin great banks' market share had more than doubled, as assets had been reduced by "only" 50 percent. This was, however, mainly due to their numerous acquisitions of smaller banks.[20] The market share of the SLGs also increased strongly because of the large number of new foundations. In the same period, the banking sector experienced an enormous physical expansion as the number of branches multiplied. Thus, the banking system had built-up excess capacities that were out of all proportion to the shrunken business volumes.[21] As the competition through interest rates was limited due to existing cartel agreements, the regional expansion played an important role in the attraction of new customers. In particular, the great branch banks tried to expand into provincial areas, which until then had been dominated by the savings banks, cooperative banks, and small provincial banks. At the same time, the savings banks entered new fields of business that formerly had been reserved to credit banks. This was made possible by the loosening of the regulatory restrictions on the savings banks, which enabled them to compete with the universal banks.[22] Finally, there also was increasing competition through foreign banks who extended direct loans to German firms, forgoing the intermediation of German banks.[23]

At the same time, concentration increased, especially because of the acquisition activities of the great branch banks: Between 1914 and 1928, these banks swallowed 210 smaller banks.[24] Thereby, the market share of the great banks as measured by total assets increased from 12.6% to 23.3% between 1913 and 1928. The concentration movement culminated in the merger of *Deutsche Bank* and *Disconto-Gesellschaft* in 1929. The merged bank had a market share of 9.2%, more than twice the size of the second largest bank *Danatbank* (table 1).

[19] However, both bank groups were able to recoup part of their former market shares over the second half of the 1920s.
[20] Enquête-Ausschuß (1930, p. 8).
[21] Hardach (1995, pp. 925).
[22] Born (1967, pp. 24), Guinnane (2002, p. 117).
[23] Balderston (1991, pp. 570).
[24] Enquête-Ausschuß (1930, p. 10).

The intensification of competition was a major determinant of banks' behavior in the 1920s. On the one hand, the battle for scarce deposits prompted the credit banks to raise part of their funds abroad; on the other hand, the erosion of rents in banking induced a general increase in risk-taking. Both points will be described in the following.

Foreign debt The most striking feature of the evolution of banks in the 1920s was the explosion of short-term foreign debt, which increased by a factor of 7.4 between 1925 and 1929. In 1929, 18% of all deposits in the banking sector were foreign.[25] Long-term foreign debt played only a minor role in the banking sector: At monthly reporting banks, long-term debt accounted for only 8.3% of total foreign debt at the end of 1928.[26] Long-term borrowing from abroad had been obstructed by a number of badly designed political measures, such as the installation of the "Beratungsstelle für Auslandskredite" in 1924 and the abolishment of tax exemptions for bonds issued abroad in 1926.[27] Instead of reducing foreign debt in general as intended, these measures led to a shift towards short-term debt and thus increased Germany's vulnerability to short-term capital reversals.[28] As long-term foreign debt underwent virtually no change in the years preceding the crisis, the following analysis will focus on short-term debt.

Foreign debt was anything but equally distributed across banks: At the end of 1929, 80% of foreign deposits were held by monthly reporting banks and another 17% by private bankers. The remaining banks' foreign debt was negligible. The great Berlin banks alone accounted for 73% of total foreign deposits, which amounted to 42% of their total deposits (table 2). For other reporting credit banks, the latter ratio was somewhat smaller (27%), but showed a strong dispersion, while foreign debt at the SLGs was close to zero. Hence, the expansion of foreign bank debt can entirely be attributed to two bank groups, credit banks and private bankers. Looking at the great banks separately, we find that the great banks without branches held much higher shares of foreign deposits than the other great banks. In absolute terms, however, these banks' foreign debt was relatively small compared to the branch banks.

Besides foreign debt, German banks also held considerable foreign claims, which amounted to 42% of foreign liabilities in 1928.[29] A large proportion of foreign debt was denominated in foreign currency. In addition, German banks held large foreign currency claims towards domestic debtors as it had become common practice to re-lend foreign currency debt in foreign currency in order to limit currency risk. Hence, there probably was no currency mismatch in most banks' balance sheets.[30]

[25] James (1986, pp. 298) has argued that part of the "foreign" deposits was German capital that was exported for tax evasion purposes and then re-lent. Unfortunately, a breakdown into true foreign deposits and re-imported German capital is unfeasible.
[26] Reichsbank (R2501/6634).
[27] Hardach (1976, pp. 57, 70), Enquête-Ausschuß (1929, pp. 81).
[28] Enquête-Ausschuß (1929, p. 113), Hardach (1976, pp. 60).
[29] Enquête-Ausschuß (1930, p. 81).
[30] Enquête-Ausschuß (1930, p. 147). This does not mean, however, that banks did not bear any currency risk, since currency risk often reappears as default risk in case of devaluation. In order to reduce this default risk, banks preferably chose domestic debtors whose earnings were at least partly in foreign currency (Enquête-Ausschuß 1930, pp. 96, p. 147).

Bank	Million Reichsmark	% of total deposits
All banks*	7,397	18
1. Monthly reporting banks*	6,057	29
(a) Great banks**	5,376	42
> Deutsche Bank	1,878	38
> Danatbank	1,150	45
> Dresdner Bank	1,087	44
> Commerzbank	618	38
> RKG	323	51
> BHG	320	69
(b) Other reporting credit banks**	758	27
> 4 large provincial banks	358	27
(c) SLGs**	96	2
2. Private bankers*	1,250	58
3. Other banks*	90	1

Table 2: Foreign deposits at different bank groups. Notes: *December 1929. **June 1930. Sources: Reichsbank, Deutsche Bundesbank (1976).

Risk-taking The third remarkable factor was the increase in banks' risk-taking. In general, risk-taking can take two different forms: The first concerns the degree of maturity transformation and, thus, the risk of illiquidity, the second concerns the riskiness of the banks' assets and the levels of equity, and therefore the risk of insolvency. We will see that the banks who suffered most in the 1931 crisis, the great branch banks, also were the ones who were most vulnerable before the crisis with respect to both risk aspects.

After stabilization, first order liquidity[31] had been very high compared to the prewar period. Over the second half of the 1920s, liquidity ratios dropped substantially at all bank groups, but were still not much lower than they had been in the prewar period. However, these numbers conceal the underlying deterioration of banks' liquidity positions. First, the banks who had acquired high shares of "hot (foreign) money" were vulnerable to sudden reversals of international capital flows. Second, many banks – especially the credit banks – relied heavily on bills of exchange for their liquidity (figure 1).

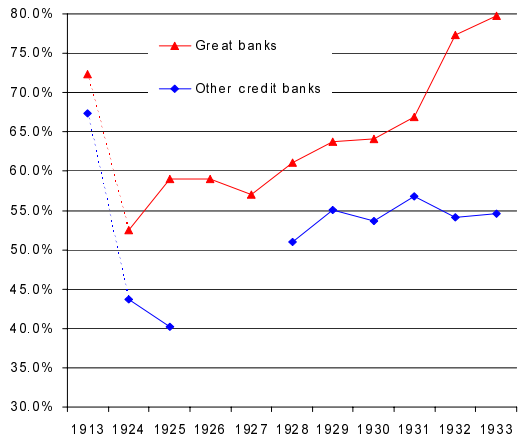


Figure 1: Bills of exchange as shares of liquid means. Source: Deutsche Bundesbank (1976).

[31] First order liquidity is defined as $\frac{\text{Cash + Deposits at other banks + Bills of exchange}}{\text{Short-term deposits } (\leq 3 \text{ months}) \text{ + Acceptance liabilities}}$.

As has been forcefully argued by Borchardt (1976) and Tilly (1986), one of the reasons for the extraordinary success of universal banking in Germany had been the "virtually unlimited access to the Reichsbank's discounting facilities"[32], which induced German banks to finance illiquid long-term projects that otherwise would have been considered too risky. Since the Reichsbank had discounted all bills satisfying certain quality criteria without any quantitative restrictions before the war, bills of exchange could be considered close substitutes to cash with respect to their liquidity.[33] However, the banks received a serious blow in the turbulent year of 1924, when the Reichsbank's implicit liquidity guarantee clashed with its goal of stabilizing the currency for the first time. The Reichsbank declared a "Kreditstopp", meaning the discount loans were frozen at their current level. Hence, bills could no longer be considered substitutes for cash, which shows up in the smaller reliance on bills in 1924 compared to the prewar period (figure 1). However, there existed a number of exceptions favoring banks who participated in the financing of agriculture, export industries, and large industrial firms.[34] Presumably, among those there were many large banks. In addition, the Reichsbank explicitly privileged the great branch banks by relaxing their quotas early on.[35] This might explain why the great banks reacted less strongly to the regime switch than the other credit banks (figure 1): They expected to be spared from discount restrictions in the future due to their economic significance.[36] Over the second half of the 1920s, bills increased as a share of liquid means for all credit banks. This means that banks' liquidity positions deteriorated even more than indicated by first-order liquidity.

Remarkably, the share of bills in liquid means at the great banks was well above the respective share at other credit banks. Table 3 shows that this was driven by the high shares of the great branch banks, where bills accounted for almost two thirds of total liquidity reserves in 1929. The highest share could be found at Deutsche Bank (72.7%). In contrast, the great non-branch banks and the largest provincial branch banks held much smaller shares of their liquidity in bills. The great branch banks also had particularly low levels of cash liquidity[37] (table 3).

	First-order liquidity	Cash liquidity*	$\frac{\text{Bills}}{\text{Liquid means}}$
Monthly reporting banks	43.3%	17.8%	56.7%
1a. Great branch banks	36.4%	12.3%	66.1%
1b.Great non-branch banks	38.6%	17.8%	53.0%
2. Other credit banks**	51.8%	16.5%	64.7%
– 4 large provincial branch banks	34.2%	15.9%	53.3%
3. SLGs	36.2%	22.3%	40.9%

Table 3: Composition of liquidity at selected bank groups, November 1929. Source: Deutscher Reichs- und Preußischer Staatsanzeiger. Notes: Numbers show arithmetic averages of individual ratios. *See footnote in the text for the definition of cash liquidity. **Numbers refer to a sub-sample of 63 banks for whom complete series are available between 1929 and 1931 to make the numbers comparable across time in the following analysis.

[32] Tilly (1986, p. 144).
[33] Hardach (1995, p. 917).
[34] Reichsbank (R2501/6462, pp. 26).
[35] Reichsbank (R2501/6462, p. 31).
[36] In fact, the great branch banks frequently declared that the liquidity of banks was the sole responsibility of the Reichsbank because of the social costs of large bank failures (Enquête-Ausschuß 1933, part 1, volume 1, p. 485, Feldman 1994, p. 319).
[37] Cash liquidity is defined as $\frac{\text{Cash + Deposits at other banks}}{\text{Short-term deposits } (\leq 3 \text{ months}) \text{ + Acceptance liabilities}}$.

Given their high levels of foreign debt and their low cash liquidity, the great branch banks could quickly find themselves in a precarious situation if the Reichsbank refused to provide liquidity through the discount window.

The deterioration of the banks' liquidity positions was accompanied by a steady decline in equity ratios (figure 2). The decline was most pronounced at the great banks where the equity ratio decreased from 19.5% in 1913 to 6.7% in 1929. In addition, equity ratios at the great banks were on average much smaller than at the other credit banks. While a lower equity ratio might itself be an indication of higher risk-taking, it also implies stronger incentives for taking risks.

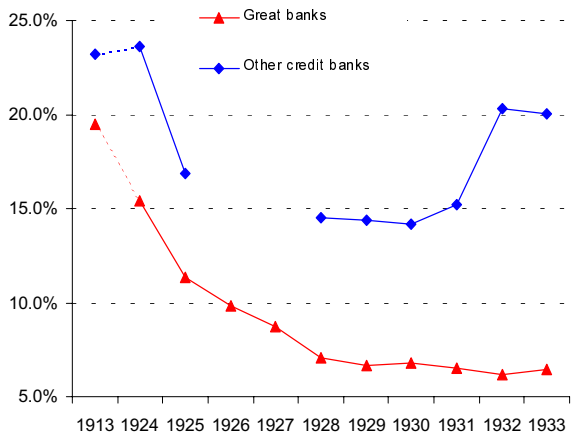


Figure 2: Evolution of equity ratios. Source: Deutsche Bundesbank (1976).

Again we find that the lower equity ratios of the great banks are driven by the great branch banks (table 4). In November 1929, Danatbank had the lowest (4.8%) and Dresdner Bank the third lowest (5.7%) equity ratio of all credit banks, while the equity ratio at Barmer Bank-Verein was as high as 12 %. The smaller credit banks had even higher equity ratios. Table 4 also shows that the decline of equity ratios was more pronounced at the great branch banks than at the great non-branch banks and the large provincial branch banks.

Equity ratios	March 1928	November 1929
All monthly reporting banks	15.6%	16.0%
Great branch banks	8.6%	6.2%
Great non-branch banks	10.6%*	9.2%**
4 large provincial branch banks	10.9%	9.3%

Table 4: Equity ratios at selected bank groups. Source: Deutscher Reichs- und Preußischer Staatsanzeiger. Notes: Numbers show arithmetic averages of individual ratios. *Only RKG. **RKG: 9.0%.

Finally, there is some additional anecdotal evidence that risk-taking increased in the 1920s, and particularly so at the great branch banks. One striking feature was the common practice to extend loans large

enough to lead a bank into distress in case of default. The most famous example is the 48 million Reichsmark loan of Danatbank to Nordwolle, which corresponded to 40 percent of Danatbank's equity. In addition, it seems that the great branch banks' monitoring was particularly poor. Deutsche Bank, for example, was involved in a series of financial scandals in the middle of the 1920s, which started a public discussion on whether Deutsche Bank was paying enough attention to monitoring its debtors.[38] Similarly, the chairman of Danatbank, Jacob Goldschmidt, had "gained a measure of negative notoriety" after the spectacular collapse of the Stinnes empire in 1925.[39] In contrast, the two non-branch great banks were known for their prudential loan policies. At RKG, for example, loans were not extended beyond a certain maximum amount and every loan had to be approved by the directors' board.[40] Similarly, the two chairmen of BHG, Carl Fürstenberg and Otto Jeidels, were known to be conservative and prudent in their loan policies. One illuminating example is the refusal of BHG to give further loans to Nordwolle, which eventually led to the switching of Nordwolle to Danatbank, where it received abundant loans.

It, hence, seems that the great branch banks were particularly vulnerable with respect to their liquidity and their solvency positions even before the crisis had started. One might argue that there was no need for the great branch banks to have the same liquidity and capital buffers as the other banks, because they were more diversified on both the asset and the liabilities sides due to their branching networks. While it is true that branching protected these banks from local asset or liquidity shocks, a branching network was of little help against an economy-wide crisis or against sudden withdrawals of foreign debt. The severity of the crisis to come could hardly have been expected, but capital reversals had happened in 1924 and 1927, and were not unlikely to happen again. Therefore, a cautious banker would have made provisions against this eventuality by holding higher levels of liquidity.[41] In fact, the large provincial banks, who also maintained branch networks, had high equity ratios and were relatively liquid, given their much smaller shares of foreign debt.

3.3 Too big to fail?

The observed increase in banks' risk-taking has often been ascribed to the intensification of competition in the banking sector.[42] This argument is certainly valid with respect to the general increase in risk-taking, but it cannot explain why the great branch banks exhibited a particularly risky behavior compared to other bank groups such as the great non-branch banks and the large provincial branch banks. We therefore propose an alternative – and complementary – explanation, namely that the great branch banks were subject to a moral hazard problem due to their enormous size. The great branch banks might have been expected to

[38] Feldman (1995, pp. 231, pp. 271).
[39] Feldman (1994, p. 317).
[40] Wirtschaftskurve (1931).
[41] The bankers seem to have been well aware of the dangers of short-term foreign debt (Stucken 1968, p. 395, Feldman 1994, p. 318).
[42] Born (1967, pp. 24), Lüke (1958, pp. 227), Balderston (1991, pp. 570).

be saved by the Reichsbank or the government in case of a crisis because the breakdown of one great bank could threaten the stability of the whole banking system. Such a "too big to fail" doctrine would, of course, lead to incentive problems showing up in excessive risk-taking at these banks.[43]

With respect to liquidity, the moral-hazard problem arose directly from the implicit liquidity guarantee of the Reichsbank. In fact, the issue of moral hazard had already been the object of much discussion before the war, when the generous liquidity provision of the Reichsbank had induced the German banks to sharply reduce their liquidity reserves.[44] The "Kreditstopp" of 1924 presumably mitigated the moral-hazard problem for credit banks other than the great banks, but not at the great banks who had received preferential treatment during the discount restrictions. With respect to solvency, it is less obvious that the great banks were protected by an implicit guarantee as there was no precedent of the failure of one of the great banks. However, the great banks had become ever more influential, especially after the enforcement of a "corporatistic model" of banking regulation by the banking commission ("Enquête-Ausschuß") in 1908, which provided for a close cooperation between the great banks and the Reichsbank in regulatory questions.[45] Their influence was still increased by the concentration movement and the ensuing growth in the great banks' market shares. Therefore, a bail-out of the great banks could easily be justified by their "economic significance".[46] Hence, it was extremely unlikely that Reichsbank and Reich would allow the failure of one of the great banks.

We would like to stress one special aspect in which the great branch banks were too big to fail, namely their high levels of foreign debt, particularly in comparison with the Reichsbank's reserves. Foreign deposits at the great branch banks exceeded the Reichsbank's reserves by 70% at the end of 1929 and were almost seven times as high as "free" reserves (i.e., reserves above the statutory 40% note cover). Thus, the withdrawals of foreign deposits at these banks could easily lead to a demand for gold large enough to exhaust the Reichsbank's reserves.[47] Through the high levels of foreign debt in the banking sector, the stability of the banking system and the maintenance of the gold standard became inextricably linked. Therefore, the central bank had an incentive to prevent withdrawals from banks holding foreign debt if it wanted to protect the stability of the gold standard. This is where the conflict of goals of the central bank comes into play. Any supporting measure towards banks would tend to endanger the gold standard. Furthermore, the Reichsbank's scope for interventions was limited as it could not create foreign currency. Therefore, the credibility of the Reichsbank's implicit guarantee towards the banks hinged on its ability to obtain foreign currency from abroad.[48] International cooperation between central banks in times of crisis had been common in the times

[43] Boyd and Gertler (1994) have documented a similar moral-hazard problem at U.S. commercial banks in the 1980s.

[44] James (1998, pp. 42).

[45] Hardach (1995, pp. 918).

[46] These were exactly the arguments used later to justify the public interventions. See, for example, Enquête-Ausschuß (1933, part 1, volume 1, pp. 394) and the quote by Dietrich, minister of finance, in Hardach (1995, p. 931).

[47] In fact, the withdrawal of foreign deposits from one of the large branch banks *alone* might have sufficed to exhaust the Reichsbank's free reserves.

[48] This is one of the central themes in Eichengreen's (1992) book on the Great Depression.

of the prewar gold standard, and was also present in the second half of the 1920s.[49] Political shocks that cast doubt on such foreign support could, however, easily decrease the credibility of both the gold standard and the implicit guarantee towards the great branch banks.

The intensification of competition probably exacerbated the moral hazard problem. Before the war, high rents in banking might have restrained banks from taking excessive risks because they ran the risk of loosing these rents – the bank's "charter value" in economic parlance – in case of default.[50] The erosion of rents after the war increased the banks' incentives to take higher risks.

There remains one unresolved question with respect to the moral hazard explanation. Why did the great non-branch banks or the large provincial banks not take comparably high risks as the great branch banks? Looking at tables 1 and 2, we find that these banks were not really large compared to the great branch banks. Therefore, these banks could be less sure that they would be "saved" in case of a crisis. In addition, the monitoring of the great non-branch banks by their depositors presumably was much better than at other banks because there were relatively few large depositors.

We can conclude that the evidence is consistent with excessive risk-taking at the great branch banks due to an implicit Reichsbank guarantee and an increasingly competitive environment. We will see later that this behavior was even reinforced during the crisis.

4 Precursors of the 1931 crisis

The macroeconomic climate started to deteriorate in 1927 when the German stock market crashed after the Reichsbank's announcement to restrict lending through the discount window to curb stock market speculation. The "Black Friday" of May 1927 marked the beginning of a long-lasting downturn in the stock market. The shortage of domestic funds promoted a further increase in short-term foreign debt; long-term bonds were unattractive due to the existing double taxation.[51] By the end of 1930, the stock index had fallen by more than 50 percent. In 1928, a rise in American interest rates initiated a drop in lending to Germany, and by 1930, net capital imports had fallen to 10 percent of the 1928 level. The concurrent improvement of the current account could not compensate for the drop in capital imports such that Germany experienced gold outflows from 1930 on. German GDP growth slowed down substantially in 1928 and became negative in 1929, which was the beginning of a deep recession with rapidly increasing unemployment, a dramatically shrinking money supply, and tumbling prices.[52]

These macroeconomic developments increased the vulnerability of both the banking system and the

[49] James (1984, p. 69), James (1998, p. 57).

[50] This argument runs along the same lines as the one by Keeley (1990) who tried to explain the apparent absence of excessive risk-taking at American banks in the decades after World War II in spite of the existing deposit insurance, and the reemergence of bank failures in the 1980s.

[51] Hardach (1976, pp. 79).

[52] The slowdown of growth has traditionally been attributed to a sharp drop in net investment. Recent research has challenged this view, claiming that it was the low productivity of investment, rather than its level, which caused the slowdown in growth (Spoerer 1997).

currency. Banks' balance sheets were weakened by falling stock prices and deteriorating loan portfolios, whereas the stability of the currency was threatened by gold outflows. However, the vulnerability of the Reichsmark had increased even before the onset of gold outflows. In the years after the stabilization of the Reichsmark, capital imports had been so large that the Reichsbank's reserves had increased strongly with the note cover being well above the level of 40% required under the gold exchange standard. However, the simultaneous increase in short-term foreign debt had been so strong, that reserves accounted for only 18% of short-term debt at the end of 1930, compared to a level of 57% in 1926. Hence, a reversal of short-term capital flows could easily overthrow the German currency.

There were three episodes of financial turmoil before the 1931 crisis. An analysis of these episodes is essential for an understanding of the 1931 crisis for two reasons: First, the situations of the banking sector and the Reichsbank at the outset of the 1931 crisis were strongly influenced by these crisis episodes. Second, the early crises will help us to identify the causes of the 1931 crisis, because the former can more easily be identified as either banking or currency events, while the latter is characterized by the simultaneity of banking and currency events. Through the analysis of the early crises, we will establish patterns of deposit withdrawals and reserve changes that will be compared to the ones observed in 1931.

4.1 Currency problems

Before 1931, there were two episodes in which the currency situation became acutely unstable, with gold reserves and the note cover collapsing (figure 3). The two crises have many similarities. Both episodes were triggered by political events, the first by the imminent breakdown of reparations negotiations in the spring of 1929, the second by the governmental crisis in July 1930 and particularly by the Reichstag elections in September 1930. As can be seen from figure 3, the note cover plummeted, almost touching the 40% boundary in April 1929. Increases in the discount rate could not stop the outflow of reserves, and the Reichsbank started to restrict lending through the discount window in April 1929. Interestingly, these restrictions were again applied selectively, favoring the Berlin banks, and in particular the great banks.[53] Reserve outflows ended only when the political crises had been settled.[54]

The currency disturbances were accompanied by declines in deposits (figure 3). The currency circulation decreased as well, which suggests that there was no substitution of deposits into Reichsmark. As there are no indications of a flight into stocks, bonds, or real assets either, it seems that the funds were transferred abroad. This is consistent with the observed gold outflows during the crises. The declines in deposits were common to almost all bank groups. Only at the savings banks, total deposits did not decrease during the two crisis episodes, but continued to grow until the end of May 1931. A decomposition of deposits shows, however, that the savings banks' giro deposits declined in both the spring of 1929 and the fall of 1930 and

[53] Evidence on this discrimination can be found in the Reichsbank's internal documents (Reichsbank R2501/6484).
[54] Hardach (1976, pp. 114, 121).

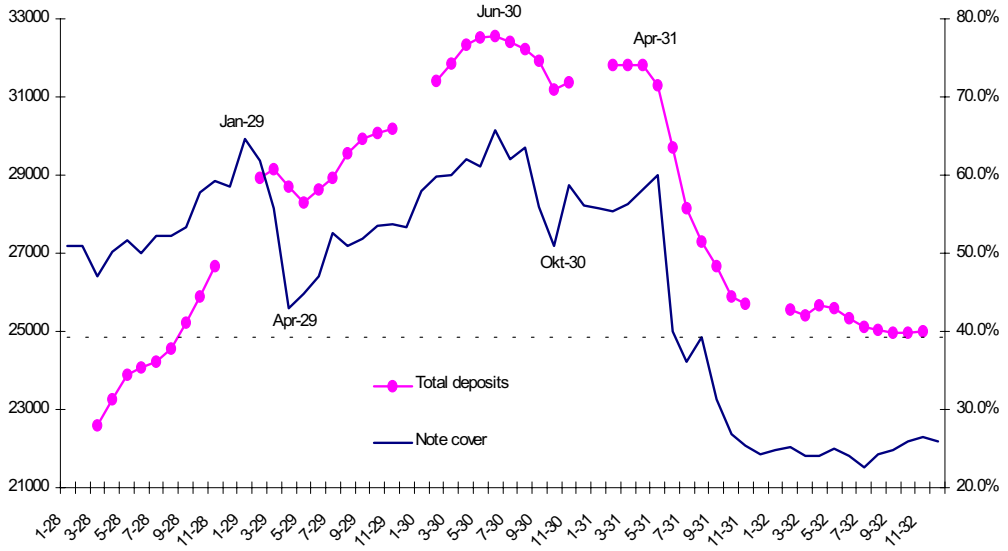


Figure 3: The Reichsbank's note cover and the evolution of total deposits. Sources: Deutscher Reichs- und Preußischer Staatsanzeiger, Konjunkturstatistisches Jahrbuch 1936. Notes: Note cover = $\frac{\text{Reichsbank reserves}}{\text{currency circulation}}$ in percent (right scale). Total deposits = deposits at monthly reporting banks (including acceptances) + giro and savings deposits at savings banks (left scale).

that the growth rates of savings deposits decreased in both episodes. Hence, the impact of the crisis episodes was discernible at all bank groups, while the magnitude of deposit losses differed across bank groups.

How did foreign creditors react during the crisis episodes identified above? Figure 4 shows that domestic and foreign deposits at monthly reporting banks generally moved in the same directions, but that foreign deposits tended to swing more strongly in both directions.[55] Thus, banks holding foreign debt were hit more strongly than other banks. In addition, the withdrawals at the great banks were particularly strong. This is consistent with the view that foreign deposits were more mobile than domestic ones and that deposits at the great banks were on average more mobile than deposits at other bank groups.[56] Thus, the intensity of deposit losses seems to have been linked to the scale of "speculative" deposits at different bank groups.[57]

The timing of the crises suggests that the deposits withdrawals were a consequence of the currency problems and not vice versa. The crises started immediately after political shocks and ended when the political situation calmed down. The political shocks shattered investors' confidence in the maintenance of the gold standard and raised fears of a sovereign default and capital controls. The wish to transfer money abroad translated into deposit withdrawals at German banks. In fact, doubts about the stability of the Reichsmark manifested themselves in disproportionate withdrawals of Reichsmark deposits: Commerzbank, who had the

[55] James (1984, pp. 77, 1986, pp. 298) has argued that a large part of "foreign" withdrawals represented German capital flight. Due to the lack of data on this issue, we cannot separate this kind of capital flight from true foreign withdrawals.

[56] The fears that made investors transfer their capital abroad were in principle relevant for both foreign and domestic depositors. However, the transfer of funds was probably more costly for domestic than for foreign creditors. Moreover, we would expect large investors to have lower transaction costs relatively to their investment sum. Therefore, domestic capital flight should have occurred mostly at large firms and wealthy individuals.

[57] This has also been noted by Balderston (1993, p. 165).

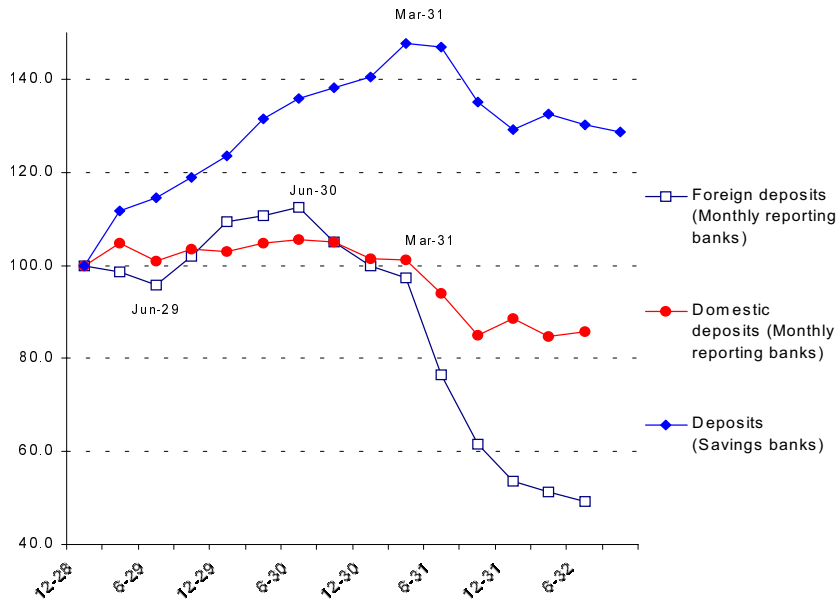


Figure 4: Evolution of different types of deposits at selected bank groups, December 1928 = 100. Sources: Konjunkturstatistisches Handbuch (1936), Reichsbank, Deutscher Reichs- und Preußischer Staatsanzeiger.

highest share of Reichsmark deposits in total foreign deposits, experienced the strongest foreign withdrawals in the spring of 1929, and the share of Reichsmark deposits at the great banks decreased substantially in both 1929 and 1930.[58] Moreover, the banks' attempts to conserve their foreign currency claims during the crises suggest that they themselves distrusted the German currency.[59] There is no indication that deposit withdrawals were triggered by doubts about German banks, as conservative banks like BHG and RKG experienced withdrawals comparable to those of a more venturous bank like Danatbank. Instead, the different intensities of deposit losses at different banks depended on the mobility of their creditors. Therefore, the savings banks survived the two crises largely unscathed because the "little savers" were relatively slow to react, while the great banks were the ones to suffer most.

4.2 Banking problems

The third crisis episode originated from problems in the financial sector, namely the breakdown of "Frankfurter Allgemeine Versicherungs-AG" (FAVAG), the second largest German insurance company, in August 1929. The collapse was followed by a stock market crash and the failures of a number of banks connected with the FAVAG through affiliation or business relations. The number of failing banks in the fourth quarter of 1929 was so high that they even exceeded the number of failures in the stabilization crisis of 1924.[60] The high number of bank failures was connected to falling stock prices and the cyclical downturn, but in most

[58] Magazin der Wirtschaft. See also Enquête-Ausschuß (1930), Balderston (1993, 1994).
[59] In spring 1929, banks' claims towards foreigners increased, while in fall 1930, they decreased only slightly.
[60] Gold (1931) reports 87 bank failures in the fourth quarter of 1929. Only seven of these belonged to the monthly reporting banks, indicating that most of the failing banks were small.

cases these factors seem to have been the trigger rather than the cause. In fact, a majority of the bank failures have been attributed to high risk-taking and fraud.[61] The breakdown of FAVAG itself had been due to losses from dubious transactions outside the insurance business that had been veiled until 1929 by falsifications of balances.[62]

Interestingly, the crisis can hardly be detected in the aggregate deposits series (figures 3 and 4). Only domestic deposits of monthly reporting banks show a slight decrease, while deposits at savings banks and foreign deposits increased strongly.[63] However, the evolution of deposit flows was not homogeneous: Deposit losses were concentrated in certain regions, such as Frankfurt and Kassel, and in certain types of banks, such as civil servants' and grain banks.[64] In our sample, there were 24 banks other than the failing banks that lost more than 10 percent of their deposits between September 1929 and February 1930, while aggregate deposits of monthly reporting banks increased by 3 percent in the same period. Deposits at the great banks were increasing as well, even though almost all of them – the exceptions being Dresdner Bank and BHG – were financially involved in the FAVAG scandal. A decomposition of deposits shows, however, that interbank deposits declined sharply towards the end of the year, and particularly so at the great banks and at the large provincial banks, but these declines could be more than compensated by an increase in foreign deposits. As the failing banks were mostly small and their foreign deposits negligible, it is not surprising that the currency situation remained stable, and that the Reichsbank's reserves even increased slightly. This time, the Reichsbank did not inject liquidity into the system. While bill holdings at the Reichsbank increased sharply during the two currency crises, they actually decreased in the end of 1929, apart from a seasonal spike in December (figure 5).

Hence, this episode differs from the two other episodes in that deposit withdrawals were restricted to a relatively small part of the banking sector and that they were not accompanied by currency problems. It seems that depositors (correctly) perceived that the FAVAG scandal and the following bank failures were idiosyncratic events. They reacted by withdrawing deposits from "bad" banks and redepositing their funds at other banks that were believed to be solvent. If there was any contagion at all, it was restricted to certain localities and types of banks.[65] Hence, the crisis was primarily a solvency crisis bringing down insolvent banks, while confidence in the stability of the banking system was not shattered in the fall of 1929.

[61] Gold (1931, p. 451).

[62] Feldman (1995, pp. 274).

[63] Note also that there is no "unusual" movement in aggregate deposits at the time of the Wall Street crash in October 1929. Therefore, the direct impact of the crash does not seem to have been very strong as has already been noticed by Balderston (1993, p. 158).

[64] The history of failures has been described in some detail by Gold (1931).

[65] Gold (1931) presents some evidence that there was local contagion (as in Kassel in November and December 1929) and bank-group specific contagion (as for the civil servants banks), which might have induced the failures of solvent banks, but this concerned only a relatively small part of the bank failures.

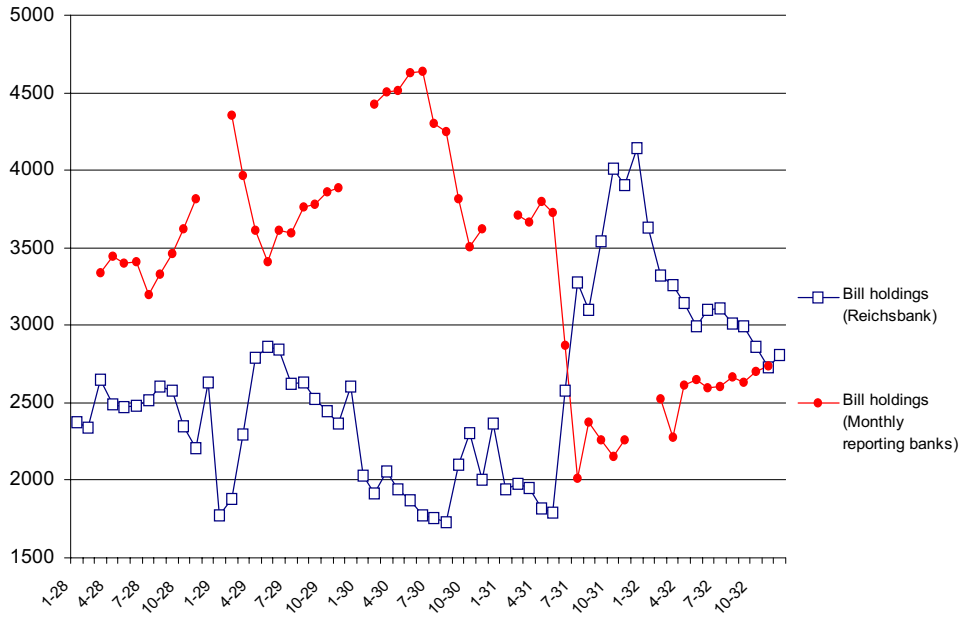


Figure 5: Bill holdings at the Reichsbank and at monthly reporting banks in million Reichsmark. Sources: Deutscher Reichs- und Preußischer Staatsanzeiger, James (1985).

4.3 Evolution of balance sheets

The crises left their marks on banks' balance sheets. Deposits at monthly reporting banks fell by 5.8% from their peak in June 1930 till the end of the year (table 5).

	Total deposits			Domestic deposits			Foreign deposits		
	Jun30	Dec30	Mar31	Jun30	Dec30	Mar31	Jun30	Dec30	Mar31
Monthly reporting banks	100	94.2	92.5	100	96.3	95.0	100	88.8	86.5
1. Great banks	100	92.6	89.3	100	96.7	95.0	100	86.9	81.4
1a. Great branch banks	100	92.3	88.8	100	n.a.	95.3	100	n.a.	79.2
1b. Great non-branch banks	100	95.4	94.4	100	n.a.	89.6	100	n.a.	97.8
2. Other reporting banks	100	96.4	97.2	100	95.9	94.9	100	101.1	118.3

Table 5: Evolution of deposits at selected bank groups, June 1930 = 100. Sources: Enquête-Ausschuß (1933), Deutscher Reichs- und Preußischer Staatsanzeiger, Reichsbank.

The time period between the fall 1930 crisis and the 1931 crisis is usually characterized as a phase of returning optimism and economic revival.[66] Yet, deposits at monthly reporting banks continued to fall after the crisis and did not recover as they had done after the spring 1929 crisis (figure 3). The declines in foreign deposits again were particularly strong, and by March 1931, monthly reporting banks had lost 13.5% of their foreign deposits compared to June 1930. The strong inflow of foreign deposits that had been experienced

[66] Temin (1976, pp. 172), Borchardt (1991, pp. 146).

in recent years had come to a halt in 1930. A decomposition into different bank groups shows, however, that foreign withdrawals were directed mainly at the great branch banks. Foreign deposits at these banks declined by more than 20%, while the decline at the great non-branch banks amounted to a mere 2.2%. Foreign debt at other reporting banks, i.e., other credit banks and SLGs, even increased by 18.3%.

How can we explain the high withdrawals of foreign deposits at the great branch banks? The answer seems to lie in the combination of a deterioration of the great branch banks' liquidity and earnings positions and an increasingly instable political environment, which shattered investor's confidence into the Reichsbank's ability and willingness to support these banks in times of crisis. As in earlier years, the great branch banks stood out with respect to their weak liquidity positions, but the difference had become much more pronounced (table 6, compare table 3). Instead of increasing liquidity in light of the apparent volatility of their deposits, the great branch banks allowed their liquidity ratios to decline even more. In November 1930, the great branch banks' cash plus deposits at other banks covered less than 10% of their short-term liabilities. Almost 70 percent of their liquidity consisted of bills, indicating that they depended more than before on the implicit liquidity guarantee by the Reichsbank.

	First-order liquidity	Cash liquidity	$\frac{\text{Bills}}{\text{Liquid means}}$
Monthly reporting banks	42.3%	18.8%	54.6%
1a. Great branch banks	31.8%	9.9%	68.9%
1b. Great non-branch banks	36.6%	18.4%	49.8%
2'. Other credit banks*	46.4%	17.2%	59.8%
– 4 large provincial banks	32.3%	15.7%	51.9%
3. SLGs	42.2%	24.2%	42.6%

Table 6: Liquidity at selected bank groups in November 1930. Source: Deutscher Reichs- und Preußischer Staatsanzeiger. Notes: Numbers show arithmetic averages of individual ratios. *Constant sample of other credit banks.

The long downturn had also impaired banks' earnings situations, and again the great branch banks seem to have been hit more strongly than other bank groups. Even though all great banks showed profits in their annual accounts of 1930, it was widely believed that the great branch banks had incurred losses in 1930.[67] The reduction of dividend rates for 1930 has to be taken as strong evidence for the great banks' disastrous earnings situation, for they had so far zealously pursued a policy of constant dividends. The great branch banks had incurred large losses from the decline in the stock market, which had depressed their stock portfolios and their commissions from securities transactions. Moreover, they had accumulated losses from loan defaults, many of which involved enormous sums.[68] The great non-branch banks were largely spared from such spectacular losses, which certainly was a consequence of their more prudent loan policies.

The banks' desperate situations also showed up in tumbling stock prices. It became common practice at the great branch banks to buy up their own shares when the share prices came close to their par values. The

[67] Die Bank (4 April 1931).

[68] Some examples are Gothaer Grundkredit, Hamburger Assecuranz and Dreyfus (all Dresdner Bank), Industriebau (Danatbank and BHG), Mansfeld (Commerzbank), Greffenius and Heinicke (Danatbank), Osthandels AG (Deutsche Bank) and Maffei (Deutsche Bank).

most extreme case was Danatbank, which had bought up more than 50% of its own shares by the middle of 1931.[69] This implies that actual equity ratios were much smaller than published ones. In contrast to the great branch banks, BHG avoided large purchases of own shares by arranging a deal with the Warburg group, who agreed to buy up large quantities of BHG shares.[70]

We can conclude that the great branch banks' absolute and relative liquidity and earnings positions deteriorated substantially in the years before 1931. In addition, the great branch banks decreased their equity cover by buying up huge amounts of own shares. If the implicit guarantee of the Reichsbank had still been credible, there would have been no need to withdraw deposits. However, the fall 1930 crisis had made clear that the Reichsbank might not be able to fulfill this guarantee.[71] Increasing political tensions made international support in times of crisis less likely.[72] Without such support the Reichsbank would not be able to ensure the redemption of the banks' debt, especially their foreign debt. Hence, political shocks not only decreased the perceived stability of the gold standard, but also the credibility of the implicit guarantee by the Reichsbank.

5 The twin crisis of 1931

The German crisis is frequently said to have started on May 11 with the publication of huge losses at the "Österreichische Creditanstalt", the largest and most renowned Austrian bank, and the following runs on Austrian banks.[73] In the following two months, bad political and financial news chased each other. The predominant topics of the day were the debate about reparations and the fiscal crisis on the one hand, and the problems of Nordwolle and Danatbank, on the other. The debate on reparations was unleashed on June 6 by a memorandum of the Brüning government stating that Germany was no longer able and willing to bear the burden of reparations. The memorandum had been meant to appease the opponents of the emergency decree issued a day before. Political uncertainty was further increased by the subsequent parliamentary crisis and by the desperate fiscal situation of the Reich at a time when the reparations annuity became due. The situation relaxed when the American president Hoover proposed a moratorium on all international political debt on June 20. However, France showed strong opposition towards the Hoover moratorium and complied to it only on July 7. About the time of the reparations memorandum, first rumors about problems at Danatbank spread because the bank had refused to prolong a loan to the city of Berlin. A few days later, the information about disastrous losses at Nordwolle, a textile company, began to circulate. This gave rise to

[69] Born (1967, p. 127).

[70] Lüke (1956, pp. 226).

[71] The Reichsbank's internal documents show that the Reichsbank had planned to impose credit restrictions primarily in Berlin and primarily on the great banks in the fall 1930 crisis (Reichsbank R2501/6484, pp. 167). These credit restrictions never materialized.

[72] The failure of the Young bond issue and the somewhat lengthy negotiations about the Lee Higginson loan had shown quite plainly that Germany had exhausted its credit capacity.

[73] Born (1967, pp. 66), Eichengreen (1992, pp. 270). In contrast, Hardach (1976), James (1984), and Ferguson and Temin (2001) place less emphasis on the impact of the Austrian crisis on German banks.

further speculations about the state of Nordwolle's major creditors, Danatbank and Dresdner Bank. Details about Nordwolle's situation leaked out only gradually, and the full extent of losses was revealed only in the beginning of July.

Severe pressure on the currency and heavy deposit withdrawals accompanied these events (figure 3). Within the first two weeks of June, the Reichsbank's reserves fell by more than one fourth and the note cover dropped from 59.5% on May 30 to 48.8% on June 15, inducing the Reichsbank to increase the discount rate by 2 percentage points. At the same time, banks suffered from heavy deposit withdrawals, and the Reichsbank discounted large amounts of bills to keep the banking system liquid. As reserve losses continued and the note cover approached 40 percent, the Reichsbank decided once again to impose discount restrictions. Again these restrictions were applied only outside of Berlin to ensure that foreign creditors, whose deposits were mainly at the great Berlin banks, were in any case satisfied when they wished to withdraw their deposits.[74] In spite of the Hoover moratorium, the reserve drain continued, and on July 3, the note cover fell below the mandatory cover for the first time. On July 4, Danatbank ran out of discountable bills, and on July 8, the Reichsbank refused to discount further bills of Danatbank because these apparently were mere financial bills that were not eligible for discount.[75] The Reichsbank made further liquidity provision contingent upon financial support from the allied countries. When the attempts to obtain such support failed, the Reichsbank felt impelled to tighten discount restrictions on July 10, which triggered the breakdown of Danatbank. The Reich assumed a guarantee for all deposits of Danatbank in the hope to be able to prevent the crisis from spreading to the rest of the banking system. Nevertheless, a general banking panic erupted as soon as the breakdown of Danatbank became public on July 13, and a number of banks declared themselves illiquid, among them Dresdner Bank. The whole banking system was temporarily suspended by the declaration of general bank holidays. The banking panic was accompanied by huge reserve losses at the Reichsbank and the note cover quickly fell below the 40% minimum. On July 15, the Reichsbank suspended convertibility of the Reichsmark into gold and imposed capital controls, which set an end to the gold standard in Germany. The payments system operated on a restricted scale until the beginning of August. Negotiations with foreign creditors resulted in a standstill agreement on part of the international debt. Danatbank was merged with Dresdner Bank, and Reich and Reichsbank acquired large stacks of shares in the merged bank as well as in Deutsche Bank and Commerzbank. Out of the great banks, only BHG and RKG could do without public assistance. The banking crisis gave rise to the creation of a national banking supervision and to a tightening of banking regulation, including rules on large exposures and liquidity and the formation of a binding interest cartel.

Because of the simultaneity of the currency and the banking problems, it is difficult to decide whether the deposit withdrawals at German banks were merely the consequence of the run on the Reichsmark, or whether

[74] Luther (1964, pp. 172).
[75] Lüke (1958, p. 288), Hardach (1976, p. 136).

the withdrawals of deposits were caused by fears about banks' solvency and liquidity, inducing investors to transfer their funds abroad and thereby endangering the gold standard. One way to distinguish between these two competing explanations is to use our knowledge about the events that occurred before 1931: We have seen that there were two episodes (spring 1929, fall 1930) that fit the currency-type explanation quite well, while there was one episode (the FAVAG crisis) that can best be interpreted as a banking event. We will pinpoint similarities and differences between the earlier crises and the 1931 crisis, stressing that the latter contained elements of a currency *and* of a banking crisis. Then we will try to tie up the two threads explaining the complex interrelation between the two phenomena.

5.1 Currency crisis

The events of 1931 show a number of similarities to the earlier episodes of currency turmoil. The currency problems started in June and were triggered by a political shock, namely the reparations memorandum, which raised new fears of a German moratorium or debt default. Shortly after, the note cover plummeted, and so did deposits (figure 3). The deposit withdrawals again affected all bank groups, but were stronger than in earlier years (table 7).[76]

	June 1930	March 1931	April 1931	May 1931	June 1931	July 1931
Monthly reporting banks	113.3	100	99.4	98.0	90.0	81.6
1a. Great branch banks	115.5	100	98.9	96.8	87.6	76.7
– Deutsche Bank	119.3	100	98.1	97.9	90.7	81.1
– Danatbank	114.8	100	99.8	95.2	80.0	66.8
– Dresdner Bank	113.5	100	98.9	95.5	87.5	75.3
– Commerzbank	108.8	100	99.6	97.8	90.6	81.2
1b. Great non-branch banks	105.5	100	100.7	101.9	89.9	83.7
– BHG	109.4	100	101.5	102.6	94.3	84.3
– RKG	102.8	100	100.2	101.4	86.8	83.2
2. Other credit banks*	104.8	100	100.0	98.9	96.5	89.8
– 4 large provincial banks	111.7	100	99.2	99.0	96.7	89.1
3. SLGs	114.8	100	100.6	100.5	95.1	92.7
Savings banks**	94.0	100	100.8	101.2	99.5	96.7

Table 7: Evolution of deposits (excluding domestic acceptances and domestic interbank deposits) at selected banks and bank groups, March 1931 = 100. Source: Deutscher Reichs- und Preußischer Staatsanzeiger. Notes: *Constant sample of other reporting credit banks. **Giro and savings deposits.

High gold outflows indicate that a large share of the withdrawn funds was transferred abroad, but there also was an increase in the currency circulation from June on, suggesting a flight into German cash. Part of the increased currency circulation probably reflected capital flight as there were numerous reports about people crossing German borders with suitcases stuffed with bank notes.[77] As before, the great banks experienced the highest withdrawals, but this time even the savings banks experienced deposit losses. Moreover, the

[76] In table 7, domestic acceptances and domestic interbank deposits are excluded, because acceptances showed a very peculiar pattern related to the Reichsbank's policy, while interbank deposits decreased sharply at all bank groups due to a general scramble for liquidity. Below we will describe the evolution of both types of deposits separately.

[77] James (1986, pp. 300).

decrease in foreign deposits was particularly strong: From March till June, total foreign deposits of monthly reporting banks fell by 21.2%, foreign cash loans even by 32.3%; domestic non-bank deposits showed only a mild decline in June, and collapsed no earlier than July (table 8). According to archival material from the Reichsbank, German capital flight started no earlier than in the middle of June.[78] Thus, greater mobility of deposits again translated into higher withdrawals.

These observations suggest the following interpretation: As in earlier periods of political uncertainty, foreign and, to a lesser extent, domestic investors started to move their money out of Germany, which showed up in reserve losses at the Reichsbank. The run on the Reichsmark translated into a run on German banks, with the causality running from the currency crisis to the banking crisis. This, in fact, is the preferred interpretation of the 1931 crisis in basically all recent studies on the crisis.

1931	Jun-30		Mar-31	May-31		Jun-31		10th Jul-31		31st Jul-31	
Monthly reporting banks	111.9	*115.6*	100	98.0*		96.9	*78.8*	n.a.	*71.6*	81.6*	
1. Great banks	107.9	*122.8*	100	98.8	*95.4*	98.7	*74.5*	n.a.	*72.1*	82.6	*70.9*
1a. Great branch banks	107.6	*126.3*	100	97.9	*95.3*	87.6*		n.a.	*71.3*	81.3	*70.4*
– Deutsche Bank	110.6	*133.6*	100	100.0	*94.6*	90.7*		n.a.	*73.9*	88.4	*69.2*
– Danatbank	106.9	*123.7*	100	101.1	*88.5*	80.0*		n.a.	*67.2*	67.5	*66.0*
– Dresdner Bank	104.3	*123.8*	100	91.7	*99.8*	93.9	*80.2*	n.a.	*68.8*	73.9	*76.8*
– Commerzbank	103.9	*115.7*	100	95.1	*101.5*	90.6*		n.a.	*75.7*	88.7	*70.6*
1b. Great non-branch banks	114.5	*102.2*	100	117.7	*96.0*	89.9*		n.a.	*77.3*	109.3	*74.1*
– BHG	113.8	*108.5*	100	105.5	*102.0*	126.6	*87.5*	n.a.	*83.4*	109.7	*78.9*
– RKG	114.7	*96.7*	100	122.1	*90.7*	86.8*		n.a.	*71.9*	109.2	*69.9*
2. Other monthly reporting banks	118.2	*84.6*	100	99.6*		94.2	*97.4*	n.a.	*69.3*	91.0*	
– ADCA	104.3	*110.3*	100	97.7*		99.1	*79.4*	n.a.	*n.a.*	88.9	*66.2*
– Barmer Bankver.	125.5	*109.0*	100	98.7*		93.7*		n.a.	*55.0*	102.5	*78.1*
Savings banks	94.0	*n.a.*	100	101.2	*n.a.*	99.5	*n.a.*	n.a.	*n.a.*	96.7	*n.a.*

Table 8: Evolution of domestic deposits (excluding interbank deposits and acceptances, left entry) and foreign deposits (right entry, in italics) at selected banks and bank groups, March 1931 = 100. Sources: Deutscher Reichs- und Preußischer Staatsanzeiger, Reichsbank. Notes: *Decomposition impossible due to lack of data. Inserted numbers are the same as in table 7.

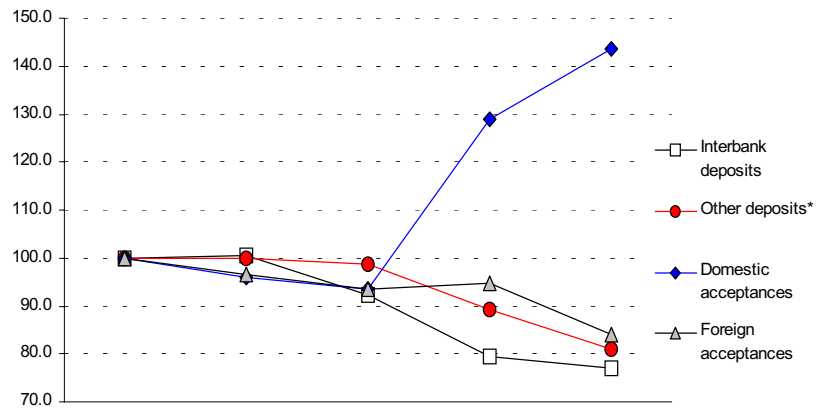
However, there are a number of differences between the 1931 crisis and the earlier episodes, suggesting that this is not the whole story. One important difference is that there was a strong heterogeneity of deposit withdrawals across banks. Moreover, the crisis did not end when the political crisis was settled. Instead, the currency events were increasingly superimposed by problems in the banking sector. Another difference is that the German government apparently had exhausted its credit capacity, showing up in a refusal of further international loans. International loans had played a major role in calming down financial markets in the

[78] Reichsbank (R2501/6492, p. 205).

earlier episodes. These differences will be shown to be crucial for the explanation of the German crisis.

5.2 Banking crisis

When two exceptional events happen in short succession, it is tempting to conclude that the event that happened first triggered the event that followed after. Therefore, it has long been uncontroversial that the German banking crisis was triggered by the Austrian banking crisis in May 1931.[79] However, one should distinguish carefully between the withdrawals of deposits at one bank ("bank run") and the simultaneous withdrawals of deposits at many banks that together constitute a significant part of the banking sector ("banking panic"). The banking *panic* clearly did not start in May 1931 as the immediate repercussions of the breakdown of Österreichische Creditanstalt in Germany were small: Total deposits started to decrease in May, but the decline – particularly that of "other deposits"[80] – was modest (figure 6) and the deposit-to-currency ratio was still rising. The strongest effect was on interbank deposits, which dropped sharply in May, indicating that the Austrian crisis led to an early scramble for liquidity at German banks.



	Mar-31	Apr-31	May-31	Jun-31	Jul-31
Interbank deposits	100.0	100.5	92.2	79.4	77.0
Other deposits*	100.0	100.0	98.8	89.1	81.1
Domestic acceptances	100.0	95.9	93.5	129.0	143.7
Foreign acceptances	100.0	96.5	93.5	94.8	84.2

Figure 6: Evolution of deposits for different deposit types at monthly reporting banks, March 1931 = 100. Sources: Deutscher Reichs- und Preußischer Staatsanzeiger, Reichsbank. Notes: *Other deposits include deposits from domestic non-banks and foreign cash loans (bank and non-bank).

The evolution of deposits at different banks and bank groups was very heterogeneous. While some banks like Danatbank and Dresdner Bank already lost fairly high shares of their deposits in May, BHG and RKG were able to increase their deposits (table 7).[81] This suggests that contagion from Austria concentrated on

[79] The most prominent exposition of this view is the one by Born (1967). Again it was Hardach (1976) who challenged the traditional perception. He claimed that the reparations memorandum in the beginning of June was the decisive date.

[80] "Other deposits" comprise domestic non-bank deposits and foreign cash loans.

[81] It has often been argued that the deposit withdrawals in May were domestic rather than foreign because the reserves at the

those banks that were known to have similar kinds of weaknesses as the Creditanstalt, namely bad industry loans, low liquidity, depreciated stock portfolios, and low equity ratios.[82] The decrease of total deposits at monthly reporting banks in May implies that the withdrawn funds were not fully redeposited at German banks. There also was no flight into cash in May. Therefore, part of the withdrawn funds seems to have left the country, putting pressure on the Reichsbank's gold reserves.[83]

Deposit withdrawals accelerated sharply in June. This acceleration was driven almost entirely by foreign deposits at the great banks, which decreased by 21.9% in the month of June. These withdrawals presumably were related to the concurrent political and currency problems. The largest part of domestic withdrawals seems to have taken place no earlier than July. The heterogeneity of deposit withdrawals persisted. Table 8 shows that domestic non-bank deposits at BHG were rising sharply in June, while the total of domestic deposits at the great banks remained roughly constant in June. The steep decline of domestic deposits in July seems to have been common to all great banks. However, the level of domestic deposits at the great non-branch banks at the end of July was almost 10 percent above the level of March 1931 and not much below the level obtained in June 1930. At the great branch banks the level of domestic non-bank deposits at the end of July was 17.4% below the level of March 1931, and even 23.4% below the level of June 1930. Thus, the total amount of domestic withdrawals was much larger at the great branch banks than at the large non-branch banks. The strongest withdrawals were again found at Danatbank and Dresdner Bank who lost 32.5% and 26.1% of their domestic non-bank deposits between March and July 1931, which has to be attributed to their involvement in the Nordwolle scandal. As in the fall of 1929, domestic depositors distinguished clearly between banks they considered to be risky, and banks they considered to be safe. Such behavior is also visible with respect to foreign deposits, even though the difference in withdrawals amounts only to 6 percentage point at 10 July 1931. However, we have seen in the preceding section that the discrimination against the great branch banks by foreign depositors had begun much earlier. Between June 1930 and 10 July 1931, foreign deposits declined by 43.5% at the great branch banks, and only by 24.4% at the great non-branch banks. This indicates that both domestic and foreign depositors had lost their confidence in the safety of their deposits at the great branch banks.

The high deposit withdrawals put a lot of pressure on the banks' liquidity positions. As most advances were frozen, banks had to reduce their cash holdings and their nostro claims in order to meet deposit withdrawals. This explains the strong reduction of interbank deposits from May on (figure 6). To ease the strain on banks' balance sheets, the Reichsbank discounted huge amounts of bills: Between May and July, bills at the Reichsbank increased by 1.5 billion Reichsmark (+82.7%) with bills at monthly reporting banks

Reichsbank increased slightly in May (James 1985, p. 186). Table 8 refutes this statement. In fact, it seems that the capital outflows were compensated by surplusses in the German current account (Reichsbank R2501/6495, p. 75).

[82] However, the high foreign withdrawals at RKG are somewhat surprising, especially in the light of the concurrent increase in domestic non-bank deposits by 22.1% since March.

[83] It might be that investors bought bonds or shares, but this is very unlikely given the bad state of the German stock market.

decreasing by approximately the same amount (figure 5). Owing to the discount restriction, this way of obtaining liquidity was, however, limited to banks in Berlin, which is impressively illustrated by figure 7. While discount loans to the Berlin banks almost tripled between May 30 and July 11, the extension of loans to provincial banks was strictly limited by the discount restriction. The largest part of total discount loans in Berlin (73.2%) had been taken out by the great branch banks, another 5.7 percent by the great non-branch banks. The largest individual amount had been extended to Danatbank, and in the last nine days before its failure the amount still increased by 25.7 percent.

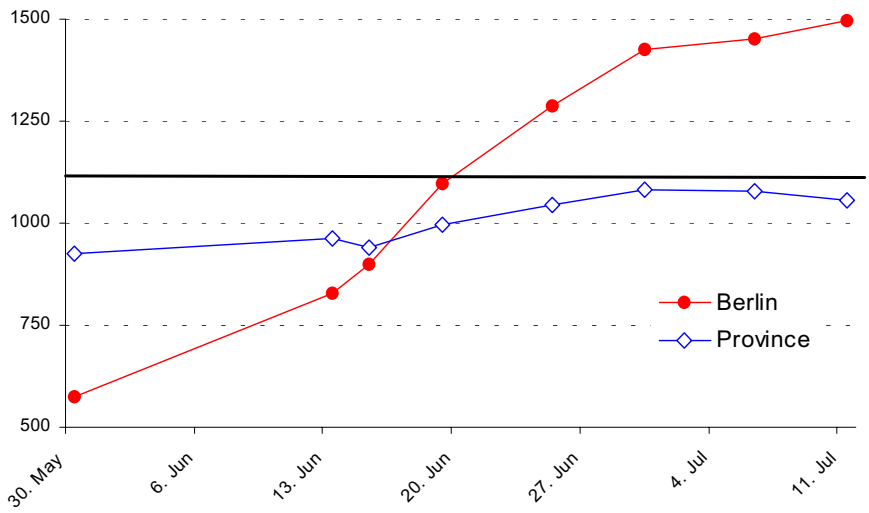


Figure 7: Discount loans by the Reichsbank to banks in Berlin and in the German province during the 1931 crisis (in million Reichsmark). Source: Reichsbank R2501/6492. Notes: The solid line denotes the maximum credit volume (including ultimo allowance) for provincial banks according to the credit restriction of June 20.

Remarkably, the Reichsbank also discounted bills that were generally not acceptable for discount[84]: Banks converted illiquid advances into acceptance loans, by allowing their customers to draw a bill of exchange on them, discounting the bill, and exchanging the bill with another bank to obtain the required third signature. Then the bill, which clearly was a pure financial bill and, hence, not discountable at the Reichsbank, was discounted at the Reichsbank. This practice is reflected in the sharp increase of banks' acceptance liabilities from June on (figure 6). The strongest increase could again be found at Danatbank where acceptance liabilities jumped up by 70 percent between March and July 1931. This makes clear that banks had run out of discountable bills long before the Reichsbank's denial to discount further bills in July. The proceeds from discount loans frequently were immediately exchanged into foreign currency. The largest part of the foreign currency demand at the Reichsbank between June 1 and July 10 again stemmed from the great banks (77.7%).[85]

[84] Born (1967, p. 117).
[85] Reichsbank (R2501/6492).

These events show some similarities with the earlier episode of banking turbulence: Again there were certain banks who had run into trouble due to risky business policies, and again depositors seem to have distinguished between these banks and the remaining banking system. However, the protagonists in the 1931 crisis were very different from the ones in the FAVAG crisis. This time, the problem banks were no small, insignificant banks, but two of the major players in the banking system, Danatbank and Dresdner Bank, who moreover had huge amounts of foreign debt. Instead of letting these insolvent banks fail, the Reichsbank exhausted its reserves by supporting them. In fact, the Reichsbank explicitly violated Bagehot's rules by discounting poor quality bills on a large scale.[86] The Reichsbank even discriminated against other (potentially solvent) banks to the advantage of the great (partly insolvent) banks in applying discount restrictions selectively, neglecting that these restrictions became completely useless because the banks with the highest demand for foreign currency were excluded. When the currency problems came to a head, the Reichsbank could not keep up their liquidity support to the great banks, which triggered the breakdown of Danatbank.

The banking *panic* started only after the breakdown of Danatbank. Born (1967) reports that "as soon as the close-down of Danatbank became known, a run on banks and savings banks by the domestic public set in." (p. 107). High withdrawals forced banks to restrict, and later suspend payments. Foreign creditors also seem to have joined the run, but the withdrawals were small compared to the preceding weeks (table 8). The question why the breakdown of Danatbank triggered the banking panic can only be answered in connection with the currency problems. Therefore, this discussion is deferred to the following section.

5.3 Analysis of the twin crisis

The preceding analysis has shown that there were two concurrent threads of actions, whose origins were largely independent. Political shocks provoked capital outflows and deposit withdrawals at many banks, and the Nordwolle scandal led to withdrawals at the main creditor banks of Nordwolle and to further capital outflows. However, the two strands became increasingly intertwined over the course of the crisis, and it is this interweavement, which makes the 1931 crisis so interesting for economic study.

In this section, we will offer an interpretation of the German crisis that stresses the interrelations between the banking and currency problems. First, we will discuss why the breakdown of Danatbank led to a full-blown banking panic although the origins of Danatbank's problems were idiosyncratic. Then, we will discuss the Reichsbank's role as a lender of last resort, especially with respect to the great branch banks, and the costs that this policy might have had. Finally, we will describe the dangers of a mutual reinforcement of banking and currency problems and the ensuing dilemma of a central bank that wants to ensure the stability of the currency and the banking system.

[86] Reichsbank (R2501/6495, pp. 57, 72).

5.3.1 Contagion

At first glance, it seems that the banking panic of July 13 was triggered by the breakdown of Danatbank. The literature on contagion in banking distinguishes two channels of how individual bank failures can spread to the whole banking system, the first operating through information, the second through interbank liabilities. The first channel is based on the idea that the failure of one bank contains information on the value of assets at other banks (Chen 1999). This channel suggests that contagion should primarily affect banks that are considered to be similar to the failing banks. The second channel refers to the domino effect that can arise if banks are linked to each other through interbank liabilities (Allen and Gale 2000b). In the FAVAG crisis, both channels seem to have been present. The extent of contagion was, however, limited because most banks were not considered to be similar to the failing banks and because the level of interbank liabilities was rather small. The same arguments are valid in the 1931 crisis: The breakdown of Danatbank had been caused by a bank-specific event – the Nordwolle default – and by an imprudent loan policy that was not representative for the banking sector as a whole, and the amount of interbank liabilities was relatively small.[87] Therefore, it is far from clear why the failure of Danatbank should induce a general banking panic.

Instead, it seems that the banking panic *and* the breakdown of Danatbank were triggered by the tightening of the Reichsbank's discount restrictions on July 10, which had become necessary because the Reichsbank had exhausted its "free" reserves. The strict implementation of discount restrictions meant that the Reichsbank withdrew its support from the banking system and that it would not serve as a lender of last resort, even if a bank was able to present bills that were in principle eligible for discount. Thus, liquidity risk of all banks – solvent or insolvent – jumped up, which triggered the general banking panic.[88]

The proponents of the currency-type explanations of the German crisis blame the political disturbances in the beginning of June for the exhaustion of reserves at the Reichsbank. According to this view, the crisis was not caused by contagion from Danatbank, but by a macroeconomic shock that hit all banks at the same time. Indisputably, this explanation has some truth to it. However, this explanation is incomplete for two reasons. First, it neglects that part of the banking problems was unrelated to the currency problems. Our comparison of different bank groups suggests that an important part of the withdrawals was triggered by doubts about the great branch banks' conditions. Hence, the great branch banks' risky business policies contributed to the exhaustion of the Reichsbank's reserves, over and above the effect that the political shock had had. Second, the "currency" explanation takes the vulnerability of German banks to a run on the currency as given instead of viewing it as the result of the banks', and especially of the great banks', decision to attract huge amounts of short-term foreign debt. Some banks, such as BHG, had taken precautions against sudden outflows of "hot" foreign money by holding comparatively high levels of liquidity and, in

[87] Only at the SLGs did interbank liabilities play an important role; more than one half of total deposits were interbank liabilities. At credit banks, less than 10 percent of total deposits were interbank deposits.

[88] One might also think of this as the economy jumping into a bad equilibrium in a Diamond-Dybvig-type coordination game.

fact, managed to stay liquid in spite of heavy deposit withdrawals. At the great branch banks, however, high levels of short-term foreign debt went along with extremely low liquidity ratios, which made their situations particularly precarious. Therefore, it is not adequate to picture the great branch banks as mere victims of a macroeconomic shock.

5.3.2 Too big to fail

Despite their particularly risky business policies, the great branch banks enjoyed a preferential treatment by the Reichsbank. We have argued above that the great banks were subject to a moral hazard problem because they were "too big to fail". Already in earlier crises, these banks had been granted privileged access to liquidity. But in the crisis of 1931, the Reichsbank went farther than that: It provided liquidity to insolvent banks, such as Danatbank, even though this endangered its ability to serve as a lender of last resort to solvent, but illiquid banks. Even when Danatbank was on the brink of collapse, the Reichsbank kept on discounting its bills.

By absorbing the Reichsbank's "liquidity" (foreign currency), the great branch banks exerted an external effect on all other banks. This effect was still exacerbated by the free-rider problem in the provision of liquidity: The great banks preferred to purchase foreign exchange on credit at the Reichsbank to using up their own foreign currency reserves. In the Reichsbank's records this shows up in the frequently made complaint that the great branch banks had used the Reichsbank not as a lender of "last", but as a lender of "first" resort.[89] The preferential treatment of the great branch banks continued even after the outbreak of the banking panic, as each of them received large capital injections.

The Reichsbank's policy had its costs. It distorted competition to the advantage of the great branch banks, which furthered the crowding out of regional and local credit banks and of private bankers. In the crisis, it forced solvent, but illiquid banks for whom the Reichsbank's discount window was closed to liquidate assets at high costs, and possibly drove some of them into insolvency. The Reichsbank itself wrote in October 1931 that "it can easily happen that healthy parts of the economy are demolished because its weakest parts ... are protected by special governmental measures for the sake of their general economic significance; this is, for example, also the case with Danatbank and Dresdner Bank."[90] After the crisis, the relative positions of smaller banks were weakened even further by the capital injections into the great branch banks. In addition, the Reichsbank's policy provided incentives for the misallocation of funds at the great branch banks, which showed up in excessively risky loan policies and in insufficient levels of liquidity. It probably even induced the great branch banks to assume particularly high levels of short-term foreign debt, thereby increasing the exposure of the German economy to the danger of short-term capital reversals.

It, hence, seems that the policy of the Reichsbank came at a high cost, and that a system with implicit

[89] Reichsbank (R2501/6492, p. 209).
[90] Reichsbank (R2501/6496, p. 18).

guarantees can be subject to much the same moral hazard problems as a system with an explicit deposit insurance.

5.3.3 The vicious circle of twin crises

We have seen that the German crisis ended in a general banking panic *and* the abandonment of the gold standard. This stands in stark contrast to the literature that predicts that there is either a currency or a banking crisis, depending on whether the central bank acts as a lender of last resort or not. The reason for this discrepancy seems to lie in the authors' assumptions that all deposits are held by domestic depositors and are denominated in domestic currency, whereas in Germany a large share of deposits was held by foreigners and was denominated in foreign currency. With high levels of foreign or foreign currency deposits, deposit withdrawals and reserve losses tend to reinforce each other in a kind of vicious circle due to the coincidence of capital flows: Deposit withdrawals often translate directly into reserve losses and threaten the stability of the currency, while capital outflows translate into deposit withdrawals and threaten the stability of banks, both resulting in further capital outflows and deposit withdrawals.

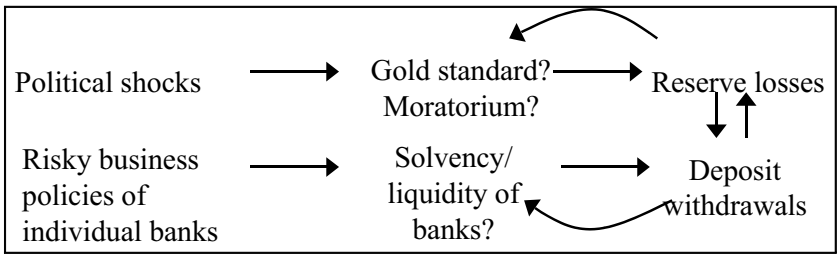


Figure 8: The vicious circle of twin crises.

This vicious circle meant that in July 1931 the Reichsbank faced a dilemma (figure 8): It could either continue to provide liquidity to the banking system risking a deviation from the note cover prescribed by law or it could – as it actually did – curtail lending to banks risking the breakdown of the banking system. However, none of these measures were suited to put an end to deposit withdrawals and reserves losses. In the absence of capital controls, further provision of liquidity would have led to an exhaustion of the Reichsbank's gold reserves that covered banks' short-term foreign debt by less than one third in the middle of July.[91] This would have triggered a run on the Reichsbank's reserves and further deposit withdrawals at German banks. Discount restrictions, on the other hand, endangered the stability of the banking system directly, inducing further deposit withdrawals and, hence, reserve losses. So it seems that both the banking crisis and the abandonment of the gold standard had become unavoidable at this point. The maintenance of the gold standard and a further provision of liquidity were only possible on the basis of foreign loans. However,

[91] Born (1967, p. 101). The Reichsbank's reserves amounted to 1.5 billion RM on July 15. Banks' short-term debt amounted to 5.5 billion RM at the end of July (Enquête-Ausschuß 1933, part 2, p. 462). Total German short-term debt even amounted to 13.1 billion RM.

because of political tensions such financial support had become unobtainable.

Hence, the German experience suggests that with high levels of foreign or foreign currency debt in the banking system, a central bank cannot choose between the stability of the banking system and the currency because of the mutual reinforcement of deposit withdrawals and reserve losses. Instead, only an "international lender of last resort" could have provided the "liquidity" (foreign currency) needed to prevent the German collapse.

6 Conclusions

Our interpretation of the German twin crisis of 1931 can be summarized as follows: Political shocks shattered investors' confidence in the stability of the Reichsmark and in Germany's ability and willingness to service its foreign debt and resulted in a run on the German currency and strong capital outflows, which translated into deposit withdrawals at German banks. At the same time, the risky business policies of the great branch banks induced deposit withdrawals at these banks and provoked further capital outflows. The Reichsbank reacted to the withdrawals by discounting huge amounts of bills to sustain the banking system's liquidity. However, the Reichsbank's role as a lender of last resort to the banking system increasingly clashed with its objective of safeguarding the stability of the Reichsmark. Therefore, the Reichsbank started to implement discount restrictions, which were, however, applied selectively. In particular, the Reichsbank continued to discount bills at the great branch banks and explicitly violated Bagehot's rules by discounting poor quality bills on a large scale. Instead of letting insolvent banks as Danatbank fail, the Reichsbank exhausted its reserves by supporting them. The Reichsbank seems to have hoped until the very end that foreign support would emerge and that the crisis would subside as the earlier crises had. Therefore, the breakdown of Danatbank was delayed until reserves had breached the mandatory note cover. Only then did the Reichsbank rigorously curtail lending to all banks, which triggered the breakdown of Danatbank and the general banking panic, as the liquidity risk of all banks – solvent and insolvent – jumped up at the Reichsbank's announcement not to serve as a lender of last resort. The factual abandonment of the gold standard could not be prevented either as deposit withdrawals and reserve losses were tied together in a vicious circle, which could not be broken in the absence of an international lender of last resort.

We have argued that the German crisis was not simply the result of a macroeconomic shock, but that both the Reichsbank and the great branch banks were accessories to the crisis. The great branch banks exhibited moral hazard because they felt they were "too big to fail". In the environment of fierce competition and eroding rents of the 1920s, this moral hazard problem showed up in excessive risk-taking in the form of low liquidity, risky loan policies, and small equity covers. Through the high levels of foreign debt, the fates of the banks holding foreign debt and the adherence to the gold standard became inextricably linked. The risk of withdrawals of "hot" foreign money was shifted to the Reichsbank, as the Reichsbank could not credibly

commit to the gold standard without at the same time committing to assist these banks in time of need. The credibility of this commitment depended, however, on the availability of foreign support in case of a crisis, which became unlikely as political tensions increased.

The question then arises whether the German crisis could have been avoided. In the crisis itself, the Reichsbank had few choices. The main allegation here concerns the support to insolvent banks, such as Danatbank. It is well possible that an early discontinuation of support to Danatbank would have prevented the outbreak of the crisis. In any case, it would have reduced the costs for the remaining banking sector. The roots of the crisis were, however, laid long before the outbreak of the crisis by founding Germany's reconstruction after the war on volatile short-term foreign debt. The Reichsbank has to be blamed for taking measures that favored short-term over long-term debt, which proved to be fatal with hindsight. In addition, the moral-hazard problems increased the great branch banks' incentives to attract short-term foreign debt. The moral-hazard problem had already been present before the war, but it was exacerbated by the intensification of competition in the 1920s. The Reichsbank did little to prevent the risk increase in the great branch banks' balance sheets. Moreover, it promoted the concentration movement and embraced the ever more prominent role played by the great banks. When the crisis arrived, the Reichsbank's preferential treatment of the great branch banks vindicated the banks' behavior.

Hence, the German twin crisis was not simply the result of an adverse macroeconomic shock, but also of bad business policies of a very important part of the banking sector and of the Reichsbank itself. Therefore, it is quite possible – contrary to Balderston (1994) – that the crisis of 1931 would *not* have occurred if the banks had acted with exemplary caution in the 1920s.

There are three important lessons to be learned from the German crisis: First, the crisis highlights the dangers of building up high levels of short-term foreign indebtedness in the banking system. A reversal of capital flows threatens not only the stability of the currency, but also the banking system, because the country enters a vicious circle that can only be broken by an international lender of last resort. Second, the German experience shows that implicit guarantees can have much the same effects as explicit systems of deposit insurance. Especially in times of intensifying competition, the importance of prudential regulation of banks cannot be overstated, particularly for banks that are "too big to fail". Finally, a selective lender-of-last-resort policy that supports weak banks at the expense of stronger banks potentially entails high costs for the economy because it distorts competition in the banking sector and because it sets bad incentives for the privileged banks.

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7 Appendix: Data Sources

Our major sources are the balance sheets of monthly reporting banks. The publication of interim balance sheets started in 1911 as a reaction to the "Bankenquête" of 1908. At first, banks published five balance sheets per year using a balance sheet scheme prescribed by the Reichsbank. Monthly publication started only in March 1928. No balances were provided in December and January to avoid interference with the annual balances. As the prescribed balance-sheet scheme was modified in March 1928, continuous series exist only from that date on. The publication of interim balance sheets was voluntary. However, any bank who wanted its shares to be authorized for trading at a German stock exchange was required to publish at least five interim balance sheets. Therefore, the group of monthly reporting banks included most big credit banks. In addition, all SLGs provided monthly balances.

Monthly balance sheets were published in Deutscher Reichs- and Preußischer Staatsanzeiger. December figures can be added from Deutsche Bundesbank (1976), Die Bank, and Enquête-Ausschuß (1933). Monthly deposits of savings banks are taken from Institut für Konjunkturforschung (1933, 1936), which also contains monthly figures on the currency circulation, exchange rates, and stock prices. Bimonthly balance sheets of savings banks are available in Statistisches Jahrbuch für das Deutsche Reich. Weekly data on Reichsbank reserves and the currency circulation are taken from James (1985). Detailed data on the characteristics of different bank groups are contained in Enquête-Ausschuß (1930). Another rich data source is Deutsche Bundesbank (1976), which has annual data on banks' balance sheets, foreign debt, the balance of payments, and other macroeconomic variables. Additional statistical information can be found in Enquête-Ausschuß (1933), Wirtschaft und Statistik, and Die Wirtschaftskurve. Moreover, we made use of the following files from the Reichsbank (R2501), located in the Bundesarchiv Berlin-Lichterfelde: 6462, 6484, 6479, 6482, 6484, 6491-92, 6494-96, 6501, 6557-59, 6572, 6574, 6631, 6634, 6709, 6746, 6925, 6984, 7712.

All banks providing intermediate – not necessarily monthly – balance sheets were also required to report their foreign deposits and foreign claims confidentially to the Reichsbank on a quarterly basis. These data were never published, but they are partly available in the Reichsbank's archive. Yearly data on foreign deposits of certain bank groups are provided by Deutsche Bundesbank (1976). Data on the evolution of foreign acceptance loans can be obtained from monthly balance sheets for monthly reporting banks, but the other type of foreign loans is hidden in the balance sheet position "other deposits". We have merged the different data sources and tried to reconcile the inconsistencies in the data, generally by replacing older figures by newer ones. Hereby, we were able to construct series that give a relatively complete picture of the evolution of foreign debt on a quarterly basis. We disregarded the data on foreign debt in Magazin der Wirtschaft because they appeared to be inconsistent with the remaining data. It should be noted, however, that these numbers indicated the correct order of magnitude of foreign debt at the great banks. Hence, the public was well informed about the high levels of foreign debt at these banks.

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