

# The Austrian banking crisis of 1931: a reassessment

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The current literature on the causes of the Austrian financial crisis in 1931 emphasises both foreign and domestic factors. This article offers new data to analyse this issue. Its findings reinforce the importance of a domestic factor in bringing about the crisis: universal banks' exposure to industrial enterprises, which were the universal banks' main borrowers and creditors. During the 1920s, these industrial enterprises failed to perform well, rendering the universal banks insolvent. The Credit-Anstalt, which became an 'acquirer of last resort' for three other universal banks during the 1920s, was insolvent as early as 1925. The bank, however, could have avoided bankruptcy had it been spared the burden of Unionbank's non-performing assets.

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**JEL classification:** N24

The banking system has tremendous ability to conceal insolvency behind liquidity. This was problematic during both the Great Recession and the Great Depression in the United States (Eichengreen 2015; Postel-Vinay 2016). This article demonstrates that the debacle of Austria's largest bank, the Credit-Anstalt (CA), was a story of the same nature.

In this article, I analyse the causes of the Austrian banking crisis of 1931. The historiography offers a number of explanations for the episode. One strand of the literature places the Austrian story into an international context and posits that the flight of

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foreign creditors played a pivotal role in bringing about the banking crisis (e.g. Eichengreen 1992; Fior 2008; Kindleberger 1986). Alternative interpretations give more emphasis to the domestic nature of the episode (Eigner 1997; März 1984; Mosser and Teichova 1991; Schubert 1991; Stiefel 2008; Teichova and Cottrell 1983; Weber 1995, 2008).

The purpose of this article is to analyse the causes of the crisis in the light of new data. I have built two data sets. One includes the balance sheets and profit and loss statements of the financial system between 1925 and 1933 and covers approximately 300 financial institutions. The purpose of this data set is to analyse how important foreign creditors were in sustaining this banking system. The other data set incorporates the balance sheets and profit and loss statements for the 'Konzerns', the industrial network of four universal banks – the Verkehrsbank (VB), the Unionbank (UB), the Boden-Credit-Anstalt (BCA) and the CA – which experienced distress (defined as a bank failure, merger or bailout) between 1925 and 1931 and which all ended up under the CA's roof by 1930. This data set includes approximately 160–80 enterprises for each year. The purpose of this collection is to uncover the extent to which the Konzern, the heart of the universal bank, contributed to the distress of these four banks and eventually to the 1931 crisis. Through these data sets, the study overcomes the traditional hurdle of data scarcity associated with the analysis of the Austrian crisis.

I demonstrate that the four banks under observation were insolvent as far back as 1925. The reason for this insolvency was the weak performance of their industrial network. I also find that the four universal banks were not equally weak. The UB was considerably more fragile than the other three, which, although still insolvent, could have survived long term without external help. The data suggest that, if the CA had been spared the UB's assets, it may have survived, and the whole banking crisis may have been avoidable.

This article follows in the footsteps of Marcus' (2018) in-depth and multi-angled investigation of the 1921–31 period. Marcus addresses the same question as this article and concludes that domestic factors had precedence over international factors in explaining the Austrian crisis. Further, this article speaks not only to the historiographer on the causes of the 1931 crisis in Austria but also to several other audiences. Those studying the role of universal banks in industrialisation (Cameron 1953; Fohlin 1999; Gerschenkron 1962; Guinnane 2002; Herriegel 1996; Lehmann-Hasemeyer and Wahl 2017; Tilly 1998) and these banks' economic benefits (Benston 1994; Boyd *et al.* 1998; Kroszner and Rajan 1994; van Overfelt *et al.* 2009; Puri 1996) may find the analytical approach of this article useful. The study of universal banks in history struggles to locate a good definition of, and a simple measure for, universal banks' exposure to their Konzern. This article offers one. It also connects to those studies investigating whether the universal banking structure increases financial instability (Battilossi 2009; Colvin *et al.* 2015; White 1986). Finally, the article relates to studies analysing interwar crises, especially in countries with similar banking structures (for Germany: Adalet 2003; Balderston 1991; Ferguson and Temin 2003; James 1984; Schnabel 2004; Temin 2008; for Italy:

Battilossi 2009; Forsyth 1991; Sraffa 1922; for Hungary: Macher 2018) and has a micro-level analytical approach similar to that of Schnabel (2004) and Macher (2018).

The article is structured as follows. The next section provides a review of the literature. An analysis of the liquidity position of the four banks follows, and I then review whether they had solvency issues. The final section concludes.

## I

What caused the debacle of the CA and the Austrian banking system? The historiography offers a number of explanations. One is concerned with the banking system's exposure to foreign capital.

The Austro-Hungarian Monarchy was on the losing side of World War I. The country had to pay reparations and, since its assets were used as collateral, it could not borrow. In the early 1920s, in the immediate aftermath of the war, the country experienced hyperinflation. When the situation became untenable, the help of the League of Nations was sought, and the economy was stabilised through a large foreign loan. The implementation of a new currency, the Austrian Schilling (AS), the establishment of an independent central bank, the Austrian National Bank (ANB), and a balanced government budget requirement assured creditors of the macroeconomic and monetary stability of the country (Cottrell 2017, pp. 105–41; Marcus 2018, pp. 35–258).

What followed stabilisation was, according to the literature, a 'borrowing binge'. The Austrian banking system was excessively exposed to short-term foreign creditors (Eichengreen 1992, pp. 262–9; Fior 2008, pp. 132–5; Kindleberger 1986, pp. 145–7). Banks borrowed short term and in foreign currency, extended these resources to Austrian industry as long-term loans denominated in Austrian Schillings, and thereby generated currency and maturity risks. Authors have argued that, due to Central Europe's high levels of indebtedness, foreign creditors had been doubtful about the stability of these currencies even before the announcement of the CA's weak financials on 11 May 1931 (Eichengreen 1992, p. 261). When the largest Austrian bank's losses became public, foreign creditors began to flee the financial system. The currency and maturity mismatches produced gaping holes in the bank's balance sheet and brought about its demise: 'In Britain, Germany, Austria, and Hungary alike, the withdrawal of foreign deposits was the catalyst for the financial crisis that shattered the gold standard system' (Eichengreen 1992, p. 262).

While this approach emphasises liquidity challenges in the crisis, the other strand of the literature focuses on solvency and blames banking fragility on a peculiar organisational structure, universal banking (Eigner 1997, pp. 481–4; März 1984, pp. 347–66; Mosser and Teichova 1991, pp. 122–57; Schubert 1991, pp. 35–40; Stiefel 1994, pp. 178–93; Teichova and Cottrell 1983, pp. 31–55; Weber 1995, pp. 340–50; 2008, pp. 76–98). Austria's largest financial institutions were universal, combining commercial and investment banking activities, and both owned and loaned to industrial enterprises. Their links to industry had originated in the pre-1914 period, and they all

had their own Konzerns: industrial networks into which the banks were invested either as shareholders or lenders, but in most cases, as both. This article defines the Konzern as those enterprises about which the universal banks made such claims.<sup>1</sup> Most Austrian industrial joint-stock corporations were under the majority ownership of one of the Austrian universal banks (Rudolph 1976, p. 120). World War I and the subsequent years of hyperinflation further cemented such connections (Schubert 1991, pp. 33–5; Weber 1995, pp. 344–50). The strengthening ties between banks and industry had serious repercussions. Authors have argued that the reconstruction scheme of the League of Nations brought about ‘no real recovery after 1924’ (Kindleberger 1986, p. 144). Hence, Austrian universal banks were exposed to the ‘fitful performance’ of industry (Weber 1991a, p. 19). This reduced the banks’ profitability, and the loans provided to the Konzerns tied up their capital.

Schubert argued, in connection with the CA’s distress, that the departure of foreign creditors was the fundamental cause of the CA’s illiquidity, while the exposure to industry explains the bank’s insolvency (Schubert 1991, pp. 33–9, 44–6). This article reassesses this argument by using new data and by applying a quantitative, micro-level analytical approach in connection with not only the CA, but also the other universal banks – the VB, the UB and the BCA – which ended up being merged with the CA.

## II

I have manually collected the balance sheets and profit and loss statements of Austrian joint-stock financial institutions, bank by bank, from 1925 until 1933. This includes underwriting banks (*Pfandbriefinstitute*), banks limited by shares (*Aktien-Kredit Banken*), savings banks (*Sparkassen*) and significant credit associations (*bedeutendere Kreditvereinigungen*). The data set is the product of primary research based on a contemporary statistical publication, the *Financial Compass*. The representativeness of this data set is reviewed in Table A2 in the Appendix.

Unquestionably, these financial statements were, in some respects, guilty of misrepresentation, but if we read them with attention to such risks, they can be relied on to construct a comprehensive overview of the financial system. Schubert has pointed out that these accounts are misleading in that they represent non-performing loans as solid, profit-producing assets (Schubert 1991, p. 25). This article also finds that Viennese banks booked interest on loans even if they did not actually receive that interest. If the financial statements are analysed by taking into consideration these caveats, they can provide very useful information. This study draws conclusions based only on data one can reasonably rely on and specifically highlights when data should be handled with care.

Table A1 in the Appendix shows that there were four main types of Austrian joint-stock financial institutions during the interwar period: universal banks, savings banks,

<sup>1</sup> *Financial Compass*, 1926–35.

mortgage banks and other banks. This article focuses on the universal banks. These were the only players in the banking system with significant direct exposure to Austrian industry through their Konzern, and only these banks had international connections and hence foreign creditor relationships. Other players were small and locally focused. The universal banks are therefore the players on which the literature's illiquidity argument must be tested.

Figure 1 shows the equity and liability side of the whole financial system's and the universal banks' balance sheets. The first diagram highlights the share of foreign creditors within the aggregate balance sheet of the banking system. At the height of the sector's foreign exposure in 1927, financing provided by foreign creditors amounted to AS 836 million, and its share in Austrian banks' total financing was 16 per cent. This figure declined to 9 per cent in 1929 and remained at that level in 1930.

Unfortunately, the data source does not disclose individual financial institutions' exposure to foreign creditors. However, it can be safely assumed that the majority of, if not all, foreign creditors can be assigned to the universal banks. Subsequent analyses allocate all foreign creditors to the universal banks.

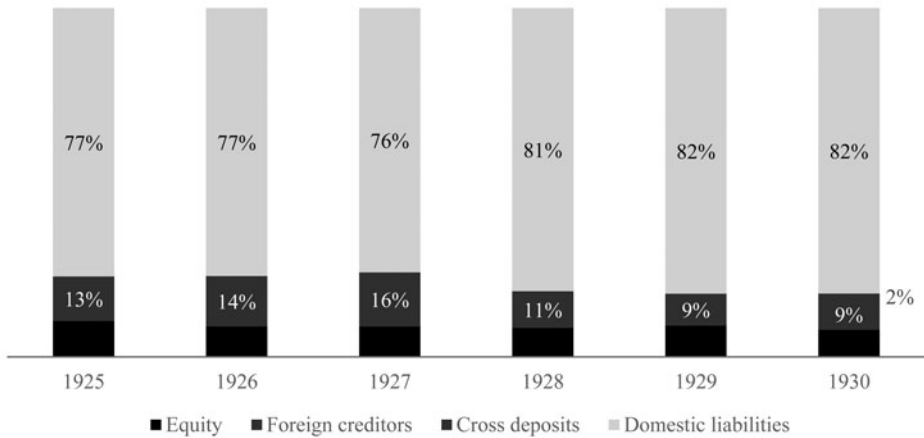
Following this assumption, the second diagram of Figure 1 shows the equity and liability side of the universal banks' balance sheet. Universal banks' exposure to foreign creditors reached its peak in 1927, when over a quarter of these banks' financing came from foreign sources. In subsequent years, this ratio declined to approximately 17–18 per cent. That is, domestic liabilities then constituted the dominant portion of universal banks' external (excluding equity) financing sources, approximately 70 per cent of the total from 1928 onwards.

If deposits are removed from domestic liabilities, the remaining 55–60 per cent are the universal banks' domestic creditors: the ANB's rediscount, loans from other financial institutions and the current account balances of the Konzern. Central bank rediscount accounted for 4 per cent of the universal banks' total financing in periods of tranquillity, and the figure seems to increase only in years of crisis. Since no information is available on individual banks' reliance on the central bank's rediscount, this analysis assumes that all of the central bank's rediscount went to the universal banks. Interbank lending generated some 6–17 per cent. These were savings banks' bank receivables (*Bankguthaben*). This analysis assumes that all of savings banks' bank receivables went to the universal banks.<sup>2</sup> The remaining portion, making up the largest part – 30–45 per cent of universal banks' total assets – came from the Konzern. That is, the universal banks' most significant financier was their very own industrial base.

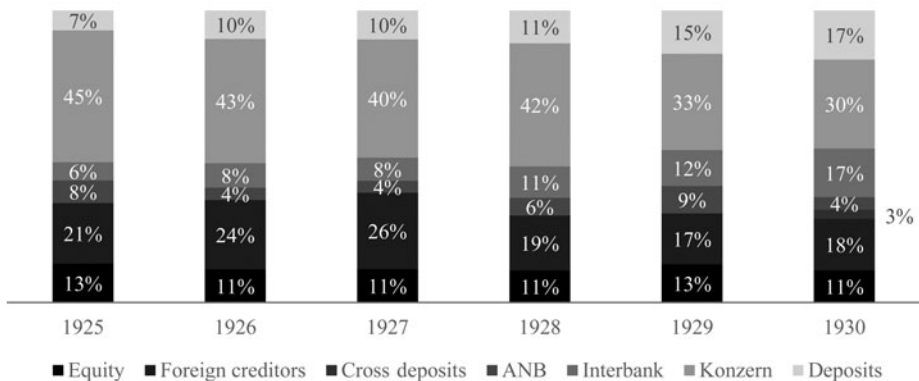
As the literature has pointed out, exposure to foreign creditors raises the risk of currency mismatch. If the universal banks were lending more in foreign currency than the volume of foreign currency financing sources made available to them, they

<sup>2</sup> There is evidence that various savings banks were closely linked with the universal banks. For example, the CA was connected to the Erste österreichische Spar-Casse (*Financial Compass*, 1927, p. 517). The largest source of bank receivables was the Österreichische Postsparkasse, providing around 20% of the total.

## Financial system



## Universal banks

Figure 1. *The equity and liability side*

Note: Data on foreign creditors unavailable for 1931.

Sources: For the total financial system: *Financial Compass*, 1925–32. Foreign creditors for 1925–8 based on *Financial Compass*, 1931, pp. 146–7. Foreign creditors for 1929 based on *Financial Compass*, 1931, p. 274, fn 7 for the CA's figure; Weber 1991b, p. 341. For the rest: foreign creditors for 1930 based on Weber 1991b, p. 341. Foreign creditor data checked against the CA's reports on its own foreign creditor exposure based on *Financial Compass*, 1928, p. 375, fn 4; 1929, p. 374, fn 5; 1930, p. 354, fn 5; 1931, p. 274, fn 7. Cross deposits based on BoEA, file OV28/75, Cross deposits, 18 April 1932; Aguado 2001, pp. 204–5.

incurred exchange rate risk. Table 1 examines this risk and calculates the foreign currency mismatch. In 1926 and 1927, institutions had more foreign currency sources than they eventually extended as loans. From 1928, however, banks were granting

Table 1. *Foreign currency mismatch (million Austrian Schilling)*

	1926	1927	1928	1929	1930
Foreign creditors	685	836	649	566	611
Foreign borrowers	535	662	728	741	758
Foreign currency mismatch	150	174	-79	-174	-147
ANB reserves	680	738	797	741	930
Foreign currency mismatch/ANB reserves	22.1%	23.6%	-9.9%	-23.5%	-15.8%
ANB gold cover – adjusted for mismatch			67.3%	51.7%	71.8%
Cross deposits					107
Mismatch with cross deposits/ANB reserves without cross deposits <sup>a</sup>					-30.8%
ANB gold cover – adjusted for mismatch and cross deposits					62.0%

Note: The *Financial Compass* identifies these creditors and borrowers as ‘*ausländische Kreditoren*’ (foreign creditors) and ‘*ausländische Debitoren*’ (foreign borrowers). It is not disclosed in what currency they were lending and borrowing. It is assumed here that the transactions were carried out in foreign currency.

Cross deposits increase the foreign currency mismatch and also reduce the ANB’s reserves.

Sources: *Financial Compass*, 1928, p. 375; 1929, p. 374; 1930, p. 354; 1931, pp. 146–7, 274; *ANB Mitteilungen*, 1926–33; BoEA, file OV28/75, Cross deposits, 18 April 1932; Aguado 2001, pp. 204–5; Weber 1991b, pp. 325–6, 342, 479.

more foreign currency loans than the volume of financing they received from foreign creditors. In 1930, the mismatch amounted to AS 147 million.

Table 1 calculates how much of the central bank’s foreign reserves would have been necessary to finance the banking system’s foreign currency mismatch. Table 1 also shows the gold cover (the ratio of the central bank’s gold and foreign currency reserves and the total banknotes in circulation) in the extreme scenario where the ANB had to finance the entire currency mismatch from its own reserves. The gap between foreign lending and borrowing amounted to 9.9, 23.5 and 15.8 per cent of the ANB’s reserves from 1928 to 1930, respectively. Had the ANB had to fill in this gap from its reserves, its coverage ratio would have declined to 67.3, 51.7 and 71.8 per cent from 1928 to 1930, respectively. These figures are well above the legal minimum.<sup>3</sup>

Nonetheless, to establish an accurate picture of the foreign currency exposure of the banking system and the ANB’s ability to provide lender of last resort support, one more matter must be taken into consideration: cross deposits. The cross-deposit

<sup>3</sup> BoEA, file OV28/32, Statutes of the Austrian National Bank. Based on the statutes, the ANB’s gold cover had to be 20% in the first five years of its operation, 24% in the next five years, 28% in the following five years, and 33 1/3% afterwards.

scheme was designed by the ANB to provide support to the CA after its merger with the BCA without hurting the central bank's reserve backing. Through this mechanism, the ANB lent foreign currency credits to international banks, and the latter in turn lent the same amount to the CA at a one-percentage point profit margin. Through this channel, the ANB indirectly provided foreign currency credits to the CA.<sup>4</sup>

The calculations in [Table 1](#) must therefore be adjusted for the volume of cross deposits. The total volume of cross deposits is estimated to be around 15 million US dollars, or AS 107 million (Aguado 2001, pp. 204–5; Weber 1991b, p. 479).<sup>5</sup> It is assumed here that cross deposits were not included in the foreign creditor figures reported by the banks and are thus depicted separately in [Figure 1](#). The ANB did not report the impact of these foreign currency credits on its books (Aguado 2001, pp. 202–4). [Table 1](#) shows that, after the adjustment, if the ANB had had to support the universal banks in the event of foreign creditor flight, it would have lost 30.8 per cent of its reserves, and its coverage ratio would have declined to 62.0 per cent. This would still have been well above the legal minimum.

The annual change in foreign creditors relative to the universal banks' assets also does not suggest that foreign creditor exposure could have caused liquidity problems at these banks. Universal banks received a capital inflow from abroad amounting to 7.1 per cent and 4.7 per cent of their total assets in 1926 and 1927, respectively. From 1928, the volume of foreign creditors declined sharply, but the biggest drop – of AS 187 million in 1928 – amounted to only 5.4 per cent of the universal banks' total assets. The year 1929 continued with a fall of AS 83 million, 2.6 per cent of assets. However, these figures should again be adjusted for cross deposits, giving a net increase in foreign creditors of AS 24 million in 1929.<sup>6</sup> The following year again saw an increase in foreign creditors of AS 45 million, 1.3 per cent of total assets. That is, universal banks experienced a net outflow of foreign credits only in 1928.

Annual fluctuations, however, may hide extreme volatility within the year. [Figures 2](#) and [3](#) hence offer a more thorough assessment of liquidity. This analysis has the following considerations. First, none of the four banks under assessment here actually failed: they were all bailed out. In 1927, the UB and the VB were merged with the BCA, while the BCA was absorbed by the CA three years later. Finally, in 1931, the CA was also bailed out by the state.<sup>7</sup> Information on whether the banks were

<sup>4</sup> BoEA, file OV28/75, Cross deposits.

<sup>5</sup> BoEA, file OV28/75, Cross deposits, 18 Apr. 1932.

<sup>6</sup> Cross deposits amounted to AS 107 million at the end of 1929. They gradually declined, falling by approximately a third by 1931. Since the exact timing of their departure is uncertain, it is assumed that their volume did not change in 1930. RAL, III/488 (a–c) Austria; BoEA, file OV28/75, Cross deposits; assumption based on the author's discussions with Dr Nathan Marcus.

<sup>7</sup> The UB's and the VB's mergers with the BCA became public around 20 Sep. 1926 and 3 Dec. 1926, respectively, and the effective date of these mergers was 25 March 1927. The BCA's merger with the CA became public around 5 Oct. 1929, and the effective date of this merger was 1 Jan. 1930.



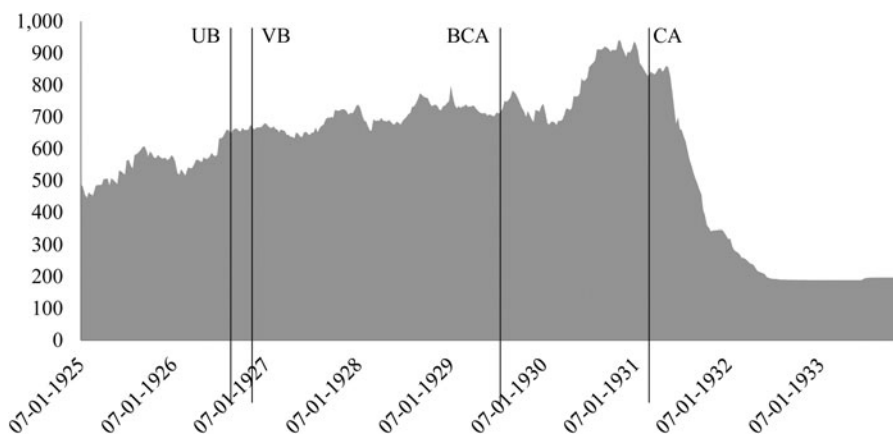


Figure 2. *The reserves of the Austrian National Bank (million Austrian Schilling)*  
 Source: ANB Mitteilungen, 1926–33.

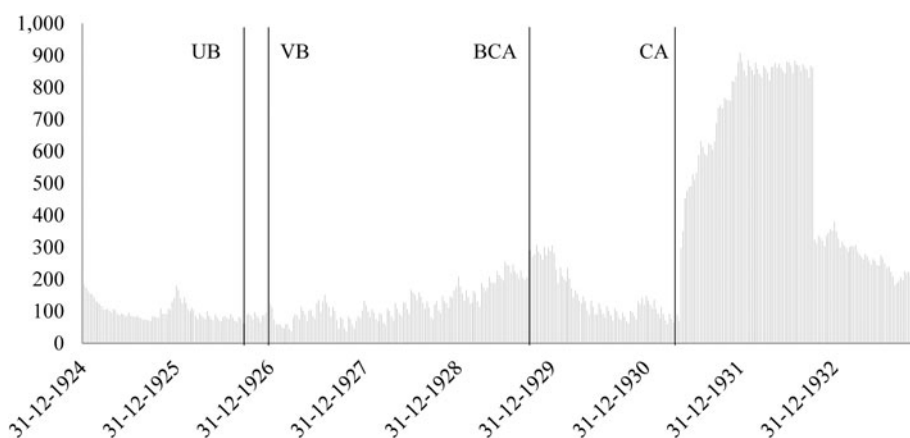


Figure 3. *The rediscount of the Austrian National Bank (million Austrian Schilling)*  
 Source: ANB Mitteilungen, 1926–33.

illiquid when they applied for external support may reveal important details about their motivations. Therefore, to make this transparent, I distinguish between two time periods: the first before the date of the announcement of each bank's distress and the other afterwards. Figures 2 and 3 indicate this date for each bank. Second, this investigation must focus on not only foreign but also domestic creditors, as the latter – more significant – financiers could also have caused liquidity problems at

the four banks. Third, since high-frequency data on foreign and domestic creditors are unavailable, the analysis applies proxies. My proxy for foreign creditors is the ANB's reserves, depicted in Figure 2. If foreign creditors commence a flight, banks turn to the central bank to purchase foreign currency, which reduces the central bank's reserves. My proxy for domestic creditors is the ANB's rediscount, depicted in Figure 3. If domestic creditors commence a flight, banks' ultimate source is again the central bank, and the financing channel they use is the central bank's rediscount.

Figure 2 shows that there was no foreign creditor flight in any of the four failures before the cut-off date. Further, in the case of the UB, the VB and the BCA, there was also no significant flight following the announcement. The CA's case is different in this regard: here, the 11 May 1931 announcement triggered an enormous and continuous decline in ANB reserves.

Figure 3 shows that the ANB's rediscount did increase before the BCA's collapse, suggesting that the central bank was providing liquidity to the BCA. Based on monthly deposit data, the bank also experienced a depositor flight immediately after the announcement of its distress.<sup>8</sup> The VB's deposits were continuously increasing right up to its merger with the BCA, and the ANB's rediscount does not indicate liquidity problems at this bank. The announcement of the UB's troubles also did not trigger significant changes to the ANB's rediscount. This bank's deposits did decline in the weeks before its merger with the BCA, but by that time, the bank's distress had been public for more than five months.

The CA's deposits were increasing prior to 11 May 1931, and before this date there was no change in the ANB's rediscount. This implies that the CA turned to the ANB for help when it was still liquid. Following 11 May, however, within just a few days, the ANB's rediscount increased manyfold, suggesting an enormous domestic flight at the bank.

The previous analyses lead to a number of findings about the liquidity position of the universal banks. First, domestic liabilities in general, and financing from the Konzern in particular, were significantly more important than financing provided by foreign creditors. This phenomenon also explains an apparent oddity about these banks. They appear thinly capitalised, with their equity at only 11–13 per cent of their total assets, raising doubts about their ability to absorb the unreported losses that the literature claims they had to endure in the 1920s. However, if one views Konzern member accounts as quasi-equity, the universal banks were in fact very well-capitalised, having sufficient funds to sustain several years of losses. If these banks failed to collect interest on many of the loans they extended, how were they able to pay interest on their liabilities? In light of the finding that much of their funding came from their Konzern, the most likely interpretation is that, even if universal banks had to book interest expenses on this Konzern funding, they did not actually have to make the payments on those payables. That is, the

<sup>8</sup> Monthly deposit data support this analysis but are not depicted here. The source is the *ANB Mitteilungen*, 1926–33.

Konzern was standing on both sides of the universal banks' balance sheets: it was receiving the loans on which interest was booked but not received as well as providing the dominant portion of the financing for the bank on which interest was booked but not paid. Konzern financing thus acted as a source of cheap – or even free – financing for the universal banks.

Second, the ANB's reserve backing was very strong. The central bank's coverage ratio was around 90 per cent in the years preceding the crisis.<sup>9</sup> The analyses demonstrate that, in the absolute extreme scenario of all foreign creditors departing from the banking system, the ANB's gold cover would still have been at the legal minimum. While in the middle of a crisis even such a strong reserve backing may prove insufficient, prior to the crisis, it should provide reassurance to investors. Further, even if the banks did not offer an honest representation of their foreign currency mismatch and the figures were in fact higher than reported, these figures would have had to be three times higher to reduce the ANB's coverage to below the legal minimum.

Third, the high frequency analysis shows that only the BCA suffered from liquidity problems prior to its application for external support. This raises the intriguing question: why were these banks bailed out? The BCA's case could potentially be explained by its domestic creditor flight. However, the loss of 6 per cent of total assets does not seem to justify a deep crisis of the kind that the powerful ANB could not have handled. These findings suggest that the four banks were not simply victims of creditor flight but had fundamental weaknesses causing them to be insolvent and making them seek external help. This is what is investigated in the next section.

### III

The equity and liability side of their balance sheet did not offer sufficient clues as to why the universal banks sought external help. The problems must therefore have resided on their asset side. However, the analysis of the asset side is generally more challenging, as data limitations abound. Information on creditors and depositors is usually accessible. However, non-performing loans and, in general, the quality of assets are not reported by banks and may not even be recorded as long as the bank is liquid. The theoretical literature on banking crises thus primarily investigates the liability side of banks in crisis (e.g. Calomiris and Gorton 1991; Diamond and Dybvig 1983). This section, however, focuses on the asset side, and its approach is closest to the theoretical model of Diamond and Rajan (2005).

In the case of the Austrian universal banks, even the quality of the data is questionable. The universal banks misrepresented the assets on their balance sheets (Schubert 1991, p. 25). They perpetuated the non-performing loans to their Konzerns and represented defaulted loans as healthy ones on their balance sheets. Furthermore, I have found that the assets of the three universal banks that merged during the 1920s – the VB, the UB and the BCA – continued to be falsified during their

<sup>9</sup> The author's calculations based on *ANB Mitteilungen*, 1926–33.

absorption into the successor bank's balance sheet.<sup>10</sup> As explained above, it is also very likely that the universal banks continued to book interest on their non-performing loans even when the interest was not received. They therefore falsified their net interest margin, thereby making their profit and loss accounts unreliable. The net-interest-margin-based approach applied by Macher (2018) for the estimation of non-performing loans thus cannot be adopted here. The universal banks' financial statements are, therefore, not useful for the analysis of their insolvency.

This article thus adopts a new approach: it reaches out to the ultimate source, the financial accounts of the Konzerns themselves. The idea is to use the information on the performance of Konzern corporations as a basis and from that infer the quality of the universal banks' assets. Since one can safely assume that the predominant portion of the universal banks' assets was lent to or invested into their Konzerns, the health of the Konzerns should reflect the health of these banks' assets. Indeed, the Konzern debt of the sample made up approximately 68 per cent of the CA's total lending in 1930.<sup>11</sup>

I have hence built another micro-level data set by collecting the balance sheets and the profit and loss statements for the period of 1925–30 of the Konzern corporations of the four universal banks that failed. The source was the *Commercial Compass*. The four Konzerns are that of the VB, UB, BCA and CA. Konzern members were identified based on the banks' reporting in the *Financial Compass*.<sup>12</sup>

Table A3 in the Appendix provides an overview of this second micro-level data set. A total of approximately 400 Konzern companies have been identified. However, not all companies actually reported a financial statement in each year between 1925 and 1930. Those that failed to report were presumably experiencing financial difficulties. Hiding financial distress through non-reporting was a common practice among banks as well as companies, and the authorities' enforcement of regular reporting was ineffective. Further, I included only those companies which supplied at least two financial statements for the six years under review to gain some sense of the dynamics of each company. After these restrictions, there are approximately 160–80 Konzern enterprises in the data set for each year, and these were most likely the best-performing Konzern members of the four universal banks.

In the analysis, I distinguish between three levels of bank insolvency based on the performance of the bank's assets:

- (i) when borrowers stop servicing the principal on the loan (tier 1);

<sup>10</sup> At the UB–BCA merger, 14.1% of the UB's total assets were written off. The figure for the VB–BCA and CA–BCA mergers was 5.7% and 5.8%, respectively. Since shareholders lost 90% of their equity at these mergers, these write-offs seem meagre and therefore deceptive. The author's calculations based on *Financial Compass*, 1928, pp. 272–3, 279–80, 459–62; 1930, pp. 256, 264–5; 1931, pp. 262–3, 274.

<sup>11</sup> The author's calculation based on *Commercial Compass*, 1925–32.

<sup>12</sup> CA: *Financial Compass*, 1927, pp. 371–5; 1931, pp. 278–81; BCA: *Financial Compass*, 1927, pp. 261, 263–8; 1931, pp. 270–1; UB: *Financial Compass*, 1927, pp. 421–2, 424–5; VB: *Financial Compass*, 1927, pp. 429–30.

- (ii) when borrowers stop servicing part of the interest on the loan as well (tier 2); and
- (iii) when borrowers stop generating sufficient cash income to cover the bank's most basic expenditures (tier 3).

Table 2 offers a simple calculation for the theoretical thresholds for the three-tier insolvency analysis. Its cases differ only in the borrower's level of indebtedness, as measured by the debt-to-profit ratio. The debt-to-profit ratio indicates how many years' earnings are necessary for a company to repay its debt in full. If the ratio is high, the company has too much debt and/or insufficient profits to service that debt. Since the calculation assumes a constant, theoretical debt level, the various scenarios differ only in the underlying company's profit-generating potential.

Assuming an 8 per cent interest rate,<sup>13</sup> a company enters tier 1 insolvency at a debt-to-profit ratio of 6 times. At a debt-to-profit ratio of 5 times, the company has sufficient earnings to pay the interest and the principal on the loan and still has some money left to distribute to its own shareholders. At a ratio of 6 times, however, the company's distributable profits are negative, suggesting that it will stop servicing the principal of the loan. Between 6 times and 12 times debt-to-profit, the company is in tier 1 insolvency, having less and less profit to service the principal, but still having enough to make interest payments in full. At a debt-to-profit ratio of 13 times, however, the company enters tier 2 insolvency, as it can no longer pay the full interest due on the loan. That is, companies with a debt-to-profit ratio at or below 5 times are healthy, those with ratios between 6 times and 12 times can still make interest payments but not principal payments (tier 1 insolvency), and from a ratio of 13 times, they default on the principal as well as on the interest of the loan (tier 2 insolvency).<sup>14</sup>

From the perspective of the bank, a tier 1 corporate default is manageable; a tier 2 default, however, threatens the existence of the bank itself. At tier 1, the bank is still earning the full interest on the loan, and it is only the loan principal – that is, the bank's capital – which is immobilised by the company's non-payment. In this phase, the bank is already insolvent, but it can still sustain its own operations from the interest payment. At tier 2, however, the bank is earning less interest than contractually determined, its net interest spread is lower than planned, and thus it faces the threat that its declining income may gradually prove insufficient to cover its own operational expenses.

Panel 1 of Table 3 applies the three-tier method to the data set of the Austrian Konzern corporations and shows the actual debt-to-profit ratios.<sup>15</sup> The four Konzerns had their combined debt-to-profit ratios at or above the 12 times critical threshold in all years under observation. This suggests that they needed their banks' active cooperation to avoid bankruptcy, as they had defaulted not only on principal,

<sup>13</sup> The 8% is generously low, applicable only to first-class, affiliated firms. *Statistische Nachrichten*, 1925–32.

<sup>14</sup> The interest rate is based on the sources listed in Table 3. The generous 10-year term is assumed as the Konzern and the bank were affiliated entities.

<sup>15</sup> Debt includes all long-term liabilities. Profit is calculated as income plus amortisation and depreciation to reach cash profit.

Table 2. *Theoretical calculations for insolvency thresholds*

	Healthy				Tier 1				Tier 2
Debt	100	100	100	100	100	100	100	100	100
Debt-to-profit ratio	5.0×	6.0×	7.0×	8.0×	9.0×	10.0×	11.0×	12.0×	13.0×
Profit before financial expenses	20.0	16.7	14.3	12.5	11.1	10.0	9.1	8.3	7.7
Interest	8%	8%	8%	8%	8%	8%	8%	8%	8%
Average term (years)	10	10	10	10	10	10	10	10	10
Debt, beginning of period	100	100	100	100	100	100	100	100	100
Interest payment	8	8	8	8	8	8	8	8	8
Principal repayment	10	10	10	10	10	10	10	10	10
Debt, end of period	90	90	90	90	90	90	90	90	90
Profit before financial expenses	20.0	16.7	14.3	12.5	11.1	10.0	9.1	8.3	7.7
Interest expense	8	8	8	8	8	8	8	8	8
Cash remaining for principal payment and distribution	12.0	8.7	6.3	4.5	3.1	2.0	1.1	0.3	-0.3
Principal payment	10	10	10	10	10	10	10	10	10
Cash remaining for distribution	2.0	-1.3	-3.7	-5.5	-6.9	-8.0	-8.9	-9.7	-10.3

Table 3. *Solvency analysis for the four Konzerns (million Austrian Schilling)*

## Panel 1. Aggregate debt-to-profit ratios

	1925	1926	1927	1928	1929	1930
Debt-to-profit – aggregate for the four Konzerns	18.5×	16.5×	13.4×	13.0×	11.9×	15.1×

## Panel 2. Tier 3 assessment (aggregate for the four banks)

	1925	1926	1927	1928	1929	1930
Interest payment	61	61	58	60	68	60
Securities <sup>a</sup>	1	1	1	1	1	1
Special loans <sup>b</sup>	0	0	0	0	0	0
Other liabilities <sup>b</sup>	2	2	1	1	1	0
Creditors – foreign <sup>b</sup>	29	31	31	24	22	19
Savings banks <sup>c</sup>	11	13	11	16	18	22
and	11	6	5	8	12	5
Deposits – domestic <sup>d</sup>	5	6	6	7	8	9
Deposits – foreign <sup>e</sup>	2	2	2	2	5	4
Operational expenses <sup>f</sup>	54	58	57	56	38	44
Dividends paid <sup>f</sup>	11	10	16	17	7	0
Theoretically necessary cash income (four banks)	126	129	131	133	113	104
Actual reported cash income of the four Konzerns	74	73	99	100	103	76

## Panel 3. Disaggregated debt-to-profit ratios

	1925	1926	1927	1928	1929	1930
CA	10.9×	8.3×	6.7×	7.4×	8.7×	8.2×
BCA	12.6×	10.8×	10.2×	9.3×	6.1×	9.0×
UB	-20.3×	-18.4×	-29.2×	-42.6×	-89.5×	-13.0×
VB	9.4×	9.5×	10.1×	11.1×	7.2×	4.6×
BCA combined			21.6×	17.8×	15.1×	25.5×

<sup>a</sup>*Financial Compass*, 1931, pp. 275–6; 1930, pp. 265–6; 1929–30 based on ANB benchmark rate.

<sup>b</sup>Same as savings banks' rate.

<sup>c</sup>*Statistische Nachrichten*, 1925–32.

<sup>d</sup>*ANB Mitteilungen*, 1926–33.

<sup>e</sup>Same as Deposits – domestic rate.

<sup>f</sup>*Financial Compass*, 1926–35, actual data for each universal bank.

Source: the author's calculations based on *Financial Compass*, 1926–35, and *Commercial Compass*, 1925–32.

but also on interest payments. As these companies' loans in all likelihood comprised the overwhelming majority of the four universal banks' assets, their default must have made the banks insolvent.

A bank's collapse in tier 2 insolvency is not, however, a certainty. Although the borrower can no longer service the principal, it still generates positive profit, which

can be a source of interest income for the bank. As [Table 2](#) shows, at a debt-to-profit ratio of 13 times, the company has a profit before financial expenses of 7.7. This is insufficient for a full interest payment, but enough for some. Banks go bankrupt when the new cash profit generated by their borrowers is lower than their own cash expenses. Then they enter tier 3 insolvency, and their bankruptcy becomes inevitable without external help.

Panel 2 of [Table 3](#) assesses the conditions under which the four universal banks should have become tier 3 insolvent. The table calculates the minimum theoretical cash income that was necessary for the four banks to stay afloat without outside liquidity injection. The calculation assumes that the cash income had to cover three types of expenses. First, the banks had to pay interest on their financing sources. As illustrated previously in [Figure 1](#), 30–45 per cent of the universal banks' total assets were financed through the Konzern prior to 1931. It is assumed here that the banks paid no interest on these current account balances. The remaining 42–59 per cent (excluding equity), however, came from sources on which the banks had to pay interest because, presumably, the relationship with those financing parties was at arm's length. (The calculation assumes that universal banks had to make no principal payments on these liabilities.) These interest expenses were one item for which the banks needed income. Diamond and Rajan's (2005) theoretical model takes into consideration only this expense category, disregarding the following two, which are equally important in the assessment of banks' tier 3 position. One is banks' own operational expenses, such as salaries, rent, taxes, and so forth, and the other is dividends.

Panel 2 of [Table 3](#) shows the actual figures for these three expense items. The four banks required approximately AS 130 million between 1925 and 1928 and some AS 110 million in 1929 and 1930 to avoid tier 3 insolvency and survive. This is how much cash profit the four Konzerns had to be able to generate at a minimum to keep the four banks afloat. Strikingly, the actual cash profit produced by the Konzerns was much lower than this. The actual reported cash income of the four Konzerns was in the range of AS 70–100 million during the period, and in each year, it was lower than the theoretically requisite cash income.

The challenge with the interpretation of these figures is that, in each year, there were a few companies that did not supply their financials for the given year. Therefore, hypothetically, Konzern profits could have been higher – but only hypothetically. A thorough assessment reveals that, had all missing financial statements been available for non-struggling companies, the profits would have been only 9–10 per cent higher in each year.

Based on the above analysis, the four universal banks were already in tier 3 insolvency at the aggregate level in 1925. It is thus no surprise that they all experienced distress. However, none of them collapsed in 1925. The debt-to-profit figures for the individual Konzerns in panel 3 of [Table 3](#) indicate that the four Konzerns were not equally weak.<sup>16</sup>

<sup>16</sup> The analysis keeps the four Konzern companies separate. Where a combined Konzern's performance is analysed, it is specifically indicated in the text.



The worst-performing industrial network was that of the UB, with ratios in the range of 13 times to 90 times. This bank had unprofitable and highly indebted companies. In comparison, the VB's industrial network was a superstar, showing improvement between 1928 and 1930 and becoming healthy in the end. The BCA's Konzern followed a positive trend until 1929, but it could not reach the sub-6-times range, and by 1930, its situation had worsened. The CA had a consistently performing industrial base whose debt-to-profit ratios were somewhere between those of the VB and the BCA.

These figures provide an obvious explanation for the distress of the UB. This bank's Konzern was in the worst shape of the four, with close to 50 per cent of its companies and 75 per cent of their total debt in the worst-performing category. It is not surprising, therefore, that it became distressed in 1926.

The debt-to-profit figures of the UB's Konzern can also account for the BCA debacle: the BCA signed its own death sentence when it decided to merge with the UB. The critical insight here is that the bad loans of the weak UB Konzern were not written off at the merger or afterwards and consequently continued to burden the BCA after the two banks' merger. Whereas the BCA Konzern itself had a 6.1 times debt-to-profit ratio in 1929 – very close to good health – the combined BCA (BCA, UB, VB) Konzern ratio was 15.1 times. The discrepancy between the independent and combined BCA Konzern's performance can be fully ascribed to the UB, because the VB, which also merged with the BCA in 1927, had a relatively well-performing Konzern. Had there been no VB merger in 1927, the debt-to-profit ratio of the BCA-UB Konzern would have had an 18.5 times debt-to-profit ratio in 1929, not the relatively better ratio of 15.1 times. Furthermore, if the BCA had acquired only the VB, the BCA-VB Konzern would have had a 6.4 times debt-to-profit ratio in the same year, close to the healthy performance level. Viewed from this standpoint, the decision of the BCA's management to pursue a merger with the UB seems foolhardy.<sup>17</sup>

The figures raise an intriguing question. We know from the previous section that the VB did not have liquidity problems before and after the announcement of its merger with the BCA, and this section has shown that the VB had tier 1 assets, which could have been sustained for the long term. Why was it necessary to merge the VB with the BCA? Lacking sufficiently reliable information on this matter, I can only develop two hypotheses. As panel 3 of Table 3 shows, the VB's industrial base had a debt-to-profit ratio of 9.5 times in 1926, which had worsened to 11.1 times by 1928. Presumably, at the time of the merger, only the threat of the VB Konzern's weak and potentially deteriorating performance was perceived, and the post-1928 improvement could not yet be foreseen. Based on this information, the merger of the VB with the BCA would have been seen as necessary to save the seemingly failing VB. An alternative explanation may be that the VB, a relatively healthy bank, was granted to the BCA in exchange for agreeing to acquire the much weaker

<sup>17</sup> BoEA, file OV28/32, letter from Kay to Siepmann, 10 May 1926.

UB. The UB had been ravaged not only by its bad assets but also by the French franc scandal.<sup>18</sup> The scandal involved a number of politicians, and the merger of the UB with the BCA was intended to conceal the matter (Ausch 1968; Jobst and Kernbauer 2016).<sup>19</sup> Based on this line of argument, the VB may have been the sugar coating that helped the BCA swallow the bitter pill of the UB merger.

The UB's weak Konzern explains not only the collapse of the BCA but also that of the CA. In 1929, when the BCA could no longer sustain the UB's Konzern, it failed and was merged with the CA. In that year, the CA's independent Konzern had a debt-to-profit ratio of 8.7 times, which declined to 8.2 times in the following year, suggesting an improving industrial base. However, at the merger, when the CA absorbed the combined BCA Konzern, bad assets were once again not acknowledged and were written off. The weakly performing companies that the CA had acquired at the merger thus created a continuing burden for the bank. If only the VB's and the BCA's Konzerns had been amalgamated with the industrial base of the CA, the combined three-bank network would have had a debt-to-profit ratio of 8.1 times in 1930. That is, the BCA's and VB's Konzerns would have improved on the solvency of the CA and would have strengthened the bank's tier 1 structure, which had issues with collecting principal repayments but no problems with receiving interest payments. Such a structure could have existed for a very long time – in theory, even in perpetuity. The problem hence resided in the UB Konzern. If only the UB's Konzern had been merged with the CA, the debt-to-profit indicator of the two-bank Konzern would have been an astounding 33.4 times. Viewed from this perspective, it is clear why the CA's management resisted the merger with the BCA (Schubert 1991, pp. 42–3).

Unfortunately, data are unavailable for a disaggregated tier 3 analysis for the four banks separately. It is thus unclear whether and when they entered tier 3 insolvency and whether their application for external help coincided with that event. However, a few hypotheses still have relevance.

The BCA's case is simple: this bank was not only insolvent but also illiquid due to the flight of its domestic creditors. It had no choice but to continue to rely on the ANB. On the other hand, the UB, the VB and the CA, though insolvent, were all still liquid when their distress was announced. As mentioned, the UB's entanglement in political intricacies may have made it necessary to incorporate this bank into the BCA to hide the traces of illicit transactions. The VB may have helped smooth such a decision. The bailout of these two banks thus seems to have been politically motivated and appears to have had nothing to do with their tier 3 condition. However, why did the CA request ANB support on 8 May 1931?

The events of 8 May followed an internal decision within the CA that involved Zoltán Hajdu, a director of the bank, refusing to sign the CA's financial accounts for 1930. He claimed that the books contained misrepresentations and he would

<sup>18</sup> BoEA, file OV28/1, letter from the Foreign Office and Board of Trade to Norman, 9 Dec. 1926.

<sup>19</sup> Also informed by the author's discussions with Dr Nathan Marcus.

not put his name to the accounts ‘until the usual method of drawing it up was changed’ (James 2002, p. 53). Hajdu’s pivotal decision precipitated the next decision: to seek a bailout from the ANB. Why did Hajdu decide to break with the past at that very moment? James has posited that he may have developed moral reservations and simply could not continue with the dishonesty (James 2009, p. 77). However, since Hajdu had by then been a director of the CA for five years and had most likely been aware for years of the ‘usual method’ of preparing the accounts, it is unclear why his conversion happened at that particular moment rather than at some other time.

Based on the evidence presented in this article, a possible explanation is that, by the end of the 1930 financial year, the performance of the CA’s Konzern had deteriorated to such a significant extent that it had shifted the bank into tier 3 insolvency. Panel 2 of Table 3 shows that the actual reported cash income of the four Konzerns dropped from AS 103 million in 1929 to AS 76 million in 1930. Since, by 1930, all four Konzerns were already owned by the CA, this drop in earnings directly affected only this bank. This suggests that the CA structure entered tier 3 insolvency by early 1931 because 30 per cent of its Konzern’s cash income evaporated. The ‘usual method’ of hiding insolvency was no longer possible without external help.

#### IV

This article has analysed the deep roots of the Austrian crisis of 1931 and emphasised the importance of a domestic factor, the universal banking structure. The article has shown that the four banks under assessment were already insolvent in 1925 and through 1930 due to the weakness of their Konzern corporations. On the day when it applied for a bailout, though liquid, the CA was in deep insolvency. However, the CA may not have come under such overwhelming distress had it not been for the weakness of one bank it absorbed, the UB. This suggests that, had the UB’s assets not been transferred to the CA through the latter’s amalgamation with the BCA, the whole crisis may have been avoidable.

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#### Sources

Bankhistorisches Archiv Österreichische Nationalbank (Archive of the Austrian National Bank), *Mitteilungen des Direktoriums der Österreichischen Nationalbank (ANB Mitteilungen)*, reviewed for 1926–33.

Bank of England Archive (BoEA), files OV28/1, 32, 75.

Compass-Verlag, *Compass Finanzielles Jahrbuch (Financial Compass)*, Vienna: Compass-Verlag, reviewed for 1926–35.

- Compass-Verlag, *Compass Kommerzielle Jahrbuch (Commercial Compass)*, Vienna: Compass-Verlag, reviewed for 1925–32.
- KAUSEL, A., NÉMETH, N. and H. SEIDEL (1965). Österreichs Volkseinkommen 1913 bis 1963. *Monatsberichte des Österreichischen Instituts für Wirtschaftsforschung* (Vienna), Sonderheft, no. 14.
- Rothschild Archive London (RAL), file III/488 (a–c) Austria.
- Statistisches Handbuch für die Republik Österreich* (in English: *Statistical Handbook for the Austrian Republic*), Bundesamt für Statistik, Vienna, reviewed for 1923–35.
- Statistische Nachrichten* (in English: *Statistical News*), Bundesamt für Statistik, Vienna, reviewed for 1925–32.

## References

- ADALET, M. (2003). Fundamentals, capital flows and capital flight: the German banking crisis of 1931. Unpublished manuscript, University of California, Berkeley.
- AGUADO, I. G. (2001). The Creditanstalt crisis of 1931 and the failure of the Austro-German customs union project. *Historical Journal*, **44**(1), pp. 199–221.
- AUSCH, K. (1968). *Als die Banken fielen – zur Soziologie der politischen Korruption*. Vienna: Europa Verlag.
- BALDERSTON, T. (1991). German banking between the wars: the crisis of the credit banks. *Business History Review*, **65**(3), pp. 554–605.
- BATTILOSSI, S. (2009). Did governance fail universal banks? Moral hazard, risk taking, and banking crises in interwar Italy. *Economic History Review*, n.s., **62**(S1), pp. 101–34.
- BENSTON, G. J. (1994). Universal banking. *Journal of Economic Perspectives*, **8**(3), pp. 121–43.
- BOYD, J. H., CHANG, C. and SMITH, B. D. (1998). Moral hazard under commercial and universal banking. *Journal of Money, Credit and Banking*, **30**(3), pp. 426–68.
- CALOMIRIS, C. W. and GORTON, G. (1991). The origins of banking panics: models, facts, and bank regulation. In R. G. Hubbard (ed.), *Financial markets and financial crises*. Chicago: University of Chicago Press.
- CAMERON, E. R. (1953). The Crédit Mobilier and the economic development of Europe. *Journal of Political Economy*, **61**(6), pp. 461–88.
- COLVIN, C. L., DE JONG, A. and FLIERS, P. T. (2015). Predicting the past: understanding the causes of bank distress in the Netherlands in the 1920s. *Explorations in Economic History*, **55**, pp. 97–121.
- COTTRELL, P. L. (2017). ‘Many a slip between cup and lip’: initiating Austrian stabilisation, 1922–23. In C. Hofmann and M. Müller (eds.), *History of Financial Institutions. Essays on the History of European Finance, 1800–1950*. London and New York: Routledge.
- DIAMOND, D. W. and DYBIVIG, P. (1983). Bank runs, deposit insurance, and liquidity. *Journal of Political Economy*, **91**(3), pp. 401–19.
- DIAMOND, D. W. and RAJAN, R. G. (2005). Liquidity shortages and banking crises. *Journal of Finance*, **60**(2), pp. 615–47.
- EICHENGREEN, B. J. (1992). *Golden Fetters: The Gold Standard and the Great Depression, 1919–1939*. New York and Oxford: Oxford University Press.
- EICHENGREEN, B. J. (2015). *Hall of Mirrors: The Great Depression, the Great Recession, and the Uses – and Misuses – of History*. Oxford and New York: Oxford University Press.
- EIGNER, P. (1997). Die Konzentration der Entscheidungsmacht: die personelle Verflechtungen zwischen den wiener Grossbanken und Industriestaftengesellschaften, 1895–1940. Unpublished PhD thesis, Universität Wien.
- FERGUSON, T. and TEMIN, P. (2003). Made in Germany: the German currency crisis of July 1931. *Research in Economic History*, **21**, pp. 1–54.
- FIOR, M. (2008). The financial instability in transition economies during the 1920s: the European reconstruction and Credit-Anstalt insolvency. In K. Gratzner and D. Stiefel (eds.), *History of Insolvency and Bankruptcy from an International Perspective*. Huddinge: Södertörns högskola.
- FOHLIN, C. (1999). Universal banking in pre-World War I Germany: model or myth? *Explorations in Economic History*, **36**, pp. 305–43.
- FORSYTH, D. J. (1991). The rise and fall of German inspired mixed banking in Italy, 1894–1936. In A. Teichova, H. Lindgren and H. James (eds.), *The Role of Banks in the Interwar Economy*. Cambridge: Cambridge University Press.

- GERSCHEKRON, A. (1962). *Economic Backwardness in Historical Perspective: A Book of Essays*. Cambridge, MA: Harvard University Press.
- GUINNANE, T. W. (2002). Delegated monitors, large and small: Germany's banking system, 1800–1914. *Journal of Economic Literature*, **40**(1), pp. 73–124.
- HERRIEGEL, G. (1996). *Industrial Constructions: The Sources of German Industrial Power*. Cambridge: Cambridge University Press.
- JAMES, H. (1984). The causes of the German banking crisis of 1931. *Economic History Review*, 2nd ser., **37**, pp. 68–87.
- JAMES, H. (2002). *The End of Globalization: Lessons from the Great Depression*. Cambridge, MA, and London: Harvard University Press.
- JAMES, H. (2009). *The Creation and Destruction of Value: The Globalization Cycle*. Cambridge, MA, and London: Harvard University Press.
- JOBST, C. and KERNBAUER, H. (2016). *The Quest for Stable Money*. Vienna: Campus Verlag.
- KINDLEBERGER, C. P. (1986). *The World in Depression, 1929–1939*. Berkeley, Los Angeles and London: University of California Press.
- KROSZNER, R. S. and RAJAN, R. G. (1994). Is the Glass–Steagall Act justified? A study of the US experience with universal banking before 1933. *American Economic Review*, **84**(4), pp. 810–32.
- LEHMANN-HASEMEYER, S. H. and WAHL, F. (2017). Savings banks and the industrial revolution in Prussia: supporting regional development with public financial institutions. Hohenheim Discussion Papers in Business, Economics and Social Sciences, no. 18–2017.
- MACHER, F. (2018). The Hungarian twin crisis of 1931. *Economic History Review*, <https://doi-org.gate3.library.lse.ac.uk/10.1111/ehr.12659>
- MARCUS, N. (2018). *Austrian Reconstruction and the Collapse of Global Finance, 1921–1931*. Cambridge, MA: Harvard University Press.
- MÄRZ, E. (1984). *Austrian Banking and Financial Policy*. London: Palgrave Macmillan.
- MOSSER, A. and TEICHOVA, A. (1991). Investment behaviour of industrial joint-stock companies and industrial shareholding by the österreichische Credit-Anstalt: inducement or obstacle to renewal and change in interwar Austria. In H. James, H. Lindgren and A. Teichova (eds.), *The Role of Banks in the Interwar Economy*. Cambridge: Cambridge University Press.
- VAN OVERFELT, W., ANNAERT, J., DE CEUSTER, M. and DELOOF, M. (2009). Do universal banks create value? Universal bank affiliation and company performance in Belgium, 1905–1909. *Explorations in Economic History*, **46**, pp. 253–65.
- POSTEL-VINAY, N. (2016). What caused Chicago bank failures in the Great Depression? A look at the 1920s. *Journal of Economic History*, **76**(2), pp. 478–519.
- PURI, M. (1996). Commercial banks in investment banking. Conflict of interest or certification role? *Journal of Financial Economics*, **40**, pp. 373–401.
- RUDOLPH, R. L. (1976). *Banking and Industrialization in Austria–Hungary: The Role of Banks in the Industrialization of the Czech Crownlands, 1873–1914*. Cambridge: Cambridge University Press.
- SCHNABEL, I. (2004). The German twin crisis of 1931. *Journal of Economic History*, **64**(3), pp. 822–71.
- SCHUBERT, A. (1991). *The Credit-Anstalt Crisis of 1931*. Cambridge and New York: Cambridge University Press.
- SRAFFA, P. (1922). The bank crisis in Italy. *Economic Journal*, **32**(126), pp. 178–97.
- STIEFEL, D. (1994). 'For better, for worse...': the Credit-Anstalt and its customers in 1931. In A. Teichova, T. R. Gourvish, Á. Pogány and P. L. Cottrell (eds.), *Universal Banking in the Twentieth Century, Finance, Industry and the State in North and Central Europe*. Aldershot: Edward Elgar.
- STIEFEL, D. (2008). The bankers' view: Austria's economic and political development and the role of banks. In G. D. Feldman and P. Hertner (eds.), *Finance and Modernization: A Transnational and Transcontinental Perspective for the Nineteenth and Twentieth Centuries*. Aldershot and Burlington, VA: Ashgate.
- TEICHOVA, A. and COTTRELL, P. L. (1983). Industrial structures in west and east Central Europe during the interwar period. In A. Teichova and P. L. Cottrell (eds.), *International Business in Central Europe, 1918–1939*. Leicester: Palgrave Macmillan.
- TEMIN, P. (2008). The German crisis of 1931: evidence and tradition. *Clometrica*, **2**(1), pp. 5–17.
- TILLY, R. (1998). Universal banking in historical perspective. *Journal of Institutional and Theoretical Economics (JITE) / Zeitschrift für die gesamte Staatswissenschaft*, **154**(1), pp. 7–32.

- WEBER, F. (1991a). Universal banking in interwar Central Europe. In A. Teichova, H. Lindgren and H. James (eds.), *The Role of Banks in the Interwar Economy*. Cambridge: Cambridge University Press.
- WEBER, F. (1991b). Vor dem großen Krach: die Krise des österreichischen Bankwesens in den zwanziger Jahren. Unpublished PhD thesis, Universität Salzburg.
- WEBER, F. (1995). From imperial to regional banking: the Austrian banking system, 1918–1938. In C. H. Feinstein (ed.), *Banking, Currency, and Finance in Europe between the Wars*. Oxford: Oxford University Press.
- WEBER, F. (2008). Austrian banking between two Great Depressions: The Creditanstalt from the 1870s to the 1930s. In G. D. Feldman and P. Hertner (eds.), *Finance and Modernization: A Transnational and Transcontinental Perspective for the Nineteenth and Twentieth Centuries*. Aldershot and Burlington, VA: Ashgate.
- WHITE, E. N. (1986). Before the Glass–Steagall Act: an analysis of the investment banking activities of national banks. *Explorations in Economic History*, **23**, pp. 33–55.

## Appendix

Table A1. *The number of financial accounts in the bank data set*

	Total	Compass 1926		Total	Compass 1927		Total	Compass 1928	
		Reporting	Non-reporting		Reporting	Non-reporting		Reporting	Non-reporting
Total	398	284	114	382	264	118	364	274	90
Universal bank	8	8	0	8	8	0	8	8	0
Other bank	87	49	38	75	34	41	62	44	18
Mortgage bank	9	9	0	9	8	1	8	8	0
Savings bank	294	218	76	290	214	76	286	214	72
		Compass 1929			Compass 1930			Compass 1931	
	Total	Reporting	Non-reporting	Total	Reporting	Non-reporting	Total	Reporting	Non-reporting
Total	352	272	80	342	311	31	340	318	22
Universal bank	8	6	2	6	6	0	6	5	1
Other bank	48	37	11	40	36	4	39	34	5
Mortgage bank	9	8	1	10	8	2	9	8	1
Savings bank	287	221	66	286	261	25	286	271	15
		Compass 1932			Compass 1933			Compass 1934	
	Total	Reporting	Non-reporting	Total	Reporting	Non-reporting	Total	Reporting	Non-reporting
Total	334	315	19	329	313	16	321	312	9
Universal bank	5	5	0	5	5	0	5	5	0
Other bank	36	31	5	34	31	3	31	29	2
Mortgage bank	10	8	2	10	9	1	10	10	0
Savings bank	283	271	12	280	268	12	275	268	7
		Compass 1935							
	Total	Reporting	Non-reporting						
Total	318	307	11						
Universal bank	5	5	0						
Other bank	31	26	5						
Mortgage bank	10	10	0						
Savings bank	272	266	6						

Table A2. *The representativeness of the bank data set, 1929 (million Austrian Schilling)*

Category	Source	Value
Total assets		
Financial system	This data set	6,184
Savings banks	This data set	2,213
Joint-stock banks	This data set	3,971
Joint-stock banks	Weber 1991b, p. 488.	3,800
Financial system	<i>Statistisches Handbuch</i> , 1931, pp. 134, 139	4,873
Savings banks	<i>Statistisches Handbuch</i> , 1931, p. 139	1,524
Joint-stock banks	<i>Statistisches Handbuch</i> , 1931, p. 134	3,366
Deposits		
Financial system	This data set	2,606
Financial system	Weber 1991b, p. 308.	1,435
Financial system	<i>Statistisches Handbuch</i> , various issues	1,945
Creditors		
Financial system	This data set	2,693
Financial system	<i>Statistisches Handbuch</i> , 1931, pp. 136, 140	2,210
Short-term borrowers		
Financial system	This data set	2,858
Financial system	Weber 1991b, p. 319.	2,731
Financial system	<i>Statistisches Handbuch</i> , 1931, pp. 136, 139	2,275



Table A3. *The number of financial accounts in the Konzern data set*

No. of years reported	1925			1926			1927			1928			1929			1930		
	2-6	1	Total	2-6	1	Total	2-6	1	Total	2-6	1	Total	2-6	1	Total	2-6	1	Total
Coal, steel, machine	48	2	50	43	0	43	44	0	44	43	0	43	48	0	48	39	0	39
Construction	7	0	7	8	0	8	8	0	8	7	0	7	7	0	7	6	1	7
Chemical	7	1	8	7	0	7	7	0	7	6	0	6	7	0	7	7	0	7
Diverse	21	0	21	19	1	20	24	0	24	23	0	23	23	0	23	22	0	22
Electricity, water, gas	15	1	16	14	0	14	15	0	15	13	0	13	14	0	14	14	0	14
Beverage	9	0	9	10	0	10	9	0	9	10	0	10	10	0	10	9	0	9
Timber	8	0	8	8	0	8	9	1	10	8	0	8	8	0	8	7	0	7
Shoe and leather	7	0	7	7	0	7	7	0	7	6	0	6	5	0	5	5	0	5
Oil	3	1	4	2	0	2	2	0	2	3	0	3	2	0	2	1	0	1
Paper	14	0	14	14	0	14	14	0	14	13	0	13	13	0	13	12	0	12
Textile	17	3	20	20	0	20	20	0	20	17	0	17	17	1	18	13	0	13
Transport	15	0	15	14	0	14	13	0	13	13	0	13	17	1	18	16	0	16
Sugar	1	0	1	1	0	1	1	0	1	1	0	1	1	1	2	1	0	1
Total	172	8	180	167	1	168	173	1	174	163	0	163	172	3	175	152	1	153