Safe and Sound: Exploring the Dutch quiet banking crisis of 1931

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May 2024

[Working Paper. Please do not cite or circulate]

Keywords: great depression, flight to safety, interest rates, savings banks, credit crunch, great depression, the Netherlands

Abstract

Despite minimal bank failures or panics, the Dutch banking sector experienced a substantial decline in deposits and outstanding loans between 1929 and 1933. Utilizing a unique combination of qualitative and quantitative data, including newly constructed datasets on bank balance sheets and lending activities, this study investigates this period in Dutch financial history. Our analysis reveals a transfer of deposits from commercial banks to savings institutions, driven primarily by a reduction in long-term interest rates offered by commercial banks relative to safer government guaranteed postal savings bank deposit rates. This reallocation of funds constrained commercial bank lending potential, leading to a preference for existing relationships over new ones and increased demand for tangible collateral. By offering an in-depth case study of the Dutch experience, this paper enriches the historical understanding of banking crises and their broader economic implications.

I. INTRODUCTION[1]

Banking crises are notoriously difficult to classify, resulting in limited agreement among existing chronologies of these events (Reinhart & Rogoff 2009; Schularick & Taylor 2012). One persistent point of contention in this literature, is whether banking crises can occur in the absence of wide spread panic and bank failures. The viewpoint that panic among bank creditors plays a central role in precipitating a banking crisis finds support in classic theories such as Diamond & Dybvig (1983), which underscore the risks associated with employing short-term debt for long-term illiquid investments. These theories highlight that even solvent banks are susceptible to self-fulfilling panics. Likewise, the works of Bernanke (2018) attribute the severity of the Great Recession to both depositor panics and collapses in funding markets. More recently, the collapse of Silicon Valley Bank in March 2023 and the subsequent financial turmoil were perceived as outcomes of a "digital banking panic" (Merler 2023).

An alternative perspective accentuates the significance of bank capital crunches resulting from asset losses rather than solely focusing on panics. These models underscore the importance of bank equity in facilitating financial intermediation and argue that adverse shocks that impair bank equity can curtail banks' capacity to finance the economy, leading to severe recessions (Admati & Hellwig 2014; Calomiris & Mason 2003). By constructing a new historical data set of bank equity returns for 46 countries between 1870 and 2016, Baron et al. (2021) have gone one step further, revealing that banking crises can have adverse economic consequences even in the absence of panics as bank equity crunches impair banks' ability to intermediate funds. Baron et al. identified a category of crises referred to as "quiet crises" (also labelled as "forgotten crises"), which involve banking distress that did not generate significant attention or featured as a prominent headline event.[2] As a result, these quiet crises have often been

[1] We thank Bram van der Graaf for excellent research assistance.

[2] In accordance with the works of Calomiris and Gorton (1991) as well as Gorton and Huang (2004), panics as defined by Baron et al. (2021), encompass any of the following conditions: (i) the occurrence of severe and abrupt withdrawals by depositors or creditors, affecting multiple major banks in a country or more than ten smaller banks, to the point where these institutions teeter on the brink of collapse; (ii) the emergence of significant and sudden strains in

overlooked in the prevailing narrative-based accounts (Demirgüç-Kunt & Detragiache 2005; Laeven & Valencia 2020; Reinhart & Rogoff 2009; Schularick & Taylor 2012).

Our study focuses on the case of the Netherlands during the Great Depression, which sits at two extremes of the debate, between those who view panics as a key driver of banking crises (Bernanke 2018; Diamond and Dybvig 1983; Friedman & Schwartz 1963) and those who focus on bank capital shortages due to asset losses (Calomiris & Mason 2003). The traditional interpretation for the Netherlands is that there was no banking crisis because there were no panics and few banking failures. (Bernanke & James 1991; Grossman 1994, 2019; Reinhart & Rogoff 2009, 2014; Jordà, Schularick & Taylor 2017; Mitchener & Richardson 2019, 2020; Jonker & van Zanden 1995). On the other hand, Baron et al. (2021, p. 104) argued that the Netherlands experienced a quiet banking crisis in 1931 as bank equity declined by 41 percent. Nominal deposits in the Dutch commercial banking system of dropped by 35 percent. Furthermore, Degorce and Monnet (forthcoming 2024), building upon Baubeau et al. (2021), shows that Dutch commercial banks experienced the fourth largest decline in deposits during the Great Depression among the 22 countries analyzed, along with one of the largest reductions in the loans-to-deposits ratio. Therefore, a detailed examination of the Netherlands could help us understand how banking crises may occur even in the absence of panics and failures.

The resilience of the Dutch banking sector is often attributed to the high capital-to-asset ratios, a result of the banking reorganization carried out between 1922 and 1924 in response to the financial crisis of the early 1920s (Colvin et al. 2015; Jonker 1996; Jonker & van Zanden 1995). Despite this, the Netherlands, akin to other economically advanced nations at the time, went through a severe economic downturn marked by a 13 percent fall in GDP from its peak in 1929, extensive layoffs and bankruptcies, a deflationary spiral, and a sustained trade deficit (van Zanden 1996; Fliers & Colvin 2022).

interbank lending markets; or (iii) the sudden and substantial outflow of foreign-currency capital from the banking sector.

While the causes and consequences of the Great Depression in the Netherlands have been carefully discussed, the role of banks has been mostly neglected (de Vries 1989, 1994; van Zanden 1996; Fliers & Colvin 2022). Specifically, the Dutch National Bank's policies "to go Dutch" and maintain the gold standard have been put forward as a contributing to the economic decline, but without looking at the effects these policies had on commercial banks' (Fliers & Colvin 2022). Nonetheless, as commercial banks followed the DNB policy rate, there must have been effects of gold standard policy on banks' deposit taking and lending. With the large decline in deposits in Dutch commercial banks, we ask how the ability of the Dutch banking sector to intermediate funds (credit supply and deposit provisions) was impeded during the Great Depression and the gold standard?

Our study relies on a combination of new qualitative and quantitative evidence to examine whether the Netherlands underwent a banking crisis, its underlying causes, and its potential impact. We rely on three newly constructed datasets. The first dataset contains annual balance sheet information for a significant portion of the Dutch banking system from 1925 to 1939, providing an overview of the financial system's relative changes during the Great Depression. The second dataset consists of monthly balance sheet data for four out of the five largest Dutch commercial banks, along with monthly statistics on deposit inflows and outflows in savings banks. This dataset allows us to demonstrate that the reduction in long-term interest rates offered by commercial banks was indeed the driving force behind the outflow of deposits from these banks. Our third dataset includes over 3,000 individual loans issued by the three largest commercial banks between 1928 and 1938, for which data was available. This information enables us to detect changes in the lending portfolios of commercial banks, which became more restrictive due to the crisis. This is evidenced by an increase in rejected credit applications, the issuance of fewer but larger loans, a higher demand for tangible collateral, and a preference for existing relationships over new ones. The strategic move by banks to eliminate less profitable loans from their portfolios enabled them to weather the crisis and remain profitable. Finally, we

rely on a series of qualitative sources, primarily consisting of annual reports of commercial banks and the postal savings bank, as well as parliamentary discussions.

While we argue that significant credit contractions and a decrease in economic activity occurred in the Dutch economy, we cannot determine the exact size of these decrease nor the direct causal relationship between the two. Informed by Baron et al. (2021), who suggest that banking crises, even in the absence of overt panics, can result in a 2.7 percent reduction in real GDP over three years, our contribution is to provide an exploratory case study. We aim to deepen the understanding of the bank lending channel, the underlying causes of credit contractions and the theory on quiet crises, drawing on a mix of quantitative and qualitative evidence.

Our article is organised as follows. Section II provides the necessary institutional context and briefly discusses the historiography of banking crises in the Netherlands. We then present our principal sources (section III). In section IV, we explore the transfer of funds away from commercial banks and toward saving institutions. We subsequently detail the underlying factors driving this reallocation of funds in section V. In section VI, we document the response by various financial institutions to these transfers of funds and attempt to quantify the size of the reduction in outstanding private credit. Section VII attempts to disentangle whether this decrease in private credit was demand or supply driven. Section VIII summarises our main findings and concludes.

II. HISTORICAL CONTEXT

Until the late nineteenth century, the Dutch banking system was considered to be relatively underdeveloped (Wijtvliet 1993). Jonker (2002; 1995) argued that the Netherlands was very much a market-based economy at the time. Most businesses relied either on funding from friends and family or the so-called *prolongatie* market, a highly liquid on-call market that operated akin to the present-day market of repurchase agreements (Colvin et al. 2015, p. 99; Gelderblom et al. 2023). This started changing from the 1880s onwards when numerous new

banking institutions began popping up, including the equivalent of German rural (*Raiffeisen*) and urban (*Schulze-Delitzsch*) credit cooperatives (de Vicq 2022; Peeters 2021). The collapse of the *prolongatie* market during the first world war further paved the way for the largest commercial banks to play a more active role, leading towards a concentration movement and gradual adoption of a more universal banking model.

Stimulated by the economic boom after the First World War, the Dutch banking landscape developed quite drastically, and the Netherlands increasingly turned into a bank-based economy. The 1920s financial crisis temporarily stalled but could ultimately not prevent this trend (Jonker 1995 and Colvin et al. 2015). In a few years, the "big 5" commercial banks - namely the Amsterdamsche Bank, Twentsche Bank, Rotterdamsche Bank, Incassobank, and the Nederlandsche Handel-Maatschappij - had managed to build an impressive branch network, providing a wide array of financial services across the country (Wijtvliet 1993; Kymmel 1996). Perhaps more importantly, they were now increasingly involved in funding large-scale industrial enterprises, making their business model more akin to that of the German universal banks (Jonker 2002; 1995). Regardless, even in the 1930s the scale and scope of Dutch banks remained highly segmented (Colvin et al. 2015). Although the largest universal banks had increasingly expanded their market share since 1911, they still coexisted with various other, often specialised, financial institutions (Colvin et al. 2020; Peeters 2021).

One of the oldest existing incumbents were savings banks. These financial institutions emerged in the early nineteenth century and were a leading market player for saving services. This changed in the early 1880s with the arrival of the postal savings bank and again in the 1890s with the emergence of farmer's credit cooperatives (*boerenleenbanken*). Whereas savings banks were set up as private societies, the state established the postal savings bank and farmer's credit

cooperatives took the cooperative form (Colvin et al. 2020; Dankers et al. 2001; Deneweth et al. 2014). [3]

Like its savings counterpart, the market for loans was equally segmented. The lower echelons of the market were served by a wide variety of institutions, including pawn banks (*banken van leening*), help banks (*hulp banken*), credit unions (*credietvereenigingen)*, and mortgage banks (*hypotheekbanken*).[4] Commercial banks generally targeted the higher echelons, providing credit almost exclusively to large joint-stock enterprises and wealthy individuals (Jonker 1995). Finally, the farmer's credit cooperatives emphasised reaching a rural clientele, fulfilling a dual savings and loan function (Colvin et al. 2020).

While the Dutch banking system was well-developed, interbank lending was fairly limited. Except for farmers' credit cooperatives having access to their centrals, nearly all banks of some size had access to the DNB funding facilities (Colvin 2018; Peeters 2021; Stoffer 1985). At that point, the DNB was not a fully fledged central bank and controlling the supply of its discounting facilities was one of the only (informal) ways in which the DNB supervised the banking sector (Jonker 1996; Mooij & Prast 2003).

The Dutch regulatory regime was, like in most economically developed countries at the time, quite laissez-faire.[5] In the absence of specific laws governing banking corporations, financial institutions were free to engage in various business endeavours without being

[3] Urban credit cooperatives, or so-called SME-banks (*middenstandsbanken*), were also active in the market for saving services but were of lesser importance. In 1927 the *Nederlandsche Middenstandsbank* (NMB) was formed out of the viable components of these SME-banks, thus ending a turbulent period which saw the end of many of these banks (Stoffer 1985; Colvin 2018; Peeters 2021).

[4] Private pawn banks, which had existed since the seventeenth century, and their public counterparts which were introduced in the mid-nineteenth century by the Dutch government, were specialised in very small loans aimed at smoothing cash flows (McCants 2007). Help banks (*hulp banken*), which started in the late 1840s, targeted a similar echelon, but issued larger loans, which had to be repaid in weekly instalments and which were guaranteed by at least two co-signers (Deneweth et al. 2014; de Vicq & van Bochove 2022, 2023). Credit unions (*credietvereenigingen)* were introduced in the early 1850s and relied on mutuality to provide productive loans to the wealthier members of the middle class. They were also used as a means for the Dutch Central Bank to expand its discounting facilities across the Netherlands (Jonker 1996). Modelled after the German Schulze-Delitzsch credit cooperatives, their part in the economy was mostly taken over by urban credit cooperatives by the early-1930s (de Vicq 2022). Meanwhile, mortgage banks (*hypotheekbanken*) emerged from the 1860s and provided mortgage loans to asset-rich individuals (van Bochove & van Hasken 2020).

[5] In France, for example, the first banking law was passed in 1941 (Monnet 2021). In Belgium a Banking Commission with supervisory powers was set up in 1935. For a history of banking supervision in various countries see: Hotori et al. (2022).

restricted by capital requirements or inhibited by shareholder liability rules (Colvin et al. 2015). Moreover, while the international turmoil of the 1930s drove the Dutch banks to accept voluntary monitoring under the supervision of DNB, the bank itself was still reluctant to accept its public duties (Jonker 1996).

The Netherlands makes for an intriguing case study because, unlike many neighbouring countries, it did not experience significant bank failures or widespread banking panics. Based on data from contemporary news sources and other secondary literature (de Vries 1994; Prast & van Lelyveld 2004) we counted 14 commercial banks that declared bankruptcy and 31 that were liquidated between 1931 and 1935, all of which were small to medium-sized. It's estimated that the total amount of deposits frozen due to these bankruptcies were less than 33 million guilders by 1935, which accounted for just about 1 percent (33 million out of 3,002 million) of the total balance sheet amount at that time. Aside from the Nederlandsche Handel-Maatschappij which encountered difficulties in 1934 due to poor investments in the Dutch Indies and had to reorganize, no major commercial bank faced significant financial distress during this period (de Graaf 2012, pp. 261–265).[6]

III. DATA AND SOURCES

The analysis in this article is primarily based on a hand-collected dataset of individual annual balance sheets of 142 unique banks (with a maximum of 62 banks reported in 1927) published by the Dutch National Bureau of Statistics (Centraal Bureau voor de Statistiek, hereafter CBS). Since 1899, the CBS has issued the financial information of this representative sample of banks. Their sample included the largest commercial banks but also smaller private banks. We collected this data for all subsequent years between 1909 and 1945, focusing particularly on the period between 1918 and 1939. The DNB's (1987, 2000) better-known statistical study of financial institutions in the twentieth century is based on these CBS publications but is slightly expanded

[6] Other smaller banks that declared bankruptcy include: the Centrale Middenstandscredietbank in het Bisdom Haarlem (Hanzebank) in 1930, Mendelssohn & Co, CV van Heel & Co and Firma Scheurleer & Zoonen in 1932, and Zaanlandsche Bank in 1935.

upon for a handful of years. The main drawback of the DNB study is that individual balance sheets are somewhat arbitrarily clumped together on a group level and only collected at a five-year interval. Only the data for the big five commercial banks as a group is available every year.

These sources provide a comprehensive overview of the Dutch commercial banking sector during the period. We acknowledge that the number of active banks throughout the 1920s-1930s exceeded the number we have gathered financial information for by at least a factor of five. Nonetheless, these omitted institutions were generally small-scale provincial banks or cashiers offering a narrow range of financial services, such as the discounting of bills (De Vicq 2022). Moreover, these banks often did not publish an annual report, hindering further analysis of their activities. Relying on rough calculations by DNB (1987, pp. 13–14), we estimate that our dataset represents at least 70 to 80 percent of total commercial banking assets in the period between 1925-1940. This level of representativeness most likely increased to over 80 percent by the late-1930s, when the commercial banking sector further consolidated (DNB 1987, p. 14).

We complemented the financial information of the commercial banks with similar data for savings banks, the postal savings bank and farmers' credit cooperatives. The CBS published data on these institutions annually, a summary of which also appeared in the study by DNB (1987, 2000). This information is thus readily available, but unfortunately, only on an aggregated level. For the general and postal savings banks, we also collected the in and outflows of deposits on a monthly basis from the published monthly statistics of the Netherlands (CBS 1924-1940).
For the sake of international comparison, we define the categories of the individual and the aggregated balance sheet data we collected similarly to the study for France (Baubeau et al. 2021, p. 229). Table 1 provides an overview of these categories. Appendix A lists an equivalence table comparing this simplified balance sheet with its more detailed Dutch counterpart, as published

by CBS, is included. To allow for a more detailed analysis of the flows of deposits, we keep deposits and current account balances as separate items. [7]

Table 1: Simplified Balance Sheet [8]

Assets	***Liabilities***
Cash	Paid-in Capital
Commercial Portfolio (discounts)	Retained Earnings (Reserves)
Advances on securities, guarantees, repos (*prolongatie*), and current accounts (overdraft credit)	Net Profit
Securities and investments in companies	Deposits
	Current accounts, and correspondents
Sundry Accounts	Acceptances
Authorised capital not paid	Sundry Accounts

Our second dataset includes monthly balance sheet data for four of the five largest Dutch banks from 1929 to 1933, sourced from local newspapers (available through Delpher) or the Dutch National Archives. Additionally, this dataset comprises 244 interest rate observations for one-year fixed deposits, collected from bank advertisements and announcements of interest rate changes in national and local newspapers. We also gathered macroeconomic indicators for the period from January 1929 to December 1935, sourced from the CBS monthly statistics of the Netherlands and the journal *Economisch Statistische Berichten* (CBS 1929-1940; Economisch Statistische Berichten 1929-1935). Moreover, monthly equity returns for the five largest commercial banks were obtained from the historical financial newspaper, the *Prijscourant* (1929-1935).

[7] The balance sheets published by the CBS list deposits and current account balances on the passive side of the balance sheet as two separate balance sheet items. For some minor banks and the larger Nederlandsch Indische Handelsbank, both items were reported together. In such cases (127 out of 747 banks in our dataset between 1925 and 1938) we have simply divided the reported value in half over both balance sheet items. In total we did this for 1.12 billion guilders out of the total 19.23 billion guilders (close to 6 percent of the sum of deposits and current accounts). Because of the relatively small amount and its equal distribution across both items, we do not bring any bias into the dataset.

[8] Adapted from Baubeau et al. (2021, p. 7)

Our third dataset consists of more than 3,000 individual loan applications from the three largest commercial banks of the period: Rotterdamsche Bank, Amsterdamsche Bank, and Twentsche Bank, where archival data was available. These applications were compiled from the minutes of the board of directors' meetings.[9] Specifically, for Amsterdamsche Bank and Twentsche Bank, the dataset covers only those applications processed at the banks' headquarters. In contrast, for Rotterdamsche Bank, we were able to obtain applications from branch offices in more remote locations, thus providing a broader sample. For each loan, we have detailed information about the borrower, the amount of the loan, the collateral provided, the nature of the bank-client relationship (whether new or existing), and sometimes, the purpose of the loan. To ensure our sample is more representative, we complemented this data with loan portfolio details from the annual reports of various banks, both large and small.

Finally, these quantitative sources are supplemented with a more qualitative analysis relying on the annual reports of the DNB, individual savings banks and the postal savings bank, and from economic analyses by contemporary scholars and policymakers published in *de Economist, Economische Statistische Berichten* and other Dutch specialised newspapers.

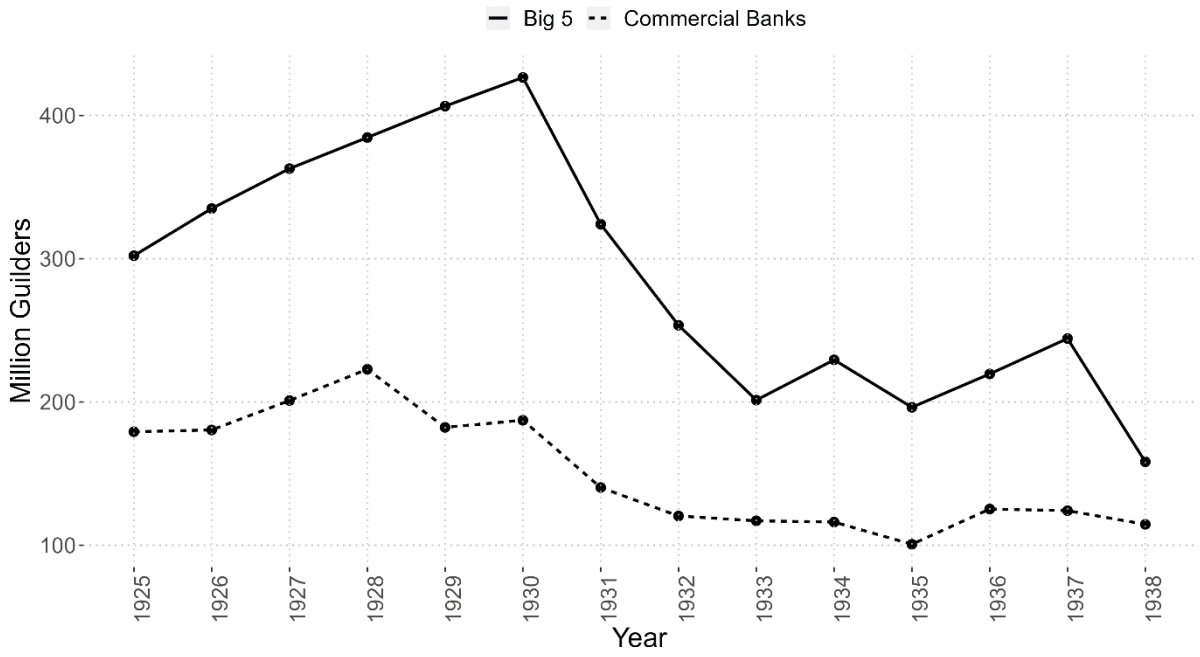
IV. DOCUMENTING THE REALLOCATION OF DEPOSITS

Much like in the United States (Mitchener & Richardson 2019, 2020) and France (Baubeau et al. 2021), starting in 1928, Dutch deposit holders withdrew their money from commercial banks across the country. Figure 1 shows a clear contraction in the nominal value of deposits placed at Dutch commercial banks, first from the smaller banks and since 1930 from the big 5 banks. The commercial banking system experienced a drop in nominal deposits of 37 percent between 1929 and 1933. Overall, nearly 662 million guilders left the commercial banks listed in our dataset between 1929 and 1933. This corresponded to 10 percent of Dutch GDP in 1929 (Van Der Bie &

[9] It is worth noting that smaller loans, which were often decided at lower managerial levels, might not be included, even though loans under 5,000 guilders were frequently discussed.

Smits 2001). Deposits continued to fall until 1937-1938 and only really recovered after the Second World War.

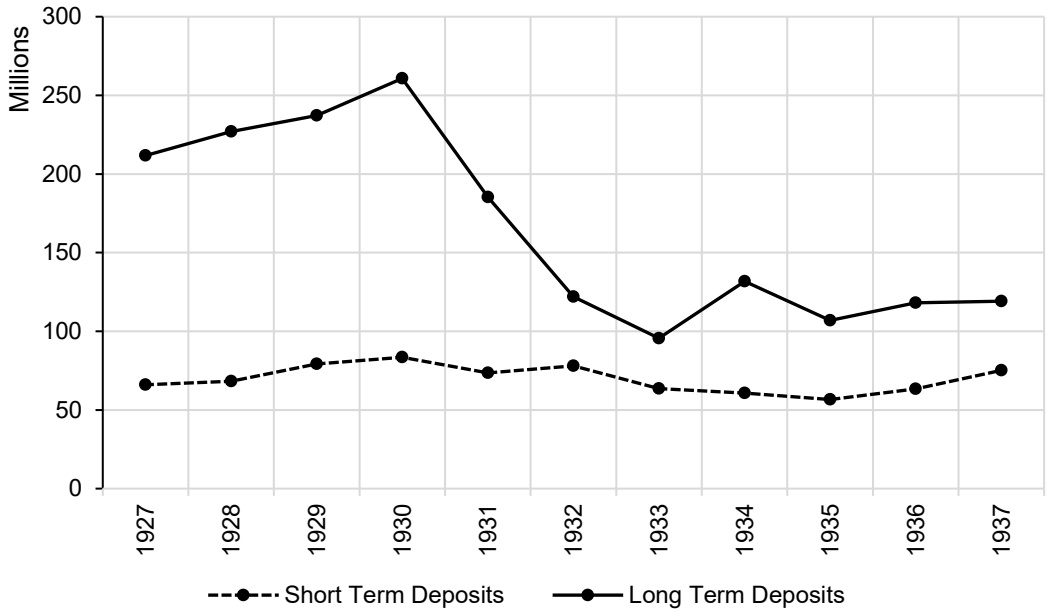
Figure 1: Nominal Deposits at Big 5 and Other Commercial Banks (1925-1938)[10]



The decrease in deposits occurred across commercial banks, but the largest outflows came from the big 5 commercial banks. More specifically, the outflow consisted nearly entirely of long term (>3 months) deposits (Figure 2). Long term deposits in the large banks were incrementally growing until 1930 and then more than halved by 1932. This was mostly caused by the Amsterdamsche Bank which went from a maximum of 34 million guilders in year fixed deposits in 1930 to a minimum of 2.8 million in 1934, a decrease of 92 percent. The other banks suffered less dramatic outflows. The NHM and Incasso Bank both lost around 65 percent of their long term deposits between 1930 and 1933, while the Twentsche Bank lost 30 percent in this period and at most lost 52 percent compared to its 1930 peak.

[10] Own calculations using our self-constructed database based on CBS (1909-1940). The deposits of the Haarlemsche Bankvereeniging (HBV) are added to the the Twentsche Bank until its merger in 1929 and the deposits of the Nationale Bankvereeniging (NatoBank) are added to the Rotterdamsche Bank before January 1931, to make the series comparable between the pre and post merger dates.

Figure 2: Long and Short Term Deposits at 4 Large Commercial Banks (1927-1937) [11]



Note: Short term deposits are defined as deposits up to one month. Long term deposits are deposits placed with at least a three month notice.[12]

Information on the breakdown of deposits for nine smaller banks in 1930 and 1931, shows a similar pattern, with the outflow of short term deposits totalling nearly one million guilders (from around 7 to 6 million), while the long term deposits fell by nearly seven million guilders, from 45.4 million to 38.5 million. This suggests that the outflow of long term deposits was a general occurrence across the banking sector.[13]

An important question to ask is what happened with the deposits that were taken out of the banks. From an investor perspective, there was a lack of viable alternatives as the economy

[11] This graph contains the sum of deposits at the end of year at the Twentsche Bank, NHM, Amsterdamsche Bank and Incasso Bank. Data was taken from their yearly reports, digitized by the ABN AMRO Historical Archives. The yearly reports of the Rotterdamsche Bank did not contain a breakdown of deposits by duration. The deposits of the HBV are added to the series until its merger with the Twentsche Bank in 1929.

[12] For the NHM, the balance sheet only makes a distinction between shorter or longer than 6 months notice. For the Amsterdamsche Bank, long term deposits also include the 1 month deposits because the balance sheet groups the 1 to 6 month deposits together.

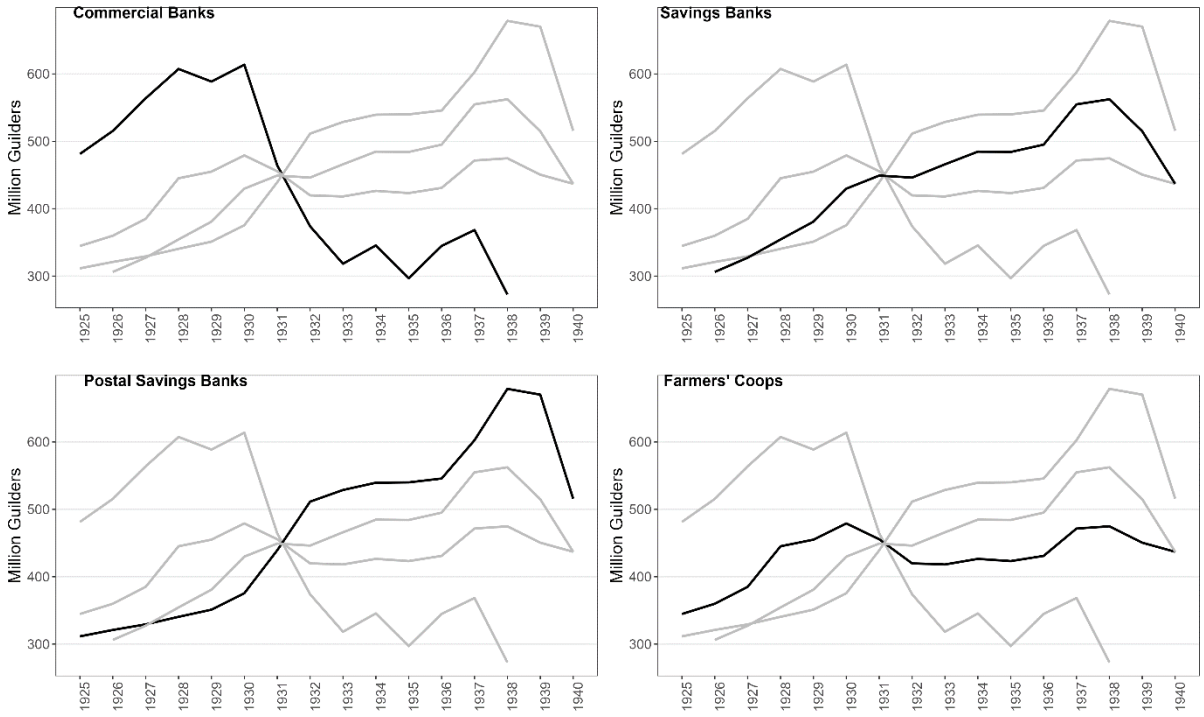
[13] For the following banks, the breakdown of deposits was provided in the balance sheets found in the DNB Archive (NA 2.25.68): Bank voor Handel en Scheepsvaart (inv. nr. 9972), Dordrechtse Onderlinge Credietvereeniging (8171), Friesche Bank (8172), Geldersche Credietvereeniging (8108), Haagsche Boazbank (9385), Het Onderling Crediet (8123), Kingma's Bank (8119), NHLCB (8151), Utrechtsche Landbouwbank (8590).

slowed down. Equity markets declined, bond yields declined as prices rose, and real estate prices decreased (Eicholtz et al. 2021). For none of those markets, we have evidence of a notable increase in investors entering them. As a last resort, people could decide to hold cash, but then they would forgo all returns. Furthermore, we find little to no evidence of individuals hoarding cash like in France (Baubeau et al. 2021).[14]

Figure 3 provides a first clue as to where deposits moved to. It illustrates that the sharp decrease in deposits held by commercial banks coincided with an increase in deposits held by savings institutions. Deposits at the postal savings bank (RPSB) increased from approximately 340 million guilders in the late-1920s to almost 680 by the late-1930s. They doubled in less than a decade. Similarly, total deposits' value at savings banks increased from 300 to over 560 million guilders (an 86 percent increase). Finally, deposits at farmers' credit cooperatives declined at first, falling by approximately 30 million guilders (i.e., from 450 to 420 million guilders) in the years 1929-1932, to then stabilise and increase gradually to nearly 470 million guilders by the mid-1930s.

[14] The total value of cash money in circulation in the Netherlands fluctuated between fl. 1.051 billion in 1925 and 888 million in 1935. We also observe no notable increase in the circulation of large denominations. See: Own calculations using DNB (1987, 2000).

Figure 3: Savings and deposits by financial institution (1925-1940)



Source: Own calculations using DNB (1987, 2000).

It is important to note that the shift of deposits from commercial banks to savings institutions, particularly the postal savings bank, does not automatically imply a cause-and-effect relationship and we do not entirely rule out the possibility that the inflow of deposits into saving institutions partly stemmed from an increase in precautionary savings (Degorce & Monnet 2024). In a similar spirit, we also do not exclude the possibility that the deposit account holders who withdrew their money from commercial banks differed from those depositors who put their money at savings institutions. This is not unlikely given the segmented nature of the Dutch banking system.

Throughout the Great Depression the lines between the various commercial and non-commercial institutions that offered saving services increasingly blurred. As noted in Section II, the savings banks and postal savings banks were established with a clear social objective of helping middling groups build financial reserves to protect them from downward social mobility

and to help the poor escape their precarious situation (Deneweth et al. 2014). Lower to middle-class workers and small businesses thus formed their prime constituency. Commercial banks on the other hand offered saving services to larger businesses, upper middle classes and wealthier individuals. The banks often imposed a minimum limit for deposits whilst granting a slightly higher interest rate. Average deposits were nearly eight times larger than those at savings banks and twenty times deposits at the postal savings bank.[15] Commercial banks thus offered distinctive services to a different type of clientele.

Nonetheless, wealthy individuals often had one (or multiple) savings account(s) at commercial banks as well as savings institutions (Gelderblom et al. 2023). And wealthier depositors could and – as the evidence points out – would move their deposits between commercial banks and saving institutions. Table 2 corroborates this point by providing a breakdown (in nominal guilders) of the size of deposits held by the postal savings bank. It illustrates that there was hardly an increase in the total number of deposit accounts at the bank, growing by little more than 13 percent over more than a decade. Conversely, the number of accounts with a value exceeding 2,000 guilders grew by a factor of 67, experiencing its strongest growth between 1930 and 1932. In the same period of time, accounts with a value of more than 3,000 guilders grew by a factor of 7.5. The increase in deposits took place at the intensive margin. This influx was reinforced by the decision of the Dutch parliament to raise the limit of maximum interest-gaining deposits from 1,200 to 2,500 guilders, on 1 January 1932 (Niemeyer 1940,p. 809).[16] This decision was a response, rather than a driver of the inflows, as the largest increase in savings booklets with deposits larger than 3,000 guilders happened between 1930 and 1931 before the legal change.

[15] The average deposit in 1929 at the Incasso Bank was 3,150 guilders and even 4.826 guilders at the Twentsche Bank (Yearly Reports IB and TWB for 1929, accessed via ABN AMRO Heritage). Average deposits in smaller banks such as Het Onderling Crediet and Noordhollandsch Landbouwcrediet in 1930 were respectively 4,789 and 1,517 guilders (NA 2.20.68/8123 & 8151). Meanwhile, the average deposit in savings banks was much less at 387 guilders, while at the RPSB was only 167 guilders (CBS, Spaar- en Leenbanken over het jaar 1929/1930, 1930, p.2).

[16] A similar change occurred in France in March 1931, when the legal maximum amount for an account in the caisses d'epargne ´was increased by Parliament from 12,000 to 20,000 francs for individuals and 50,000 to 100,000 for corporations (Baubeau et al. 2021: 23).

Table 2: Breakdown of Deposit Accounts at the Postal Savings Bank by Size (1927-1937) [17]

Year	*< 1*	*1 to 10*	*10 to 100*	*100 to 1.000*	*1.000 to 2.000*	*2.000 to 3.000*	*> 3.000*	*Total*
1927	334,915	613,288	481,809	514,105	93,310	715	184	2,038,326
1928	324,533	625,377	490,939	531,016	96,390	755	212	2,069,222
1929	314,292	635,815	501,551	548,957	99,656	764	186	2,101,221
1930	304,442	651,653	505,658	570,824	110,176	986	287	2,144,026
1931	293,462	664,261	505,997	610,501	137,915	4,378	706	2,217,220
1932	281,642	683,026	508,718	619,151	142,838	24,401	876	2,260,652
1933	269,193	704,589	511,879	508,062	140,149	32,822	982	2,267,676
1934	256,699	713,934	511,670	604,796	137,407	38,266	1,041	2,263,813
1935	242,617	728,322	518,768	601,024	132,508	42,109	1,079	2,266,427
1936	228,080	735,810	525,527	600,687	130,911	45,038	1,102	2,267,155
1937	212,033	736,374	537,713	618,844	140,224	59,554	1,381	2,306,123

V. WHAT DROVE THE REALLOCATION OF DEPOSITS?

A flight to safety

The next piece in the empirical puzzle is to explain the driving forces behind the reallocation of deposits. The risk-adjusted interest rates on deposits offered by the postal savings bank compared to commercial banks provide a plausible explanation. The current literature focussing on the reallocation of deposits during the Great Depression emphasises the risk aspect by putting forward the flight to safety mechanism of deposit reallocation from commercial banks to savings banks (Baubeau et al. 2021, Monnet et al. 2021, Degorce & Monnet 2024). The (implicit) argument is that all else being equal, the higher fear of contagion and banking failure

[17] Figures are for 31 December of every year. Source: CBS, Jaarcijfers voor Nederland, 1935 p. 156 and 1938 p. 160.

drives depositors to safe havens, even if they offer lower returns. At first sight, such an interpretation holds for the Dutch case and contemporaries also put forward this argument. In its annual report, the postal savings bank itself commented that this near exponential increase was the direct result of depositors' preference to invest their money as safely as possible.[18] Niemeyer (1940, p. 810), also claimed that the institutional set-up, the fact that postal savings bank was guaranteed by the state, the management, and especially the investment constraints that made them safe havens for increasingly risk-averse depositors.

Figure 4 supports the analysis made by contemporary scholars by illustrating the large differences in the level of liquidity between different types of financial institutions.[19] It indicates that the postal savings bank was the most liquid. This was mostly due to their legal obligation to convert nearly all deposits into easily tradable or discountable public debt (Levy 1916, p. 71). The fact that the Netherlands remained on the gold standard until 1936 made, much like in France, that Dutch public debt was 'as good as gold' and inspired much confidence (Fliers and Colvin 2022). The steady decrease in interest rates also pushed up bond prices indicating increased demand. Bonds were highly tradeable or discountable at the DNB (Van der Valk 1938, p. 567). This further increased the appeal of the postal savings bank.

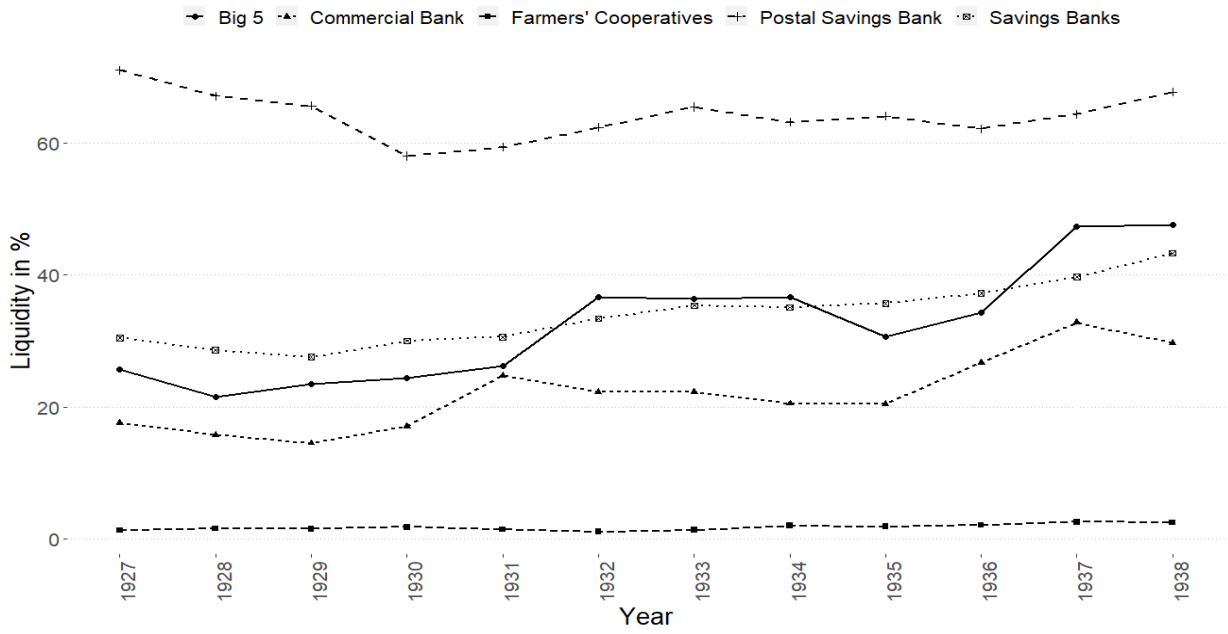
Regular savings banks followed in second place during the 1920s, and while becoming increasingly liquid in the 1930s, they were overtaken by the big 5 commercial banks. After having maintained a stable level of liquidity during the 1920s, the big 5 became notably more liquid after 1931, after deposits left their balance sheets. Again, farmers' credit cooperatives form the exception as they do not evidence a shift to more liquidity. On the contrary, they were consistently very illiquid throughout the entire period (Boonstra & Mooij 2006; Jonker 1988). The high confidence in these institutions and their large influence over their depositors,

[18] "… Gepaard aan den drang, beschikbare middelen zo veilig mogelijk te beleggen, maken het verklaarbaar, dat veel gelden naar de Rijkspostspaarbank zijn toegevloeid, welke in andere omstandigheden haar niet zouden zijn aangeboden". See, Niemeyer (1940, p. 810).

[19] Liquidity is calculated as the sum of all cash, deposits at the national bank, and short and long term public debt (national and local), divided by total assets. We classify public debt as liquid since national government bonds could be traded on an active secondary market, or at all times discounted at the DNB.

inherent to their cooperative model, combined with a focus on low risk mortgage lending ensured a stable base of deposits. With recourse to such funding, this allowed them to operate with high leverage ratios and illiquid portfolios, without becoming insolvent (Colvin 2018). Simply put, Dutch deposit holders seemed to have gradually transferred their deposits away from commercial banks to a safer alternative, notably the state guaranteed postal savings bank.

Figure 4: Liquidity Level at Financial Institution (1927-1938) [20]



Risk-returns

We argue, however, that a flight to safety does not fully explain the timing of the outflow of deposits from the commercial banking system nor the reason. Instead, we argue that these effects were reinforced by a higher interest rate on long-term deposits, resulting in a higher risk-adjusted return. To demonstrate this, we gathered monthly balance sheet and interest rate information for four of the five largest commercial banks for whom this information was available and monthly in and outflows of deposits in the postal savings bank.[21] We chose these banks because the largest outflow in deposits occurred from the big 5 and the largest inflow

[20] Own calculations using DNB (1987, 2000).
[21] Unfortunately, we could not find monthly balance sheets for the NHM.

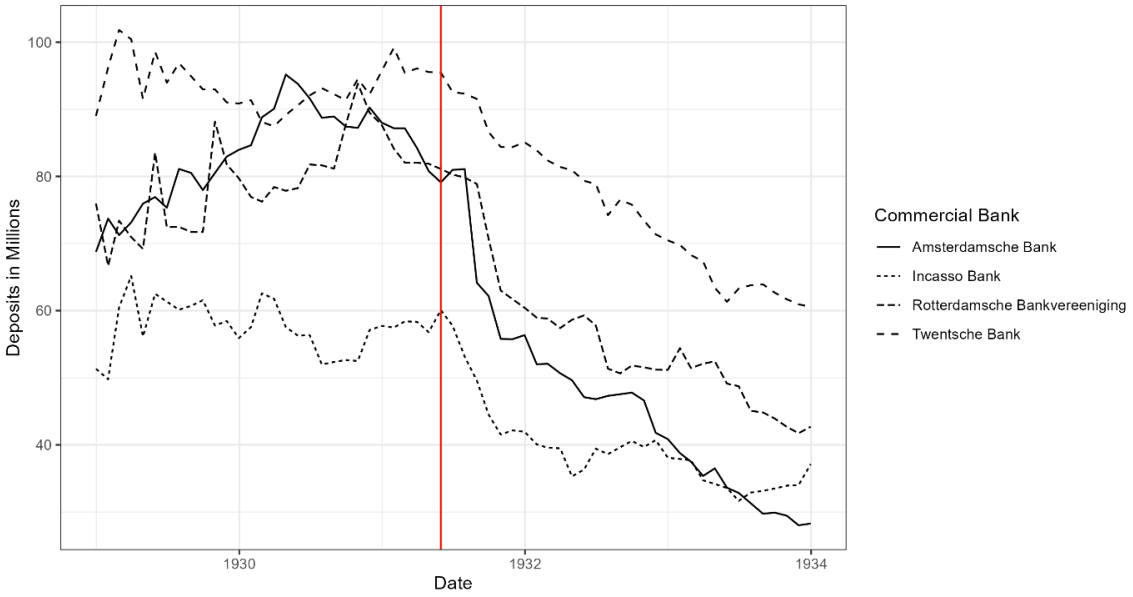
went into the postal savings bank (Figure 1). We exclude private saving banks and farmers' cooperative banks from our analysis and compare commercial banks to the postal savings bank.[22]

Figure 5 shows the monthly deposits at four large commercial banks between 31 December 1928 and 31 December 1933. It shows that the outflow of deposits was not gradual, but mostly took place after the collapse of the Credit-Anstalt on 11 May 1931 (indicated by the red vertical line) amidst a series of financial panics across central Europe (Accominotti 2019) Before the collapse, commercial bank deposits fluctuated around a flat or increasing trend. Afterwards, deposits flowed out of the Amsterdamsche Bank, Incasso Bank and Rotterdamsche Bank, and to a lesser extent from the Twentsche Bank.

At first glance, this could be interpreted as a flight to safety response away from the commercial banking system over rising fears of contagion and foreign exposure, but there is more at play here. Unlike Accominotti (2012) find no correlation between the outflow of deposits and the exposure to frozen assets or foreign banks. Instead, DNB policies to protect the gold standard were driving force. Following the Credit-Anstalt collapse, the Dutch central bank changed its policy rate (*wisseldisconto*) on May 16 1931 to a record low of 2 percent (van Zanden 1997, p.148). Commercial banks followed this rate to set their own deposit interest rates, especially year fixed deposit rates, which were exactly the type of long-term deposits that left the banks (Figure 2). Consequently, on 27, 28 and 29 May 1931, the Amsterdamsche Bank, Rotterdamsche Bank and Incasso Bank respectively lowered their interest on year fixed deposits to 2.5 percent per year, for the first time dropping below the interest rate of the postal savings bank, which – as we will subsequently discuss in more detail - was set at 2.64 percent.

[22] This is because the interinstitutional flow of deposits seemed to have primarily occurred between commercial banks and said saving institutions.

Figure 5: Deposits at Big 4 Banks, monthly data (December 1928-December 1933)



Note: The vertical red line is set on 31 May 1931, after the big 4 commercial banks adjusted their interest rate.

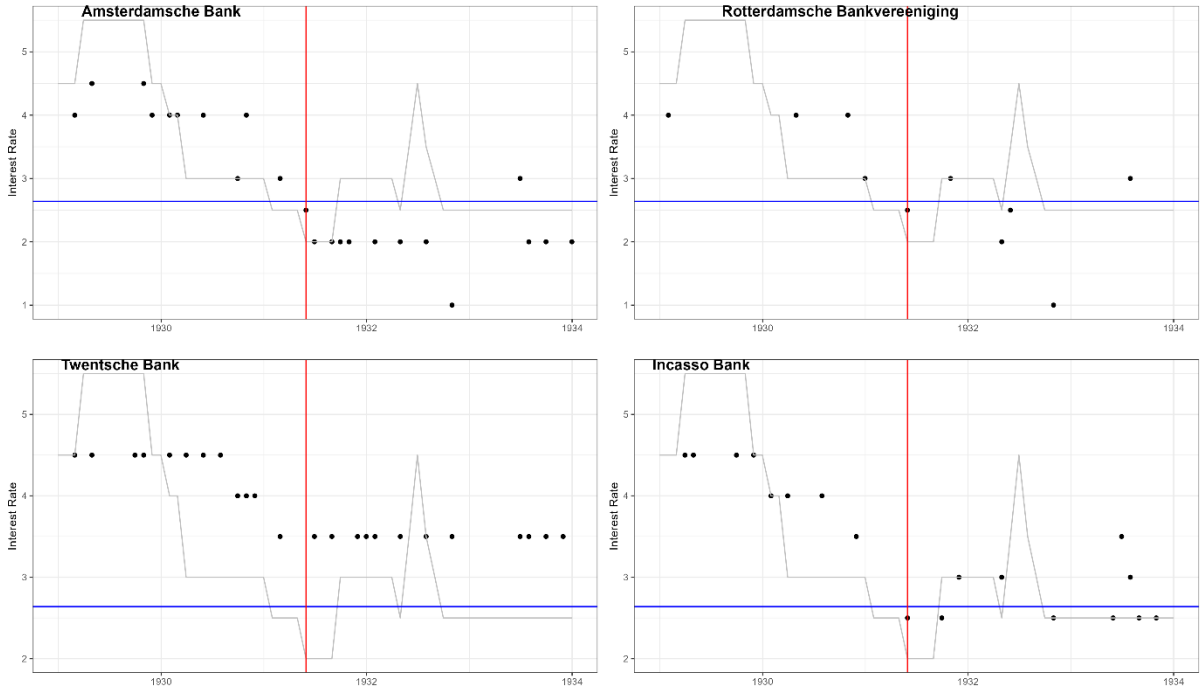
The fact that the interest rates on long-term deposits at commercial banks dropped below the postal savings bank is surprising considering that since its founding, the resolve of the bank was to encourage savings for those with little to no access to other financial service providers.[23] Its core business consisted of investing the savings from its deposit holders into (long term) treasury bonds. The yield it earned from this asset transformation was used to pay its operating expenses and to strengthen its reserve fund. With this business model, the postal savings bank positioned itself as a safe, but less commercially attractive alternative (Dankers et al. 2001).

The annual interest rate paid on deposits held at the postal savings bank was fixed at 2.64 percent per annum.[24] This specific rate was chosen due to administrative purposes: it equalled a half-monthly interest payment of 11 cents on a 100 guilders deposit.[25] It was also

[23] It should be note that similar to what Monnet et al. (2021) have found for France, the interest rate on short term deposits (i.e. for up to periods of six months) offered by commercial banks was consistently lower than those offered by the postal savings bank. Such short term deposits however offered a different purpose, serving more as a credit line than as a savings instrument. Furthermore, as demonstrated by figure 2, we observe no real contractions in these type of deposits.
[24] This was set by article 13 in the Law of 25 May 1880.
[25] "Ter vereenvoudiging van de berekening is een rentetype genomen, dat door 24 (het geval der halfmaandelijsche termijnen) deelbaar is. De rente van f.100. – bedraagt nu juist 11 cent over één rentetermijn." (Groen 1927: 12).

purposely set below the interest rates of savings banks and commercial banks, in order not to engage in direct competition with these private institutions (Oomkens 1938). The interest rate was occasionally under discussion, especially during periods of low interest rates and bond yields, and it was legally possible to lower it since 1895 (Groen 1927). Nonetheless, the rate remained unaltered from its onset and continued to be a fixed 2.64 percent even when the DNB lowered its policy rates to historic lows in 1931 (Oomkens 1943).[26]

Figure 6: Interest Rates on Year Fixed Deposits at Big 4 Commercial Banks (December 1928-December 1931)



Note: The vertical red line is set on 31 May 1931, after the big 4 commercial banks adjusted their interest rate. The horizontal blue line is the postal savings bank's interest rate of 2.64 percent. The grey line is the DNB policy rate.

Through this passive stance, the postal savings bank became an interesting option for depositors, offering higher nominal interest rates for lower risk.[27] The commercial bank interest rate remained below the postal savings bank until November 1931, when it rose again to around 3 percent. In October 1932, the interest rate again fell below the postal savings bank. However,

[26] On the contrary, there were even discussion to raise the postal savings bank interest rate. Despite these discussions, it remains unclear why the government chose this path.
[27] A similar situation occurred in France (Monnet et al. 2021) and Belgium (NBB 1930-1931)

by that time many deposits had already left the big 4 banks, therefore the outflows were smaller (Figure 6).

We have monthly deposit and interest rate information for only three smaller banks, but the patterns there suggest a similar search for higher returns.[28] When interest rates on deposits fell underneath the postal savings bank rate, the banks experienced an outflow of deposits. In turn, when rates stayed high, some banks experienced an inflow of deposits. The example of the Geldersche Credietvereeniging shows depositors were looking for higher returns. Throughout 1930, the bank offered 4 percent interest on year long fixed deposits (above the postal bank rate) while the 6 month rate was put at 3.5 percent. During this period, the amount of deposits increased from 9.5 million to 11.3 million guilders. The 6 month interest rate was lowered to 2.5 percent in November 1930 without much impact on the total amount of deposits. However, when in September 1931 the interest offered on 6 month year fixed deposits respectively dropped to 1.5 and 3 percent, and 2.3 million guilders in long term deposits left the bank in three months time.

VI. DOCUMENTING THE DECREASE IN PRIVATE CREDIT

Through our analysis, we have shed light on the reallocation of funds and the factors that drove these transfers. It is important to note, however, that the movement of financial flows from commercial banks to savings institutions is just one aspect of our broader empirical analysis. Equally important is comprehending how banks that faced substantial depositor withdrawals responded to these abrupt changes.

Figure 7 indicates that, on average, all financial institutions shifted their portfolio away from private investments into safer, more liquid public investments. Consistent with their legal obligations, the postal savings bank, being the primary recipient of deposits, converted a

[28] Information on monthly deposit amounts and interest rates for Het Onderling Crediet, and Dordrechtsche Onderlinge Credietvereeniging was found in their yearly reports. Source: NA 2.25.68/8123 and 8171. Monthly balance sheets and interest rate information for the Geldersche Credietvereeniging were found in newspapers on Delpher. See replication package for links to the newspaper pages.

significant portion of these inflows into government bonds and other liquid assets. The total value of national debt held in their portfolio, which stood at approximately 170 million guilders in the late 1920s, experienced a substantial surge, reaching nearly 300 million guilders by 1932. In contrast, local government debt exhibited a slight decrease between 1932 and 1935, declining from 187 million guilders to 153 million guilders, while private debt fluctuated within the range of 30 to 38 million guilders. As a result, by 1933, the postal savings bank held around 12 percent of the outstanding national debt, up from 6 percent in 1929.

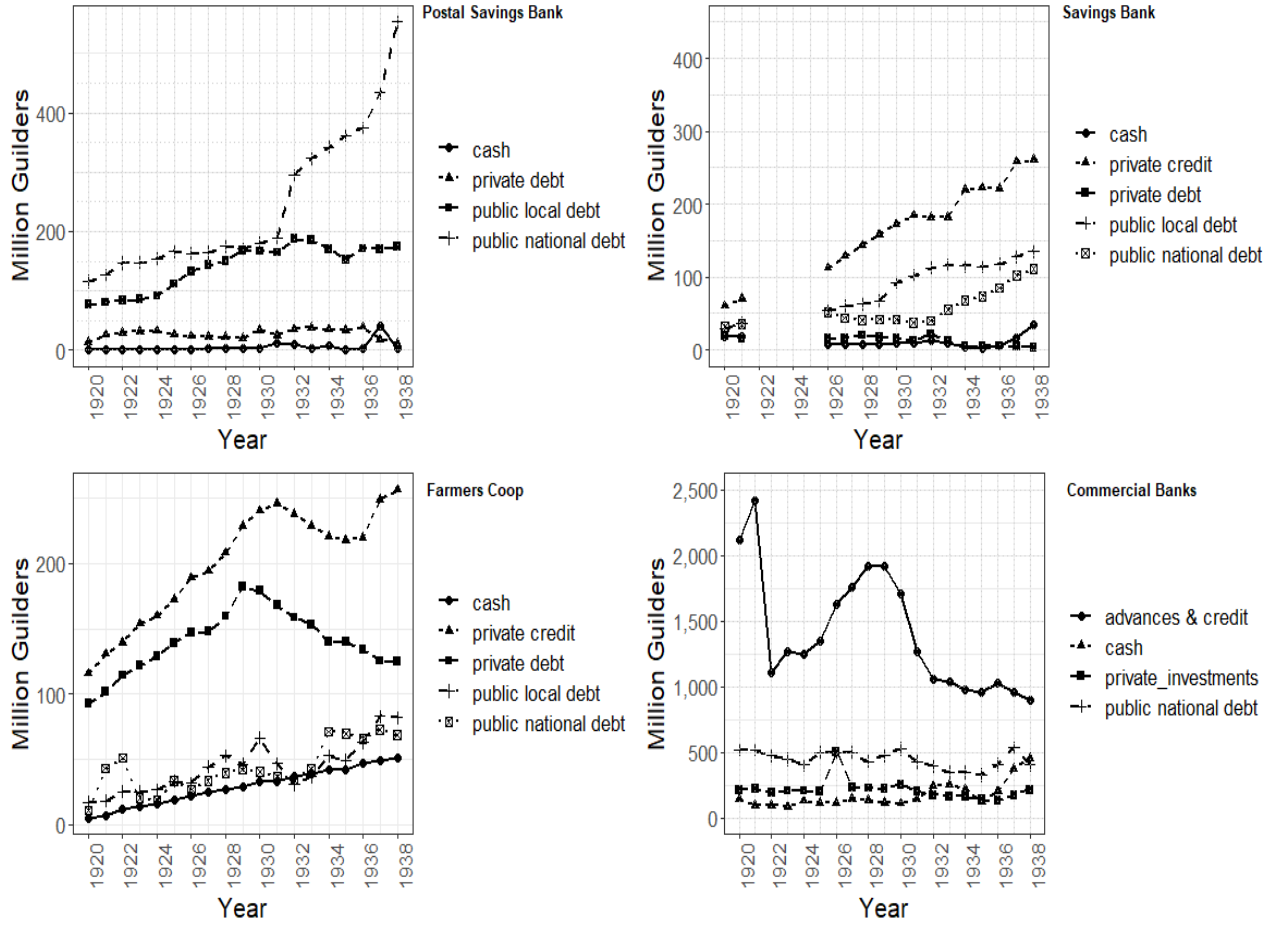
A detailed examination of the annual reports of the postal savings bank and the minutes from parliamentary debates on the postal savings bank's statutory changes reveals active government support for this increase in national debt holdings. Notably, during the 25th meeting of the lower house on 25 November 1931, it was clearly stated that "the State of the Netherlands would greatly benefit from using the National Postal Savings Bank as a means to gather capital for its loans, given the significant need for capital". [29] To encourage this growth, the government, in 1932, redefined the postal savings bank as an independent entity. This change enabled it to discount government bonds at the Dutch Central Bank (DNB), a transaction it was previously unable to perform as a government entity (Groen 1941; Barendregt & Overman 2020). At the same time, the bank's ability to offer interest on deposits was increased from 1,200 to 2,500; to which we have alluded to earlier (Section 4). These adjustments allowed the postal savings bank to augment its government bond holdings without sacrificing liquidity. The government's decision not to lower the fixed interest rate of the postal savings bank can also be seen as part of this strategy (Section 5).

Saving banks followed a similar pattern. From a peak in 1930, savings banks' investment in the private sector (i.e., mainly invested in private sector bonds) dropped from slightly over 90 million guilders to less than 75 million guilders, a decrease of 20 percent. Loans issued to the

[29] "Het lijdt toch geen twijfel dat bij de groote behoefte aan kapitaal, de Staat der Nederlanden in het vergaren van kapitaal bij de Rijkspostspaarbank een zeer te waarderen middel zou vinden voor het verkrijgen van kapitaal voor zijn leeningen." 25th meeting, Lower House, 25 November 1931.

private sector dropped as well, but with a delay and also less drastically: from a peak in 1931 of 184.7 million to a low point of 172.1 million guilders in 1936. Conversely, investments in the public sector, predominantly debt issued on the national level, increased by 40 percent (from 134.4 million guilders to 188.2 million guilders).

Figure 7: Asset Allocation at Financial Institutions (1920-1938) [30]



Farmers' cooperatives similarly reallocated their funds to savings banks. Debt investments in the private sector decreased from a high of 182 million guilders in 1929 to a low of 125 million in 1938. Lending also decreased, albeit with a slight delay. Between 1931 and 1935, the value of outstanding loans dropped by 13 percent (from 245.9 to 217.8 million guilders). When taken

[30] DNB (1987, 2000). Asset for commercial banks are grouped according to Table 1, further detailed in Annex 1.

together, investments in local and national debt grew by 45 percent, increasing from 106.9 to 155.7 million guilders in the period between 1932 and 1937.

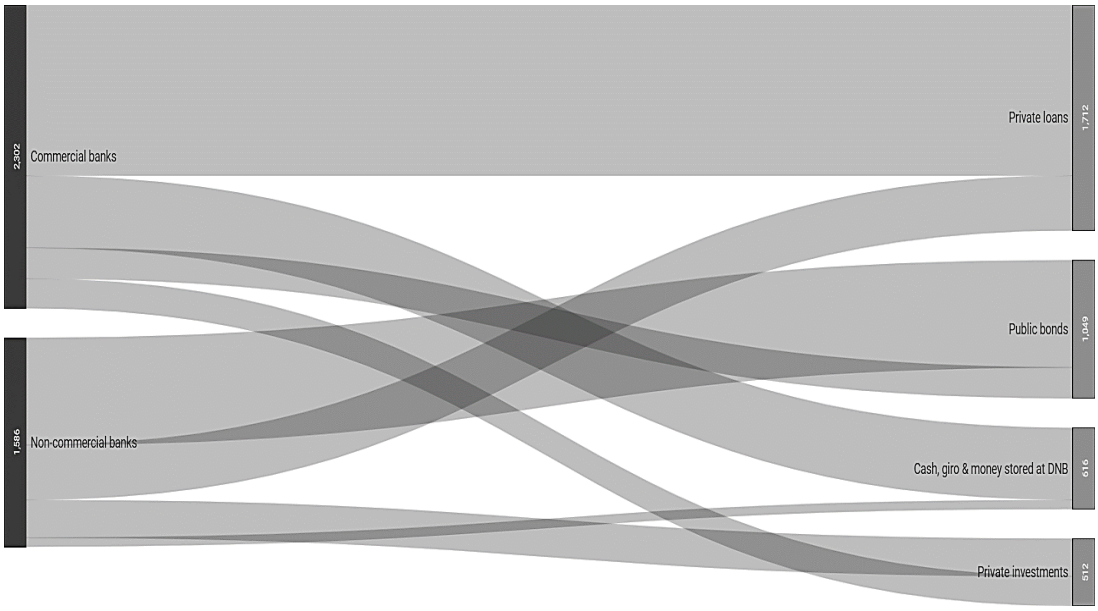
Commercial banks show a slightly different trend. We observe a substantial decline in the nominal amount of advances and private credit. These fell, not as much as after the 1920s banking crisis, but they still nearly halved from the 1929-level to stay there until the 1940s. Unlike their non-commercial counterparts, however, they did not shift their portfolio fundamentally in any other way. Much like saving institutions, the holdings of cash increased, but only slightly. Finally, there was also a small bump in the holdings of public national debt, but this was only temporary.

Figures 8 and 9 present a comprehensive overview of the flow of funds from 1928 to 1933. These figures encapsulate the notable transformation that occurred in the composition of assets during this period. In 1928, commercial banks accounted for a substantial portion of total assets, amounting to over 3.7 billion guilders, or nearly three quarters of the total, while non-commercial institutions represented approximately a quarter with nearly 1.3 billion guilders. These institutions, together with commercial banks, extended loans to the private sector, including households and small businesses, amounting to more than 3.2 billion guilders, or close to 4 billion guilders when private investments were included. Simultaneously, safer and more liquid investments, such as cash and government bonds, amounted to 1.3 billion guilders. However, by 1933, a significant shift had taken place. Non-commercial institutions' investments surged to nearly 41 percent, while commercial banks' share dwindled to 59 percent, corresponding to approximately 1.58 billion guilders and 2.3 billion guilders, respectively.

Collectively, our analysis reveals a substantial decline in the value of private credit and other private investments, including equity and debt, from 3.7 billion to 2.2 billion guilders between 1928 and 1933. Lending itself was contracted by more than 86 percent (i.e., from nearly 3.2 billion to 1.7 billion guilders). In contrast, safer, more liquid asset classes, such as national government bonds, increased in value from 1.3 billion to 1.7 billion guilders.

Figure 8: Money Flow From Commercial Banks and Non-Commercial Banks (1928) [31]

Figure 9: Money Flow From Commercial Banks and Non-Commercial Banks (1933)



VII. SUPPLY OR DEMAND DRIVEN CREDIT CONTRACTIONS

In section 6 of our analysis, we observed a notable reduction in private credit. This phenomenon can be understood in light of the analysis by Baubeau et al. (2021) and Monnet et al. (2021) for France which showed that banks responded to deposit withdrawals by reshaping their investment portfolios and reducing loans to businesses. Similarly, the study by Degorce &

[31] Own calculation using DNB (1987).

Monnet (2024) highlighted how a flight to safety resulted in a contraction of credit, subsequently affecting economic activities significantly.

However, an alternate explanation for the decline in deposits (as discussed in section 5), could be related to a reduced demand for credit stemming from a downturn in economic activities, rather than the other way around. In this context, the decrease in credit is due to a diminished demand from borrowers. This is because loans are not being renewed upon their maturity, leading to a natural decrease in outstanding loans, rather than a credit crunch initiated by mass deposit withdrawals from the bank. In the following analysis, we aim to evaluate the evidence supporting both supply-driven and demand-driven hypotheses, introducing new qualitative and quantitative data specific to the Netherlands.

Demand-driven credit contraction

Earlier, we discussed how the redistribution of deposits within the Netherlands was influenced not only by a flight to safety but also by commercial banks' lower interest rates on deposits compared to those offered by the postal savings bank. We also addressed the government's refusal to adjust the interest rate of the postal savings bank. However, the rationale behind the banks' apparent acceptance of this situation seemingly without objection requires further examination. Insight into this can be gained from a detailed analysis of the annual reports of commercial banks.

These reports indicate that the banks' decision to keep deposit interest rates low was not a matter of choice, but a consequence of the absence of profitable investment opportunities, leading to a contraction in their balance sheets. For instance, the 1931 annual report from the Twentsche Bank highlighted a decreased demand for credit and the difficulty in securing adequate returns on liquid assets. The Amsterdamsche Bank, the Rotterdamsche Bank, and the Incasso Bank also reported substantial amounts of funds that remained uninvested. In 1933, the Amsterdamsche Bank stated, "since a significant portion of the funds entrusted to us could not find profitable placement in the money market, the deposit interest rate had to remain low,

resulting in decreased deposits." The following year, the Twentsche Bank commented on the economic instability in the Netherlands, noting that it "inevitably led to reduced reliance on banking services by the trade and industry sectors. This, coupled with the low interest rates offered by banks, encouraged the search for alternative investment opportunities, leading to a decline in our balance sheet figures."

Similar remarks were made in many of the yearly reports of smaller banks, and for three banks we have detailed information on the number and amount of loan applications and approvals in 1930 and 1931. Noordhollandsche Landbouwcrediet and the Crediet en Depositokas, both experienced a large drop in the demand for credit, with respectively 24 and 35 percent less applications, and the amount of credit requested falling by 30 and 48 percent. At the same time, the approval rates of the Noordhollandsche Landbouwcrediet remained around 80 percent while the Crediet en Depositokas approved 71 percent of the loans in 1930 and 56 percent in 1931.[32]

Supply-driven credit contraction

While the evidence presented thus far may hint that the drop in deposits was mainly due to demand factors, a thorough quantitative analysis uncovers a more nuanced story. Table 3 delves into 3,024 loan applications processed by three leading commercial banks of the time for which historical records were available: Rotterdamsche Bank, Amsterdamsche Bank, and Twentsche Bank.

The first five columns of the table present essential financial figures for each year, covering the total loans issued, the range of loan values from smallest to largest, the median loan value, and the total value of all loans. These figures show a pronounced decrease in both the number and total value of loans from 1929 to 1931, with a slow recovery in the following

[32] Archive of the Dutch National Bank held at the Nationaal Archief (inv. nr. 2.25.68), Yearly Reports of the Noordhollandsche Landbouwcredietbank (8151), the Crediet en Depositokas (8390) and Haagsche Boazbank (9386).

years. While this trend might seem demand-driven at first glance, other indicators suggest that the banks were becoming more conservative in their lending policies.

Notably, the sixth and seventh columns reveal interesting trends: the percentage of loans made to existing customers and the percentage of secured loans increased significantly from 1929 to 1935. The proportion of loans to existing customers rose from 52.4 percent in 1929 to 70.5 percent in 1934, and the prevalence of secured loans went up from 55.6 percent to 68 percent. This pattern likely put smaller businesses at a disadvantage, as they often lack the collateral needed, indicating a tightening credit market for these entities. A close reading of the yearly reports of smaller banks provides further evidence for a supply driven contraction. The Haagsche Boazbank, for instance, saw a 5 percent increase in the number of applications, asking for 10 percent more credit in 1931 compared to the year before. All the while, its acceptance rate fell from 81 to 46 percent of the loans, and from 68 to 30 percent of the requested amount.

Table 3: Breakdown of New Loans by Year (1929-1936)

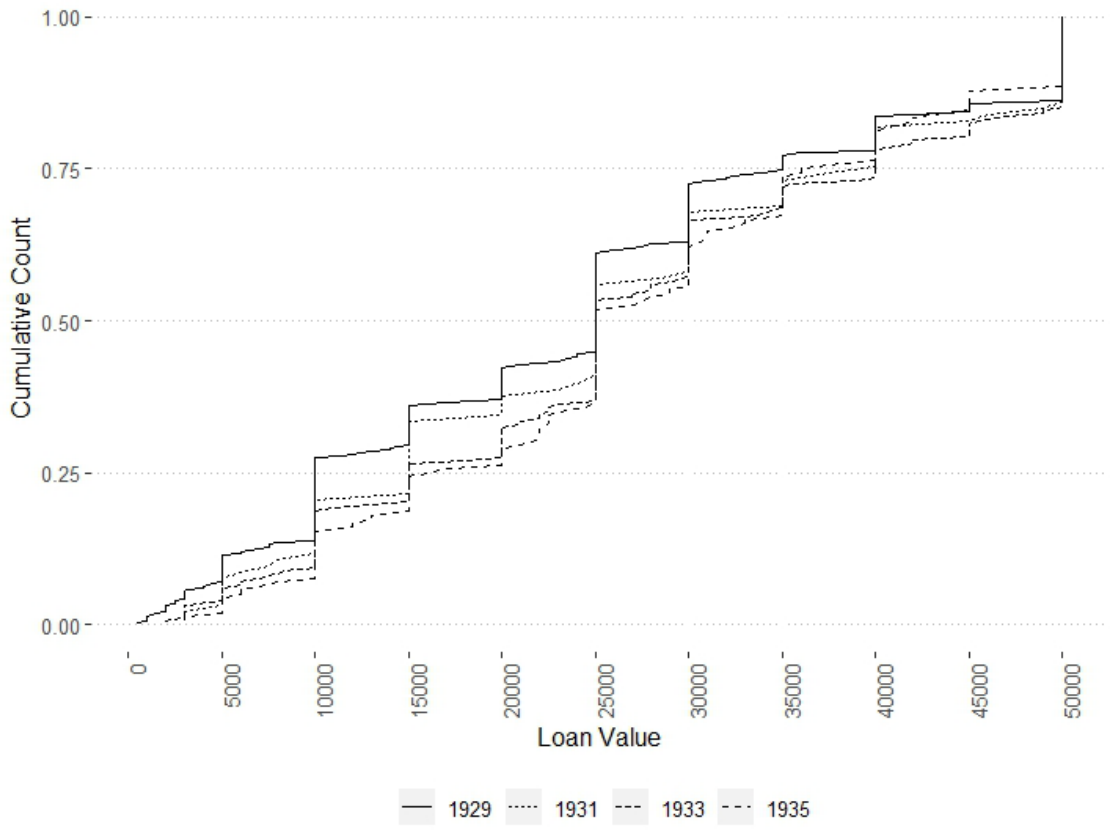
Year	*Number*	*Minimum*	*Maximum*	*Median*	*Total*	*Existing*	*Collatorized*
1929	572	500	10,000,000	55,000	134,683,328	52.4%	55.6%
1930	628	1,000	5,000,000	40,000	106,978,178	52.1%	58.9%
1931	173	3,000	5,000,000	50,000	41,348,148	60.1%	53.2%
1932	312	2,500	6,000,000	46,500	51,934,604	57.1%	64.4%
1933	327	2,000	3,000,000	50,000	50,685,100	56.9%	67.0%
1934	271	2,500	4,040,000	50,000	48,061,555	70.5%	64.2%
1935	322	3,000	7,000,000	60,000	87,078,259	68.6%	68.0%
1936	419	1,000	3,500,000	50,000	90,094,145	61.6%	60.1%

Sources: Archieven van de Hoofdbank van de Amsterdamsche Bank NV en van hierbij gedeponeerde archieven, held at Nationaal Archive (NA), Minutes of the meetings of the Standing Committee (Notulen van de vergaderingen van de Permanente Commissie) NA 2.18.32/186; Archief van het Hoofdkantoor van de Rotterdamsche Bank NV en van hierbij gedeponeerde archieven, held at NA, Minutes of the meetings of the board of directors (Notulen van de vergaderingen van de directie), NA 2.18.33:/148-152; Archief van Twentsche Bankvereeniging B.W. Blijdenstein & Co., sedert 1917 de Twentsche Bank N.V., held at Historical Center Overijssel (HCO), Decisions regarding the provision of credit facilities (Besluiten inzake de verlening van kredietfaciliteiten), HCO 0173/2046-2047.

Figure 10 adds to this interpretation. It shows a step graph of the cumulative distribution of loan values for 1929, 1931, 1933, and 1935. The graph for 1929, with a solid line, shows a sharp initial increase, indicating many small loans were issued that year. In contrast, the lines for subsequent years rise less steeply at the start, suggesting fewer small loans were made. This change indicates banks were increasingly hesitant to provide smaller loans to smaller businesses. Additionally, the increase in the minimum loan value from 1929 onwards (Table 3) highlights this shift in banks' lending portfolios.

The 1929 graph also levels off quicker than the others, indicating fewer large loans were made that year. In contrast, the graphs for later years show a more gradual increase across various loan values, indicating a broader range of loan sizes and a move towards larger loans over time, despite deflation.

Figure 10: Cumulative Distribution of The Number of Loans (below 50,000 guilders)



Source: See Table 3

It is important to note that the banks' decision to downsize their operations had minimal impact on the profitability of Dutch commercial banks. This conclusion is drawn from Table 4, which summarizes the financial performance of the Dutch banking sector from 1929 to 1938, based on a sample of 44 banks. It covers the average gross and net profits, return on equity, and dividend payout rates, with values in thousands of guilders or percentages. In 1929, the sector showed strong financial health, with gross profits at 2.278 million guilders and net profits at 87,000 guilders, accompanied by a 9.9 percent return on equity and an 8.0 percent dividend payout. The early 1930s saw challenges, including net losses in 1931 and 1932 and the lowest gross profits in 1933 at 1.316 million guilders.

Despite these difficulties the sector began recovering quickly, exceeding its 1929 net profits by 1935 with a 10.9 percent return on equity. Throughout this turbulent period, the banks

also managed to keep dividend payouts relatively consistent, showcasing their resilience and ability to adapt their financial strategies to maintain stability amidst economic upheavals.[33]

Table 4: Breakdown of Loan Level Data by Year (1929-1936)[34]

	Gross profits (in 1,000 guilders)	Net profits (in 1,000 guilders)	Return on equity (in %)	Dividend pay-out (in %)
1929	2,278	87	9.9	8.0
1930	1,962	2	0.2	7.7
1931	2,148	-140	-16.8	6.0
1932	1,783	-196	-20.1	5.8
1933	1,316	70	8.3	5.3
1934	1,355	54	7.2	5.5
1935	1,432	77	10.9	5.2
1936	1,605	73	9.2	5.9
1937	1,681	84	11.9	6.0
1938	1,567	90	12.8	5.4

The resilience of Dutch banks in maintaining profitability is key to understanding their indifference towards deposit outflows during the flight to safety, especially when they offered lower interest rates on deposits compared to the postal savings bank. This resilience also sheds light on the Netherlands' unique position during the Great Depression, marked by significant declines in bank deposits without experiencing a banking panic or significant bank failures, as noted in the literature. The strategic move by banks to eliminate less profitable loans from their portfolios enabled them to weather the crisis with minimal damage. This approach ensured the stability of the Dutch banking system but likely strained liquidity for smaller companies, which had limited access to capital markets. Consequently, the reduction in private lending in the Netherlands during this period mirrors the credit crunch experienced in neighbouring countries, marking this era as a 'quiet crisis' in Dutch financial history (Baubeau et al. 2021; Baron et al. 2021; Degorce & Monnet 2024).

[33] See appendix D.
[34] Source: see footnote 35

VIII. CONCLUSION

Can a banking crisis occur in the absence of widespread panic? By incorporating the recent insights of Baron et al. (2021) in economics and Baubeau et al. (2021) and Degorce & Monnet (2024) in economic history, this paper employs an analytical narrative approach, focusing on the case of the Netherlands, to contribute to the growing body of literature on this topic. The Dutch banking historiography argued that, due to its high liquidity, banks were well equipped to handle shocks and that therefore the Netherlands did not experience a banking crisis in the 1930s. However, our study reveals that starting in late 1928 and picking up pace in the spring of 1931, deposits shifted from commercial banks to savings banks, with a particular emphasis on the postal savings bank, which observed a substantial increase in deposits from 340 million guilders in 1928 to 511 million guilders by 1932. This shift limited commercial banks' capacity to intermediate funds, and we then demonstrated how this reshuffling of deposits aligned with a decrease in private credit. While larger corporations scaled back their operations resulting in a reduced demand for credit, smaller firms, facing more difficulties in accessing stock market credit, increasingly reported issues with obtaining credit for daily operations or for refinancing existing debts (de Hen 1980; Peeters 2021). In response, the Dutch government established the National Commission for Work Expansion in 1934, the Bank for Industrial Finance in 1935 and Public Loan Guarantee Funds in 1936 (De Jong & Roell 2005; Barendregt 1992; Kaag 1935; Schras 1967).

Our contribution to this emerging body of literature is to clarify the bank lending channel in the Netherlands. Our main assertion is that the sudden shift in depositor behaviour was driven by considerations of the risk-return ratio. Depositors perceived the government-backed postal savings bank, offering higher deposit interest rates, as a safer option compared to commercial banks, leading to a reallocation of funds towards the former. We also highlight the Dutch government's reluctance to reduce the postal savings bank's interest rates below market

levels, viewing it as a useful vehicle to buy up government debt, a stance that commercial banks were shown to be indifferent to given its negligible impact on their profitability.[35]

Finally, our analysis sought to differentiate between supply and demand-driven factors contributing to the decrease in outstanding credit. Our observations based on new qualitative and quantitative evidence tell a complex story but indicate that, at a minimum, the crises prompted a shift in the lending portfolios of banks. This shift likely resulted in reduced credit availability for smaller companies, which had more limited access to capital markets. As a result, while the total money supply remained unchanged, the availability of credit, especially for a crucial part of the economy, did indeed decrease. Our approach underscores the necessity of examining the entire financial sector, including non-bank institutions and taking a closer look at the subtle shifts in the business models of banks and the motivations behind these shifts. Understanding these dynamics is essential to grasp how banks' crisis responses may lead to reduced credit availability for firms. Under such circumstances, government intervention might be required to support the economy, even if the banking system's stability is not directly threatened, as was the case when the Dutch government introduced measures from 1934 to ease credit restrictions for certain smaller companies.[36]

Besides making a more general contribution to the literature, our analysis also contributes to our understanding of the causes of the economic decline in the Netherlands during the Great Depression. While banks remained seemingly unaffected during this period, their response to the shock most likely had a negative impact on the broader Dutch economy. Compared to many of its neighboring countries the Dutch economy did not go in substantial decline until 1931. Despite this slight delay, the Netherlands experienced a severe economic crisis, characterised by a high number of layoffs and bankruptcies, a deflationary spiral, and a persistent trade deficit (Fliers & Colvin 2022). Traditionally adherence to the gold standard was

[35] This aspect is further elaborated in Appendix D.
[36] See for instance the National Commission for Work Expansion in 1934, the Bank for Industrial Finance in 1935 and Public Loan Guarantee Funds in 1936 (De Jong & Roell 2005; Barendregt 1992; Kaag 1935; Schras 1967).

seen as one of the culprits for prolonging the crisis. Following Degorce & Monnet (2024), it is likely that the adherence to the gold standard in the Netherlands made Dutch Government Bonds, the main asset of the postal savings bank, as good as gold. Moreover, starting in 1932 the government further stimulated bond holdings by the postal savings bank. Until now, Dutch scholars overlooked the role of the banking sector in exacerbating the economic problems, yet such an interpretation can help explain how the flight to safety, gold-standard and economic decline were linked in one coherent causal narrative.

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Appendix A - Simplification of Original Balance Sheets

Assets

1. **Cash, cashiers and coupons**
    a. [20] "Kas_kassiers_coupons_vreemde_Munt"
2. **Commercial portfolio (discounts)**
    a. [32] "Wissels_in_Portefeuille"
3. **Advances on securities, repos, and current accounts (overdraft credit)**
    a. [19] "Borgtochten_garanties"
    b. [26] "Debiteuren_en_rek_Crt_Houders"
    c. [27] "Debiteuren_tegen_accept._Rembouers_cred"
    d. [25] "Prolong_Beleening_Daggeldl_Debiteuren_met_effecten_En_onderpand"
4. **Securities and Investments in Companie**
    a. [22] "Wissels_schatk_Papier"
    b. [23] "Effecten_en_fondsen"
    c. [24] "Syndicaten_en_Deelnemingen"
5. **Property, plant, and equipment**
    a. [28] "Vaste_Eigendommen"
6. **Sundry Accounts**
    a. [21] "Banken_en_Bankiers"
    b. [29] "Overige_Activa"
7. **Authorized Capital not Paid**
    a. [7] "Nominaal_Kapitaal" MINUS [9] "Gestort_Kapitaal"

Liabilities

1. **Paid-in Capital**
    a. [9]"Gestort_Kapitaal"
2. **Retained Earnings**
    a. [10] "Reserve”
3. **Net Profit**
    a. [17] "Winst_saldo"
4. **Deposits**
    a. [12] "Depositos_en_Crediteuren"
5. **Current Accounts and correspondents**
    a. [11] "Crediteuren_of_Aandeelh_Leendepot”
    b. [13] "Crediteuren_en_Rek_Couranthouders"
    c. [15] "Prolongaties_beleen_Daggeldl_dep_Met_onderpand"
6. **Acceptances**
    a. [14] "Te_betalen_Wissels"
    b. [31] "Geaccepteerde_Wissels"
7. **Sundry Accounts**
    a. [16] "Overige_Passiva"

Appendix B – Dynamic Difference in Differences Model

We develop and test the hypothesis that the flight to safety as a mechanism does not fully explain the outflow of deposits from the commercial banking system and the inflow of deposits into the Postal Savings Bank (RPSB). Rather, we argue that the relative spread between the commercial bank interest rate on long term deposits (one year or more) and the Postal Savings Bank interest rate on deposits determines the timing of the outflow of deposits. Particularly the moment that the commercial bank rate drops below the RPSB rate, and the spread becomes negative is the important point at which savers move their deposits.

The treatment is the interest rate offered on long term deposits dropping under the postal savings bank rate of 2.64%. We think that the spread on long term deposits interest rate is the best way to measure competition between commercial banks and the RPSB for two reasons.

1. Deposits at the postal savings bank, especially large ones could only be drawn upon after at giving a few months notice, possible even up to 6 months. Long term deposits were thus the functional equivalent offered by commercial banks.
2. The yearly reports of the big 5 commercial banks state that the largest outflows of deposits happen in the long term deposits. Compared to 1929, commercial banks experienced an average decline of total deposits of 51 percent by 1932 for a total of around 170 million guilders (2.9 percent of GDP). Long term deposits made up the most of this outflow and decreased by 45 percent between 1927 and 1932. This number underestimates the relative outflow because we do not info on the division of long and short term deposits for the Rotterdamsche Bank. The Amsterdamsche Bank, Incasso Bank and NHM lost on average 55 percent of their long term deposits in between 1929 and 1932, while the Twentsche Bank only lost 14 percent. Because long term deposit left commercial banks, we should look at this interest rate.

For the purpose of the analysis, we restrict the dataset to the period between 31 December 1930 and 30 November 1931. We do this to isolate the effect we are looking for from the broader context. Granger Tests (Appendix C) for our data indicate that a drop in interest rates Granger cause/predict outflows of deposits. However, we believe that the real driving force is not the decrease in rates, but whether the spread with the RPSB became negative.

Interest rates had started declining since January 1930 but the moment when the big 5 banks, except the Twentsche Bank dropped their interest rates below 2.64 percent per year came in May 1931. The commercial bank interest rate remained low throughout 1931, until October-November, when it began to rise again to around 3 percent. In October 1932, the interest rate again fell below the postal savings bank rate. However, by that time many deposits had already left the big 4 banks, therefore the outflows were smaller. Because of the timing and recurrence of drops and rises, we restrict our sample to the period around first drop below the RPSB, in May 1931. The rates before the drop had decreased compared to their previous points, but were relatively stable, so that the May 1931 drop was the first change in a few months.

Moreover, there is quite some movement in the deposits the period before November 1930, and the parallel trends assumption, necessary for the Difference in Differences analysis does not hold for the entire sample. Restricting the sample to the period of interest does ensure that the trends were parallel in the pre treatment period.

Placebo Test

To confirm the parallel treatment assumption, we perform a placebo test where we only use the pre-treatment period and recode not yet treated observations of the treated group as treated (Fake 1 and 2) . Then we run a simple difference in difference model comparing the pre-treatment observations to the fake post-treatment observations. We do this with the last two pre-treatment observation recoded as treatment (Fake 1) and only the last pre-treatment observations (Fake 2). The results of the analysis are shown in table B1. Placebo tests have no

significant results, which indicates that there was no treatment effect taking place in the treated group, before the treatment had taken place.

Table B1. Results of the Placebo Test Regression

	(1)	(2)
Fake1	-1757817.582	
	(2092285.585)	
Fake2		-1817477.352
		(2275383.781)
Num.Obs.	24	24
R2	0.986	0.986
R2 Adj.	0.976	0.976
R2 Within	0.048	0.046
R2 Within Adj.	-0.020	-0.022
AIC	776.4	776.4
BIC	788.2	788.2
RMSE	1687966.73	1690099.85
Std.Errors	by: bank	by: bank
FE: bank	X	X
FE: date	X	X

* p < 0.1, ** p < 0.05, *** p < 0.01

Dynamic Difference in Differences Estimation

To estimate the monthly time effects we employ a Dynamic Difference in Differences model. Our model looks like:

$$Y_{it} = \alpha_i + \gamma_t + \sum_{k=-5}^{6} \beta_k \, k * treated + \epsilon_{it}$$

Where:

- Y_{it}: Dependent variable Deposits of bank i in time t
- α_i: Bank Dummy
- γ_t: Time Dummy
- β_k: Coefficient for the interaction term between time and treated (indicating the treatment effect)
- ϵ_{it}: Error terms

This equation represents a dynamic difference-in-differences (DDID) regression, which is used to estimate the impact of a treatment (treated) on the dependent variable (Deposits) over

different time periods (-5 to 6), while controlling for bank-specific fixed effects and time-specific fixed effects. The reference category for the time periods is set to 0 (31 May 1931, the first monthly balance sheet observation after the change in interest rate).

The coefficient plot shows that there was no statistically significant effect before the treatment period. The effect of treatment is not instantly there either, rather it shows up with a delay of 4 months. This makes sense, as it takes some time before people could withdraw their savings, especially if these were large sums of money. The results are nearly identical when we run the regression with the logarithm of deposits as the dependent variable.

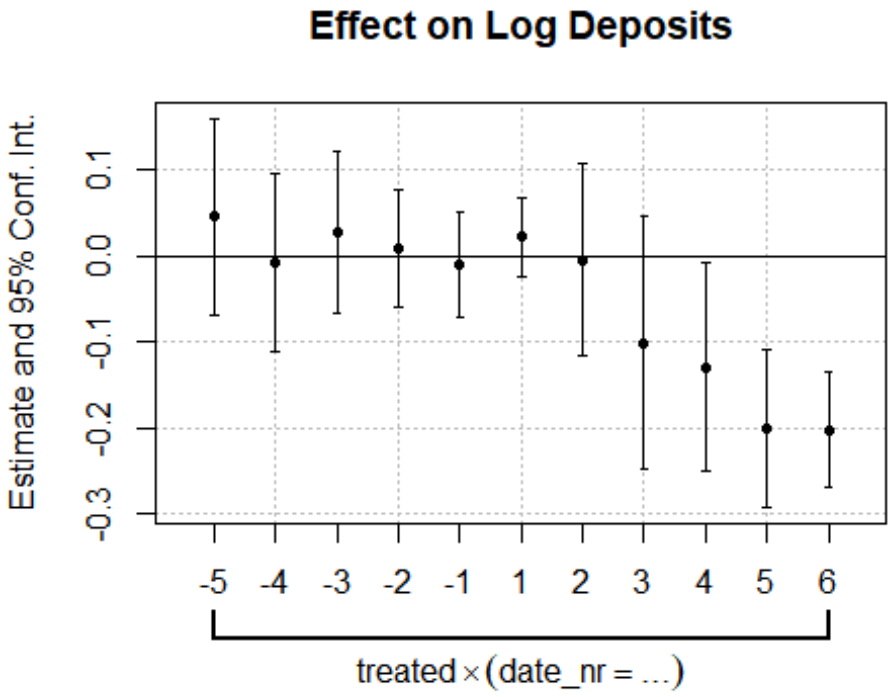
Table B2. Regression Results of the Dynamic Difference in Differences Model

	(1)
date_nr = -5 × treated	4139801.920
	(4433286.049)
date_nr = -4 × treated	-867769.687
	(3982689.949)
date_nr = -3 × treated	2470778.933
	(3766614.897)
date_nr = -2 × treated	821938.360
	(2588276.800)
date_nr = -1 × treated	-352579.940
	(1981690.722)
date_nr = 1 × treated	2476943.900
	(1583339.374)
date_nr = 2 × treated	1069127.833
	(3370434.005)
date_nr = 3 × treated	-5295757.617
	(4814753.965)
date_nr = 4 × treated	-5448782.120
	(2575810.137)
date_nr = 5 × treated	-8909995.383**
	(2154895.486)
date_nr = 6 × treated	-9122448.577**
	(2097307.566)
Num.Obs.	48

	(1)
R2	0.976
R2 Adj.	0.948
R2 Within	0.352
R2 Within Adj.	0.028
AIC	1603.6
BIC	1652.3
RMSE	2529554.67
Std.Errors	by: bank
FE: bank	X
FE: date_nr	X

* p < 0.1, ** p < 0.05, *** p < 0.01

Figure B1. Coefficient Plot DDID Regression Log Deposits



Appendix C – Granger Causality

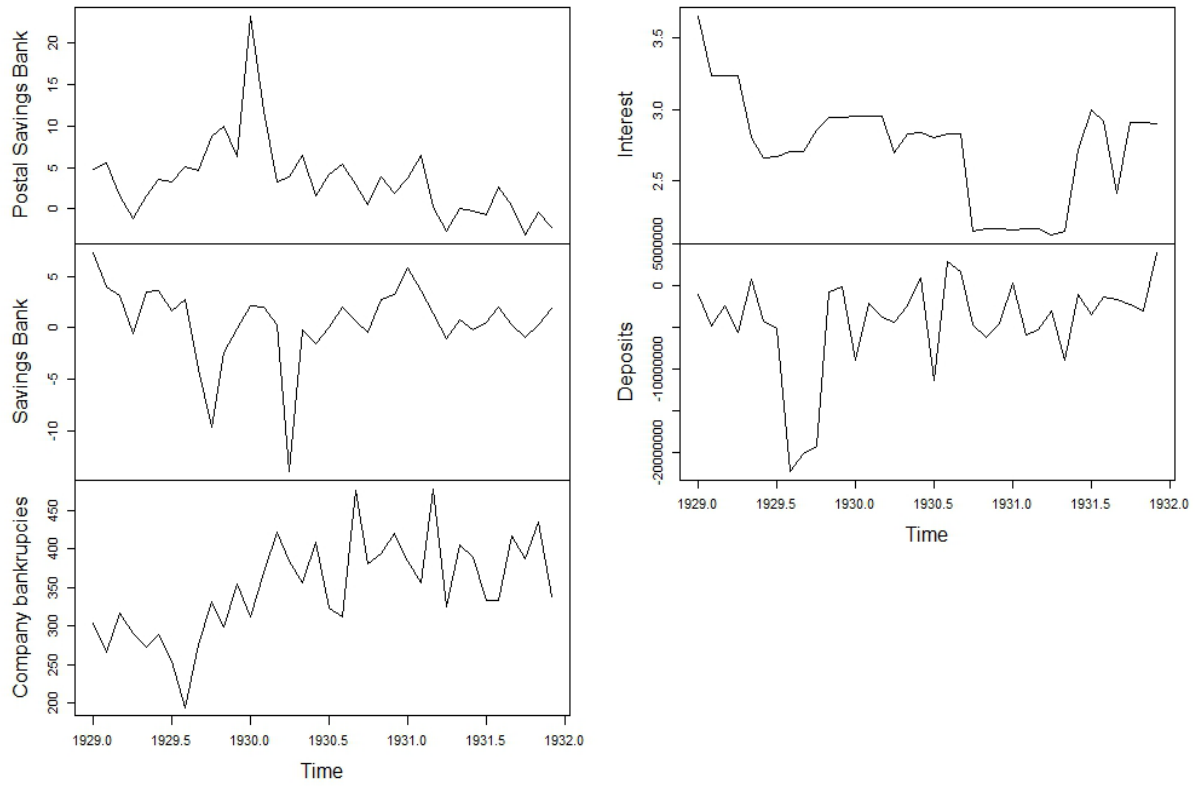
In this appendix we aim to support our analytical narrative about the causes and consequences of the Dutch quiet banking crisis. To this end, we constructed new time series datasets comprising net inflows of deposits at the postal savings bank (PSB) and savings banks (SB), the net outflow of deposits at the five largest commercial banks (DEP), the weighted interest rate offered by the commercial banks on these deposits (IR), and the total number of company bankruptcies (BR). We collected this data on a monthly interval for the period between January 1929 and December 1935, but focus mostly on the period between November 1930 and November 1931 (Section III).

Following our argumentation set out in the main body of this article we attempt to further disentangle the causal relationship between commercial bank interest rates, deposits reallocations and economic decline by testing for Granger causality. It should be noted that this concept of Granger causality is strictly a statistical one, and it is not related to causality concepts of economic theory (Granger 1987). We hypothesize that – at least in the case of the Netherlands – these causal roles were influenced by a higher risk-adjusted rate of return causing deposits to flow away from commercial banks towards saving banks. We are therefore mainly interested in exploring whether a decline in commercial bank's deposit interest rates Granger causes a net inflow of deposits at the postal savings bank and saving banks. To this end we explore whether there exists a Granger causal relationship between the time series DEP and RPSB and between IR and RPSB. Furthermore, we test whether a net inflow of deposits at the postal savings bank (RPSB) led to an increase in the number of bankruptcies (BR) since we hypothesize that these inflows led to a credit crunch that might have made companies cash-starved.

1. Pre-estimation specification

Prior to conducting the causality-test in time series models, it is necessary to perform a unit root test to assess the stationarity of the data. Upon visual inspection of our data (Figure A1), it appears that all-time series, except possibly for PSB and SB, exhibit non-stationarity. This observation is substantiated by conducting a standard Augmented Dickey-Fuller (ADF) test, the outcomes of which are presented in Table A1. It shows that all our time series, including PSB and SB, are indeed non-stationary. To induce stationarity in the time series, we take the first-order difference.[37] The resulting differenced time series are visually depicted in Figure A2. The ADF test on these *I*(1) timeseries confirms that they are now stationary and have no unit roots.

Figure C1: Non-stationary time series



[37] For IR we needed to take the second-order difference.

Figure C2: Stationary time series ($I_{(1)}$)

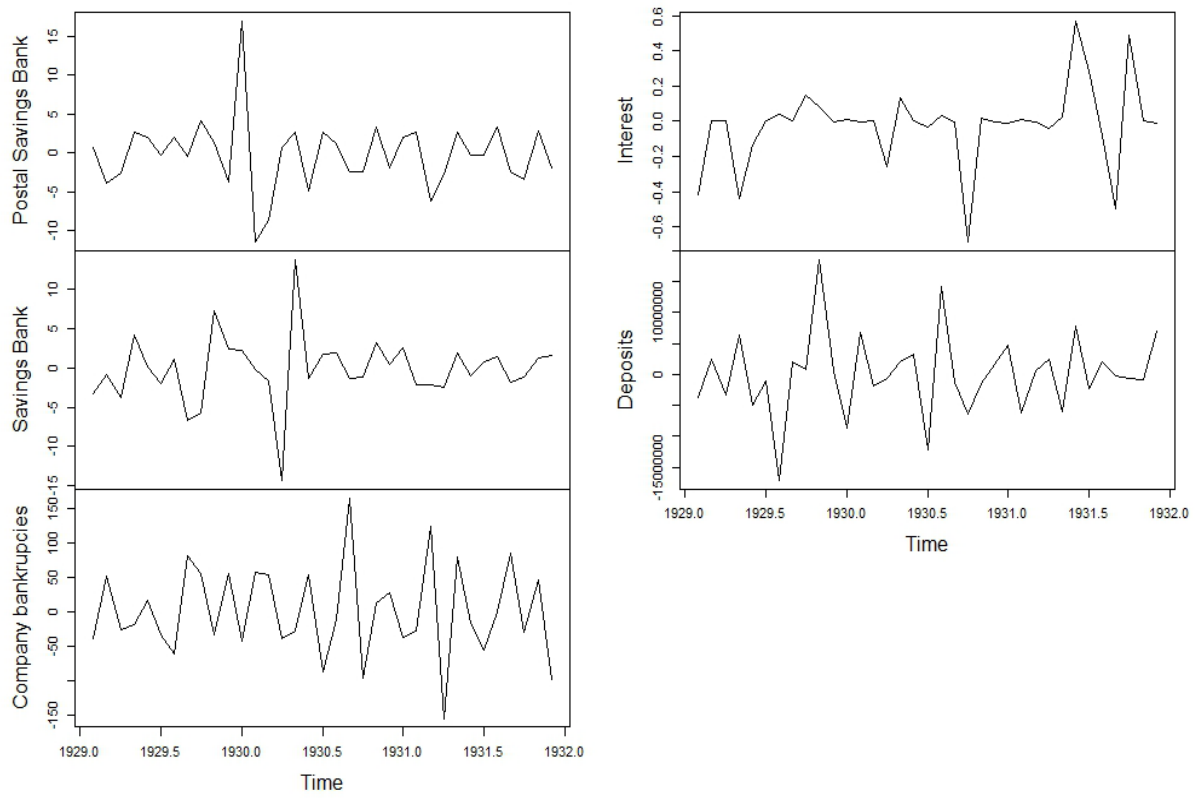


Table C1: Augmented Dickey-Fuller test for non-integrated vs. integrated time series

	PSB	SB	BR	Deposit	Interest
ADF	-2.437	-2.891	-1.855	-2.881	-1.809
ADF for $I_{(1)}$	-3.401***	-4.764***	-3.251***	-4.017***	-4.004***

2. Lag order selection

When estimating the VAR model, the selection of an appropriate lag length becomes crucial. In our case, we follow the approach Oddo & Zanini (2022) and adopt a combined strategy. Firstly, we consider a lag length recommended by theory. Given our VAR model, we anticipate observing effects in the interactions within a relatively short time span. For instance, we hypothesise that a decrease commercial banks deposits' interest rate will lead to a shift of deposits away from commercial banks towards savings banks, particularly the government guaranteed postal savings banks. However, these effects are not expected to manifest immediately, as immediate withdrawal of deposits was often not possible during that time. Nonetheless, they should unravel within approximately a few months' time. Similarly, the repercussions of the credit crunch resulting from this reallocation of deposit are not anticipated to manifest instantaneously but still within the timespan of a few months. Furthermore, the time series employed in our analysis exhibit a relatively high frequency, with monthly intervals, suggesting that a maximum of four lags would be appropriate. Secondly, we adopt a data-oriented approach to select the most optimal lag length within a maximum order of four. The Akaike Information Criterion (AIC), Hannan Quinn (HQ) Criterion and Akaike's Final Prediction Error (FPE) similarly recommend a VAR model with an optimal lag order of four; therefore both strategies converge on a VAR model with a lag order of four.

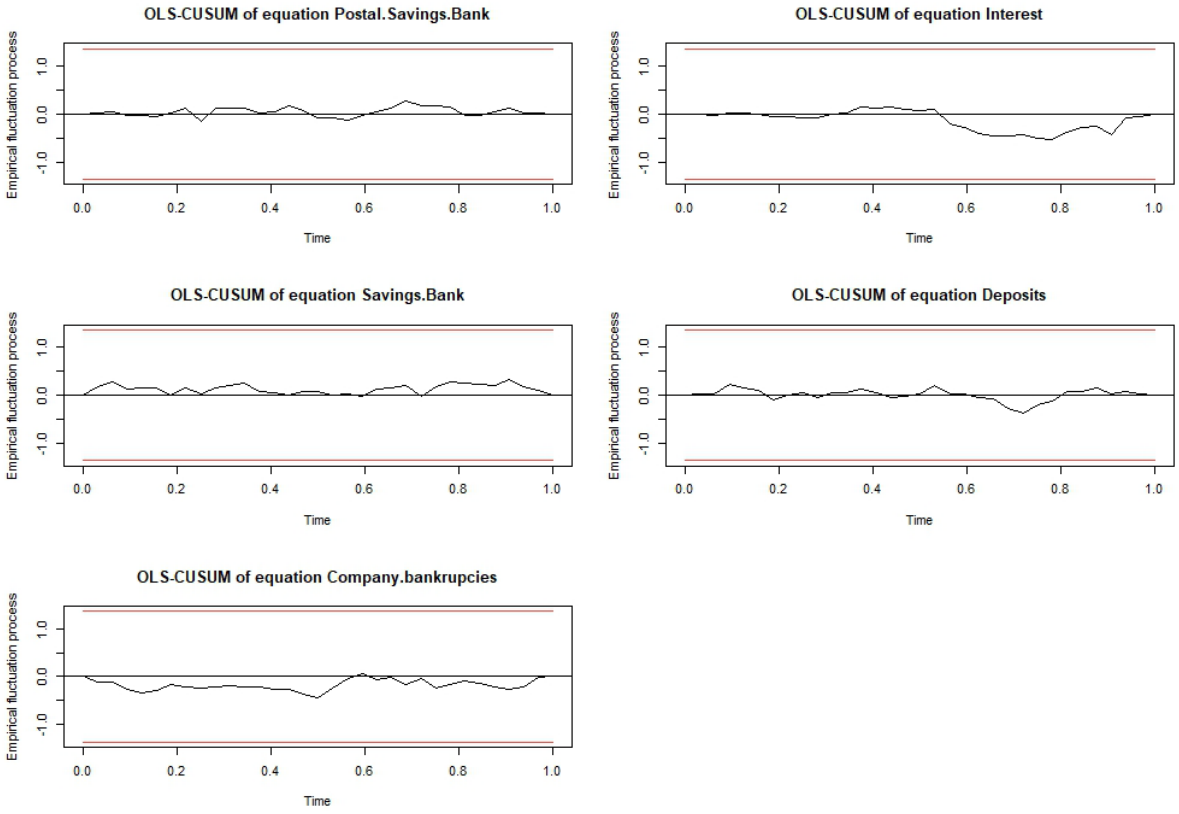
3. Post-estimation diagnosis

Once the VAR model was estimated, it was necessary to diagnose it. One important assumption in our analysis is that the residuals should exhibit minimal autocorrelation. To assess this, we conduct the Asymptotic Portmanteau test (APT). Additionally, we consider the presence of heteroscedasticity by performing the Autoregressive Conditional Heteroscedasticity (ARCH) test and test for normality using the Jacque-Bera test. The results of these tests are presented in Table A2. None of the tests reject the null hypothesis, indicating that our VAR model does not exhibit autocorrelation, is normally distributed and is not heteroscedastic. Finally we examine the presence of structural breaks in our model. To accomplish this, we employ a simple test that involves plotting the sum of recursive residuals. If the sum exceeds the red critical bounds at any point on the graph, it suggests the presence of a structural break at that particular juncture. Figure A3 illustrates the plot, indicating that there are no instances where the sum surpasses the critical bounds. Consequently, we can conclude that our VAR model is stable.

Table C2: the Asymptotic Portmanteau test (APT), Autoregressive Conditional Heteroscedasticity (ARCH) test and Jacque-Bera test

Test	Null-hypothesis	P-value
APT	Ho: no-autocorrelation	0,149
ARCH	Ho: no-heteroskedasticity	0,491
JB	Ho: normally distributed	0,164

Figure C2: Stability test



4. Granger causality

Once we estimated the VAR model we conducted Granger causality tests. The results of these tests are presented in table 4. The findings provide evidence that a decrease in bank deposit interest rates (IR) caused a net inflow of deposits at the postal savings bank, while no such causality was observed in relation to saving banks. We also found no evidence of any reverse Granger causality between net inflows towards the postal savings bank or saving banks and a decline in bank deposit interest rates.

Furthermore, we find that the net inflow of deposits at both saving banks was Granger caused by the net outflow of deposits at commercial banks (DEP), although we did not detect any reverse Granger causality. Lastly, we examined whether the net inflow of deposits at saving banks, and particularly at the postal savings bank, Granger caused the occurrence of bankruptcies (BR). In both cases, we were able to reject the null hypothesis of no causal

relationship, but the association appeared to be strongest for the postal savings bank. These findings support our argument that the influx of deposits at the postal saving bank resulted in a cash shortage for companies, seemingly contributing to an increase in the number of bankruptcies.

Table C3: Granger causality test results

	Ho: IR did not cause (p-value)	Ho: IR is not caused by (p-value)
PSB	0.05927**	0,848
SB	0,8316	0,7459
	Ho: DEP did not cause (p-value)	Ho: DEP is not caused by (p-value)
PSB	0,0218**	0,1555
SB	0.06372**	0,8837
	Ho: PSB did not cause (p-value)	Ho: PSB is not caused by (p-value)
BR	0,005394***	0,3132
	Ho: SB did not cause (p-value)	Ho: SB is not caused by (p-value)
BR	0,04876**	0,2361

Overall, the results of the Granger tests lend empirical support to our analytical narrative, which posits that the transmission mechanism responsible for exacerbating the Great Depression in the Netherlands during the quiet banking crisis of 1931 was primarily attributable to a reallocation of deposits driven by the postal savings bank offering a higher interest rate on deposits at a lower risk.

Appendix D. Fixed Effect Regressions

Our analysis has revealed that deposit withdrawals were predominantly driven by a flight-to-safety, further exacerbated by the postal savings bank offering higher interest rates, a phenomenon we describe as a flight-to-quality. This initial investigation relied on monthly balance sheet data from only the four largest commercial banks. Despite uniform trends in interest rates, we observed significant variations in the rate of deposit withdrawals.

In this appendix, we support this analysis more formally via a comprehensive analysis of the determinants influencing deposit fluctuations in Dutch banks during the tumultuous decade from 1928 to 1938, encompassing the onset, the peak, and the aftermath of the Great Depression. We conduct a fixed effects panel model analysis on data from an unbalanced panel of 44 banks, spanning up to 9 years and yielding 323 observations. The year-over-year change in the deposits ratio (deposits over total assets) for each bank serves as the dependent variable, while the independent variables comprise the ratio of retained earnings (the portion of net income not distributed as dividends over total assets), net debt (defined as total debt less deposits over total assets), cash (cash over total assets), securities (securities over total assets), government bonds (government and municipal bonds over total assets) and real estate (real estate holdings over total assets). We also included the log of total asset sizes and the age of each individual bank.

The selected dependent variables aim to quantify the (perceived) risk associated with the operations of individual banks. They are based on similar studies for France and the United States for investigating the root causes of bank failures, or as in this context of this study, the withdrawal of deposits in the 1930s (Postel-Vinay 2016; Baubeau et al. 2021). The model specification is as follows:

$$\Delta Deposits_{\{it\}} = \alpha + \beta_1 Size_{\{it\}} + \beta_2 Age_{\{it\}} + \beta_3 Retained\ Earnings_{\{it\}} + \beta_4 Capital_{\{it\}} + \beta_5 Securities_{\{it\}} + \beta_6 Government\ Debt_{\{it\}} + \beta_7 Net\ Debt_{\{it\}} + \beta_8 Cash_{\{it\}} + \beta_9 Real\ Estate_{\{it\}} + \mu_i + \epsilon_{\{it\}}$$

Our results indicate that bank size is negatively associated with deposit changes, indicating that larger banks experienced a less pronounced reduction in deposits. Similarly, the age of a bank presents a highly significant negative association with deposit changes, suggesting that older, more established banks may have instilled more confidence in depositors, resulting in less pronounced deposit outflows.

Among the financial ratios examined, the retained earnings ratio is positively correlated with deposit changes, showing a highly significant positive impact. This finding suggests that banks with a higher retained earnings ratio witnessed higher deposit outflows. This inverse relationship is rather remarkable as one would expect deposit holders would perceive banks with more retained earnings to be more stable. It is not unlikely however that deposit holders withdrew from these banks because they perceived that the high retained earnings signalled underinvestment or inefficient capital management. In contrast, the capital ratio is negatively correlated with deposit changes, with a highly significant negative impact, implying that banks with higher capital ratios may have seen a decrease in deposit fluctuations, potentially indicative of a more conservative risk management approach.

The securities ratio is another variable that demonstrates a highly significant positive relationship with deposit changes, suggesting that banks with a greater proportion of securities in their asset portfolios experienced increased deposit fluctuations. On the other hand, the government bonds ratio did not exhibit a statistically significant relationship with deposit changes, indicating no clear influence on deposit variability.

Other variables, such as the cash ratio and net debt ratio, did not show significant impacts on deposit changes, suggesting that these factors may not play a critical role in

influencing deposit dynamics within the observed banks. However, the real estate ratio revealed a highly significant positive association with deposit changes, indicating that banks with a higher proportion of real estate investments experienced greater fluctuations in deposits. This finding aligns with Postel-Vinay's (2012) research on Chicago banks during the 1930s, which indicated that banks with higher investments in mortgages before the crisis were more prone to failure due to perceived liquidity shortages. A similar trend appears to be evident in our dataset.

In addition to examining factors influencing deposit outflows, we conducted a fixed effects regression on this dataset to more rigorously assess our hypothesis that neither deposit outflows nor a reduction in private credit substantially impacted commercial banks' profitability. In this analysis, the annual change in profits (return on equity) is the dependent variable, with changes in the deposit ratio and the loans-to-assets ratio (private credit relative to total assets) as independent variables. Consistent with our previous model, we controlled for the logarithm of total assets and each bank's age. The model specification is as follows:

$$\Delta Profits_{\{it\}} = \alpha + \beta_1 Size_{\{it\}} + \beta_2 Age_{\{it\}} + \beta_3 Deposits_{\{it\}} + \beta_4 Credit_{\{it\}} + \mu_i + \epsilon_{\{it\}}$$

The results indicate that larger banks saw a smaller decline in profitability, whereas banks with a higher loans-to-assets ratio experienced a significant reduction in their return on equity. Neither the age of the banks nor changes in deposits seemed to notably affect the return on equity in this group of banks. Although the model accounts for only a minor share of the variance in return on equity changes, suggesting the potential relevance of unconsidered factors, it does support the conclusions drawn in Section 7.

Table 1: Fixed Effect Model of Deposit Changes

	Dependent variable:
	Deposits
Size	-0.159***
	(0.059)
Age	-0.005***
	(0.001)
Retained earnings	1.122***
	(0.413)
Capital	-0.632***
	(0.233)
Securities	0.511***
	(0.161)
Government bonds	0.203
	(0.123)
Cash	0.118
	(0.116)
Net debt	0.00000*
	(0.00000)
Real estate	1.988***
	(0.745)
Observations	323
R^2	0.175
F Statistic	6.364*** (df = 9; 270)
Note:	*p**p***p<0.01

Table 2: Fixed Effect Model of Profit Changes

	Dependent variable:
	Profits
Size	-0.034***
	(0.009)
Age	0.0001
	(0.0004)
Deposits	-0.008
	(0.015)
Credit	0.044**
	(0.021)
Observations	323
R^2	0.073
F Statistic	5.419*** (df = 4; 275)
Note:	*p**p***p<0.01