

The Great Depression as a Savings Glut

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New data covering 23 countries reveal that banking crises of the Great Depression coincided with a sharp international increase in deposits at savings institutions and life insurances. Deposits fled from commercial banks to alternative forms of savings. This fueled a credit crunch since savings institutions did not replace bank lending. The rise in savings triggered by banking crises was not only due to a flight-to-safety but also to precautionary savings. These findings provide new explanations of the fall in credit and aggregate demand in the 1930s. They illustrate the need to consider nonbank financial institutions when studying banking crises.

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“There are today many well-wishers of their country who believe that the most useful thing which they and their neighbours can do to mend the situation is to save more than usual. [...] It is utterly harmful and misguided – the very opposite of the truth.”

J.M. Keynes (1931, II.6 p.151).

A black hole remains in studies on the Great Depression: what happened to savings? Conventional wisdom assumes that people lost their savings in bank failures, or withdrew their bank deposits to hoard cash. The bank failures created a negative shock to the stock of money, which triggered or exacerbated the economic crisis (Fisher, 1932; Friedman and Schwartz, 1963; Grossman, 1994; Mitchener and Richardson, 2019). We paint a different picture, based on a new dataset covering 23 countries. One does not have to look under the mattress to see that savings increased during the banking crises of the Great Depression. Savings accumulated in savings institutions, at the expense of commercial banks. This phenomenon was an international feature of the Great Depression, and on a considerable scale.

Savings deposits did not only increase as a share of income. Their nominal value increased, despite economic crisis and deflation. In the 23 countries of our dataset, deposits in savings institutions increased on average by 111 percent between 1928 and 1933, while bank deposits collapsed by 15 percent.¹ This increase was stronger during banking crisis years. In some countries, the increase in savings also occurred through life insurances. We do not find that cash was the primary vehicle for savings.

Savers shifted their funds from commercial banks to other financial institutions because the latter were safer than the former. Savings institutions had first appeared in the mid-to-late 19th century. They took various institutional forms within and between countries. Despite their diversity, they were everywhere recognized to belong to a different category than the one of commercial banks. They were primarily set up to promote savings, in contrast to commercial and cooperative banks whose aim was to develop credit. They offered less payment and credit facilities but were perceived as safer because they were more regulated by governments, with most of their assets invested in safe long-term securities rather than lending to businesses.

The increase in deposits in savings institutions is the mirror image of the widely studied banking crises of the 1930s. This part of the story, which has long remained in the shadows, broadens our knowledge of the period for two reasons. First, it sheds new light on the relationship between

¹Romania is a clear outlier with a 723% increase in savings deposits between 1928 and 1933, if we exclude Romania from the sample, the average growth rate of savings deposits between 1928 and 1933 is 82%.

banking crises and the fall in private credit. The reason is simple: the transfer of deposits from commercial banks to savings institutions mechanically triggered a credit crunch, since the latter did not replace the former as lenders to businesses. Studying the US economy, Friedman and Schwartz (1963) argued that the decline in the money supply associated with bank failures caused the Great Depression. Bernanke (1983) demonstrated the need to look beyond this monetary effect because the loan-to-deposit ratio of commercial banks fell. In his view, a rise in the cost of credit intermediation also drove the decline in credit. Our analysis brings a more institutional perspective to this debate. The aggregate loan-to-deposit ratio (i.e. credit multiplier) fell sharply because savings institutions that received deposits generally did not lend to businesses. They invested their funds in government securities, mortgages, or other forms of safe long-term assets. If savings institutions had replaced banks as lenders, total lending might have remained stable in the economy (or the decline in lending would have been due solely to the asymmetric information problem described by Bernanke).

Second, our investigation sheds a new light on the debate on precautionary savings during the Great Depression (Keynes, 1931; Temin, 1976; Romer, 1990). Was the increase of deposits at savings institutions merely a reallocation of funds or was it also driven by an accumulation of new savings at the expense of consumption (i.e. precautionary savings)? Since historical data are too limited to compute total saving flows or personal saving rates, we can only provide partial answers to this question.² Moreover, there are in fact important difficulties to identifying precautionary savings even when a personal saving rate is computed by National Accounts.³ The first reason was already highlighted by Keynes (1936, p. 84): “Every such attempt to save more by reducing consumption will so affect incomes that the attempt necessarily defeats itself.”⁴ Savings and GDP are jointly determined. The second is that the negative effect of precautionary savings on aggregate demand can be at work at the same time as the debt-deflation channel highlighted by Fisher (1933), but

²Section III discusses the data issues. There are at least three. First, we cannot measure savings in stocks and bonds because data on stock and bond holding are limited and, when available, does not allow to distinguish between price and volume effects. The same applies to real estate. Second, it is impossible to know the share of the decrease in commercial banks deposits driven by deposit withdrawals and by the decrease in credit. Third, we cannot distinguish between the savings of households and firms.

³A series of personal saving rate on the interwar period has been built for the US only (U.S. Bureau of Economic Analysis, Personal saving as a percentage of disposable personal income [A072RC1A156NBEA], retrieved from FRED, Federal Reserve Bank of St. Louis; <https://fred.stlouisfed.org/series/A072RC1A156NBEA>, October 6, 2022.). It shows a decline of the personal saving rate starting in 1932. Besides the uncertainty surrounding historical data on income and the usual pitfalls of saving rate’s calculations based on national accounts (Guidolin and La Jeunesse, 2007), the decline of the saving rate is not inconsistent with an increase in precautionary savings for the wealthiest. As we discuss in Section III, the decrease in the US personal saving rate is driven by the sharp increase in consumer debt observed in this country, not by the destruction of existing savings or the drying out of saving flows.

⁴It was later called the paradox of thrift; see Chamley (2012); Eggertsson and Krugman (2012)

for different types of households (Eggertsson and Krugman, 2012; Guerrieri and Lorenzoni, 2017; Mian et al., 2020). In other words, aggregate or average personal saving rates hide the fact that some economic agents can save more at the same time as others increase their liabilities.

Although it is impossible to estimate precautionary savings precisely by income groups, we can nevertheless provide evidence that savings increased for at least part of the population. The first piece of evidence is simply to add up all the forms of saving that we have been able to measure, including the commercial bank deposits that declined during the Great Depression. If the flight-to-safety were simply a reallocation of funds from commercial banks to other forms of saving, we should not see an increase in the sum of these savings during the Great Depression.⁵ Yet, we do observe an increase in these total savings during the Depression. This is true for the average ratio across countries as well as if we add up all the savings of the countries in our sample, expressed in constant dollars. However, this leaves aside the possibility that households or firms sold bonds, real estate or shares and transferred the money to their savings accounts (since we cannot distinguish between price and volume effects for these forms of savings). To address this issue, we estimate the relationship between the growth rate of savings on the left-hand side (including deposits in savings institutions, cash and life insurance) and banking crises on the right-hand side, while controlling for the growth rates of equity prices, house prices and commercial bank deposits. If the increase in savings on the left-hand side was only due to a transfer of savings captured by the variables on the right-hand side, we should see a negative coefficient on these variables and no significant relationship with banking crises. Instead, we find that banking crises are positively associated with an increase in our measure of savings.

A. Academic literature on savings during the Great Depression

The extensive literature on banking crises during the Great Depression has focused primarily on the monetary and non-monetary effects of bank failures. While first formulated in the context of the US economy, these perspectives have been applied to international comparisons as well (Bernanke and James, 1991; Eichengreen, 1992; Grossman, 1994; Grossman and Meissner, 2010).

⁵Note that this method deliberately underestimates new gross saving flows because it makes the strong (and wrong) assumption that all the fall in bank deposits was due to withdrawals. Since banks create deposits to lend, this decrease was in fact also due to decisions to reduce lending. In countries without a banking crises and a flight-to-safety - such as Canada or Denmark - the commercial bank deposits decreased with output. Thus, we provide a lower-bound estimate of precautionary savings in savings institutions and life insurances.

More recently, the literature has shed light on the amplifying effect of network transmission through a flight-to-safety within the banking sector (Mitchener and Richardson, 2019; Calomiris et al., 2020; Blickle et al., 2021). It remains focused on the commercial banking system. One reason why the role of nonbank savings institutions was neglected in the literature may be that – as our comparative dataset reveals – they were of more limited importance in the United States (see Table A1 in the Appendix), the country that has been and still is the basis for most macroeconomic theory of the Great Depression. The United States, however, was not spared the transfer of deposits from commercial banks.⁶ The growth in deposits in mutual and postal savings banks in the US between 1930 and 1933 was already visible in the data published by Friedman and Schwartz (1963). Their analysis was nevertheless confined to a footnote: “The growth of postal savings deposits from 1929 to 1933 is one measure of the spread of distrust of banks.” (p.308).⁷ Likewise, in their international study of banking crisis in the Great Depression, Bernanke and James (1991) devoted only a footnote to the phenomenon we fully characterize in the current paper: “Savings banks, in contrast, held mostly government securities and thus often gained deposits during panic periods” (p.65).

Thus, although the rise in savings deposits was not unseen by previous scholars, it never was the subject of a specific study. Its macroeconomics effects have not been appreciated. It is only recently that the role of savings institutions during the Great Depression received attention, in a case study focusing on France (Baubeau et al., 2018, 2021). It stimulated ongoing research on other European countries (see Molteni (2021) on Italy and de Vicq and Peeters (2022) on the Netherlands). In a similar vein, Schuster et al. (2020) noted that the US postal savings banks served as a “safe haven” during the banking crises of the 1930s and Fleitas et al. (2020) observed a negative correlation between US postal savings and Building and loan associations deposits.⁸ Our study elevates these recent observations to a full account by providing the first comprehensive international study of savings during the Great Depression. Moreover, we attempt to systematically assess the macroeconomic implications of the rise in some forms of savings. We track savings

⁶Life insurances were quantitatively more important in the US. See Table A2 in the appendix and Goldsmith (1969, p.450).

⁷Studying the role of financial intermediaries in the US since 1900 (defined as banks, trusts, insurances, savings and loan associations, credit unions, investment companies and government lending institutions), Goldsmith concluded “The most rapid increases [of the assets of financial intermediaries] occurred during the Great Depression and World War II.” Goldsmith (1958, p.12). He did not study the potential relationship between this increase and the Great Depression. Rockoff (1993) built on Friedman and Schwartz’s observation and concluded that it was not the stock of money that declined during the Great Depression but its “quality” because postal savings offered less payment facilities (check in particular). Our argument is different because we are interested in the assets of savings institutions.

⁸These papers on the US postal savings system neither quantify the flight-to-safety from commercial banks and its effect on credit, nor discuss mutual savings banks and life insurances.

deposits across as many countries and institutions as possible, we study the effect of the flight-to-safety on aggregate credit and we discuss the potential macroeconomic importance of precautionary savings.

As explained previously, our interpretation of the fall in private credit is complementary but distinct from those of Friedman and Schwartz (1963) and Bernanke (1983). Their arguments were limited to the banking system and explained the decline in credit either by the contraction of deposits during bank failures (monetary effect) or by the increase in information asymmetry following bank failures (nonmonetary effect). In our perspective, the flight-to-safety from commercial banks to savings institutions was associated with periods of banking distress, but it was not necessarily a mechanical consequence of bank failures. Commercial banks might face withdrawals but not necessarily fail. For example, we observe a flight to savings institutions in the Netherlands, a country where no major banking failures or panics are recorded but where recent work has identified a "quiet banking crisis": that is, banks underperformed compared to the rest of the economy (Baron et al., 2021).⁹ The same is true for Greece. By contrast, we see no transfer in savings in Canada, a country that is known as a notable exception during the Great Depression because banks remained strong despite the economy being also affected by the international slump in trade and production (Bordo et al., 2015).

Another strand of the literature on the Great Depression – also centered on the United States – has studied the debt-deflation (or "consumer balance sheet") channel, following Fisher (1933). This literature emphasized that the increase in the real value of debt put a strong constraint on consumption (Mishkin, 1978; Olney, 1999; Hausman et al., 2019). This perspective is different but complementary to ours. The focus on US consumer debt and net aggregate savings, however, has distracted the literature from the accumulation of savings by the wealthiest firms and households. Economic theory points out that debt deflation can occur along with precautionary saving because individuals respond differently to a banking crisis, depending on their level of debt (Challe et al., 2017; Guerrieri and Lorenzoni, 2017; Mian et al., 2020). Constrained consumers reduce their spending to pay off existing debt while unconstrained consumers accumulate precautionary savings to stay away from the borrowing limit, as in Keynes (1931, 1936). In both cases, aggregate demand is pushed down and output falls. We present further evidence – when we could gather such data –

⁹See de Vicq and Peeters (2022) for a recent detailed study of this episode. In the French case, Baubeau et al. (2021) also show that some banks that did not fail experienced a significant drop of their deposits.

that the number of accounts and the average volume of deposits in savings account increased. The number of savings accounts per capita indicates that not all the population has access to savings deposits.

Despite the influence of Keynesian theory on the interpretation of the Great Depression, we are aware of very few attempts to quantify the increase in savings at the expense of consumption. Temin (1976) and Romer (1990) provided indirect evidence of precautionary savings by examining the pattern of consumption of several goods after the 1929 stock market crash in the United States (US), but they did not study the data on savings.¹⁰ We focus here on the link between banking distress and the accumulation of savings, a story more consistent with the fate of other countries where banking crises, rather than stock market crashes, first triggered economic crises (Grossman and Meissner 2010, p. 320). Our argument on banking crises and precautionary savings is nevertheless broadly similar to the one of Romer (1990) on the consequences of the US stock market crash: in addition to other negative economic shocks, financial uncertainty led people to forego consumption.

The international comparison covering more than 20 countries is both the strength and the weakness of this paper. Its strength is that it allows us to present the shift from commercial banks to savings institutions as a major macroeconomic and international feature of the Great Depression (although the extent varies from country to country). More importantly, our explanation based on the heterogeneity of financial institutions is able to reconcile the increase in savings with the decrease in credit. Yet, macroeconomic comparisons across countries do not allow for a precise analysis of the motives for savings and the identification of the causal chain of events that led from savings accumulation to economic depression. We hope that our presentation of the broad macroeconomic picture and of the potential mechanisms at play will encourage further research at the regional or individual level when data are available. Once visible, the role of saving and savings institutions in the Great Depression can no longer be ignored.

¹⁰Still about the US economy, Goldsmith (1958) noted that the assets of financial intermediaries increased during the Great Depression. Goldsmith (1969, vol.1, W18) found that total nominal intangible assets of the US economy decreased between 1930 and 1933 but this is driven by deposits in commercial banks, private securities and receivables. He showed but did not discuss the increase in deposits in other institutions and life insurances, nor he discussed their relationship with the banking crises and the Great Depression.

I. Savings institutions and banking crises during the interwar

A. History of savings institutions

Savings institutions first appeared in the mid-to-late 19th century.¹¹ They were typically set-up by local or central governments to encourage thrift among lower social classes. Yet, they soon started attracting funds from higher social classes and even from small businesses (Vogler, 1991; Brück, 1995; Mura, 1996; Schuster et al., 2020; Monnet et al., 2021). Savings institutions' deposits indeed had three main advantages: they were safe (usually due to state guarantee), they were widely accessible (unlike commercial banks in most countries, savings institutions established branches in rural and sparsely populated areas), and they earned an interest (unlike cash and other hoarded funds). The special status of savings institutions progressively disappeared after the Second World War, as deposit insurance was extended to commercial banks. Then, starting in the late 1970s and early 1980s, most savings institutions were privatized or merged with commercial banks. In the 1920s and 1930s however, commercial banks were essentially unregulated (US banking regulation being an exception), and savings institutions' deposits were a unique haven for precautionary savings.

Savings institutions enjoyed a privileged relationship with the State. Still, the degree of state involvement varied widely between (and sometimes within) countries. Two broad groups of institutions can be distinguished. In the first group, savings institutions were set-up as state-backed institutions, under the direct responsibility of the Ministry of Finance.¹² Their deposits were explicitly guaranteed by the State. The US Postal Savings bank (along with most postal savings institutions) can be included in this category (Kemmerer, 1911; Schuster et al., 2020). As a rule, funds deposited at these institutions were invested in government securities (National Monetary Commission, 1910).¹³ In Italy, postal savings were lent to the Treasury; in Japan, they were placed at the Deposit Bureau which used them to buy government debt.¹⁴ Yet, there were exceptions to the rule. Belgium's *Caisse Générale d'Épargne et de Retraite* (CGER), a public institution which

¹¹Kindleberger (1984, p.12) dates the birth of savings banks to 1810 in England and 1818 in France. Nevertheless, he gives little or no space to these institutions in his landmark book on the financial history of Western Europe.

¹²Cooperative banks whose first aim was to grant credit to local businesses (such as Raiffeisen's credit cooperatives in several European countries, see Guinnane (2001)) are not considered as savings banks.

¹³The US Postal savings system was an exception, with part of the assets invested as commercial bank deposits. During the Great Depression, however, these assets were almost entirely invested in Treasury bills. Commercial banks refused to remunerate the deposits of postal savings banks at the required rate of 2.5%. In 1939, only 5% of the assets of US postal savings were deposited in commercial banks (Schuster et al., 2020)

¹⁴See Molteni (2021) for Italy, and Calder (1990) on Japan's postal savings bank.

collected deposits through post offices, used its funds to grant loans to farmers and mortgage loans to low-income groups (Van Molle, 1986). Conversely, some private institutions' deposits were centralized by the state. UK's Trustee Savings Banks (TSBs) were private institutions, but their deposits were collected by the Bank of England, and invested in government bonds (Horne, 1947). Likewise, the French *Caisses ordinaires d'épargne*, founded in the early-19th, were still privately owned. From 1837 onwards, their assets were nevertheless managed by the *Caisses des dépôts et consignations*, a government-sponsored financial institution, and fully invested in government securities (Monnet et al., 2021).

The second group of savings institutions includes private savings institutions which enjoyed more autonomy to manage their portfolio. They were however strictly regulated by the State. In Austria, savings banks had to report annually on their activities, and an imperial commissioner sat on their board (Lepelletier, 1911). In Denmark, a supervision authority (the "Tilsynet") was created in 1880 to monitor private savings banks. The Tilsynet could ask for the suspension of a bank, if more than 5% of deposits were lost annually (a similar rule existed after 1887 in Norway).¹⁵ In return, private savings institutions' deposits enjoyed an explicit or implicit state guarantee. The founding act of the Spanish *cajas de ahorros* of June 1880 for example stated that the *cajas* were "under the protection" of the government (Mura, 1996; Casals, 1991). Funds deposited at private savings institutions were primarily invested in government securities or in long-term loans: mortgage loans, loans to agriculture, loans against guarantee (pawn loans). Discounting of commercial bills or other short-term loans similar to commercial bank loans were not their main business activity (see discussion in Section II and Table A2 in Appendix). Starting in the 1920s, some private savings institutions became involved in commercial discounting, especially in Germany (Proettel, 2016). Short-term loans to businesses however remained the prerogative of commercial banks.

The degree of state involvement also affected the ability of savings institutions to set their interest rate independently. In public institutions (and sometimes also in private ones), the interest rate on deposits was set directly by the Ministry of Finance. As a rule, the rate on public savings deposits was kept below market interest rates. This was mainly because high interest rates would have put considerable pressure on commercial banks. During the Great Depression, however, many governments failed to keep the rate on savings deposits in line with falling market rates. More importantly,

¹⁵See the chapter on Norway and Denmark in Mura (1996).

the risk-adjusted interest rate was clearly in favour of the savings banks once the commercial banks started to face deposit withdrawals. This generated intense criticisms on the part of commercial banks and considerable debates among the political class in many countries. Savings institutions were accused of unfair competition (see for example Skulic (1936) on Yugoslavia, Monnet et al. (2021) on France, de Vicq and Peeters (2022) on the Netherlands, Sissman (1938) on the US, and Horne (1947) on the UK).¹⁶

B. New data on deposits in savings institutions

We build a new international database of deposits at savings institutions in 23 countries, covering the 1920-1936 period. Our sample includes the richest part of the World and the hardest hit by banking crises and the Great Depression: North America, Japan and most European countries. Overall, the 23 countries included in our sample account for 65% of world real GDP in 1930 (Inklaar et al., 2018).¹⁷ Data are annual. We collected the data from national statistical yearbooks and, in few instances, from the League of Nations statistical yearbooks. Whenever possible, we corrected and improved these series with more recent estimates built by other scholars or - when available - by going back to the original annual reports published by savings institutions (see online Appendix). Both the League of Nations and national yearbooks clearly distinguished commercial banks from savings institutions. We relied on these categories built by contemporaries, rather than on our own assessment, to construct our database (see online Appendix for a country-by-country list of savings institutions). Data on commercial banks are from similar sources or from recent scholarship when available. All our data sources for financial institutions and macroeconomic variables are listed in the online Appendix.

For the majority of countries, higher frequency data were not available. Data on the flow of deposits are also absent, so we have to rely on the end of year balance sheets. In the absence of banking regulation in most countries (Grossman, 2010), it is also impossible to find continuous and representative series of deposit interest rates of commercial banks.

¹⁶Thomes (2013) notices that German's Sparkassen tended to gain deposits from wealthy households during economic recessions (i.e. periods of falling interest rates) because their rate of interest were quite stable. According to Thomes, this process was at work during the Great Depression from 1929 to the 1931 banking and debt crisis, when the Sparkassen faced large withdrawals.

¹⁷Austria, Belgium, Bulgaria, Canada, Denmark, Finland, France, Germany, Greece, Hungary, Italy, Japan, Netherlands, Norway, Poland, Portugal, Romania, Spain, Sweden, Switzerland, United Kingdom, United States and Yugoslavia.

C. The evolution of savings during the Great Depression

A first glance at the data reveals that savings institutions thrived during the Great Depression. Country-by-country plots are presented in the online Appendix. Table A1 in the Appendix shows the growth rate of deposits between 1930 and 1932, i.e. the beginning of the Great Depression and the years of the great banking panics. Commercial bank deposits declined everywhere. On the contrary, most countries experienced a strong increase in savings bank deposits. As we will see later, the exceptions (6 out of 23 countries) were either countries with a major sovereign debt crisis or countries without a banking crisis. The increase in nominal deposits is all the more striking given that, as is well known, the years 1930-1932 were characterised by global deflation and falling output.

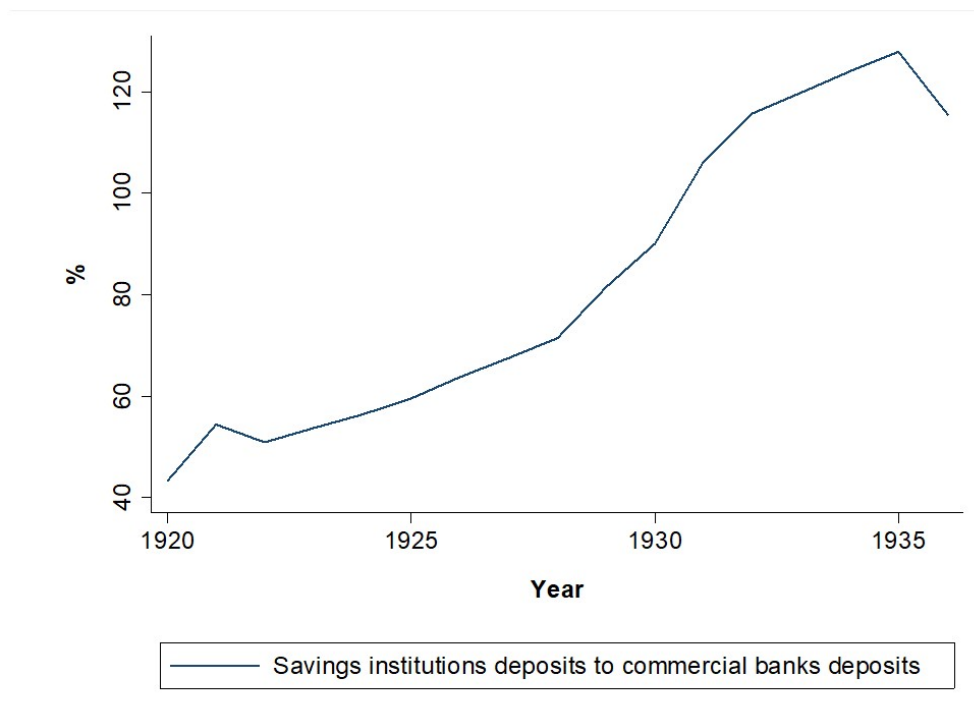
Figure 1 plots the average ratio between savings institutions' deposits and commercial bank deposits, over the 1920-1936 period for 23 countries. The average ratio increases from 71.4% in 1928 to 115.8% in 1932. This means that, on average, in our sample of countries, the early years of the Great Depression saw savings bank deposits become the dominant form of deposit. Figure 1 also suggests that the increase in the ratio started before the Great Depression, as soon as 1926. This increase is driven by a few countries (notably Japan and Scandinavian countries) which experienced banking instability in the mid-to-late 1920s. Excluding these countries, we find that the ratio was stable around 35% from 1925 to 1928, and then increased to 45% in 1929 and reached 84% in 1932 and 95% in 1935.

The 1928-1933 increase in the ratio is not only due to a fall in bank deposits, but also to a sharp increase in savings deposits. On average, bank deposits decreased by 14.5% between 1928 and 1933, while savings institutions' deposits increased by 111%.

In terms of GDP, the figures are equally striking (Figure 2). Note however that our sample is reduced to 19 countries in this case because of the lack of GDP data for several countries. Deposits in savings institutions increased from 13% to 20% of nominal GDP, while the share of commercial bank deposits remained constant. The cash to GDP ratio increased more modestly and the increase is mostly driven by the drop of GDP. The nominal quantity of cash increased in only 6 countries out of 23.¹⁸ Cash hoarding played a small role as a vehicle for savings (contrary to the widely

¹⁸As it is well-known, central banks did not respond to the Great Depression by increasing base money (at least not before they exited the gold standard).

Figure 1. : Ratio of deposits in savings institutions to deposits in commercial banks, 1920-1936



Note: Unweighted average of the data for the 23 countries in our sample.

Source: See online Appendix.

held belief that precautionary savings were put “under the mattress” Fisher (1932)).¹⁹ As can be seen from Table A1 and from the online appendix (which provides country-by-country graphs), the increase in savings institutions deposits was a feature of the Great Depression in countries that experienced a banking crisis, although its extent varied from country to country.

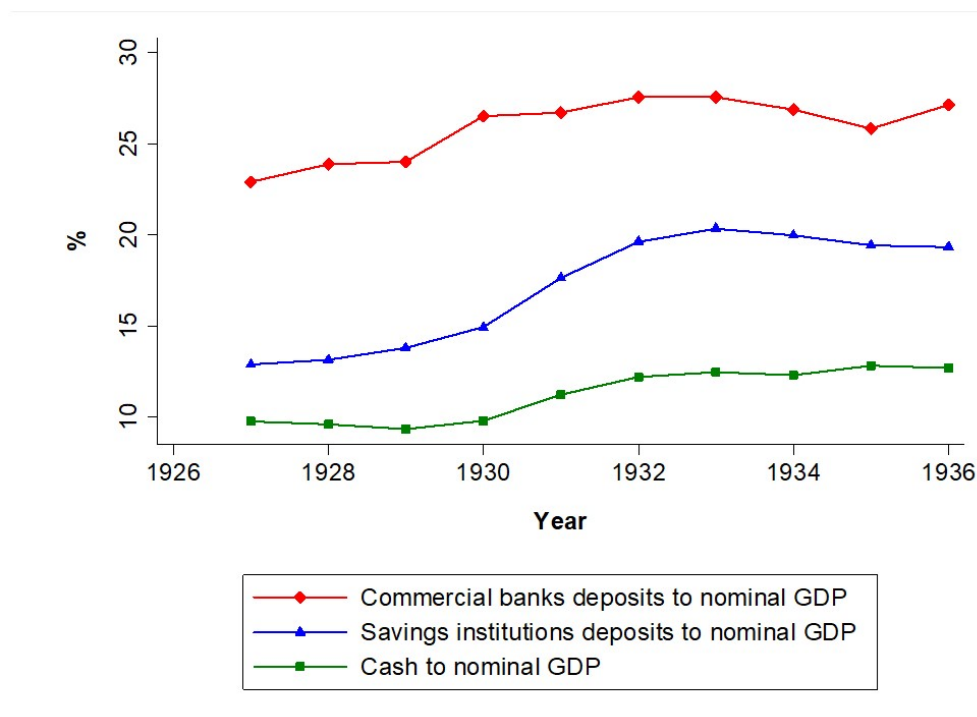
D. Savings institutions and banking crises

The previous discussions suggest a link between the occurrence of banking crises and the rise of deposits at savings institutions. This is confirmed by descriptive statistics. On average, in each country of our sample, the growth rate of savings deposits was 6.5 percentage points higher during banking crisis years. If we look at the growth rate of the savings deposits to GDP ratio, the difference is 10.7 percentage points.

To code banking crises, we started from the definition of banking panics provided by Bernanke

¹⁹A similar conclusion was reached by Baubeau et al. (2021) on France. About the US, net saving data between 1930 and 1933 gathered by Goldsmith (1969) also show that savings in currency represented only 20% of the savings through life insurances and savings banks (see Table S.21).

Figure 2. : Ratio of bank deposits, savings institutions deposits, and cash in circulation to nominal GDP, 1926-1936



Note: Unweighted average of the data for the 19 countries for which we have nominal GDP data.

Source: See online Appendix.

and James (1991) (also used by Grossman (1994)). It covers the largest share of countries in our sample, and it is the most documented and consistent with scholarship on specific countries. In few instances, we supplement their data using more recent studies. For France, we coded the year 1932 as “non-crisis year”, based on recent research by Baubeau et al. (2021). For Spain, we coded the year 1931 as “crisis year” based on the work of Jorge-Sotelo (2020). Portugal and Bulgaria are not covered by Bernanke and James, so we instead rely on Reinhart and Rogoff (2009) for Portugal, and on Kossev (2008) for Bulgaria.

The difference between crisis and non-crisis years holds if we also include episodes of banking crises that were not associated with banking panics or bank failures (see Table 1, bottom line). These episodes were defined - and named “quiet crises” - by Baron et al. (2021). These are years when the equity prices of banks under-performed markedly compared to the rest of the stock market. Considering “quiet crises” in our sample is important since we noted in our country-by-country investigation that large banking panics and waves of failures were not always necessary to trigger

a reallocation of savings from commercial banks to savings institutions. The Netherlands is a clear case of increase in savings deposits without major banking panic (see appendix), but with a "quiet banking crisis" identified by Baron et al. (2021). So is Greece.

Table 1 shows that, in each country of the database, the growth rate of savings deposits was 6.3 percentage points higher during years of banking crises (including quiet crises), while the growth rate of the savings deposits to GDP ratio is higher by 11 percentage points.²⁰ Focusing only on the Great Depression crises (1929-1933), we find similar results.

Table 1: Banking crisis and savings: Some descriptive statistics
Mean of within-country differences between crisis and non-crisis years

	Growth rate of savings deposits	Growth rate of savings deposits to GDP
Banking panics	6,5	10,7
Banking crises	6,3	11

Note: All figures are in percentage points. The table reads as follows: on average, in each country, the growth rate of savings deposits was 6.3 pp higher during banking crisis years than in non-crisis years. Banking crises years include both years of banking panics (our update of the series of Bernanke and James (1991)) and years of quiet crises (Baron et al., 2021). We first take the difference within each country, and then we average it out across our sample. For the growth rate of savings deposits (column 1), the sample covers 23 countries. For the growth rate of savings deposits to GDP (column 2), the sample covers only the 19 countries for which we have nominal GDP data.

Although not recorded in international accounts of the Great Depression (Kindleberger, 1973; Bernanke and James, 1991; Eichengreen, 1992), the increase in savings institutions' deposits during banking crises is not surprising given the lack of financial insurance in the interwar period. The absence of public unemployment insurance and (more importantly) of financial insurance meant that consumers had to self-insure against risk. When credit dried-up, unconstrained consumers had a strong incentive to accumulate savings as a buffer against future shocks.²¹

To be sure, part of the increase in savings deposits during a banking crisis was driven by portfolio reallocation (i.e. flight-to-safety from stocks and commercial bank deposits to safe savings institutions), rather than by an increase in precautionary savings. Section III will discuss this issue extensively. This potential reallocation is almost impossible to track precisely however. Aggregate

²⁰We exclude the 1922 "quiet" banking crisis in Japan, which was a crisis of the small savings banks. The crisis led the Bank of Japan to regulate the private savings banks (see Shizume (2012)).

²¹Models of precautionary savings rely on "incomplete insurance" (see Challe et al. 2017 for a review).

capital stock data such as those compiled in Piketty and Zucman (2014) are not well suited to address these issues because most of the changes in financial wealth may be driven by a price effect rather than by savings flows. If stock market prices decrease and individuals do not sell their stocks, their nominal savings decrease. This decrease should not be interpreted as a reallocation towards other forms of savings. At this stage, it is sufficient to say that, for this reason, we cannot include in our study data on the stock of housings, bonds and stocks.

Last, it is worth reminding that interwar banking crises were often independent from stock market crises (see Grossman and Meissner (2010) for a recent survey). After the US stock market crash of 1929, the Great Depression was characterized by a series of banking crises in the early 1930s, not by stock market crashes. Our first graphical and statistical investigations suggest that savings institutions' deposits strongly reacted to the uncertainty surrounding banking crises, rather than being of consequence of the 1929 international stock market crash.

Sovereign debt crises had potentially important consequences on savings institutions. In few countries (see A1 in the Appendix), a banking crisis hit but deposits in savings institutions did not increase (in nominal terms). These were the three countries that suffered from very strong public debt crises starting 1931: Austria, Germany and Hungary. Note however that the negative growth rate of nominal savings deposits was still much smaller than the one of commercial banks deposits in these countries. The situation was obviously more difficult for savings institutions that had invested in government securities. Austria's postal savings bank lost 13% of its deposits during year 1931. Savings institutions which invested a lower share of their assets in public securities seem to have suffered less from debt crisis. Key examples include Germany's public savings banks (*Sparkassen*), which invested a large fraction of their assets in short-term loans to the economy and mortgages (Lehmann-Hasemeyer and Wahl, 2021).

E. Number of depositors

How many depositors increased their savings during the crisis? If the increase in savings was driven by a small share of the population, then the increase in savings deposits need not be associated with an increase in total savings, or in the average saving rate. To assess if the increase in savings deposits was a widespread phenomenon within the population, we collected data on the number of savings accounts for a sub-sample of 7 countries. First it is worth looking at how many

accounts were open. As can be seen from panel A in Figure 3, the number of savings accounts per inhabitant in 1933 was well below 10% in Greece and Romania, and barely above 10% in the US. By contrast, the ratio of savings accounts by inhabitant was equal to more than half in Belgium and France. The differences between these countries can be explained quite easily. Greece and Romania are typical examples of countries that were still poor at that time. Saving was unlikely to be widespread in the population despite state policies to import financial institutions from wealthiest European countries. The low number of accounts in the US - already a rich country - can be explained by the fact that government policies to develop savings institutions had been more modest than in Western Europe. Postal savings were created there in 1911 only and mutual savings banks were usually created through private initiatives. At the other hand of the spectrum, Belgium, France and the Netherlands were rich countries where the state had pushed the development of savings institutions from the 19th century whereas commercial banks were not regulated. Italy could be included in this group, but the lower number of accounts is probably due to weaker economic and financial development than in the other three countries.

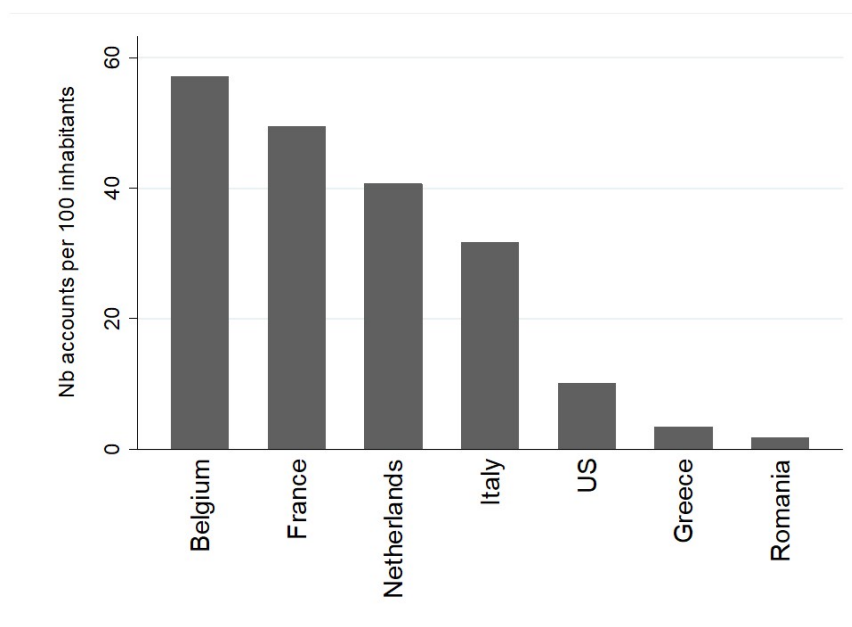
One point is worth stressing concerning the interpretation of these figures. These accounts were not limited to individuals and could also be used by firms. Thus it cannot be interpreted as the number of account per inhabitant strictly speaking. Considering the existence of accounts opened by firms (although we cannot estimate their exact share), it is safe to state that less than half of the population had a savings account, even in countries like Belgium and France where savings accounts were widespread. Moreover, except in Greece, the growth of the volume of deposits per account was larger than the growth of new accounts during the crisis (see Panel B in Figure 3). Although there were some new entrants, the increase in savings deposits occurred significantly at the intensive margin. People who already had an account repatriated their funds from other institutions or saved more. This type of behaviour shows that these people were not over-indebted or hand to mouth households. Poor households facing debt repayment and/or unemployment would not have been able to increase the value of their accounts.

F. Life insurance

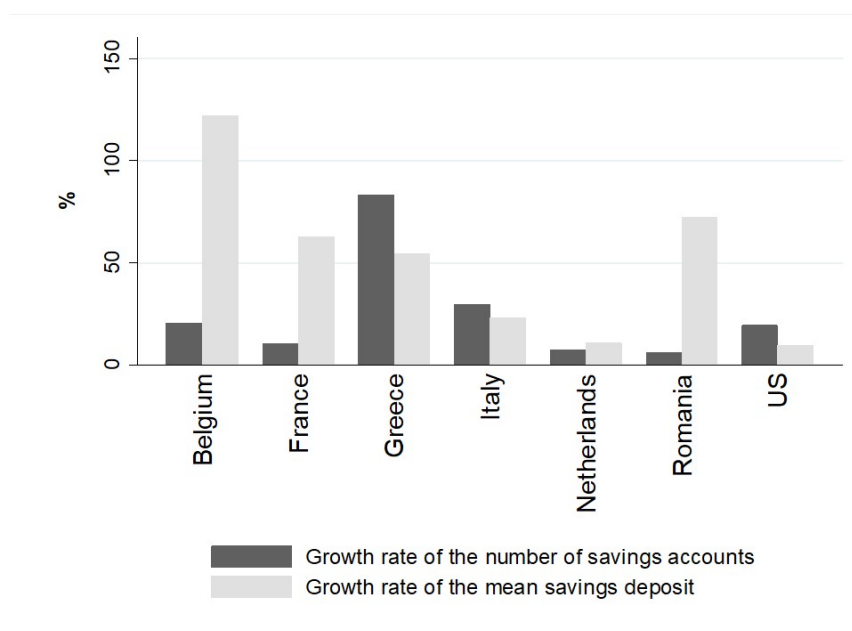
Life insurance policies were also an important vehicle for savings in the interwar. They had emerged later than savings institutions but became prominent in the late 19th century (Radice,

Figure 3. : Number of savings accounts and average savings deposit

(a) Number of savings accounts per 100 inhabitants in 1933



(b) Growth rate between before and after banking crises



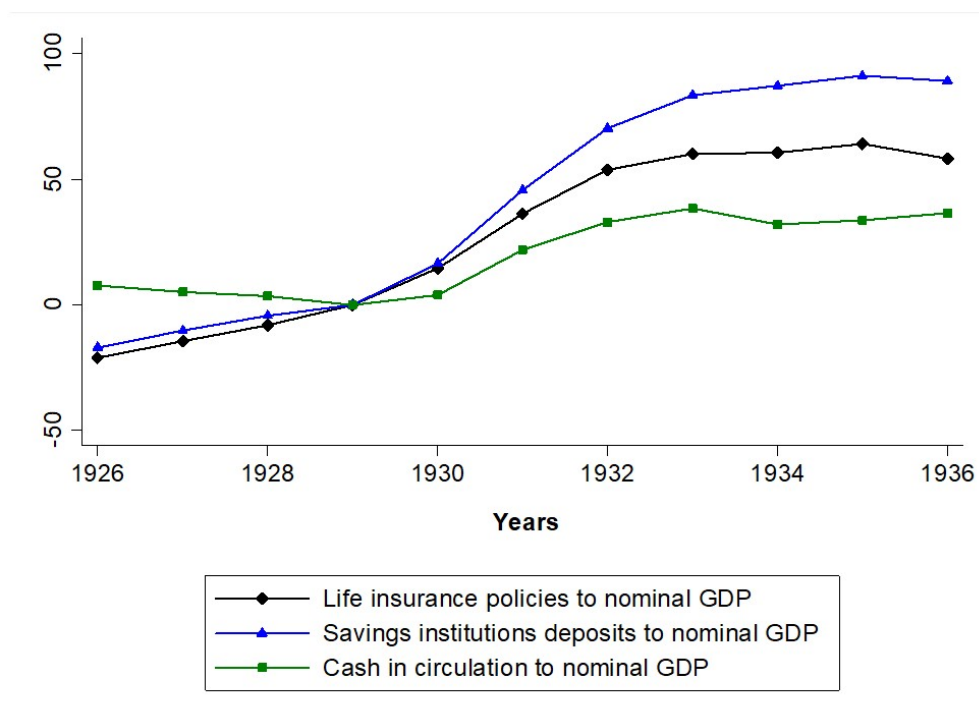
Source: See online Appendix.

Note: Panel B focuses on the 1928-1936 banking crises. We calculate - for each country - the growth rate between the year before the first banking crisis and the year after the last banking crisis. For countries that did not have a banking crisis (here, only Greece) we take the growth rate between 1930 and 1933.

1939; Goldsmith, 1969; Hautcoeur, 2004). We collected data on life insurance policies for 16 countries in our sample (in the remaining 7 countries, life insurance companies were either non-existent or not sufficiently organized to report aggregated data). A list of the sources used is given in the online Appendix.

In these 16 countries, life insurance policies increased on average by 42% in nominal terms, between 1928 and 1933 (while savings deposits increased by 48%). Figure 4 shows that, in these 16 countries, the ratio between life insurance policies and nominal GDP increased in the early 1930s, but less than the ratio between savings deposits and nominal GDP.

Figure 4. : Life insurance policies to nominal GDP. Index: 1929=100



Note: Unweighted average of the data for the 16 countries for which we have life insurance policies data. 1929 is the base year.
Source: See online Appendix.

However, caution should be applied when using data on life insurances in international comparison. Life insurance policies often took the form of investment accounts. The value of an investment account depends on the value of stocks and bonds in which the capitals are invested. Since both the composition of life insurance companies' assets (e.g. government securities, corporate bonds or stocks) and the fluctuation of the prices of these assets differed widely from one country to

another during the Depression (Snowden, 1995; Baker and Collins, 2003; Hautcoeur, 2004), it is quite difficult to present reliable cross-country comparisons that would capture the true increase in savings. We therefore prefer to focus mainly on savings institutions in the rest of our analysis, while checking that our main conclusions do not differ if we also consider life insurances (see sections II.B and III.B).

Still, it is remarkable that life insurance policies increased on average by 42% between 1928 and 1933, while the price of stocks and junk bonds decreased and the price of safest government and corporate bonds remained stable (for data on the US, see Basile et al. (2017)).

II. Savings institutions and the credit crunch

From a macroeconomic perspective, the inflow of deposits in savings institutions raises two main concerns. First, how was the money invested by savings institutions? Since part of the deposits were transferred out of commercial banks, the overall effect could have been benign if firms were able to borrow from savings institutions as they used to do from banks. On the contrary, the flight-to-safety may affect aggregate output through the credit multiplier if savings institutions did not lend as much as commercial banks. Second, is there any evidence of an increase in precautionary savings, in addition to the flight-to-safety? This section focuses on the credit multiplier effect. Section III will investigate the issue of precautionary savings.

A. *The assets of savings institutions*

Savings institutions lent less to private businesses than commercial banks. A larger share of their assets was invested in safe government bonds or in Treasury deposits.²² Nevertheless, some savings banks were involved in short-term credit markets (such as the *Sparkassen* in Germany, see Lehmann-Hasemeyer and Wahl (2021)), and could potentially have taken over the role of commercial banks during the crisis. Whether the flight-to-safety led to a decline in the credit multiplier therefore remains an empirical question.

To evaluate this claim, we assembled data on savings institutions assets, using annual balance sheets, which we then compared to commercial banks' assets. We managed to collect this data

²²Even in the absence of state regulation, savings institutions generally followed more "conservative" lending policies than commercial banks. See Andersson and Rodriguez (2013) on Sweden's savings banks, and Martin-Acena (2014) on Spain's *cajas de ahorros*.

for the 23 countries in our sample, covering the 1923-1936 period. For most countries, we rely on national statistical yearbooks (see online Appendix). These sources generally report the yearly balance sheets of each type of savings institutions. We focus on two categories of assets: loans and securities. Loans include commercial paper, discounts, advances, overdraft credit, and long-term loans (mortgages, long-term loans to the State, long-term loans to agriculture...). Securities include stocks and bonds (importantly, we consider sight deposits at the central bank or at the Treasury as short-term securities, to reflect their high degree of liquidity). For each savings institution, we thus compute two annual series: loans and securities. Then, we split each category into two sub-categories: private and public. The purpose of these two categories is to reflect the lending activities of savings institutions that were potentially similar to banks in that they could finance private businesses.

Private loans are comparable to the loans granted by commercial banks (i.e. short term loans to businesses or individuals), while public loans are mostly granted to central or local governments, or as mortgages. We choose to include mortgages in this second category because in most countries the mortgage market was highly organized by the State (with specific regulation and guarantee) while commercial banks were little involved in it.²³ Private securities are stocks and bonds issued by businesses, while public securities are essentially government (central or regional) bonds, and short-term claims on government institutions. So, according to our definition, deposits invested in public loans and securities could not replace bank credit to businesses.

For a few institutions, balance sheets are not available. This is often the case for postal savings and for savings institutions that were required by law to hold mostly or only government securities. We then rely on available institutional information to characterize their assets. For example, funds collected by the French *Caisse Nationale d'Epargne* (CNE) had to be deposited at the Treasury or invested in government bonds. In this case, we compute loans as equal to 0 and securities as equal to the deposits of the CNE. Here, all securities are public securities (private securities are equal to 0). A country-by-country description of the choices made to construct asset series for savings institutions is provided in the online Appendix.

For commercial banks, standardized series of assets were published by the League of Nations.²⁴

²³In some countries like France, mortgages were neither made by banks nor savings institutions but through notaries or by a government-backed credit institutions that issued bonds (*Crédit Foncier*). See Hoffman et al. (2019).

²⁴Unfortunately, the League of Nations did not publish data on the assets of savings institutions. However, this difference is not accidental. It reflects the fact that for the League of Nations statisticians, savings institutions were not primarily lending

As for deposits, we used series based on more recent historical studies, when possible. Assets are classified into 5 different categories: cash, bills discounted and bought, investment and securities, participations, and loans and advances. We classify bills discounted and bought, and loans and advances under "loans", and investment and securities and participations under "securities". All banking loans are classified as "private" loans; and all securities are assumed to be private securities. This assumption cannot be verified in our sources and is very likely to be false in some or most countries. Yet, it will only underestimate the credit crunch if banks purchased government securities during the crisis.

B. The credit crunch

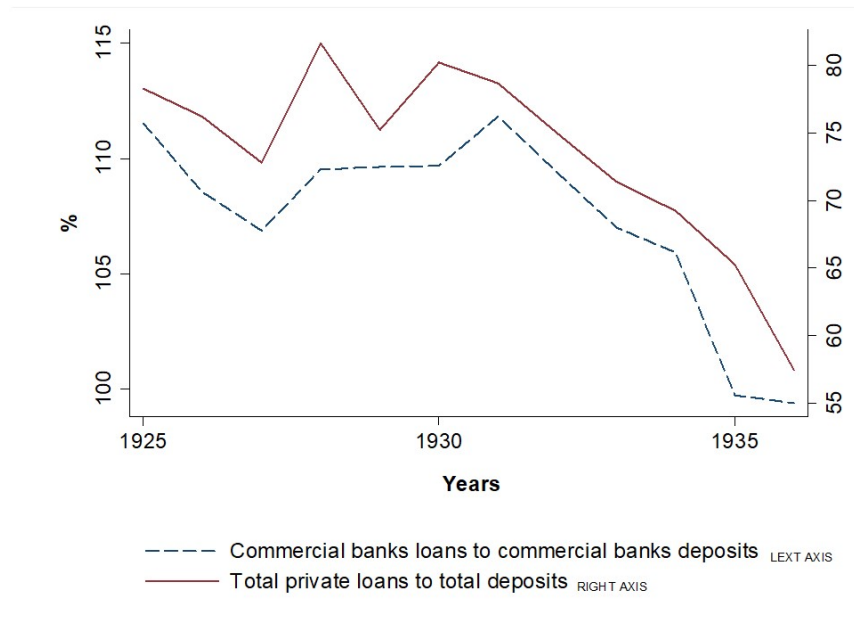
We expect that the total loan-to-deposit ratio (covering both commercial banks and savings institutions) decreased during the early 1930s when depositors shifted their money from banks to savings institutions. Panel A in Figure 5 compares the credit multiplier (i.e. loan-to-deposit ratio) of commercial banks to the aggregate credit multiplier (which also includes savings institutions). We include the ratio for commercial banks in the chart for comparison purposes, because Bernanke (1983) looked at the loan-to-deposit ratio of commercial banks to conclude that the fall in bank loans was not simply a balance sheet reflection of the decline in deposits, but was also driven by the rise in information asymmetries after bank failures.²⁵ The blue dashed line represents the commercial bank credit multiplier, calculated as loan-to-deposit ratio for commercial banks. The red solid line represents the aggregate credit multiplier, calculated as the sum of 'private' loans by commercial banks and by savings institutions divided by the sum of deposits in both types of institutions.

Two comments are in order. First, the pre-crisis aggregate multiplier is significantly below the commercial banks multiplier (80% vs 110%). This is because, indeed, savings institutions provided less credit to businesses than commercial banks. As can be seen in Table A2, only 33% of the assets of savings institutions were invested in private loans, similar to those of commercial banks. For this reason, we have to use two different scales to show both lines on the same graph. Second, institutions similar to banks.

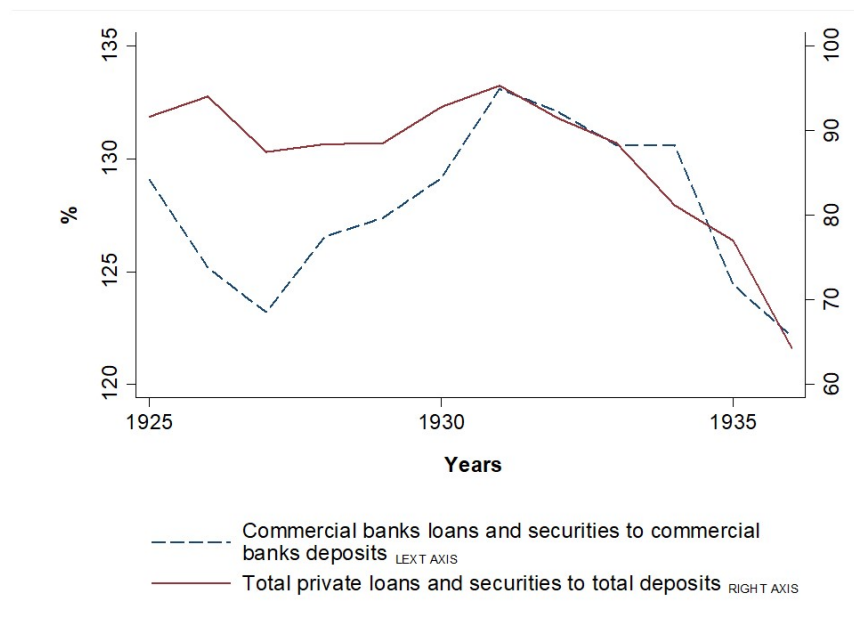
²⁵He found that the ratio of loans to deposits among US commercial banks dropped from 85% in 1929 to around 60% at the end of 1934. For this country, we find that the total loans to deposits ratio decreased from 68% to 44%. In absolute terms, the decrease of the commercial bank multiplier and aggregate multiplier are comparable. In growth rates, however, the fall in the aggregate multiplier (-35%) outweighs the fall in the commercial bank multiplier.

Figure 5. : Flight-to-safety and the credit multiplier

(a) Private loans to deposits



(b) Private loans and securities to deposits



Note: Unweighted average of the data. Panel A includes the 23 countries in our sample. Panel B includes the 16 countries for which we are able to distinguish between private and public securities held by savings institutions. See the text for the definition of private loans and securities.

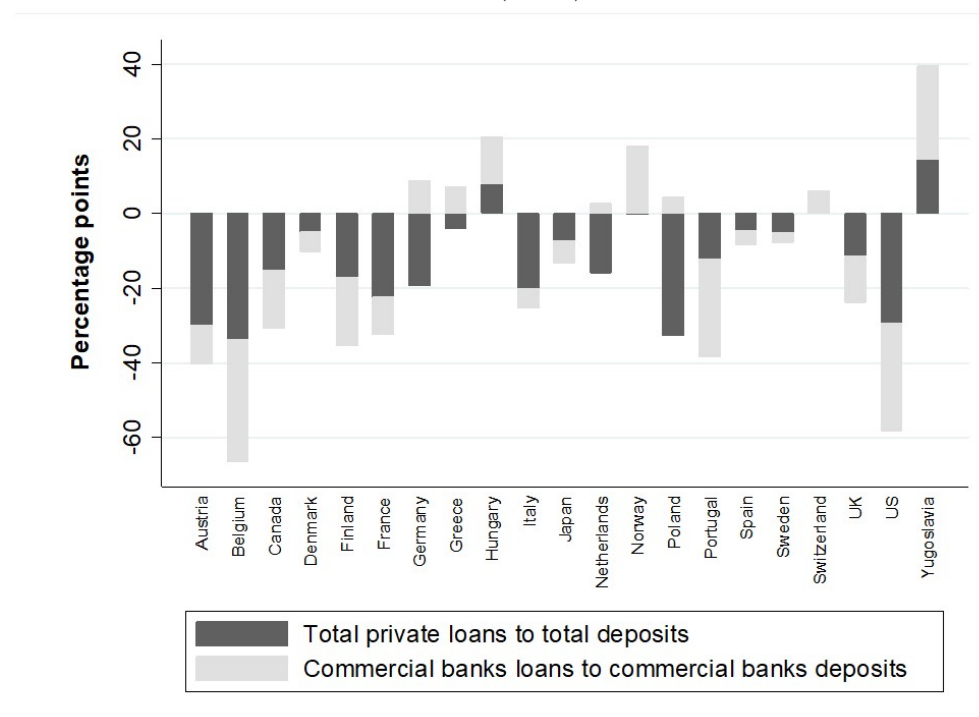
the drop of the aggregate credit multiplier during the Great Depression outweighs the drop of the commercial banks multiplier. The aggregate multiplier indeed drops from 80% in 1930 to 65% in

1935 (an absolute decrease of 15%), while the commercial banks multiplier decreases from 110% to 100% (an absolute decrease of 10%). In relative terms, the 1935 aggregate multiplier is 19% below its 1930 value, while the commercial bank multiplier is only reduced by 9%.

By switching their funds from commercial banks to savings institutions, depositors therefore impaired the ability of the financial system to create credit. As shown in panel B (Figure 5), this result is even stronger if we take into account private securities. This time, the aggregate multiplier drops from 92% in 1930 to 77% in 1935 (-15% in absolute terms), while the commercial bank multiplier only decreases from 129% to 124% (-5% in absolute terms).²⁶ Thus, a key message of Figure 5 is that the drop of the loans-to-deposits ratio is larger if we consider savings institutions.

Figure 6. : Change in the loan-to-deposit ratio during banking crises

Difference between the year before the first banking crisis and the year after the last banking crisis (in pp)



Note: We focus on the 1928-1936 banking crises. We calculate the difference of both ratios between the year before the first banking crisis and the year after the last banking crisis. For countries that did not have a banking crisis, we take the growth rate between 1930 and 1933. Data for Bulgaria is not available before 1932, hence Bulgaria does not appear in the graph (Bulgaria experiences one banking crisis in 1931). For Italy, asset data for the casse di risparmio ordinarie are not available for year 1936, so we calculate the growth rate between years 1930 and 1935 instead (Italy experiences two crises, one in 1931 and one in 1935). Finally, Romania appears as a clear outlier with an increase in both multipliers of more than 30% (driven by a 50% fall in commercial banks deposits). In the Appendix, we present the same graph including Romania.

Source: See online Appendix.

²⁶A 25-30% capital ratio was usual for commercial banks in the interwar.

Figure 6 highlights the heterogeneity across countries in response to banking crises. It displays the first difference of both the aggregate multiplier (black) and of the commercial banks multiplier (grey) before and after banking crises (in percentage points). The first difference is thus calculated over a specific period for each country, depending on when it was hit by a banking crisis (in case of several banking crises, the last one is considered). For countries that did not have a banking crisis, we take the growth rate between 1930 and 1933 (i.e. the years when most banking crises were concentrated in other countries).

It is important to note that, since the loan-to-deposit ratio was always higher for commercial banks, a decline in both ratios of the same magnitude (in pp) means that the decline in the aggregate ratio was caused by more than the decline in the commercial bank ratio.²⁷ In the US case where the fall in both ratios is of similar magnitude, a flight-to-safety to savings institutions was also at work (and the loan-to-deposit ratio of these institutions plunged), in addition to the fall in the commercial bank credit multiplier observed by Bernanke. Figure 6 shows that the change in the commercial bank multiplier was sometimes very small (or even positive), which did not prevent a large fall in the aggregate credit multiplier (e.g. Netherlands, Italy, Poland, France). This fall was driven by the flight-to-safety. In fact, the commercial bank credit multiplier can remain stable (or even slightly increase) even if there is a commercial banking crisis. Friedman and Schwartz' argument, for example, did not require a decrease in this ratio, but simply that loans and deposits plunged together. For several countries (Hungary, Yugoslavia, Norway), the commercial bank multiplier even increased whereas commercial bank deposits fell. For this reason, the aggregate multiplier also increased in such cases, although the loan-to-deposit ratio in savings institutions clearly decreased. The US - together with Belgium - experienced the largest fall in the commercial bank credit multiplier. In all other countries, the aggregate multiplier decreased more (or increased less) than the commercial bank multiplier.

Portugal is a unique case where the decline in the aggregate multiplier was small compared to the commercial bank multiplier. The case of Portugal is particularly interesting because the government openly asked the savings institutions to take over the role of banks and lend to businesses. Starting in 1929 Portugal's national savings bank, the *Caixa Geral de Depositos*, was involved in a government policy designed to modernize agriculture and industry (Lains, 2008). This is the

²⁷For example, if the loan-to-deposit ratio of commercial banks is 60/100 and the aggregate one is 20/100. A fall in the former by 10pp will lead to a fall in the latter by around 3.5pp only.

only case in our sample where the loan-to-deposit ratio of savings institutions increased around a banking crisis. Between 1930 and 1932, the Caixa increased its credit to the economy by 58%, even more than the 46% increase in deposits.

Counter-cyclical lending by savings institutions was the exception rather than the rule. Governments were generally unwilling to conduct counter-cyclical credit policies (Baubeau et al., 2021; de Vicq and Peeters, 2022). Often, the gold standard mentality proved impossible to overcome until the devaluation. This applied to state credit policies as well. Governments believed that using those funds to invest in the economy would damage the credibility of the State and those of savings institutions themselves. It was only in the late 1930s, and most of the times during and after World War II, that governments started to use savings institutions to direct credit to some specific sectors or firms (Monnet, 2018). In the US, Jaremski and Plastaras (2016) estimate that inflows in postal savings deposits alone helped fund 4,2% of total New Deal spending.

Comprehensive data on life insurances' assets for all countries in our sample are altogether missing for the interwar years. However, the investment strategy of life insurance companies in a limited number of countries was studied by Baker and Collins (2003); Hautcoeur (2004); Stalson (1942). Much like savings institutions, life insurance companies invested primarily in safe assets. In France, on the eve of the Great Depression, life insurance companies for example held nearly 70% of their assets in state-guaranteed bonds and in real estate. In the UK, public sector investments concentrated 43% of total assets (the rest being mainly held in mortgages and shares). This share remained broadly constant during the Great Depression. Data for the US show that about 1/3 of the assets of life insurances were invested in bonds in 1930 (no detail is available on the types of bonds held) and only 3% in stocks (see Goldsmith (1969, vol.1, Table I5, p.450)). The largest share was mortgage loans (40%). These shares remained stable in the early 1930s. It is therefore unlikely that the absence of data on life insurance companies' investments biases our measure of the aggregate multiplier.

III. Precautionary savings

Our previous argument about the flight-to-safety and the credit multiplier is valid even if there is a constant saving rate. A different matter is whether the transfer of deposits during banking crises was associated with a rise in precautionary savings. If banking crises made consumers and

businesses worry about their future ability to borrow, they could have reacted by saving more than before, at the expense of consumption. Whereas neoclassical theory postulates that a rise in the saving rate pushes investment and economic growth up, Keynesian theory predicts that - in the short-term - an increase in savings depresses aggregate demand. More recent theories consider that these two views are not incompatible as long as we consider heterogeneous economic agents. The negative effect of an increase in precautionary savings on economic growth can occur at the same time as a decrease in the average savings rate or in total net savings, if the richest save while the debt of the poorest increases (Challe et al., 2017; Guerrieri and Lorenzoni, 2017; Mian et al., 2020).

In this section, we present and discuss pieces of evidence showing that the savings flows discussed previously were unlikely to be explained only by a transfer of funds. Instead, some households and firms may have saved more than before, especially when banking crises hit. Before presenting the quantitative evidence, it is first necessary to explain the theoretical and empirical difficulties to measuring precautionary savings.

We face several important problems to decompose the rise in savings deposits between reallocation of existing funds and new precautionary savings. The first one is because banks create money when they lend (or destruct it if they do not renew the loan). Thus, commercial bank deposits can decrease both because they are withdrawn by depositors or because loans are not renewed at maturity. In times of economic crisis and banking panics, the two are probably happening at the same time, especially if a commercial bank tried to restore its reserve ratio by reducing lending.²⁸ It follows that the drop of commercial bank deposits is larger than the rise in deposits at savings institution, even if the increase in the latter is entirely explained by a transfer from the former.

The second issue is that we cannot know if individuals or firms sold other assets (possibly at a depreciated price) to increase their savings deposits. In the handful of countries in which we have estimations of the nominal financial wealth (Piketty and Zucman, 2014), it is impossible to distinguish between price and volume effects. This prevents us from measuring the aggregate wealth of different groups and from determining if the rise in savings deposits was driven by the sale of securities. Considering capital losses (or gains) through changes in the price of securities or housing would run counter to standard practices for calculating savings flows and savings rates (Guidolin and La Jeunesse, 2007; Mody et al., 2012; Mian et al., 2020).

²⁸We thank an anonymous referee for pushing us to develop this argument.

The third problem is that an aggregate or average saving rate in fact tells us little about precautionary saving and the Keynesian mechanism. As emphasized by Guerrieri and Lorenzoni (2017) and Mian et al. (2020), the Keynesian effect of precautionary savings is compatible with a significant part of the households (or firms) being debt-constrained while another part of the population saves more. This can be illustrated by the case of the United States, where household debt during the Great Depression has received a substantial amount of attention and for which we have better data on assets and liabilities than in other countries. Olney (1999) shows that households were shouldering an unprecedented burden of installment debt in the early 1930s. This led them to cut consumption in order to repay the debt. Both the nominal and real total liabilities of households increased in 1930, 1931, 1932 by 10% a year on average (Mishkin, 1978).²⁹ In percentage points, the increase in the debt of households was indeed higher than the decrease in wealth. Moreover, if one exclude stocks (whose prices plunged with the stock market crash), the net saving of households did not decrease (Goldsmith, 1969, vol.1, Tables S20-21). It is only because of the increase in consumer debt and the fall in the price of securities that the net saving of household decreases in the figures published by Goldsmith (and used by Mishkin).³⁰ Other publications by Raymond Goldsmith are consistent with this picture: Goldsmith (1958) found that total assets of all financial intermediaries increased during the Great Depression while Goldsmith (1969) showed that the decrease in total US intangible assets in the early 1930s was mostly driven by the fall in private securities. Thus, the US case in fact shows that a decrease in total net savings and an increase in debt are compatible with the accumulation of savings by a part of the population in savings deposits and life insurances.

In what follows, we rely on two different methods to show that the increase in deposits at savings institutions and life insurances was not simply a reallocation of funds (flight-to-safety). Given the data limitation underlined previously, we cannot provide a precise measure of precautionary savings but we find that the pattern of savings is consistent with an increase in new gross savings for at least a part of the population.

²⁹The growth rate is the same each year because Mishkin interpolated the data between 1929 and 1933 published by Goldsmith.

³⁰For the same reason, the personal saving rate published by the BEA started to decrease in 1932. The methodology used by the BEA relies on national accounts and thus starts from consumption and income series whereas Mishkin (1978) uses data on wealth. The discrepancy between the two methodology (which should not exist in theory, if data were perfect) is well-known, including for recent periods Guidolin and La Jeunesse (2007). To our knowledge, only the United States has published a personal saving rate series covering the interwar period. It is also the only country for which data on household debt are available. This is probably due to peculiarity of the US banking regulation at that time.

A. An approximate evaluation of precautionary savings

Figure 7 presents the evolution of total savings, calculated as the sum of commercial banks deposits, savings institutions deposits, cash in circulation, and life insurance policies. This is intended to measure approximately the financial wealth of households and firms (excluding securities). The key feature is to include commercial bank deposits that decreased during the period. Thus, if all the increase in savings deposits, cash and life insurances was driven by the fall in commercial bank deposits, this measure of total savings should not grow. If it grew at a faster rate than total income, we interpret this as evidence of precautionary savings.³¹ This method deliberately understates precautionary savings because it assumes that the entirety of the decrease in bank deposits was driven by withdrawals. Moreover, looking at the growth of real savings also understates precautionary savings because of the "paradox of thrift" emphasized by Keynes (Chamley, 2012; Eggertsson and Krugman, 2012): the initial increase in savings causes a fall in GDP so that both real savings and real GDP eventually grow less than their potential.

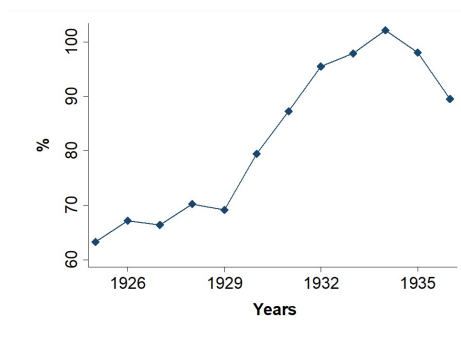
We first look at the ratio of savings to GDP in order to check if economic agents decreased their savings to compensate fully the decrease in income. It is clear that they did not. In Figure 7, panel A presents the cross-country average of the ratio of total savings to nominal GDP. The sample is limited to the 16 countries for which we have data on life insurances. Starting in 1929, the ratio increases very sharply. The ratio indeed jumps from 69% in 1929 to 79% in 1930, to finally reach a maximum of 102% in 1934. To rule out the possibility that outliers are driving this result, we also calculate the ratio of savings to GDP at the global level, that is for all countries in our sample. To do so, we convert national series into dollars using yearly exchange rate data. We then compute a series of total savings, which we divide by total nominal GDP. This method gives larger economies a larger weight. This property is particularly interesting to capture how precautionary saving may have affected aggregate demand at the international level during the Great Depression. Panel B plots the ratio of global savings to global GDP. Once again, the ratio jumps from 60% in 1929 to 94% in 1932 and 117% in 1935.

We now look at the real growth rates of our measure of savings. Panel C and D confirm that the evolution presented in panel A and B is not only driven by the fall in GDP during the Great

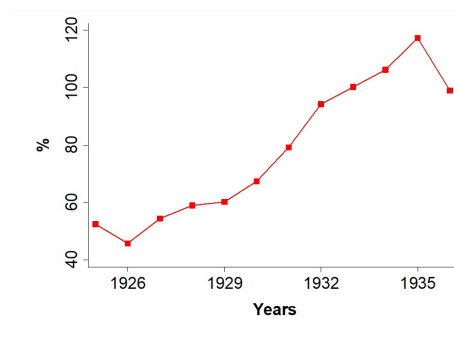
³¹Of course, the ideal measure would be to scale the measure of savings by the income of the same group. This is impossible without individual data.

Figure 7. : Total savings during the Great Depression

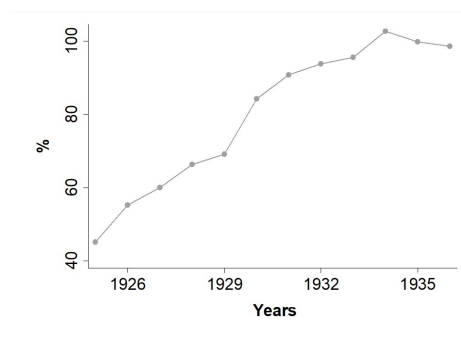
(a) Total savings to GDP, cross-country average



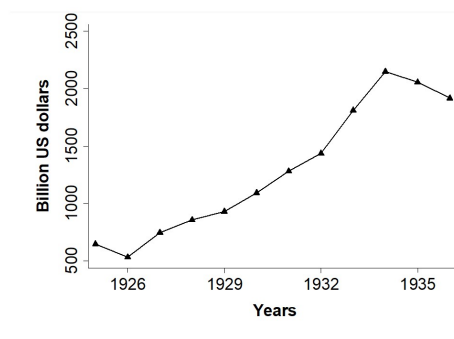
(b) Global savings to GDP



(c) Total savings to 1929 GDP, cross-country average. Constant 1929 dollars.



(d) Real global savings (Constant 1929 dollars)



Note: Total savings is calculated as the sum of savings institutions deposits, commercial banks deposits, cash in circulation, and life insurance policies.

Panel A shows the unweighted average of the ratio total savings to nominal GDP across the 16 countries for which we have life insurance data. Panel B presents the evolution of the ratio of global savings to global nominal GDP. To obtain this ratio, we first convert each country's total savings in dollars, using yearly exchange rate data (see Appendix). We do the same for national GDPs. Then we add up savings to create a yearly measure of world savings, which we divide by the sum of national GDPs. The sample is the same as in panel A. Panel C plots the cross-country average of the ratio real total savings to GDP. Unlike in panel A, the GDP is held constant (at its 1929 value). Panel D looks at real global savings. We use the same measure of world dollar savings as in panel B, but instead of scaling it by nominal GDP we deflate it with the US price index (constant 1929 prices). The sample is the same as in panels A, B, and C.

Depression. While GDP and prices collapsed, total savings accumulated in financial institutions continued to grow. We see this divergence as evidence of the existence of precautionary savings. Panel C looks at the cross-country average of the real savings to GDP ratio with GDP kept constant (at its 1929 value). We still scale savings by GDP in order to obtain comparable values across countries. Yet, as savings are divided by the value of GDP in 1929 for each year, the increase in the series after 1929 cannot be due to the fall in GDP. Like in Panel A the ratio increases markedly in 1930 (from 69% to 84%), to finally reach 103% in 1934. It is not surprising to see that real savings

(expressed as a share of 1929 GDP in constant 1929 prices) increased in the 1920s in line with real GDP growth. It is striking to see that it continued to rise in the 1930s while the world entered Depression and real GDP fell.

Panel D provides a similar picture looking at the evolution of the world real savings (in dollars). To obtain this series, we calculate total nominal savings by year in dollars (like in panel A), which we then deflate using US prices. The series is thus expressed at constant 1929 prices. As panel D shows, world real savings more than double between 1929 and 1935 (930 to 2150 billion constant US dollars). Consistent with studies that have underlined the deflationary international context (Eichengreen, 1992), we thus show that the increase in precautionary savings was a global phenomenon, which means that it could affect aggregate demand across countries. All series in Figure 7 decrease markedly in 1936 when the last key European countries (Gold bloc) leave the gold standard.

B. Banking crises and precautionary savings

We now test directly whether a rise in savings was associated with a banking crisis. Following the literature, the usual method is simply to regress a measure of precautionary savings on a measure of banking crisis (Mody et al., 2012). In accordance with the previous discussion, it is important in our case to control for reallocation between different type of savings. Otherwise, we could wrongly interpret the positive coefficient on the banking crisis dummy as an evidence of a positive correlation between precautionary savings and crisis, whereas it in fact captures the reallocation between different forms of savings during banking crises. Thus, we use the growth rate of the sum of savings deposits, cash, and life insurance policies in the left-hand side, and we include the growth rate of commercial bank deposits, equity return, and the growth rate of housing prices on the right hand side. If a banking crisis triggers only a reallocation of funds from the variables in the right-hand side to those in the left-hand side, then the correlation between these variables should be negative and the coefficient on the banking crisis dummy should equal zero. By contrast, if the coefficient on the banking crisis is positive despite the aforementioned control variables, we conclude that a crisis was associated with a rise in precautionary savings for a part of the population. Finally, since our dependent variable is the nominal growth rate of savings, we control for the nominal growth rate of GDP on the right-hand side. This prevents the correlation

between banking crises and savings from being driven by the direct effect of banking crises on output and prices.

$$\begin{aligned} Savings_{i,t} = & \beta_0 + \beta_1 BankPanics_{i,t} + \beta_2 Bank_{it} + \beta_3 GDP_{it} \\ & + \beta_4 Equity_{it} + \beta_5 Housing_{it} + y_t + d_i + \varepsilon_{i,t} \end{aligned} \quad (1)$$

Savings is the growth rate of total savings (savings deposits + cash + life insurance). *BankPanics* is a banking crisis dummy. *Bank* is the growth rate of commercial bank deposits, *GDP* is the growth rate of nominal GDP, *Equity* is the return on equity (calculated as the growth rate of the stock market index by Baron et al. (2021)), and *Housing* is the growth rate of housing prices. *Bank* controls for the reallocation away from commercial bank deposits, while *Equity* controls for the reallocation from stocks, and *Housing* for the reallocation away from real estate. All specifications include country and year fixed effects. Standard errors are clustered at the country level. Year-fixed effects capture common global shocks, including the international contagion of the US stock market crash of 1929.

Column (1) estimates our model without the control variables *Equity* and *Housing*. The sample is limited to 16 countries because of the availability of GDP and life insurances data. In column (2), we add *Equity* as control variable. In column (3), we estimate the full equation by adding *Housing* as control variable. Adding housing prices to the equation decreases the sample to 12 countries. Columns (4) replicates the specification from column (3), but excluding life insurance policies from our measure of total savings. The first four specifications are estimated using an updated version of Bernanke and James' definition of banking panics (see Section I.D). In column (5), we look at the effect of banking crises, which include both panics and "quiet" crises.

According to the benchmark specification, banking panics lead to a significant increase of 2.5 percentage points in the growth rate of total savings (column (1)). The coefficient is larger (3.1 pp) when adding control variables (columns 2 and 3), and 4.5pp when excluding life insurance policies from total savings (column 4).³²

In the fifth column, we combine Bernanke and James' coding of banking panics with the recent

³²We reach similar conclusions if we use a sample of 19 countries, excluding life insurances, and without controlling for equity and house prices.

Table 2: Banking panics, precautionary savings and total savings

	(1)	(2)	(3)	(4)	(5)
Banking panics	0.025** (0.010)	0.031** (0.011)	0.031** (0.011)	0.045** (0.017)	
Banking crises					0.035*** (0.009)
Nominal GDP	0.131*** (0.040)	0.128** (0.044)	0.102* (0.049)	0.138** (0.045)	0.091* (0.043)
Bank deposits	0.169 (0.099)	0.179 (0.117)	0.182 (0.120)	0.163 (0.120)	0.191 (0.121)
Equity return		-0.004 (0.026)	-0.030 (0.020)	-0.029 (0.017)	-0.028 (0.020)
House prices			0.138*** (0.018)	0.130*** (0.016)	0.138*** (0.017)
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Observations	204	180	151	161	151
R-squared	0.328	0.348	0.463	0.311	0.472
No. of countries	16	14	12	12	12

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

Note: The dependent variable is the growth rate of total savings. Except in column (4), total savings is calculated as the sum of savings deposits, cash in circulation, and life insurance policies. In column (4) we exclude life insurance policies from total savings. Column (2) controls for the return on equity, column (3) controls for the growth rate of housing prices. In the first 4 specifications we use an updated version of Bernanke and James (1991) definition of banking crises (see footnote 18 and online appendix). In column (5), we combine Bernanke and James' coding with the coding of Baron et al. (2021). We exclude the 1922 "quiet" crisis in Japan, which was mostly a crisis of the small savings banks (Shizume, 2012). All estimations include country-fixed and year-fixed effects, and standard errors are clustered at the country level.

coding of Baron et al. (2021) which includes banking crises without panics. Compared to column (3), the coefficient is slightly larger (3.5pp vs 3.1pp). In line with previous discussions, considering such episodes confirms that bank runs and bank failures were not a necessary condition for banking crises to produce an increase in precautionary savings.

C. Did precautionary savings predict banking crises?

A different interpretation of the results displayed in Table 2 would be that banking crises were themselves due to a drop of aggregate demand in the preceding years, driven by precautionary savings. This could have weakened the economy and hence the health of the banking system, as argued by Temin (1976).³³

To account for this potential problem, we run a regression with a banking crisis dummy as

³³Romer (1990) does not argue that US financial turmoils were preceded by a rise in precautionary savings, but she documents a fall in consumption after the 1929 market crash, before the banking crises of 1930-1931. Temin (1994) disputes the role of the 1929 crash in causing the banking crises. Outside the US, the origin of banking crises is not attributed to the stock market crash (Bernanke and James, 1991; Grossman, 1994; Grossman and Meissner, 2010).

Table 3: Does the increase in savings predict banking crises?

	(1)	(2)	(3)	(4)
Log savings deposits (t-1)	0.042 (0.032)		-0.079 (0.057)	
Growth rate savings deposits (t-1)		-0.040 (0.059)		-0.159 (0.146)
Country FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Controls	No	No	Yes	Yes
Observations	316	291	263	240
R-squared	0.201	0.182	0.191	0.173
No. of countries	23	23	19	19

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

Note: The dependent variable is our banking panics dummy. All variables are Lagged by one year. Columns (1) and (2) do not include any controls. In column (3), we control by the lagged value of log bank deposits, log banknote circulation, and log nominal GDP. In column (4), we use the growth rate of the same variables as control. All estimations include country-fixed and year-fixed effects, and standard errors are clustered at the country level.

independent variable and the lagged value of the growth of savings deposits as explanatory variable. If Temin's argument were valid, a banking crisis at date T could be accurately predicted by the increase in savings at date T-1. The results presented in Table 3 invalidate this hypothesis. The coefficient on lagged savings deposits is never significant (and usually negative). In columns (1) and (3), we consider the logarithm of savings deposits and, in column (2) and (4) their growth rates. In columns (3) and (4), we add control variables (commercial bank deposits, cash and GDP). In the online appendix, we consider alternative specifications where we also include life insurances with a smaller sample size, or use the extended definition of banking crises. We still find no evidence that the previous values of the level or growth rate of savings predicted banking crises.

IV. Conclusion

The banking crises of the Great Depression shifted the world economy from a regime of easy credit to a regime of tight credit (Eichengreen, 1992; Eichengreen and Mitchener, 2004; Schularick and Taylor, 2012). This change has been widely studied - at the national or global level - as the consequence of the decline in money and of the increase in the cost of financial intermediation caused by bank failures (Friedman and Schwartz, 1963; Bernanke, 1983; Bernanke and James, 1991). Our investigation points at an additional mechanism: credit collapsed because banking crises were associated with a transfer of funds from commercial banks to other institutions that collected savings but did not lend (or lent much less) to businesses. This paper has provided evidence of

such transfers and of their significant effect on the total credit multiplier, considering both banks and non-banks. The overall picture is one of a rise in savings but of a decrease in credit. We hope to have demonstrated that the aggregate effect of banking crises during the Great Depression can no longer be studied without considering jointly the savings institutions to which depositors turned during bank failures. Data for more than 20 countries illustrate the international character of this phenomena. More research is now needed to understand the precise country-specific mechanisms behind these transfers and how governments and banks responded differently across nations. A key question that emerges from our research is why governments have not actively acted to redirect accumulated savings towards business investment.

Studying the transfer of savings from commercial banks to savings institutions and life insurances, we also found evidence that the increase in savings was not only a reallocation of funds. The banking crises not only caused a flight-to-safety, but also an increase in precautionary savings at the expense of consumption. Here we relate to the Keynesian interpretation of the Great Depression, which emphasizes the decline in aggregate demand (Temin, 1976; Eichengreen, 1992; Romer, 1990; Bernanke and James, 1991). Our contribution to this line of thought is to present the first evidence of an increase in savings where the literature previously focused on consumption or macroeconomic constraints. This does not contradict the debt-deflation channel that may also have been at work in several countries. The two are compatible as long as we take into account household and firm heterogeneity (Guerrieri and Lorenzoni, 2017). Given the data problems and limitations inherent in cross-country analyses, however, we recognize that there is still much to be written on the distribution of savings and on financial inequalities during the Great Depression and on how it may have contributed to the deepening of the economic crisis.

REFERENCES

- Andersson, M. and E. Rodriguez (2013). Banks and crisis: Sweden during 150 years. *ESBG Perspectives* (66), 99–129.
- Baker, M. and M. Collins (2003). The asset portfolio composition of british life insurance firms, 1900–1965. *Financial History Review* 10(2), 137–164.
- Baron, M., E. Verner, and W. Xiong (2021). Banking crises without panics. *The Quarterly Journal of Economics* 136(1), 51–113.
- Basile, P., S. W. Kang, J. Landon-Lane, and H. Rockoff (2017). An index of the yields of junk bonds, 1910–1955. *The Journal of Economic History* 77(4), 1203–1219.

- Baubeau, P., E. Monnet, A. Riva, and S. Ungaro (2018). Flight-to-safety and the Credit Crunch: A new history of the banking crisis in France during the Great Depression. *CEPR Discussion Papers* (13287).
- Baubeau, P., E. Monnet, A. Riva, and S. Ungaro (2021). Flight-to-safety and the credit crunch: a new history of the banking crises in France during the Great Depression. *The Economic History Review* 74(1), 223–250.
- Bernanke, B. and H. James (1991). The Gold Standard, deflation, and financial crisis in the Great Depression: An international comparison. In *Financial Markets and Financial Crisis*, pp. 33–68. Chicago: University of Chicago Press.
- Bernanke, B. S. (1983). Nonmonetary effects of the financial crisis in the propagation of the Great Depression. *American Economic Review* 73(3), 257–276.
- Blickle, K., M. K. Brunnermeier, and S. Luck (2021). Micro-evidence from a system-wide financial meltdown: the german crisis of 1931. Available at SSRN 3436140.
- Bordo, M. D., A. Redish, and H. Rockoff (2015). Why didn't Canada have a banking crisis in 2008 (or in 1930, or 1907, or...)? *The Economic History Review* 68(1), 218–243.
- Brück, C. (1995). *Les caisses d'épargne en Europe*, Volume 1. Editions de l'épargne.
- Calder, K. E. (1990). Linking welfare and the developmental state: postal savings in Japan. *Journal of Japanese Studies* 16(1), 31–59.
- Calomiris, C. W., M. Jaremski, and D. C. Wheelock (2020). Interbank connections, contagion and bank distress in the Great Depression. *Journal of Financial Intermediation*, 100899.
- Casals, J. F. F. (1991). Interpretación básica de la historia de las cajas de ahorros españolas. *Papeles de Economía Española* (46), 39–51.
- Challe, E., J. Matheron, X. Ragot, and J. F. Rubio-Ramirez (2017). Precautionary saving and aggregate demand. *Quantitative Economics* 8(2), 435–478.
- Chamley, C. (2012). A paradox of thrift in general equilibrium without forward markets. *Journal of the European Economic Association* 10(6), 1215–1235.
- de Vicq, A. and R. Peeters (2022). "Flight-to-Safety"? Reassessing the dutch banking sector during the Great Depression. *Working Paper*.
- Eggertsson, G. B. and P. Krugman (2012). Debt, deleveraging, and the liquidity trap: A Fisher-Minsky-Koo approach. *The Quarterly Journal of Economics* 127(3), 1469–1513.
- Eichengreen, B. (1992). *Golden fetters: the gold standard and the Great Depression, 1919-1939*. Oxford University Press.
- Eichengreen, B. and K. J. Mitchener (2004). The Great Depression as a credit boom gone wrong. *Research in Economic History* 22, 183–237.
- Fisher, I. (1932). *Booms and depressions: Some first principles*. Adelphi Company New York.
- Fisher, I. (1933). The debt-deflation theory of great depressions. *Econometrica: Journal of the Econometric Society*, 337–357.
- Fleitas, S., M. Jaremski, and S. S. Schuster (2020). The US postal savings system and the collapse of building and loan associations during the Great Depression. *Center for Growth and Opportunity working Paper*.

- Friedman, M. and A. J. Schwartz (1963). *A Monetary History of the United States, 1867-1960*. Princeton University Press.
- Goldsmith, R. W. (1958). *Financial intermediaries in the American economy since 1900*. Princeton University Press.
- Goldsmith, R. W. (1969). *A Study of Saving in the United States: Nature and deprivation of annual estimates of saving, 1897 to 1949*, Volume 1-3. Princeton University Press.
- Grossman, R. S. (1994). The shoe that didn't drop: explaining banking stability during the Great Depression. *The Journal of Economic History* 54(3), 654–682.
- Grossman, R. S. (2010). *Unsettled account: The evolution of banking in the industrialized world since 1800*. Princeton University Press.
- Grossman, R. S. and C. M. Meissner (2010). International aspects of the Great Depression and the crisis of 2007: similarities, differences, and lessons. *Oxford Review of Economic Policy* 26(3), 318–338.
- Guerrieri, V. and G. Lorenzoni (2017). Credit crises, precautionary savings, and the liquidity trap. *The Quarterly Journal of Economics* 132(3), 1427–1467.
- Guidolin, M. and E. A. La Jeunesse (2007). The decline in the US personal saving rate: Is it real and is it a puzzle? *Federal Reserve Bank of St. Louis Review* 89(November/December 2007).
- Guinnane, T. W. (2001). Cooperatives as information machines: German rural credit cooperatives, 1883–1914. *The Journal of Economic History* 61(2), 366–389.
- Hausman, J. K., P. W. Rhode, and J. F. Wieland (2019). Recovery from the Great Depression: The farm channel in spring 1933. *American Economic Review* 109(2), 427–472.
- Hautcoeur, P.-C. (2004). Efficiency, competition, and the development of life insurance in France (1870–1939): Or: should we trust pension funds? *Explorations in Economic History* 41(3), 205–232.
- Hoffman, P. T., G. Postel-Vinay, and J.-L. Rosenthal (2019). *Dark Matter Credit: The Development of Peer-to-Peer Lending and Banking in France*. Princeton University Press.
- Horne, O. (1947). *A History of Savings Banks*. Oxford University Press.
- Inklaar, R., H. de Jong, J. Bolt, and J. van Zanden (2018). Rebased Maddison: new income comparisons and the shape of long-run economic development. Technical report, Groningen Growth and Development Centre, University of Groningen.
- Jaremski, M. and B. Plastaras (2016). The competition and coexistence of mutual and commercial banks in New England, 1870–1914. *Econometrica* 10(2), 151–179.
- Jorge-Sotelo, E. (2020). The limits to lender of last resort interventions in emerging economies: evidence from the Gold Standard and the Great Depression in Spain. *European Review of Economic History* 24(1), 98–133.
- Kemmerer, E. W. (1911). The United States postal savings bank. *Political Science Quarterly* 26(3), 462–499.
- Keynes, J. M. (1931). *Essays in Persuasion*. Macmillan & Co, London.

- Keynes, J. M. (1936). *The General Theory of Employment, Interest and Money*. Macmillan & Co, London.
- Kindleberger, C. P. (1973). *The World in Depression, 1929-1939*. University of California Press.
- Kindleberger, C. P. (1984). *A financial history of Western Europe*. George Allen & Unwin.
- Koshev, K. (2008). The banking sector and the Great Depression in Bulgaria, 1924-1938: interlocking and financial sector profitability. *Bulgarian National Bank Discussion Papers* (68).
- Lains, P. (2008). *História da Caixa Geral de Depósitos, 1910-1974: política, finanças e economia na República e no Estado Novo*. Imprensa Ciências Sociais.
- Lehmann-Hasemeyer, S. and F. Wahl (2021). The german bank-growth nexus revisited: savings banks and economic growth in Prussia. *The Economic History Review* 74(1), 204-222.
- Lepelletier, F. (1911). *Les Caisses d'Épargne*. J. Gabalda & Cie, Paris.
- Martin-Acena, P. (2014). The savings banks crises in Spain: When and how? Documentos de Trabajo (DT-AEHE) 1404, Asociación Española de Historia Económica.
- Mian, A. R., L. Straub, and A. Sufi (2020). The saving glut of the rich and the rise in household debt. *NBER working paper* (w26941).
- Mishkin, F. S. (1978). The household balance sheet and the Great Depression. *The Journal of Economic History* 38(4), 918-937.
- Mitchener, K. J. and G. Richardson (2019). Network contagion and interbank amplification during the Great Depression. *Journal of Political Economy* 127(2), 465-507.
- Mody, A., F. Ohnsorge, and D. Sandri (2012). Precautionary savings in the great recession. *IMF Economic Review* 60(1), 114-138.
- Molteni, M. (2021). Bank failures: What failure? Distress, development, and supervision in italian banking, 1926-1936. *Unpublished PhD-Manuscript, University of Oxford*.
- Monnet, E. (2018). *Controlling Credit: Central Banking and the Planned Economy in Postwar France, 1948 1973*. Cambridge University Press.
- Monnet, E., A. Riva, and S. Ungaro (2021). The real effects of bank runs. Evidence from the french Great Depression (1930-1931). *CEPR Discussion Papers* (16054).
- Mura, J. (1996). *History of European savings banks*. Deutscher Sparkassenverlag.
- National Monetary Commission (1910). *Notes on the Postal Savings-bank Systems of the Leading Countries*. US Government Printing Office.
- Olney, M. L. (1999). Avoiding default: The role of credit in the consumption collapse of 1930. *The Quarterly Journal of Economics* 114(1), 319-335.
- Piketty, T. and G. Zucman (2014). Capital is back: Wealth-income ratios in rich countries 1700-2010. *The Quarterly Journal of Economics* 129(3), 1255-1310.
- Proettel, T. (2016). Path dependencies in european savings banks: The impact of the fundamental decisions from the beginning of the 19th century. *Vierteljahrschrift für Sozial- und Wirtschaftsgeschichte* 104(2), 177-202.

- Radice, E. A. (1939). *Savings in Great Britain, 1922-1935: an analysis of the causes of variations in savings*. Oxford University Press.
- Reinhart, C. M. and K. S. Rogoff (2009). *This time is different: Eight centuries of financial folly*. Princeton University Press.
- Rockoff, H. (1993). The meaning of money in the Great Depression. *NBER Historical Working Papers* (0052).
- Romer, C. D. (1990). The Great Crash and the onset of the Great Depression. *The Quarterly Journal of Economics* 105(3), 597–624.
- Schularick, M. and A. M. Taylor (2012). Credit booms gone bust: Monetary policy, leverage cycles, and financial crises, 1870-2008. *American Economic Review* 102(2), 1029–61.
- Schuster, S. S., M. Jaremski, and E. R. Perlman (2020). An empirical history of the US postal savings system. *Social Science History* 44(4), 667–696.
- Shizume, M. (2012). The Japanese economy during the interwar period: instability in the financial system and the impact of the world depression. In *The Gold Standard Peripheries*, pp. 211–228. Springer.
- Sissman, L. (1938). The postal savings system and the banks. *Southern Economic Journal* 4(3), 339–351.
- Skulic, J. A. (1936). *La caisse d'épargne postale en Yougoslavie*. Ph. D. thesis, Université de Paris.
- Snowden, K. (1995). The evolution of interregional mortgage lending channels, 1870-1940: The life insurance-mortgage company connection. In N. R. Lamoreaux and D. M. Raff (Eds.), *Coordination and information: Historical perspectives on the organization of enterprise*, pp. 209–256. University of Chicago Press.
- Stalson, J. O. (1942). *Marketing life insurance: Its history in America*. Cambridge, MA: Harvard University Press.
- Temin, P. (1976). *Did monetary forces cause the Great Depression?* W. W. Norton & Company.
- Temin, P. (1994). The Great Depression. *NBER Historical Paper* (62).
- Thomes, P. (2013). The impact of crises on the savings banks institutions in Germany. *ESBG Perspectives*.
- Van Molle, L. (1986). *Les banques d'épargne belges: histoire, droit, fonction économique et institutions*. Tielt.
- Vogler, B. (1991). *L'histoire des caisses d'épargne européennes*, Volume 1. Editions de L'Epargne.

APPENDIX

Table A1: Banking crisis and savings: Additional descriptive statistics

Country	Growth rate of bank deposits: 1930-1932	Growth rate of savings deposits: 1930-1932	Growth rate of life insurance: 1930-1932	Bank deposits to GDP in 1930	Savings deposits to GDP in 1930	Life insurance to GDP in 1930	Number of banking crises (quiet crises in parentheses): 1930-1932
Austria	-47%	-10%	NA	NA	NA	NA	1
Belgium	-10%	+27%	+33%	25%	9%	2%	1
Bulgaria	-4%	+78%	-8%	26%	1%	9%	2
Canada	-11%	-3%	+10%	36%	2%	28%	0
Denmark	-13%	-1%	+10%	11%	38%	32%	0
Finland	-7%	+2%	-5%	32%	18%	40%	0 (1)
France	-14%	+48%	+25%	24%	12%	11%	2
Germany	-40%	-5%	+6%	18%	15%	2%	2
Greece	-9%	+87%	NA	42%	2%	NA	0 (1)
Hungary	-19%	-19%	NA	NA	NA	NA	1
Italy	-15%	+18%	+1%	27%	24%	9%	1
Japan	-6%	+13%	+15%	7%	24%	53%	0
Netherlands	-36%	+19%	+5%	34%	12%	44%	0 (1)
Norway	-17%	-4%	+3%	23%	49%	41%	0 (1)
Poland	-30%	+23%	NA	NA	NA	NA	1
Portugal	-7%	+46%	NA	5%	7%	NA	1
UK	+1%	+9%	+7%	26%	9%	28%	0
US	-26%	+12%	+10%	23%	11%	21%	3
Romania	-51%	+217%	NA	NA	NA	NA	1
Spain	-15%	+15%	+19%	10%	6%	1%	1
Sweden	-2%	+9%	+6%	36%	33%	41%	1
Switzerland	-10%	+13%	+6%	70%	9%	33%	1
Yugoslavia	-32%	+17%	NA	28%	2%	NA	1

Note: We take the growth rate between 1929 and 1932 for bank deposits in Belgium, and for savings deposits in Austria (data for 1930 is not available). Quiet crises are the crises identified by Baron et al. (2021), that do not appear in our banking panics dummy based on Bernanke and James (1991). The "quiet crisis" in Greece started in 1929.

Table A2: Savings institutions' assets in 1930

Country	Total Loans in % of deposits (1) = (2)+(3)	Private loans in % of deposits (2)	Public loans in % of deposits (3)	Total Se- curities in % of de- posits (4) = (5)+(6)	Private securities in % of deposits (5)	Public se- curities in % of de- posits (6)
Austria	0	0	0	100	0	100
Belgium	34	16	18	60	10	50
Bulgaria	13	13	0	8	0	0
Canada	34	16	18	60	10	50
Denmark	80	14	66	23	NA	NA
Finland	87	31	56	6	NA	NA
France	0	0	0	100	0	100
Germany	83	22	61	0	0	0
Greece	34	0	34	66	0	66
Hungary	0	0	0	100	0	0
Italy	82	35	47	34	NA	NA
Japan	23	23	0	48	0	48
Netherlands	36	6	30	48	15	33
Norway	77	51	26	34	NA	NA
Poland	74	47	27	36	NA	NA
Portugal	69	37	32	16	5	11
UK	0	0	0	100	0	100
US	61	4	57	42	19	23
Romania	100	0	100	0	0	0
Spain	52	21	31	48	0	48
Sweden	72	10	62	31	NA	NA
Switzerland	106	2	104	18	NA	NA
Yugoslavia	40	40	0	29	0	29

Note: Loans include commercial paper, discounts, advances, overdraft credit, and long-term loans (mortgages, long-term loans to the State, long-term loans to agriculture...). Securities include stocks and bonds (we classify sight deposits at the central bank or at the Treasury as securities). If there is more than one savings institution in the country, we take the sum of loans, securities, and deposits across all savings institutions. Column (1) is calculated as the sum of column (2) and column (3). Column (4) is calculated as the sum of column (5) and column (6). The sum of column (1) and column (4) does not necessarily equal 100. It can be inferior to 100 (since there were other items on savings institutions' asset side, notably cash), and it can also be superior to 100. For Bulgaria, the data is for year 1932 (since data before 1932 are missing).