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EHES WORKING PAPERS IN ECONOMIC HISTORY | NO. 86

Did monetary forces cause the Hungarian crises of 1931?

Flora Macher
London School of Economics

OCTOBER 2015

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Did monetary forces cause the Hungarian crises of 1931?

Flora Macher*
London School of Economics

Abstract

The purpose of this paper is to analyze the causes of the Hungarian financial crisis of 1931. The prevailing view is that the episode was caused by monetary forces. After the October 1929 Wall Street crash, the already indebted country with high government deficits was unfavorably impacted by the reduced availability of foreign capital and deteriorating terms of trade. These factors together depleted the foreign currency reserves of the country and culminated in a currency crisis in 1931.
Using a large macroeconomic dataset and relying on a database for the banking sector, both manually built from contemporary statistical publications and archival records, this paper develops a new interpretation to the Hungarian crisis of 1931 and shows that the financial system had a central role in this episode and it was, in fact, in the banking system where the origins of the crisis can be located. The causes behind banks' distress were a restrictive monetary policy in the aftermath of an early currency crisis in October 1928, an agricultural crisis in 1930, and an unorthodox fiscal policy which offered state-guarantees to banks and thereby further increased their exposure to the crisis-ridden agriculture.

JEL classification:

Keywords:

This paper relies on the detailed research framework that I submitted at the London School of Economics in April 2014. Afterwards, the paper evolved through the comments I received from various economic historians and from participants of workshops and conferences. I would like to thank Professor Max-Stephan Schulze and Dr. Tamás Vonyó, my two supervisors for their guidance on this work. Dr. Olivier Accominotti, Professor Peter Eigner, Dr. Clemens Jobst, Dr. Nathan Marcus, Dr. Matthias Morys, Professor Albrecht Ritchl, and Dr. Tobias Straumann have all provided valuable insights to my work. I want to thank the participants of the EHES Summer School in Berlin in September 2014, the Economic History Thesis Workshop at the London School of Economics in January 2015, the WEast workshop in Budapest in January 2015, the LSE Interwar Economic History Workshop at the London School of Economics in May 2015, and the SEEMHN Conference in Vienna in October 2015 for their valuable comments on this work. I also relied on help from Veronika Katz Kálniczkyné, archivist at the Hungarian National Archive. I am grateful for their help.
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INTRODUCTION

The Great Depression comprised the most severe economic and financial turmoil that the world has ever experienced.[2] There seems to be broad scholarly consensus that the global monetary system of the time was the critical factor behind the prolonged global recession. (Temin 1976, Eichengreen 1992) The gold exchange standard created links across countries that fixed their currencies to gold and they were left vulnerable to the restrictive monetary policies of France and the US. Since these two countries refused to play by the "rules of the game" (Bordo and Rockoff 1996) and did not ease their monetary conditions in spite of their large gold inflows, they exported a deflationary wave to other countries linked to them through the common anchor of gold.

The economic trilemma is a key insight in this gold standard literature. The impossible trinity holds that of the three desirable policy goals – fixed exchange rate, free capital flows, and independent monetary policy – only two can be simultaneously implemented. Under the gold exchange standard, countries committed themselves to the first two conditions, leaving the third unattainable. (Obstfeld 1997) Policy-makers thus did not have the freedom to independently stimulate the economy in times of downturn. While in the period of the classical gold standard deflationary spirals emanating from such a policy commitment were swallowed by economies and suffered through, they became intolerable in the increasingly enfranchised societies of the post-WWI gold exchange standard. (Eichengreen 1996) High unemployment rates eventually created a rupture in the contemporary orthodoxy and forced policy-makers to opt for an independent monetary policy by giving up either the fixed exchange rate or free capital flows.

The 1931 financial crises were a watershed event as they were the first shock that caused a large number of countries to reconsider their choices within the policy trilemma. The 1931 financial crises emerged in Central Europe and their start is signified by the collapse of the Austrian Credit-Anstalt in May 1931. Subsequently, a number of other regional countries, such as Germany and Hungary, experienced bank runs, and from August-September it was the pound sterling that came under investors' pressure. The crises further deepened the economic recession and hence invited a turnaround in policy-making. The three Central European countries mentioned above opted for capital controls, thereby maintaining the fixed parity to gold but gaining ground in their independence of domestic policy-making. Britain, and what later became known as the "sterling bloc", achieved a free hand in tackling slow growth and high unemployment by choosing a floating exchange rate and free capital flows. (Obstfeld 1997)

Since the 1931 financial crises were a turning point, they have received wide scholarly attention. The case of Germany has been extensively investigated because it was the largest Central European economy that collapsed and US and UK investors' financial exposure was the highest there. (e.g. Temin 2003 and 2008, James 1984, Balderston 1994, Schnabel 2004) The story of the Austrian Credit-Anstalt's failure has been well-documented, (Schubert 1991a, Weber 1991) although an in-

[2] Although in the wake of the current Great Recession it appeared conceivable that what we have presently experienced is comparable to the Great Depression in depth and bredth; by now it is clear that the current slump has not come close to the devastation of the late 1920s, early 1930s. Barry Eichengreen and Kevin O'Rourke, *'A Tale of Two Depressions',* VoxEU, http://www.voxeu.org/article/tale-two-depressions-redux, 2009, 2010 and 2012

depth macro-financial assessment of the Austrian case is missing.[3] Hungary's crisis, on the other hand, has not been systematically examined. This is despite the fact that the country was in a political, economic and monetary union with Austria under the Austro-Hungarian Monarchy, it went through similar experiences during World War I (WWI) as Austria and Germany, it experienced hyperinflation and its currency was subsequently stabilized through a League of Nations reconstruction scheme in the early 1920s just like in Austria, and it experienced a financial collapse in parallel with Austria and Germany in 1931. The purpose of this paper is to focus on the Hungarian financial crisis of 1931 with the goal to create an in-depth account of this episode and discuss the drivers that contributed to the break in the orthodox approach to the economic trilemma and the introduction of capital controls on July 17, 1931. (Ellis 1939)

The widely held view is that the panic in Central Europe was brought about by the flight of foreign creditors who became wary of the stability of local currencies. The countries of the region financed their post-war reconstruction through foreign loans and by the late 1920s they reached high levels of indebtedness. When international lending declined and these countries started lacking foreign exchange to service their high debt levels, creditors became increasingly doubtful of whether regional central banks would be able to defend their own currency. After the failure of the Credit-Anstalt, foreign creditors' doubts transpired into their massive withdrawal from the region. Since financiers lacked sufficient information to make a distinction between the various regional countries' level of distress, they simply pulled their funds from the whole region. Therefore, what started off in Austria, quickly spread to other nations, including Hungary. (Eichengreen 1996, p260-61, p270, James 2002, Kindleberger 1987)

National studies on the Hungarian crisis echo the views of the international literature.[4] Regarding initial conditions, the Hungarian historiography emphasizes unsustainable levels of government deficit and indebtedness. They argue that Hungary was so heavily bound by its liabilities that by 1929 all of the new loans it obtained went towards debt service (Berend 1998) and due to large debts and overspending, the government budget was unbalanced. In terms of timing, Hungarian scholars pinpoint the Wall Street crash as a turning point that reversed foreign capital flows, created difficulties due to the country's large foreign currency denominated debt pile and thus, led to the 1931 event. Regarding the causes of the crisis, authors point to two exogenous factors: the reduced availability of foreign capital and the decline in export revenues. Once foreign capital became scarce from Oct 1929, the state's foreign currency obligations put pressure on central bank reserves and hence made the currency vulnerable to an attack. In addition, since deteriorating terms of trade brought about a decline in export revenues, the country earned less foreign exchange and this also influenced the reserve-levels of the central bank and further damaged the stability of

[3] An in-depth assessment of the macroeconomic conditions leading to the Austrian crisis and the investigation of the wider banking system are the topics of my second thesis paper: "The causes of the Austrian Banking Crisis of 1931".

[4] The key author on Hungary's interwar economic history is Iván T. Berend and this paper mainly investigates Berend's views on the factors contributing to the crisis of 1931. Although there are a few other authors who have produced research on the interwar period in Hungary after Berend (see bibliography), their works have not tested Berend's interpretation on the causes of 1931 or have not been able to challenge the main tenets of Berend's view. When reference is made to the "Hungarian historiography" and "Hungarian authors", it is mainly Berend's views that are being discussed. The following studies have been used to construct the key premises of the existing historiography which are presented in this paper: (Berend 1982b, Berend 1982a, Berend 1987b, Berend 1987a, Berend et al. 1966, Kaser and Nötel 1987).

the currency. Based on the above, authors argue that the 1931 episode originated in the monetary system and it was initially a balance-of-payments crisis.

The literature does not analyze whether the banking system had anything to do with bringing about the calamities of 1931. Based on authors' line of argument the financial sector was drawn into the crisis only after balance-of-payments difficulties had already come to the surface. The banking system's demand for liquidity emerged in 1931 because their foreign creditors became wary of the stability of the Hungarian currency and started withdrawing their funds from financial institutions. Thus, according to the national historiography, the financial system simply became a victim of a balance-of-payments crisis.

This paper puts the prevalent view on the Hungarian crisis under close scrutiny. The Hungarian historiography cited above is traditionally narrative and it does not specifically focus on the analysis of the causes of the 1931 crisis. It uses little data to back up its statements and lacks a systematic investigation of the available data sources. The analyses of the current paper rely on a macroeconomic and a financial system dataset, both manually built. I have collected the macroeconomic dataset from contemporary statistical publications and archival records.[5] I have built the bank-by-bank database of balance sheets and profit and loss statements for 400-650 banks for each year in the period of 1926-33 using the *Nagy Magyar Compass*.[6] These two new databases provide a clear view of the macroeconomic position of the country and the health of its financial system in the years leading to 1931. I have also reviewed the minutes of the board meetings of the Hungarian National Bank and the Central Commission for Financial Institutions[7] for the period between 1925 and 1931 as well as a number of contemporary newspapers for 1928-193[8] to better understand the circumstances of the events taking place during the period. The quantitative analyses as well as the qualitative evidence have helped me establish an in-depth understanding of the 1931 episode in Hungary. My findings significantly differ from the prevalent view and offer a basis for a new interpretation of the crisis.

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[5] The contemporary statistical publications I have used for building the macroeconomic dataset are the quarterly *Gazdasági Helyzetjelentés*, the monthly *Statistical Review* and the *Monthly Statistical Report*. The Institute of Hungarian Economic Research is Magyar Gazdaságkutató Intézet in Hungarian. Its publication, *Gazdasági Helyzetjelentés,* is *Report on Economic Activity* in English and it is available at libraries in Budapest. The monthly *Statistical Review* is *Statisztikai Szemle* in Hungarian which is available online through the website of the Central Statistical Office. The *Monthly Statistical Report* is *Statisztikai Havi Közlemények* in Hungarian which is available at libraries in Budapest as well as at the library of the London School of Economics. The archival sources I have used for building the macroeconomic database are the files of the Hungarian National Bank which are available at the Hungarian National Archive (HNA) under various files but I have been primarily using files Z6 and Z12.

[6] The *Nagy Magyar Compass* is *Big Hungarian Compass* in English and it is available at libraries in Budapest and for some years even at the library of the London School of Economics.

[7] In Hungarian: „Pénzintézeti Központ". It was established in the 19th century for the oversight of foreign-owned assets, then its operations were suspended. It was re-established in 1916 with a new purpose: to supervise banks. It was partially owned by the state but the majority of joint-stock financial institutions were also its quota holders (around 500 of them, including all large institutions). Its purpose during the interwar period was to conduct annual audits for all of its member institutions, except for the largest ones, and provide bailout financing to ailing banks. The archival records of the Central Commission are available at the Hungarian National Archive under files Z90-95 and Z1497, Z1505, Z1599.

[8] The newspapers I reviewed are *Magyar Pénzügy* (in English: *Hungarian Finance*) and *A pénzvilág* (in English: *Financial World*).

The question I investigate in this paper is: did monetary forces cause the Hungarian crisis of 1931? To answer this question, I analyze the arguments of the literature on four counts: regarding initial conditions, the timing of the events, the causes, and the type of crisis. In connection with initial conditions, I argue that government deficit and debt did not have as a prominent role in the 1931 crisis as authors propose. Government deficit after debt service remained below 2% of the domestic national income (DNI) and it followed a declining trend prior to 1931.[9] The same applied to government debt: it was not excessive and dropped from 25% to 21% of the DNI between 1926 and 1929.[10] Nonetheless, an important initial condition has been left unmentioned by the literature: the banking system's high exposure to agriculture. In 1930 over 50% of banks' total lending was towards this sector.[11] This was detrimental since agriculture experienced a collapse from 1930.

In connection with the turning point, I argue that it was an event 12 months before the Wall Street crash. Hungary experienced a currency crisis in October 1928 which reached its bottom in mid-1929. This balance-of-payments crisis arose a few months after the Federal Reserve's implementation of a restrictive monetary policy. The Fed started a gradual rate increase in the first half of 1928 and this induced a sudden stop of capital inflows to Hungary and caused a shortage of foreign currency. Since the economy had to resort to using the central banks' reserves, this immediately brought about a currency crisis.[12] It was after this late 1928 episode that the Hungarian economy's vulnerabilities started accumulating.

I propose that the late 1928 currency crisis prompted a monetary policy action that was one of the three causes behind the Hungarian crisis of 1931. The episode motivated a restrictive monetary policy which squeezed credit out of the banking system and of the real economy. This policy stance was a wall of defense which protected the gold cover and kept the currency stable up until late May 1931. Nonetheless, it weakened financial institutions and aggravated the recession that the country was sinking into from mid-1929.

The second factor behind the 1931 episode was an agricultural crisis emerging in 1930 which was the result of falling domestic agricultural prices that closely followed the declining trend of global prices. In contrast with the arguments of the Hungarian historiography, the price decline produced a fall primarily in the domestic currency income of the agricultural sector, not in its export income. This essentially meant that the contraction had only a minor impact on the reserves of the central bank but heavily influenced the domestic real economy. Since agriculture employed over 50% of the labor force,[13] the sector's falling income led to a contraction of domestic consumption and this, in turn, induced a recession in non-agricultural sectors as well. As the whole of the real economy sank into a slump from mid-1929, the proportion of banks' non-performing loans

[9] The author's own analysis based on data from the *Gazdasági Helyzetjelentés* and (Eckstein 1956), see details later in the paper.
[10] The author's own analysis based on data from Global Financial Data, Bank of England Archive, File OV9/234 and OV9/235, League of Nations Statistical Yearbooks, (Eckstein 1956), see details later in the paper.
[11] The author's own analysis based on the *Nagy Magyar Compass*, see details later in the paper.
[12] HNA, Z6, 1. doboz (File Z6, box 1) - Minutes of the Board of Governors of the Hungarian National Bank, board meetings of April 25, May 30, June 27, and Aug 29, 1928
[13] In 1920, 58% of the population was employed in agriculture, according to the League of Nations Statistical Yearbooks.

increased, and the financial sector was becoming increasingly vulnerable and started reducing its lending.

Finally, the third factor behind the 1931 episode was a fiscal policy action that further deepened banks' woes. When financial institutions started reducing their lending from 1929, the government, in order to stimulate the ailing economy through continued lending, started offering state-guarantees to the banking sector which could only be applied to agricultural lending. This increased the already high exposure of the banking system to the collapsing agricultural sector and hence contributed to financial institutions' fragile state.

I propose that the Hungarian crisis of 1931 was not caused by monetary forces, rather it was the weak banking sector that was at the center of the episode. According to my banking crisis indicator, Hungarian financial institutions started experiencing waves of crisis already from October 1930. I propose that the lack of liquidity support from the central bank in the aftermath of the late 1928 currency crisis, the agricultural crisis, and state-guaranteed loans for agricultural lending together contributed to the rise of non-performing loans and hence made financial institutions fragile. On the other hand, and in contrast with the arguments of the Hungarian literature, the currency was strong going into the 1931 crisis: my currency crisis indicator does not signal a crisis in 1931 prior to the introduction of capital controls. I propose that the restrictive policy stance of the central bank defended the strength of the gold cover and limitations on the use of foreign exchange were introduced in good time before a complete currency collapse could occur. Thus, I argue that the Hungarian crisis erupted in the financial sector, not in the monetary system as existing research claims.

Based on the paper's interpretation, the key participants of the Hungarian crisis were a conservative central bank and a desperate government. The former strictly adhered to the rules of the gold standard and, especially after the October 1928 currency crisis, single-mindedly defended the stability of the currency. The fiscal authority, on the other hand, did experiment with non-conformist economic stimulus but it was bound by the country's reliance on external financing and the restrictive central bank which was unwilling to finance these programs. Monetary and fiscal authorities' choices within the economic trilemma thus greatly contributed to the weakness of the banking sector and the whole economy.

The structure of the paper is as follows. Section I introduces the available literature on the topic and then section II-V discuss the four issues I am addressing. First, I examine the initial conditions that the country was facing in the wake of the events leading to the crisis (section II). Second, I discuss the timing of the crisis (section III). Third, I investigate the three factors that contributed to the fragility of the banking sector (section IV). Fourth, I illustrate with quantitative analyses the weakness of the banking system (section V) and afterwards section VI concludes.

I - THE HISTORIOGRAPHY OF THE HUNGARIAN CRISIS

Around May-July 1931, three Central European countries, Austria, Germany and Hungary experienced a financial collapse in close succession. The calamity started off in May with the announcement of the Austrian Credit-Anstalt's troubles. Then in June-July the German

Danatbank experienced liquidity problems and this was followed by a crisis in Germany. In the meanwhile, Hungary also had to deal with bank runs and authorities introduced a number of measures from July: a bank holiday, the closure of the stock exchange, the de-listing of banks from the stock exchange, restrictions on deposit withdrawals, and eventually, capital controls.

Whereas the German and Austrian events have been analyzed in-depth, Hungary's crisis has received much less scholarly attention. The international literature (Eichengreen 1992, Kindleberger 1986, James 2002) has touched upon the issue but only in passing. The Hungarian literature's key author is Iván T. Berend whose works date back to the 1980s. He has developed a systematic assessment of Hungary's interwar economy and within that the country's Great Depression and the 1931 crisis. (Berend 1982b, Szuhay and Berend 1978, Kaser and Nötel 1987) However, Berend's work is narrative, it does not rely on the available data sources, and it also lacks an in-depth investigation of the causes of the crisis. More recent Hungarian work has somewhat extended Berend's views, but this research lacks a well-founded theoretical and empirical framework, does not specifically address Berend's approach, and is also largely descriptive. (Pogány 2014) Thus Berend's remains the best available investigation of Hungary's 1931 crisis so far and hence it is used as a reference point by this paper.

Berend argues that Hungary's crisis was brought about by monetary forces. The reduced availability of foreign capital and deteriorating terms of trade made the monetary system and the currency increasingly vulnerable. Foreign financiers hence became nervous that the central bank would not be able to maintain the gold parity. The shock came with the announcement of the Credit-Anstalt's financial distress and foreign financiers started fleeing the whole region.

The historiography's position is that high debt levels and high government deficits are an important initial condition in the interpretation of the crisis. After the post-WWI hyperinflationary years, Hungary's currency and economy were stabilized through a League of Nations reconstruction scheme which involved a large foreign currency state loan.[14] In the next few years Hungarian municipalities, other state-related entities, as well as private players obtained a substantial amount of foreign loans.[15] These foreign currency denominated obligations increased the contingent liabilities of the central bank. Further, government deficits were high not only due to debt service but also because of extravagant spending on agricultural programs, the boletta and the futura. The purpose of these government projects was to provide subsidies to the ailing agricultural sector. The historiography argues that since these government initiatives created deficits which were financed through new loans, this budgetary over-spending further aggravated the country's already high indebtedness.

In terms of timing, the national historiography proposes that the Wall Street crash was the critical juncture. The October 1929 event changed the direction of global capital flows and, in the case of Hungary, resulted in the reduction of the inflow of foreign capital. Once foreign capital was less

[14] Bank of England Archive, Files OV9/436-439 and OV9/234-235

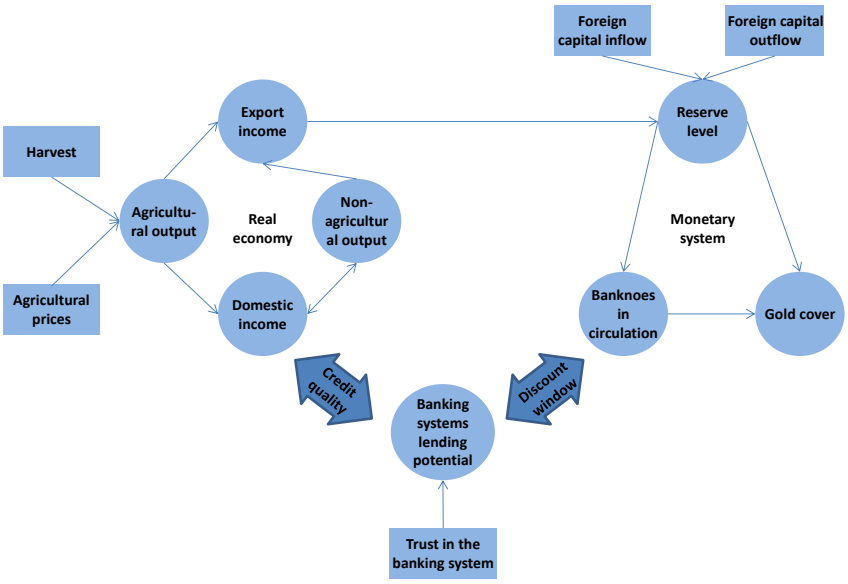
[15] E.g. Counties of Hungary, 7.5% Sterling Bonds, £1.25m (Rothschild Archive, File 000/401K/9), Counties of Hungary, 6%, £1m (Rothschild Archive, File 000/337/15/14), Budapest City Loan (Rothschild Archive, File XI/111/311; HNA, File Z51, binder 13, item 207) or the Municipalities Loan (Rothschild Archive, various files)

abundant, the country's foreign currency denominated debt pile became a burden on the reserves of the central bank.

Regarding the causes of the Hungarian crisis, the historiography's arguments can be best understood with the help of Figure 1 and Figure 2. I have constructed this diagram to illustrate the complex interrelations between the different mechanisms of the economy. I will use these diagrams to pinpoint the differences between the arguments of the literature and my own. Figure 1 schematically describes the three parts of the Hungarian economy - the real economy, the banking system and the monetary system – and points out those links between the three parts and those exogenous factors which were relevant during the interwar period.

Since the country was predominantly agricultural, the real economy was influenced by two external factors: the success of the harvest and the change in agricultural prices. Agricultural incomes were earned either through exports or through domestic income. Since the majority of the labor force was employed in agriculture, the state of agriculture influenced the purchasing power of the majority of the population and this affected the rest of the real economy. The health of the real economy in turn, influenced the banking sector through the quality of credit. When the real economy was in a recession, the number of defaults and, hence, the proportion of non-performing loans increased, and these had a negative impact on the banking system through the degrading quality of credit. The direct connection between the real economy and the monetary system was export income. Since this income was realized in foreign currency, the changes in external trade affected the reserve levels of the central bank.

Figure 1 Linkages across the real economy, the monetary system and the banking system



Moving on to the monetary system: overall stability was highly dependent on the inflow and outflow of foreign capital. Since the country was on the gold exchange standard, monetary policy-makers' hands were tied when it came to the stimulation of the economy. Being on the gold standard meant that the minimum gold cover requirement was set by legislation. The gold cover is the ratio of the foreign currency and the gold reserves of the central bank and the total banknotes

in circulation. The minimum legal requirement for Hungary's gold cover was 24%, set at the establishment of the independent central bank on June 30, 1925.[16] The gold cover was the indicator of the stability of the currency: if in high territory, it reflected a strong currency; if declining or low, it depicted an unstable currency. The monetary authority could not resort to printing money or to reducing its reserves to increase liquidity in the economy because these steps would have deteriorated the gold cover. The monetary system was hence highly dependent on the availability of foreign capital. If more foreign capital arrived to the country, reserves increased, the gold cover rose and the banknotes in circulation could potentially be raised, providing economic stimulus. The nature of this monetary regime had a strong influence on the banking system since the additional banknotes in circulation were distributed into the economy through the financial system. If the gold cover improved due to the inflow of foreign loans, the discount window of the central bank could potentially be widened towards financial institutions, banks would become more liquid and they could in turn increase the liquidity of the real economy by lending more.

The health of the third part of the economy, the banking system, was conditional upon one external factor: trust in financial institutions. Hungary - similarly to Germany and Austria - experienced a hyperinflationary period in the early 1920s. Stabilization took place from mid-1924 through mid-1926 under the reconstruction scheme of the League of Nations (just like in Austria).[17] In the early period of the stabilization, in 1925-26, the financial system was highly unstable: in 1925 there were 903 joint-stock banks in the economy and of these 167, i.e. 18% reported that they were in a state of distress.[18] From the end of 1925 by the end of 1930, the number of joint-stock banks declined from 903 to 583.[19] Those institutions that remained standing were starved for deposits after the war and hence kept interest rates on deposits high. From 1926-27 savers were slowly returning to the banking system. This renewed trust, however, was delicate and banks' fear of runs and the public's fear of bank collapses persisted through the period.[20]

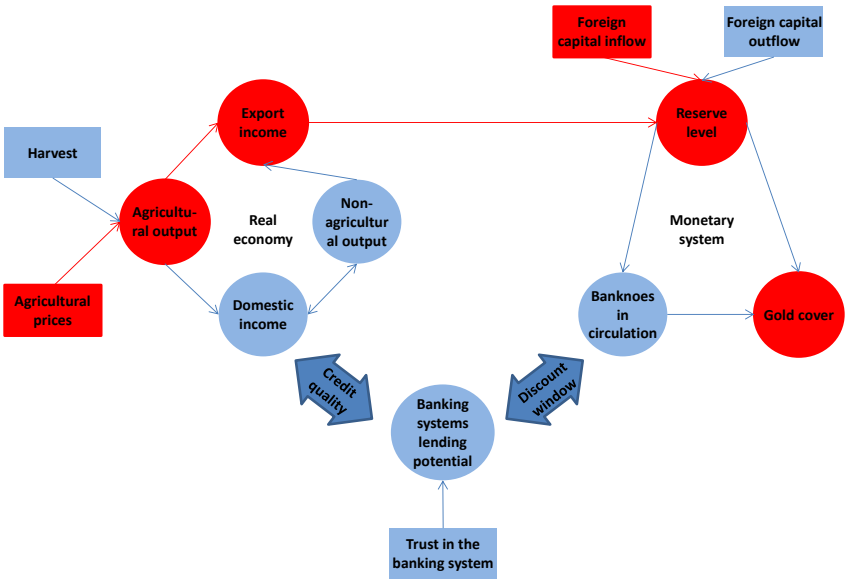
Figure 2 highlights the key points of the Hungarian literature within the general framework introduced above and on Figure 1. The studies argue that two exogenous factors brought about the Hungarian crisis of 1931. One of them was the decline of agricultural prices which reduced export revenues. Since export revenues influenced the foreign exchange reserves of the central bank, their decline caused reserves to fall, reduced the gold cover and thereby weakened the stability of the currency. The other critical factor that the literature mentions was the drop in the inflow of foreign capital. This, again through lower reserve levels, also undermined the gold cover and the strength of the currency. The literature argues that these two factors together made the currency weak and highly vulnerable to shocks.

The national historiography thus claims that the causes of the crisis exerted their impact through channels that entirely avoided the financial system. The literature does state that falling agricultural

[16] Bank of England Archive, Files OV9/436-439 and OV9/234-235, Papers of Otto Ernst Niemeyer, League of Nations
[17] Ibid.
[18] I define a bank in distress if it was under liquidation or bankruptcy procedure, underwent a merger, terminated its (financial) operation in the given year or did not issue financial statements for two consecutive years. Calculations are based on the *Nagy Magyar Compass*.
[19] The author's own calculations based on the *Nagy Magyar Compass*.
[20] HNA, Z6, 2. doboz (File Z6, box 2) - Minutes of the Board of Governors of the Hungarian National Bank

prices - besides causing exports to drop - also contributed to the decline in domestic incomes. However, it does not take this point further and does not assume that the troubles of the real economy could have actually impacted the banking system through the degrading quality of credit. Further, the literature does not assume that deteriorating credit quality could have made the banking sector vulnerable and increased banks' reliance on central bank liquidity through the discount window. Hence, based on the historiography's interpretation, the Hungarian crisis was caused by monetary factors: it was initially a balance-of-payments crisis and the financial sector was only affected when the currency panic was already well under way.

Figure 2 The existing literature's interpretation of the causes of the crisis



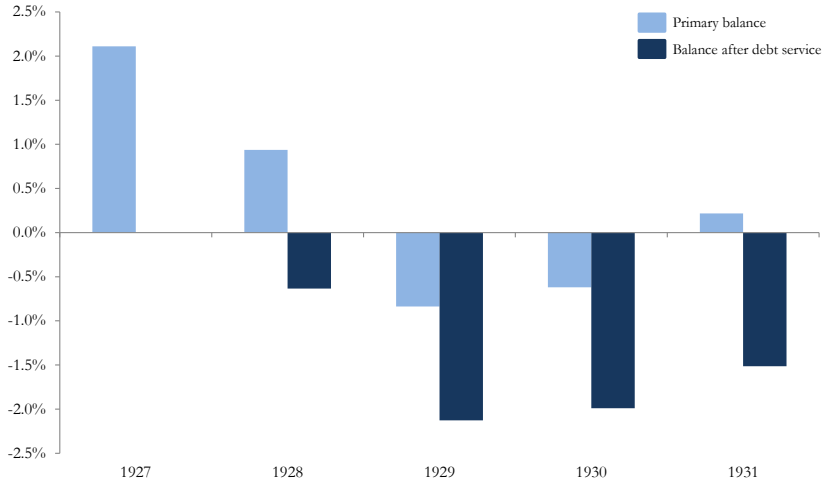
This paper's interpretation of the Hungarian financial crisis significantly differs from the main claims of the existing literature. I propose that not monetary forces but the fragility of the financial system brought about the crisis. I argue that the important initial conditions were primarily not government debt and deficit but the financial sector's high exposure to agriculture. I will show that the turning point was not the Wall Street crash but a currency crisis which happened a year earlier, in late 1928. I will demonstrate that the causes were not declining export income and the reduced inflow of foreign capital but a restrictive monetary policy in the aftermath of the late 1928 currency crisis, an agricultural crisis in 1930 and agriculture-focused state-guaranteed loans. Finally, I will argue that these three causes made the banking sector weak and hence, the 1931 crisis actually emerged there, in the financial system.

II - Initial conditions

The Hungarian historiography points to government deficits and high levels of indebtedness as crucial initial conditions in the interpretation of the 1931 episode. In connection with excessive spending, studies cite government programs like the boletta and the futura as factors that contributed to the increase in budget deficits. Figure 3 shows the primary balance of the government budget as well as the balance after debt service as a proportion of the domestic national income. The data reveal that the primary balance was positive in 1927 and 1928, it turned

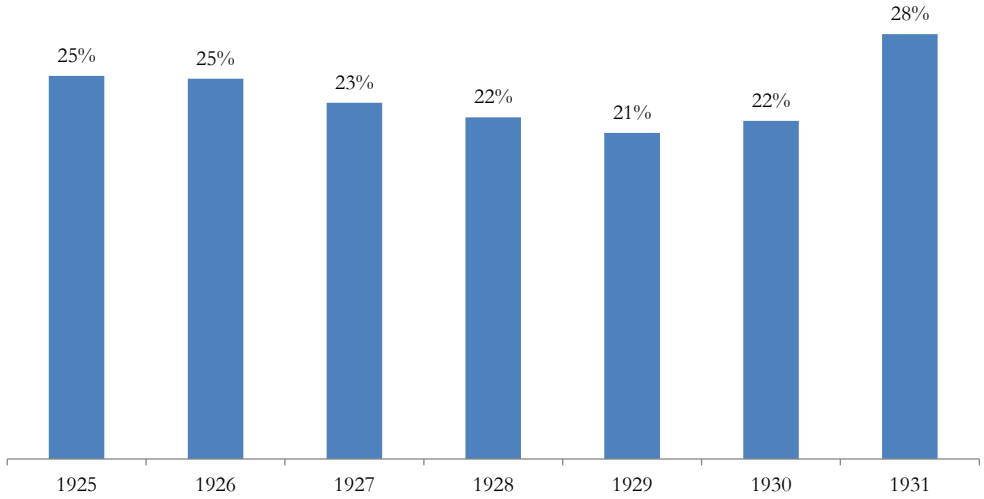
negative for 1929 and 1930 and then it returned to positive territory in 1931. Even when the government had a primary deficit, it did not reach 1% of the DNI. When debt service is added to the deficit, the balance is negative from 1928 but even at its lowest level in 1929 it is less than 2% of the domestic national income. Moreover, from 1929 through 1931 the deficit had a declining trend.

Figure 3 The government budget balance as a percentage of the domestic national income



Note: no after debt service budget balance available for 1927
Source: Gazdasági Helyzetjelentés; League of Nations Statistical Yearbooks

Figure 4 Hungary's public debt as a percentage of the domestic national income



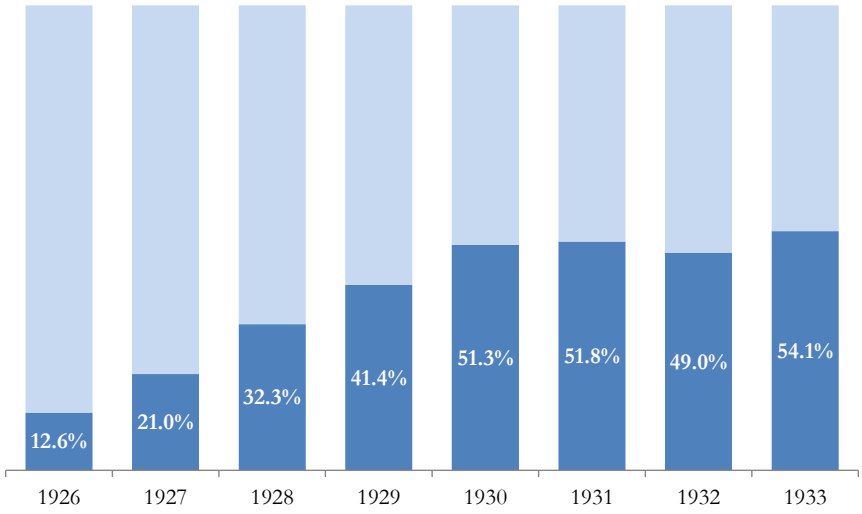
Source: Global Financial Data; Bank of England Archive, File OV9/234 and OV9/235; League of Nations Statistical Yearbooks; Eckstein, 1956

The literature argues that high government spending was problematic because the country was already significantly indebted and government deficits further aggravated debt levels. Figure 4 depicts the total indebtedness of the country during the period and shows Hungary's total public debt as a percentage of the domestic national income. It should be noticed that from 1926 through 1929 the country's total liabilities declined from 25% to 21% of the domestic national income.

This suggests that in contrast with the argument of the literature, Hungary was in fact reducing the relative size of its liabilities.

The above figures demonstrate that Hungary's contemporary public finances did not appear as critical as the Hungarian historiography suggests. While it is true that the government's budget was in a deficit, the amount did not reach 2% of the domestic national income and it declined from 1929 to 1931. The figures also imply that the boletta and futura programs must have had a minor impact on the economy. Further, public debt actually declined from 1926 through 1929 in proportion to the domestic national income and stayed at the same level in 1930. While in a panic even low levels of deficit and debt could make investors anxious, the trends described above indicate that investors should not have been more wary of Hungarian deficits and indebtedness in 1931 than they were a year or more earlier.

Figure 5 The share of agricultural lending in total lending



Source: The author's own calculations based on the Nagy Magyar Compass

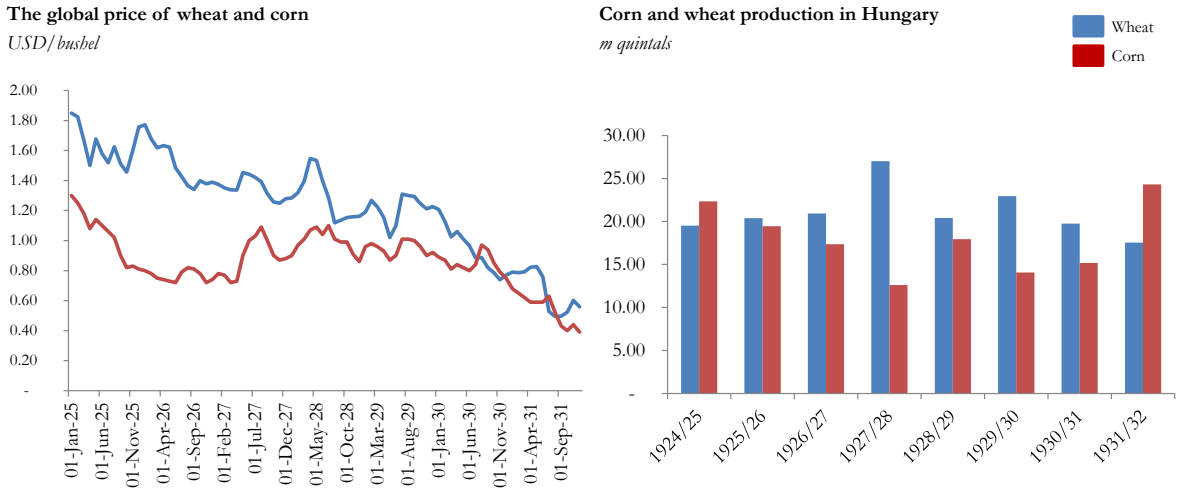
What appears to have a more significant influence on the interpretation of the 1931 episode is the Hungarian financial system's exposure to agriculture. The majority of the country's workforce was dependent on agriculture and around 70-80% of exported goods were either primary or manufactured agricultural products.[21] In such an economy, the majority of bank lending would naturally be towards the dominant sector, i.e. agriculture. Figure 5 shows that from 1926 through 1931, the financial sector increased the share of agricultural lending from 13% to 52% of total lending.

Nonetheless, this high and increasing exposure towards agriculture occurred in a period when agricultural prices followed a steeply declining trend. The diagram on the left of Figure 6 shows the global price of wheat and corn, Hungary's two main agricultural products, between 1925 and 1931. Both curves follow a falling trend, especially from 1928. This price decline could not be compensated by increasing the volumes sold. The diagram on the right of Figure 6 shows Hungary's wheat and corn production and illustrates that the amounts produced remained largely

[21] The author's own calculations, based on the reports of the *Statisztikai Szemle*.

at the same level during the period. Therefore, the financial sector became increasingly exposed to a part of the economy whose revenues were declining in the period under review. As later sections will demonstrate, this was a critical initial circumstance that played into to the 1931 crisis.

Figure 6 The global price of wheat and corn and Hungarian production volumes



Note: Chicago price for corn and wheat
Source: http://www.nber.org/databases/macrohistory/rectdata/04/m04001a.dat, http://www.nber.org/databases/macrohistory/rectdata/04/m04005.dat, Statisztikai Havi Közlemények

III - THE TURNING POINT

To determine the start of Hungary's distress I am relying on internationally applied indicators of financial crises. Reinhart and Rogoff provide a comprehensive typology of financial crises. (Reinhart and Rogoff 2009) Their definition of financial crises incorporates inflationary, currency, banking and sovereign debt crises. In this paper I only focus on Hungary's currency and banking crises in or before 1931.

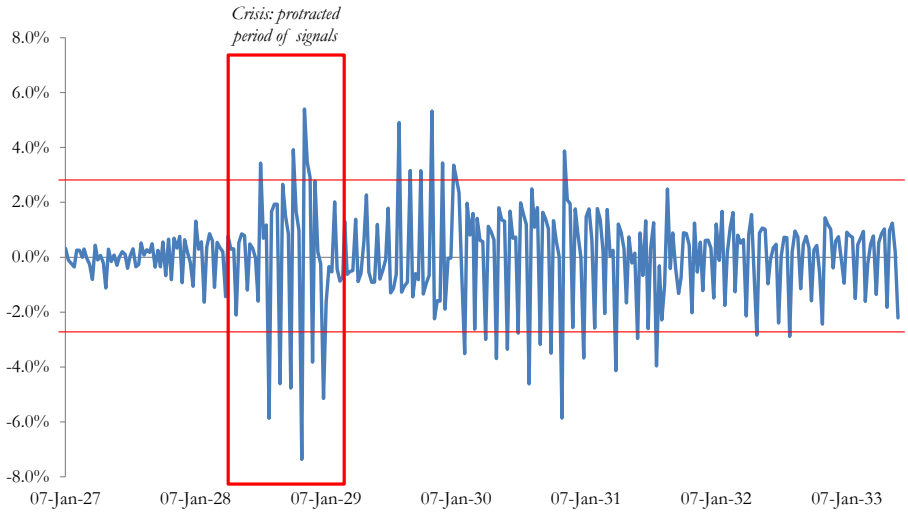
For the construction of the banking crisis indicator, I am using the monthly change in domestic currency and foreign currency deposits at Budapest and non-Budapest banks from the quarterly publication *Gazdasági Helyzetjelentés*. My definition of a crisis is when the monthly decline in deposits exceeds the average monthly change of the whole period under observation by at least 1.5 standard deviations.

For the definition of the currency crisis, I apply the Eichengreen-Wyplosz-Rose exchange market pressure index. (Eichengreen, Rose, and Wyplosz 1995) For the construction of the exchange market pressure index (EMP), I use the weekly changes in the foreign exchange and gold reserves of the central bank, the weekly changes in the gold cover (which is my proxy for the exchange rate[22]) and the weekly changes in the interest rate of the Hungarian National Bank. I fully rely on Eichengreen-Wyplosz-Rose to construct the index: the three elements of the index are weighted by their standard deviation and the EMP indicates a crisis if it swings above or below the mean by at least 1.5 standard deviations. I add one more condition to this definition: the EMP must give a

[22] The parity against the dollar or the pound sterling was kept fixed during the whole period and hence it is not a useful indicator for the changing vulnerability of the currency.

signal in four consecutive periods for a crisis to occur. I am using this restriction in order to avoid false alarms. I have collected the data for the EMP from the *Gazdasági Helyzetjelentés* and from the archival records of the Hungarian National Bank.

Figure 7 The signals of the exchange market pressure index (EMP)



Source: The author's own calculations based on Gazdasági Helyzetjelentés; Eichengreen-Wyloszz-Rose, 1996

Figure 7 depicts the results of the EMP index for the period of 1927-33. The indicator shows that Hungary experienced a currency crisis already in late 1928. From October 31, 1928 the EMP gives a signal through six consecutive periods (i.e. six weeks), indicating a prolonged period of monetary distress. The EMP also gives a few signals afterwards in 1929 through 1931. However, these are non-persistent changes that remain one-off signals and hence do not fit the definition of a currency crisis.

Figure 8 shows the signals of the banking crisis indicator for 1930-31.[23] The first signal arose in October 1930 for domestic currency deposits at Budapest institutions. Afterwards, 1931 appears relatively hectic. The first signal came in January for foreign currency deposits for non-Budapest institutions. The next appeared in April for domestic currency deposits for Budapest institutions. Afterwards, in July Budapest institutions underwent an across-the-board decline of all of their deposits. The same happened for non-Budapest institutions a month later. Moreover, in the case of non-Budapest banks, the decline in domestic currency deposits was persistent for four consecutive months, whereas for Budapest institutions the crisis was recurring in October and then in December.

The above analyses reveal that Hungarian calamities arose well before what the national historiography identifies as the turning point, the October 1929 Wall Street crash. In fact, as early as October 1928 the country experienced a currency crisis. This occurred only a few months after the Federal Reserve's monetary tightening when the board gradually increased the base rate from 3.5% to 4.5%.[24] This monetary restriction caused a sudden stop in capital flows and Hungary was

[23] The indicator gives no signal for 1928 and 1929.
[24] http://www.nber.org/databases/macrohistory/rectdata/13/m13011.dat

immediately affected by the reduced availability of foreign capital on the continent. This also reveals that the country's foreign financiers left Hungary not after the Wall Street crash but already a year earlier. This finding is entirely consistent with findings on Austria.[25]

Figure 8 The signals of the banking crisis indicator

Date	Domestic Budapest	Foreign Budapest	Total - Budapest	Domestic non-Budapest	Foreign non-Budapest	Total - non-Budapest	Date	Domestic Budapest	Foreign Budapest	Total - Budapest	Domestic non-Budapest	Foreign non-Budapest	Total - non-Budapest
Jan-30	0	0	0	0	0	0	Jan-31	0	0	0	0	1	0
Feb-30	0	0	0	0	0	0	Feb-31	0	0	0	0	0	0
Mar-30	0	0	0	0	0	0	Mar-31	0	0	0	0	0	0
Apr-30	0	0	0	0	0	0	Apr-31	1	0	0	0	0	0
May-30	0	0	0	0	0	0	May-31	0	0	0	0	0	0
Jun-30	0	0	0	0	0	0	Jun-31	0	0	0	0	0	0
Jul-30	0	0	0	0	0	0	Jul-31	1	1	1	0	0	0
Aug-30	0	0	0	0	0	0	Aug-31	0	0	0	1	1	1
Sep-30	0	0	0	0	0	0	Sep-31	0	0	0	1	0	1
Oct-30	1	0	1	0	0	0	Oct-31	1	0	1	1	0	1
Nov-30	0	0	0	0	0	0	Nov-31	0	0	0	1	0	1
Dec-30	0	0	0	0	0	0	Dec-31	0	1	0	0	0	0

Source: The author's own calculations based on Gazdasági Helyzetjelentés

In addition, the indicators provide clues not only on the starting point of Hungary's misfortunes but also on the events immediately before or in the panic months of May-July 1931. Figure 7 shows that the EMP remained well within its bands in the period of the 1931 crisis, i.e. in May-July, 1931. This implies that no currency crisis occurred in the period immediately preceding the panic of 1931 which is in sharp contrast to what the Hungarian historiography claims. And the EMP also suggests that capital controls were introduced before a full-blown currency crisis could have exploded. The banking crisis indicator on the other hand, illustrates that the financial system started experiencing waves of crisis from October 1930, well before the announcement of the Credit-Anstalt's difficulties. The recurring signals indicate the banking system's vulnerability to shocks.

Currency and banking indices hence demonstrate that Hungary's crisis in 1931 arose in the banking system and capital controls were introduced before banks' demand for central bank support could have significantly affected the currency. These results confirm that the causes of 1931 should be sought in the financial system.

IV - The causes

The Hungarian crisis of 1931 had three causes. First, a restrictive monetary policy in the aftermath of the late 1928 currency crisis squeezed the banking system and the real economy of liquidity from mid-1929. This policy-approach was in accordance with the contemporary orthodox view that the central bank's top priority was the stability of the currency even if that brought about or

[25] Supporting evidence for Austria is available in my other thesis paper: "The causes of the Austrian Banking Crisis of 1931".

reinforced the recession of the economy. Second, an agricultural crisis in 1930 and the recession that followed worsened credit quality in the economy and negatively affected the financial position of the banking system. Finally, guarantees offered by the state to encourage agricultural lending further reinforced the financial system's exposure to the crisis-ridden sector of the economy. This policy contradicted the contemporary view that the government should refrain from intervening into the economy and generally focus on eliminating its budget deficit and reducing its debt. The fact that the fiscal authority was seeking ways to stimulate the ailing economy illustrates that already around 1929, policy-makers were desperately trying to break out of the hold of the trilemma and pursue independent policy-making.

IV.1 - THE CURRENCY CRISIS IN LATE 1928

The currency crisis in late 1928 was a typical emerging market, post-stabilization crisis, as it is well described by (Reinhart and Vegh 1999) and discussed in connection with the interwar period by others. (Accominotti and Eichengreen 2013) Through the analysis of recent emerging market examples, Reinhart and Végh point out that post-stabilization currency crises are typical and they follow the same pattern. First, a hyperinflationary period is overcome by foreign financial support which lends credibility to and hence stabilizes the currency. Stabilization is then followed by a large boom in the economy due mainly to an increase in consumer spending. The rise in consumption and the decline in private savings lead to imbalances in the trade account. This is financed through foreign loans and countries generally undergo "binge-borrowing". However, when the availability of foreign capital suddenly comes to an end, a balance-of-payments crisis takes place. This is exactly the pattern that characterized the Hungarian crisis in late 1928.

IV.1.1. - THE CAUSES OF THE CURRENCY CRISIS IN LATE 1928

Hungary's stabilization took place from mid-1924 through mid-1926. The reconstruction was overseen by the League of Nations through a large foreign loan and the primary objective of the scheme was to achieve a balanced government budget. This was accomplished within a few months into the program. Therefore, the loan, originally intended to fill in the budget gap, was invested into the economy.[26] The success of the reconstruction brought with it a large inflow of additional foreign loans. Table 1 shows the balance-of-payments for the period under review. The data demonstrate that after 1926 there was a substantial increase in the inflow of foreign capital and during 1927 and 1928 a total of 1.226 billion pengős of foreign loans entered the country, equivalent to 8% of the DNI each year.

The inflow of foreign capital during the two years after the stabilization enabled the country to finance the imbalances of its trade account. Figure 9 shows that the trade account was in a deficit throughout the whole of 1927 and 1928. The total deficit in these two years was 718 million pengős, i.e. app. 60% of the total foreign capital inflow.

[26] Bank of England Archive, Files OV9/436-439 and OV9/234

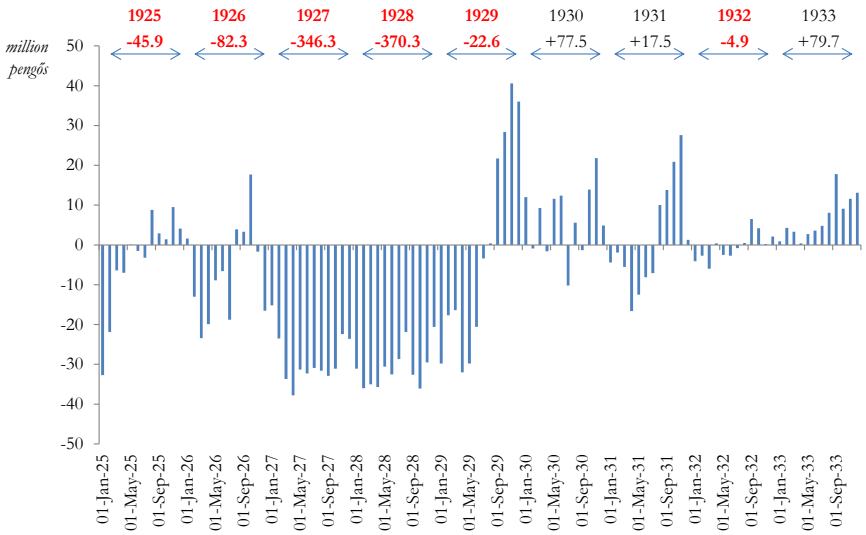
Table 1 Hungary's balance-of-payments, million pengős

	1926	1927	1928	1929	1930	1931	1932
Inflow							
Current account							
Total	950	897	987	1238	1111	733	397
Capital account							
Medium- and long-term capital	206	364	446	319	377	120	10
Short-term capital	0	230	187	58	12	515	8
Total	206	593	633	376	389	634	18
Total	1156	1490	1621	1614	1500	1368	415
Outflow							
Current account							
Total	1098	1376	1489	1451	1249	958	422
Capital account							
Medium- and long-term capital	38	86	131	100	179	100	9
Short-term capital	21	28	0	68	0	247	3
Total	59	114	131	168	179	347	12
Total	1157	1490	1620	1619	1428	1305	433

Balance of payments	1926	1927	1928	1929	1930	1931	1932
Current account							
Balance	-148	-479	-502	-213	-138	-225	-25
Capital account							
Long- and medium-term capital transactions	167	278	315	218	198	20	1
Short-term capital transactions	-21	202	187	-10	12	268	5
Balance	147	480	502	208	210	287	7
Balance as a % of DNI	2%	8%	8%	3%	3%	5%	0%

Source: Statisztikai Szemle

Figure 9 Hungary's trade account



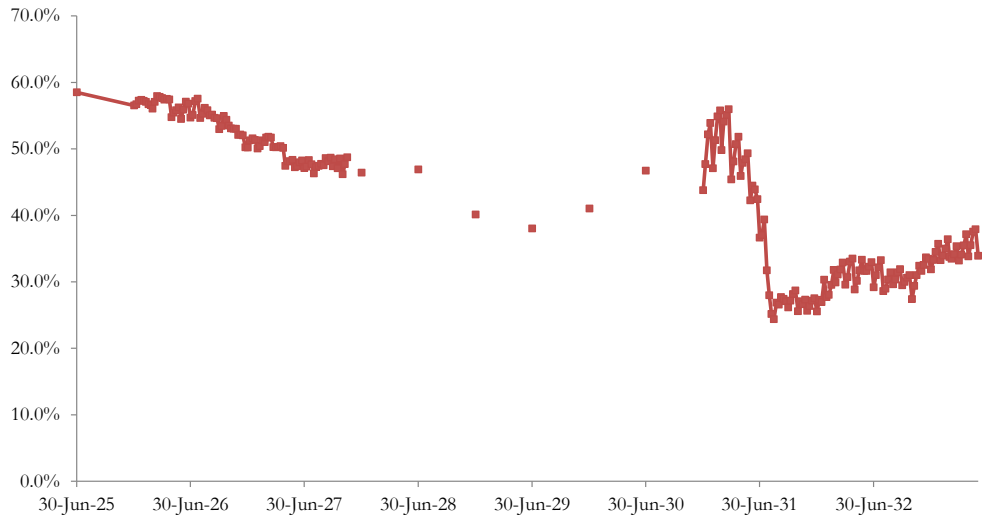
Source: Statisztikai Havi Közlemények

However, the volume of foreign capital inflow significantly dropped in 1929. Whereas in 1928 the total inflow was 633 million pengős, by the end of 1929 it fell to 376 million pengős. This sudden slow-down created a liquidity crunch in the economy in late 1928, early 1929. Former high levels of imports could not be further sustained and the country was forced to sharply reduce the volume

of goods it imported. The economy quickly adjusted and by the second half of 1929 these actions translated into a trade account surplus and thus the current account deficit was reduced. Nevertheless, the last quarter of 1928 and the first half of 1929 was critical as previous import arrangements still had to be obliged by. Since foreign capital was available to a more limited extent than before, the economy had to resort to utilizing the reserves of the central bank to meet these immediate foreign currency obligations.

Figure 10 reveals how this pressure affected the gold cover at the central bank. The gold cover was 47% in mid-1928 but dropped 7 percentage points by the end of the year and a further 2 percentage points by mid-1929. Around this point, in May 1929 the Governor of the Hungarian National Bank visited the Governor of the Bank of England and asked for emergency support to resolve the crisis. After this meeting, the Hungarian central bank received a bridge loan facility from the Bank of England in the amount of GBP 500,000.[27] Then in August 1929, a larger, USD 20 million loan was provided to the Hungarian central bank by a group of international central banks.[28] These foreign currency loans were sufficient to stabilize the currency.[29]

Figure 10 The gold cover



Source: HNA, Z12, 128 and 129 csomó; Gazdasági Helyzetjelentés

After this early balance-of-payments episode in late 1928, the country was forced to reduce its binge-borrowing and balance its trade account. From 1929, the economy quickly adapted to the reduced volumes of foreign capital. The country's balance-of-payments indicates that the economy more than halved its financing need after 1928. Whereas in 1927 and in 1928 the current account was negative 479 million and 502 million pengős, respectively, by 1929 it was reduced to 213

[27] HNA, Z6, 2. doboz (File Z6, box 2) - Minutes of the Board of Governors of the Hungarian National Bank, May 22, 1929

[28] HNA, Z6, 2. doboz (File Z6, box 2) - Minutes of the Board of Governors of the Hungarian National Bank, Aug 30, 1929

[29] It is interesting to note that the very period when the central bank decided not to report its gold cover at a high frequency was the one I am describing as a currency crisis. I propose that this just underscores the argument that there was a crisis at that time. My experience is the same with financial institutions: when they stopped reporting their financial statements, in the majority of the cases this was a sign of their financial difficulties.

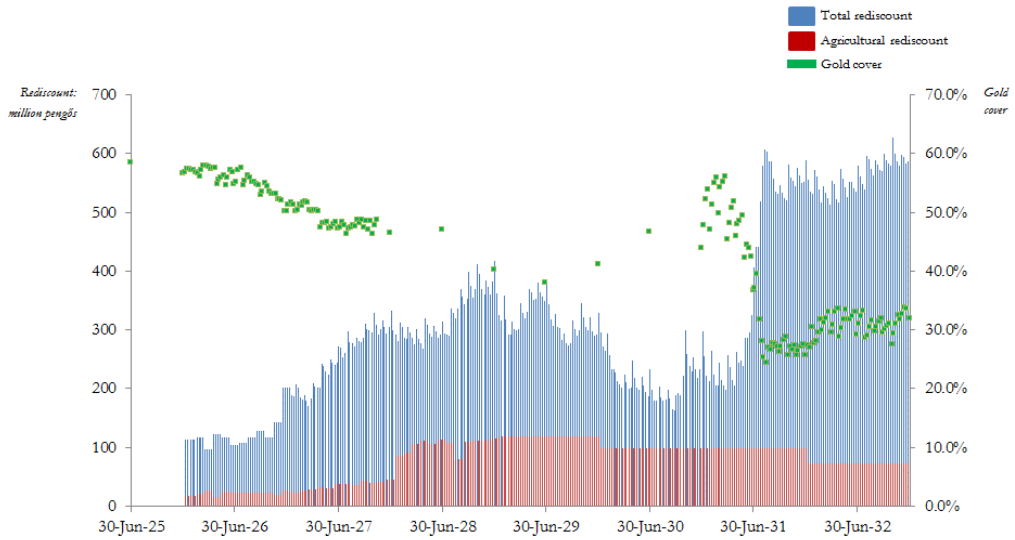
million pengős and further to 138 million pengős in 1930. The 1930 figure was less than 2% of the DNI. This implies that after the late 1928 currency crisis, the excesses behind the unbalanced trade account and binge-borrowing were corrected and the economy adapted to the new circumstances.

The root causes of the late 1928 currency crisis were over-borrowing and the imbalances of the trade account. The trigger event was an exogenous shock: the sudden decline in the availability of foreign capital. This reduced the inflow of foreign loans which then put pressure on the reserves of the central bank and induced a currency crisis. This is exactly what the Hungarian literature has described as one of the two main causes of the 1931 crisis. This, however, was a cause not to the 1931 episode but to this earlier event, the currency crisis in late 1928.

IV.1.II - The consequences of the currency crisis in late 1928

The currency episode did not pass without long-term consequences. Even though the event did not have observable, immediate effects on the banking system, it did have long-term repercussions on the health of the financial sector and hence had an influence on how the events of 1931 enfolded. The long-term consequences of the late 1928 currency event were twofold.

Figure 11 Total and agricultural rediscount offered by the central bank and the gold cover



Source: HNA, Z12, 60. csomó; Gazdasági Helyzetjelentés

First, the experience made the central bank extremely cautious and protective of the parity. As a result, the currency was strong going into the 1931 crisis, with the gold cover hovering around 50%. Nevertheless, to achieve this, the central bank became ever more restrictive when it came to rediscounting bills, i.e. providing liquidity for the banking sector. Figure 11 shows the total volume of rediscount the central bank provided to the financial system (blue bars). The diagram indicates that from mid-1929, in parallel with the rise of the gold cover back to over 50%, total rediscount levels declined. While the average volume of rediscount was app. 325 million pengős in 1928 and 1929, by 1930 the central bank reduced it to 218 million pengős. The emergency loans that the central bank received in 1929 were only sufficient to stop the immediate crisis. The rise of the gold

cover from the mid-1929 low of 38% to around 55% by March 1931 was accomplished almost entirely by restricting the banknotes in circulation.

Table 2 offers year-end data on the central bank's total rediscount and its annual change. It is visible that the increase was much lower in 1928 than in 1927, and in 1929 and 1930 the monetary authority reduced the liquidity available for the banking system through the discount window. Then the significant jump in 1931 is already due to the crisis of 1931.

Table 2 The rediscount provided by the central bank, pengős

	Total	Change
1926	202,080,000	
1927	332,095,000	130,015,000
1928	382,373,000	50,278,000
1929	329,494,000	-52,879,000
1930	297,655,000	-31,839,000
1931	588,540,000	290,885,000
1932	587,760,000	-780,000
1933	373,520,128	-214,239,872

Source: The author's own calculations based on the Nagy Magyar Compass

The restriction of the rediscount had a strong impact on the financial system: it deprived banks of an important source of liquidity. Already during the 1928 currency crisis, there were requests from the financial sector that the central bank widen the discount window. However, the management of the bank resisted these demands and after the 1928 crisis, in mid-1929 it went on to actually tightening its rediscount policy.[30] The central bank issued a warning to financial institutions that they should refrain from using the discount window and they should more diligently evaluate the bills they accept. In addition, the national bank also informed banks that bills with certain types of collateral would not be accepted for rediscount.[31] Prior to implementation, this new policy was discussed at the board meeting of the central bank and the issue kindled a heated debate. Some members of the board raised concerns that perhaps the restriction of the central bank's discount window would over-burden financial institutions. Nevertheless, the management of the monetary authority followed through with the tightening.

The other outcome of the 1928 currency crisis was that the central bank restructured its rediscount portfolio. Figure 11 also depicts the central bank's discount practices: red bars show the amount of agricultural bills rediscounted, while blue bars are the total rediscount facility that was provided for the whole economy. Even though the total volume of rediscount substantially declined following the 1928 currency event, the volume of agricultural rediscount stayed at the same level. While this could theoretically be explained by changes in sectors' relative demand, what appears a much more plausible explanation is that the supplier of liquidity was biased towards rediscounting the bills of the agricultural sector. This is the sentiment that is gathered through the discussions of the board. The board minutes of the national bank reveal general anxiety about the performance

[30] HNA, Z6, 2. doboz (File Z6, box 2) - Minutes of the Board of Governors of the Hungarian National Bank, Nov 28, 1928

[31] HNA, Z6, 2. doboz (File Z6, box 2) - Minutes of the Board of Governors of the Hungarian National Bank, June 26, 1929

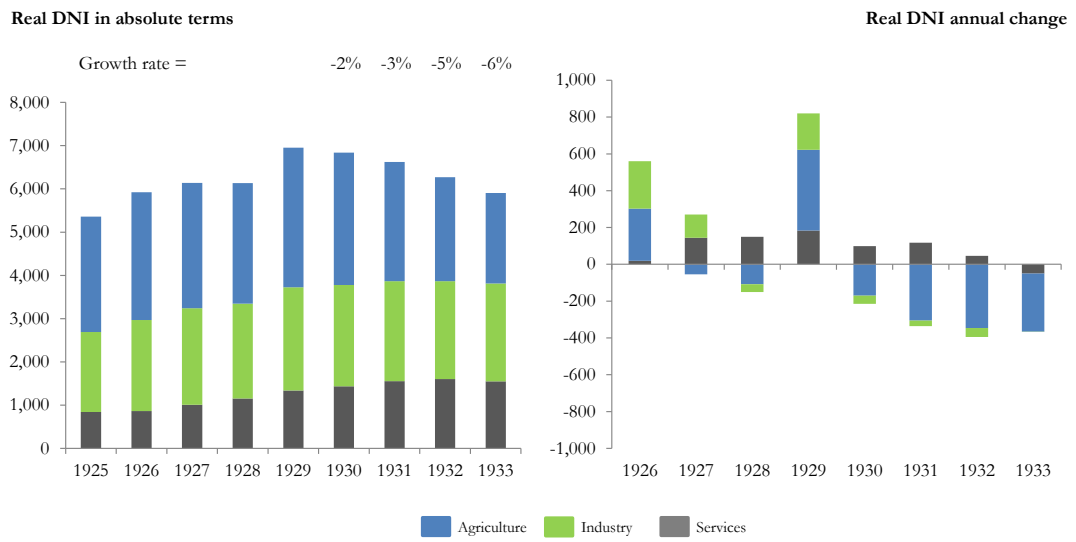
of agriculture throughout the period. Board members often emphasized that institutions outside of Budapest, i.e. key agricultural financiers, were in great need of central bank liquidity. Such comments appear more frequently after the management introduced restrictions on the liquidity window.[32] The evidence therefore, indicates that the central bank was just as likely to rediscount agricultural bills after the 1928 currency crisis as it was before but it became much more unlikely to provide liquidity against the bills of other sectors.

The central bank's tightening and its bias towards the agricultural sector were two consequences of the late 1928 currency crisis which contributed to the events in 1931. The first measure reduced the capital available in the economy and thus generally tightened the liquidity of the financial system. What added to banks' misfortune was that the restriction in monetary policy happened in a period when their demand for rediscount would not have been low at all. The country was already in a recession from 1930 with the DNI declining by 2% and, as later analyses will show, the proportion of non-performing loans was on the rise. The central bank therefore, narrowed its discount facility just when the banking sector would have greatly needed its liquidity support. The other policy measure further increased banks' exposure to agriculture. It encouraged banks to lend more to this sector since they were more likely to obtain liquidity after agricultural than after non-agricultural bills. These monetary policy changes in the aftermath of the late 1928 currency crisis hence contributed to the banking sector's vulnerabilities before 1931.

IV.2 - THE AGRICULTURAL CRISIS IN 1930

After the currency crisis reached its bottom, the country fell into a recession. Based on the economic activity index, Hungary's economic performance was at its peak in mid-1929. (Albers and Uebele 2015) Afterwards, the indicator continuously declined.

Figure 12 The real domestic national income by sector, million pengős



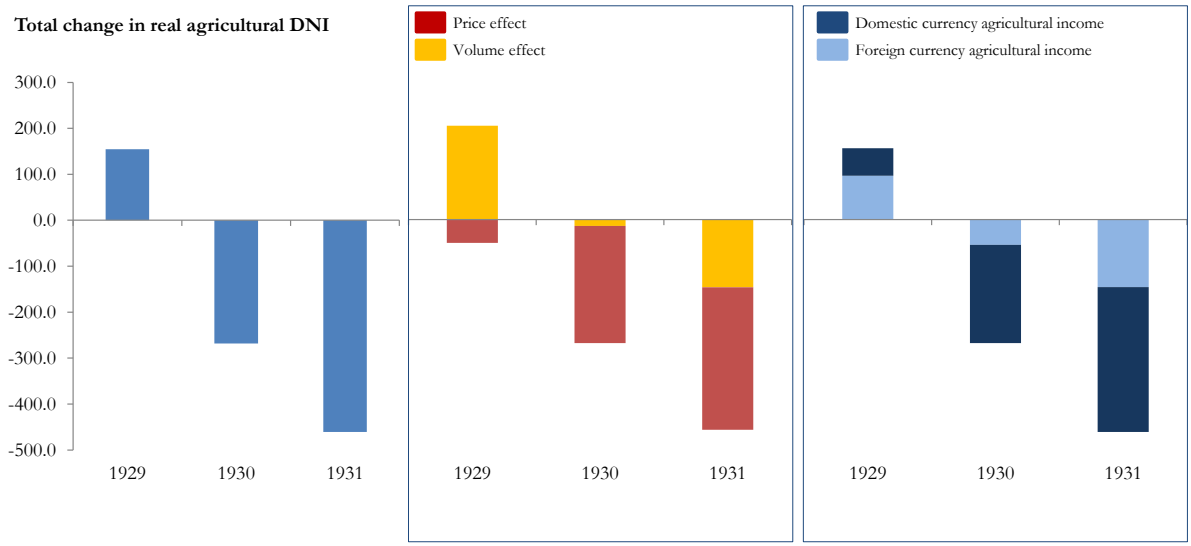
Source: Eckstein 1956; Statisztikai Szemle

[32] HNA, Z6, 2. doboz (File Z6, box 2) - Minutes of the Board of Governors of the Hungarian National Bank, Mar 22, 1929 and Aug 30, 1929

Figure 12 disaggregates the pattern of the economic activity index and demonstrates that in 1930 an agricultural crisis hit the Hungarian economy. The diagram on the left shows the country's DNI from 1925 until 1933 and highlights that in 1930 the economy contracted by 2%. The diagram on the right demonstrates that the agricultural sector had a leading role in the recession in 1930, as its decline brought about the dominant portion of the fall in the national income.

Next, Figure 13 goes more in-depth into investigating what happened in the agricultural sector. The first diagram shows the annual change in agricultural income from 1929 until 1931. Then the second diagram in the middle decomposes the causes behind the change in agricultural income into price and volume drivers. The data pinpoint agricultural prices as the key culprit behind the decline in agricultural incomes in 1930. Finally, the diagram on the right decomposes the impact of the change in agricultural income into the change in domestic agricultural income and export income. The data identify domestic income as the key driver behind the fall in total agricultural incomes. This is in contrast with the argument of the Hungarian historiography which states that mainly export incomes were affected by the recession. In fact, the data show that over 80% of the fall in agricultural DNI was realized in the drop of domestic incomes and less than 20% through the fall of export incomes.

Figure 13 The decomposition of the causes and the impact of the change in agricultural DNI, million pengős



Source: Eckstein 1956; Statisztikai Szemle

The above analyses reveal that the cause of the agricultural crisis in 1930 was the decline in prices. As the prices of agricultural goods underwent a global decline, Hungarian domestic prices, which closely followed global prices, similarly fell. The fall in domestic agricultural prices automatically reduced the income of a large proportion of the Hungarian population. Through their declining consumption, - due to their falling income - other, non-agricultural sectors also experienced a contraction and the whole economy shrank by 2% in 1930 and 3% in 1931, in real terms.

The banking sector was influenced by this recession through an increase in non-performing loans. There is abundant indirect evidence for this. For instance, the number of insolvencies increased

from 1,097 in 1927 to 1,580, 2,226, and 2,472 in 1928, 1929 and 1930, respectively.[33] One contemporary source estimated that in 1930 at least 25% of all agricultural loans were in default. (Dr. Surányi-Unger 1936) Direct evidence, however, is much more difficult to gather since institutions did not account for degrading loan quality in their financial statements. This meant that even though the loan was delinquent, it still remained on banks' books at par value. Nonetheless, the next section will demonstrate that it is possible to use banks' financial statements to produce an approximation of the proportion of their non-performing loans. The next section will offer an in-depth analysis on this and will show that in 1930, app. a quarter of all loans in the economy were non-performing and non-agricultural lending started to decline in 1929.

While the banking system was weak under the burden of non-performing loans, the monetary system was entirely sealed off from the impacts of the agricultural crisis. As illustrated on Figure 13, export (i.e. foreign currency) incomes were only a small portion in the overall decline of agricultural incomes. Thus the direct channel between the real economy and the monetary system, exports, did not threaten the stability of the currency. The other, indirect channel between the real economy and the monetary system, the financial system itself, was sterilized by tight monetary policy. Even though banks may have had an increasing demand for liquidity support due to the difficulties of the real economy after the agricultural crisis, this demand remained latent because of the central bank's wall of defense around the currency. Therefore, in 1930 the agricultural crisis stopped at the real economy and the banking sector, and it did not leak out into the monetary system. The banking system hence became a buffer zone between the crisis-ridden real economy and the strong currency.

IV.3 – STATE-GUARANTEES FOR NEW AGRICULTURAL LENDING

Since the mandate of the monetary authority was to guarantee the stability of the currency, it could choose to turn a blind eye on banks' craving for liquidity and still narrow the discount window. The government on the other hand, had different incentives: striving to please its voters by low unemployment and a growing economy, it sought to ensure that the banking system continued lending. Therefore, as the country started experiencing an economic downturn and the financial sector reduced its lending from 1929, the state started providing guarantees to banks to boost their lending. These state-guaranteed loans could only be used for agricultural financing.[34]

Table 3 demonstrates the significance of these state-guarantees in banks' operations. The various columns decompose the change in banks' total lending into agricultural and non-agricultural lending and agricultural loans are further divided up into guaranteed and non-guaranteed loans. Total lending was increasing up until 1930. However, non-agricultural lending started to decline already from 1929. This could have been the result of the general economic recession that had set in from mid-1929 and/or banks' decision to reallocate their resources to agriculture. It is likely that both forces were in place. Agricultural lending increased in 1928 and 1929 as well but its rise was the steepest in 1930. It is critically important, however, that of the 634 million pengős of new agricultural lending in 1930 463 million pengős were guaranteed by the state. From their own, non-guaranteed resources banks dedicated less and less to agricultural lending. This illustrates that the

[33] Based on the *Gazdasági Helyzetjelentés*.
[34] Based on the notes of the various banks in the *Nagy Magyar Compass*.

state effectively used guarantees to incentivize lending to agriculture even in the years of 1929 and 1930 when other lending was already declining.

Table 3 The change in the volume of lending, pengős

	Change in total lending Total	Change in non-agricultural lending Total	Change in agricultural lending Total	Change in guaranteed agricultural lending Total	Change in non-guaranteed agricultural lending Total
1927	834,966,537	524,898,799	310,067,738	2,647,491	307,420,247
1928	757,431,577	241,260,336	516,171,241	9,412,711	506,758,530
1929	362,487,413	-79,112,198	441,599,611	141,863,823	299,735,788
1930	559,769,807	-74,328,367	634,098,174	462,720,830	171,377,344
1931	-653,166,230	-336,313,633	-316,852,597	-231,517,605	-85,334,992
1932	-176,634,537	7,076,447	-183,710,984	-31,767,569	-151,943,415
1933	93,245,692	-125,174,538	218,420,230	201,182,527	17,237,703

Source: The author's own calculations based on the Nagy Magyar Compass

This policy intervention had two important consequences. First, non-agricultural sectors were entirely squeezed of credit. Not only was the monetary authority biased towards agricultural rediscount but the banking sector's new lending was also fully directed towards the agricultural sector. This crowding out effect reinforced the recession in non-agricultural sectors. Second, state-guaranteed loans increased the exposure of the financial system to agriculture. In 1930 the financial sector's loan exposure to agriculture reached 51% which was a jump from 41% in the previous year and almost entirely due to state intervention. This increase in banks' exposure to agriculture occurred in a year when agriculture contracted by 5%. And this was only the beginning of the sector's catastrophe: in 1931, the decline in agricultural DNI was 10%. As a result of state-guaranteed agricultural lending, the banking system became highly exposed to a sector of the economy which experienced the steepest recession from 1930 and contributed the most to the contraction of the whole of the economy.

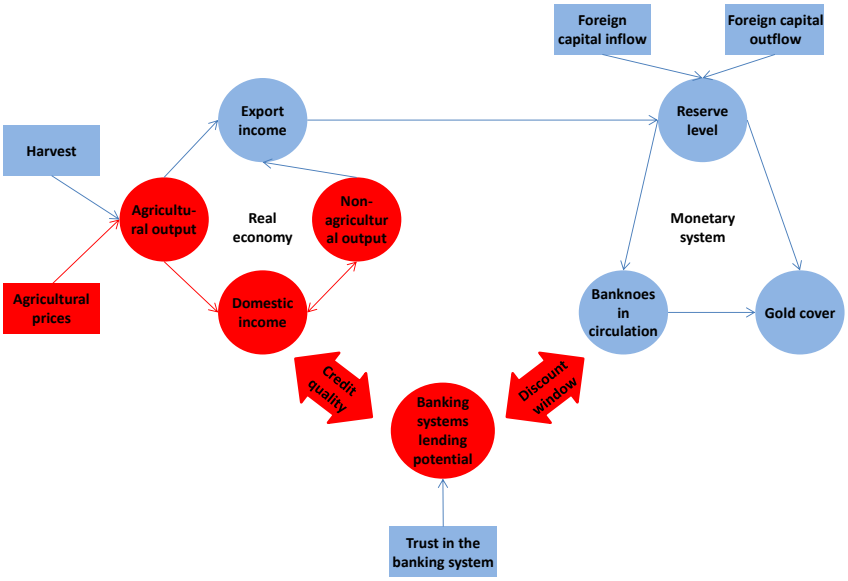
IV.4 – Putting it all together: the mechanism behind the 1931 crisis

Figure 14 illustrates this paper's interpretation of the mechanism behind the Hungarian crisis of 1931. Previous sub-sections have argued that the causes behind the Hungarian crisis were the restrictive policy of the central bank, the agricultural crisis, and agriculture-focused state-guaranteed loans. These factors made the banking system weak and vulnerable to shocks.

The root cause of the agricultural crisis was the decline in global and domestic prices, in line with the arguments of the historiography. However, the collapse of the sector only negligibly affected export incomes. Therefore, in contrast with the arguments of the national literature, the agricultural sector's calamities did not spill over into the monetary system through export incomes but had repercussions mainly on domestic incomes and consumption. The subsequent recession deteriorated the quality of credit in the real economy which naturally brought about distress in the banking sector. Financial institutions' woes were further exacerbated by policy-makers. On the one hand, banks could not rely on the monetary authority as a lender of last resort: the discount window of the central bank was increasingly narrow. On the other hand, the fiscal authority had given banks an incentive to increasingly expose themselves to the worst-performing sector of the

real economy, agriculture. All these increased the proportion on non-performing loans on financial institutions' balance sheets and hence made the financial system sensitive to shocks.

Figure 14 The causal mechanism behind the paper's interpretation of the Hungarian crisis



V - THE BANKING CRISIS OF 1931

The purpose of this section is to quantitatively assess the weakness of the banking sector and to demonstrate that the 1931 crisis erupted in that part of the economy.

V.1 - DATA

I am using a database of balance sheets and profit and loss statements for 649 financial institutions to assess the weakness of the banking sector. The bank-by-bank database has been manually compiled from various issues of the *Nagy Magyar Compass*. The *Compass* was an annual publication dating back to the 19th century and it compiled the annual reports of corporations within a given territory. It was published for both Austria and Hungary and for several other successor states of the Austro-Hungarian Monarchy. The Hungarian publication of the interwar period reported each year in two separate volumes on industrial enterprises and on financial institutions. The latter included the annual reports of joint-stock banks and savings banks and credit cooperatives. Only joint-stock banks and savings banks have been reviewed for this study which together covered over 99% of the country's whole financial system since the contribution of credit cooperatives was negligible.

Appendix 1 provides an overview of the dataset in more detail. In the 1927 publication, which offers a view on banks' financial status in 1926, there are altogether 743 banks that reported some sort of operation – either going concern or distress. However, only 608 of these institutions provided their balance sheet and only 334 included their profit and loss statement as well. Similar limitations applied in the years through 1933 but to a declining extent. The 649 banks in the database are those that submitted a financial statement at least in one of the years from 1926 until

1933.[35] Those banks that chose not to report in a given year were predominantly small institutions or institutions under distress. The database is able to capture close to the whole of the Hungarian financial system. A discussion on the representativeness of the database is under Appendix 2.

Table 4 provides an overview of the final database. The first column shows the number of banks reporting any type of operation in the given year. Since distressed banks were closed down and new banks were established in each year, the numbers here are always below the 649 total number of banks in the database. The next column shows the number of those institutions that reported distress in the given year while the third column calculates the ratio of reported distress to the total number of institutions. The final column calculates a hypothetical ratio of distressed banks. The key insight here is that those banks that reported going concern in the given year but chose not to include their financial statements were highly likely to be distressed in the following period. In 1929, 579 banks reported going concern, 33 did not provide their financial statements and, of the 33, 22 came under distress in the following year. The last column of Table 4 takes into consideration the distress-anticipating feature of banks' non-reporting. These results show that the financial system's distress started already in 1928.

Table 4 Banks in distress

	Number of joint-stock banks in the given year l	Number of banks that report going concern but provide no financials	% in reported distress	% in reported and non-reported distress
1926	623	13	0.6%	3%
1927	631	14	2.1%	4%
1928	625	27	4.3%	9%
1929	605	33	4.3%	10%
1930	583	22	6.3%	10%
1931	550	29	6.0%	11%
1932	521	43	5.2%	13%
1933	495	50	2.6%	13%

Source: The author's own calculations based on the Nagy Magyar Compass

In connection with Austrian, and esp. Viennese banks, it became clear after the 1931 crisis that there were egregious misrepresentations on their financial statements. For instance, while originally the Credit-Anstalt's loss was declared to be around 140 million Austrian schillings, in a few months it became clear that the actual figure was a number of times more than this. (Schubert 1991) In the case of Hungarian banks, László Ádám addressed this issue in his regular publications.[36] He did not find similar misstatements in Hungarian financial statements. What he did point out, and what this study takes into consideration, was that banks did not write off the non-performing loans either prior to 1931, or after. In addition, Ádám also reports that after the devaluation of the sterling and the dollar, Hungarian banks did not book their losses on items denominated in these currencies. Since this study focuses on the pre-1931 period, this latter problem does not affect the current analyses.

[35] If banks chose to submit financials, they always provided their balance sheet.
[36] The title of the publication is *Konjunktúra Barométer* (title in English: Barometer of Economic Development) and the author is László Ádám. The analysis is based on various issues.

V.2 – ESTIMATING THE SIZE OF THE NON-PERFORMING LOAN PORTFOLIO

Banks did not write off the non-performing loans from their balance sheet to avoid having to acknowledge the loss of equity arising from such write-offs. This means that there is no precise way to capture the most important impact of the crisis on the banking sector: the volume of non-performing loans and how much of banks' capital was eliminated by these defaults. There is, however, a solution to go around this problem and prepare an estimate of each financial institution's non-performing portfolio. The key insight in this approach is that the change in banks' net interest margin to their total lending indicator can be used as a proxy for loans in delay or in default.[37]

The year on year change of the net interest margin to total lending ratio may be the result of three drivers. First, changing interest levels of the general economy could influence the interest earned by banks. Nonetheless, since the indicator uses interest margin, i.e. the difference between revenues and expenses, the impact of this factor should be largely eliminated. At the same time, a scenario is conceivable when for instance, interest rates generally decline in the economy and banks cannot fully push through a rate reduction on their deposits but are forced to immediately reduce the interest on their loans. However, in such a case, the key factor is not declining overall interest levels, rather the second driver, changes in market structure and competition.[38] A fragmented and increasingly competitive market could reduce interest margins in the whole sector. Nevertheless, all available other metrics point towards the opposite in the observed case. The number of banks was declining during the period. Further, from 1929, lending towards non-agricultural sectors was falling, while the growth of non-state-backed lending to agriculture was growing marginally in 1930 and falling sharply in 1931. This suggests that competition for clients was not intensifying in the sector and thus, it could not have been the reason for any fall in margins. Finally, the third factor that could explain changes in the net interest margin to lending is the increasing proportion of loans in delay or in default. Delinquencies reduce banks' interest revenues and decrease their net interest margin. While the first two possible drivers do not explain what occurred in the examined period, this third explanation is in line with contemporary general observations about loan quality. Therefore, I use the observed decline in the net interest margin as a proxy for estimating the volume of non-performing loans.

Table 5 presents the results of the net interest margin to total lending calculation. The data illustrate that in 1930 and afterwards, the change in net interest margin to lending was negative, implying that the quality of banks' loan portfolio weakened. In 1930, the figure was negative 12%. Based on the net interest margin calculations in Table 5, the approximate magnitude of non-performing loans can be calculated. The theory is that a 10% decline in net interest margin over a year suggests that on average 10% fewer loans paid interest than last year. In this case, if loan defaults are spread evenly within a year, then by the end of the year, 20% of the loan portfolio must be in default. This calculation however underestimates the share of loans in default at the end of the year, as in an emerging crisis the number of defaults is likely to increase towards the end of the year.

[37] The net interest margin is the difference between a bank's interest revenues and interest expenses. This is then divided by the given bank's total lending to arrive at the final indicator.

[38] A special theoretical case is when deposit rates are zero; therefore, they could not possibly fall further. This however, was not the situation in Hungary in the observed period.

Therefore, the assumption of even distribution of defaults within the year is a very conservative one.

Table 5 The net interest margin to total lending

	Interest margin to lending	% change
1929	3.3%	
1930	2.9%	-12.0%
1931	2.8%	-3.3%
1932	2.4%	-15.5%
1933	2.2%	-7.2%

Source: The author's own calculations based on the Nagy Magyar Compass

Table 6 uses this theoretical insight to calculate the non-performing portfolio (NPL) of the banking sector in 1930. The sector's net interest margin to total lending dropped 12% in 1930, which indicates that minimum 24% of the loan portfolio (more specifically, 23.9%) was in default at the end of the year. Again, this figure disregards the fact that the number of defaults must have been increasing as the crisis was deepening during 1930. Were this factor taken into account, the corresponding estimate for non-performing loans would be significantly higher.

Table 6 The impact of non-performing loans on banks' equity

Panel 1 - conservative assumptions

	Interest margin to lending	% change	% change * 2	New NPL	Guarantees	Unguaranteed NPL	Equity	Part of equity lost
	%	*%*	*%*	*pengős*	*pengős*	*pengős*	*pengős*	*%*
1929	3.3%							
1930	2.9%	-12.0%	-23.9%	806	621	185	633	29.3%

Panel 2 - realistic assumptions

	Interest margin to lending	% change	% change * 2	New NPL	Guarantees	Unguaranteed NPL	Equity	Part of equity lost
	%	*%*	*%*	*pengős*	*pengős*	*pengős*	*pengős*	*%*
1929	3.3%							
1930	2.9%	-12.0%	-23.9%	806	621	361	633	57.0%

Source: The author's own calculations based on the Nagy Magyar Compass

The next step is to understand how much of the banking sector's equity was locked up in bad loans. For this, one needs to take into account one more factor: that of state guarantees. The benefit of the state-guarantee was that if a loan under guarantee defaulted, this was a loss not to the given bank but to the state. However, the guarantee applied only to specific loans - agricultural loans; therefore, it did not act as a shield for banks' equity in all cases.

The first panel of Table 6 calculates the loss of capital as a result of defaults by assuming that all state-guarantees were called by banks in full, i.e. all guaranteed loans defaulted. This is an extreme assumption, given that only approximately 18% of loans enjoyed such a guarantee. Under this assumption, a large chunk of the loan losses would have been swallowed by the state, and "only" 29% of the banking sector's equity would have been depleted by non-guaranteed non-performing

loans. The second panel of Table 6 adopts a more realistic approach and assumes that not all guaranteed loans defaulted but guaranteed loans were 3-times more likely to become delinquent than non-guaranteed loans. Based on these assumptions, in 1930, 57% of the total financial sector's equity was immobilized by non-performing loans. While this figure is only an estimate, it illustrates the extremely fragile, in fact, practically insolvent state of the Hungarian banking sector at the end of 1930.

V.3. – NOT MONETARY BUT FINANCIAL FORCES

In late February, early March of 1931 the gold cover was around 55% which was close to the all-time-high of 58.5% at the establishment of the central bank in mid-1925. The big drop occurred during the week of May 23 when within seven days the gold cover fell 7 percentage points. Afterwards, there were minor climb-backs but the fall was irreversible. The ratio was 32% on July 23 and it reached its legal minimum of 24% on Aug 15.

Figure 15 Decomposing the changes in the gold cover

There could be two explanations for the drop in the gold cover. One is the decline in the reserves of the central bank. The fall in reserves would indicate that economic players were initiating a run on the currency, i.e. they were converting their domestic currency deposits into foreign currency or foreign deposits were being withdrawn. In this case, the banking system must rely on the central bank' foreign exchange reserves to service the demand for foreign currency and this depletes the central bank's reserves. Another explanation for the drop in the gold cover is the increase in banknotes in circulation. This increase would imply that economic players were initiating a run on the banking system and they were withdrawing their deposits to keep the money in cash. In this case, the banking system must rely on the liquidity support of the central bank through the discount window to service their clients' increased cash need.

Figure 15 relies on the above theoretical insight into the mechanism behind the changes in the gold cover and confirms that the Hungarian crisis of 1931 was a banking crisis at its origins. Figure 15 decomposes the changes in the gold cover into changes in its numerator (reserves, color red)

and changes in its denominator (banknotes in circulation, color blue). When in positive territory, the blue and red bars contribute to the increase in the gold cover and when in negative territory then they explain its decline.

The diagram demonstrates that reserve changes only marginally contributed to the crisis and the fall in the gold cover was brought about by the increase in the banknotes in circulation. Technically, the latter meant a sudden enlargement of the discount window. Moreover, Figure 15 also illustrates that the episode was predominantly a "pengő-denominated" crisis, as the amount of foreign exchange reserves remained steady throughout the outbreak, while the amount of pengő in circulation increased sharply. The above phenomena reject the currency crisis interpretation and confirm that a run on the banking system took place.

SECTION VI - CONCLUSION

This paper has shown that the Hungarian crisis of 1931 was not caused by monetary forces but it was a banking crisis in its origins. The banking crisis was caused by an exogenous shock to the country's agricultural sector as well as by fiscal and monetary policy actions. Regarding policy-decisions, it is hard not to connect this historical case to the current crisis in the Eurozone. This recent episode has also involved a conservative central bank and desperate governments who were trying to stimulate the economy but were saddled by the deficit requirements set by the EU. While in the US and Britain quantitative easing has been pursued and these economies are already recovering, the European Central Bank refrained from applying such measures and the Eurozone economy is stagnating. The ECB's early 2015 decision to embark on an easing path should be an interesting monetary experiment.

There are several areas that could be further researched to make the assessment of the Hungarian crisis more comprehensive. This paper does not discuss the actual triggers of the 1931 crisis in Hungary. What caused the public to start a run on the banking system? The historiography holds that the collapse of the Credit-Anstalt had a major role in bringing about the panic in Hungary and claims that it was foreign financiers who were fleeing the country. However, the banking crisis indicator presented in this paper has shown that already from October 1930 shock-waves emerged in the banking system and these waves were recurring. Further, these waves were caused by the flight of domestic financiers and the EMP and the balance-of-payments have demonstrated that the majority of foreign currency financiers had already left the country much earlier, after the 1928 currency crisis. This evidence raises the question: which of the two factors contributed more to the Hungarian crisis in 1931: the fragility of the financial system or contagion from Austria? In addition, since the crises of Austria, Germany and Hungary happened in parallel, it would be interesting to see the actual channels that may have propagated the panic from one country to the next. The Credit-Anstalt may have been one but there could have been several others. Chronological evidence reveals that the timing of Hungary's crisis actually appears much more closely connected to the German events than to those of Austria. A circumspect review of this question could thus uncover new information on this period and this region.[39] Finally, evidence on the Hungarian and Austrian crises of 1931 reveals that these events show striking similarities

[39] These are the topics of my third thesis paper: „Crisis Triggers and Contagion".

to more recent emerging market episodes. An investigation of this parallel could be an interesting extension of these historical events.

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APPENDIX 1

I have compiled the balance sheets and profit and loss statements of 649 joint-stock banks into a strongly balanced panel running from 1926 to 1933. The below tables offer a summary of the number of banks and number of financial statements included in the database.

The below table shows that from 1926 to 1933 the number of banks reporting any sort of operation declined from 743 to 498. Banks either reported distress or they reported going concern. Those reporting distress did not provide their financial statements while the majority, but not all of going concern institutions did. The table shows that in the critical years of 1929, 1930 and 1931 94%, 97% and 96% of going concern banks reported their balance sheet and the figures for profit and loss statements are 62%, 65% and 66%, respectively.

The number of balance sheets reported						
	Number of joint-stock banks in the given year	**Of these: reporting distress**	**Number of balance sheets reported**	**% of going concern banks reporting a balance sheet**	**Number of profit&loss statements reported**	**% of going concern banks reporting a profit&loss smnt.**
	Total	Total	Total	Total	Total	Total
1926	743	74	608	91%	334	50%
1927	687	49	611	96%	351	55%
1928	645	37	578	95%	382	63%
1929	615	27	550	94%	366	62%
1930	593	42	532	97%	359	65%
1931	557	38	498	96%	341	66%
1932	530	34	456	92%	329	66%
1933	498	13	437	90%	316	65%

The table below shows the number of balance sheets reported by bank type.

The number of balance sheets reported by bank type						
	Number of balance sheets reported					
	Total	Budapest banks	Non-Budapest banks	Budapest big banks	Budapest other banks	State-owned banks
1926	608	111	497	20	91	6
1927	611	112	499	20	92	6
1928	578	103	475	20	83	6
1929	550	96	454	19	77	7
1930	532	96	436	19	77	7
1931	498	84	414	20	64	7
1932	456	75	381	20	55	6
1933	437	79	358	20	59	6

The table below shows the number of profit and loss statements reported by bank type.

The number of profit and loss statements reported						
	Number of profit&loss statements reported					
	Total	Budapest banks	Non-Budapest banks	Budapest big banks	Budapest other banks	State-owned banks
1926	334	49	285	20	29	6
1927	351	50	301	19	31	5
1928	382	55	327	20	35	6
1929	366	49	317	19	30	6
1930	359	46	313	19	27	7
1931	341	45	296	20	25	7
1932	329	42	287	19	23	6
1933	316	46	270	20	26	6

The below table calculates the proportion of total assets of those banks that only reported their balance sheets but did not include their profit and loss statement. The figures show that in the critical years of 1929, 1930 and 1931, banks representing 3.5%, 2.8% and 2.7% of total assets were not reporting their profit and loss statements. The last four columns of the table decompose this aggregate figure by bank type and shows that the non-reporting of profit and loss statements was prevalent across Budapest other (small) banks. The total assets of this bank category, however, amounted to less than 10% of those of the whole financial system. Therefore, the 18% non-reporting of these banks in 1929 accounts for app. 2% of the whole financial sector. In the case of non-Budapest banks reporting behavior substantially improved from 1926 to 1931. The total assets of this bank category are less than one quarter of those of the whole financial system. Therefore, the 7-8% non-reporting of these banks accounts for app. 1.5% of the whole financial sector.

The total assets of banks that did not report their profit and loss statement							
	Total assets of banks that reported their balance sheet	Total assets of banks that did not report their profit&loss statement		The share of total assets of banks that did not report their profit&loss statement in the total assets of their own category			
	Total	Total	% non-reporting P&L	Budapest banks	Non-Budapest banks	Budapest big banks	Budapest other banks
1926	2,036,051,228	134,123,693	6.6%	2%	18%	0.0%	15%
1927	2,973,305,012	192,076,514	6.5%	3%	14%	0.4%	22%
1928	3,884,011,289	126,782,690	3.3%	1%	9%	0.0%	8%
1929	4,309,423,004	149,510,406	3.5%	2%	7%	0.0%	18%
1930	4,865,537,682	134,268,337	2.8%	1%	8%	0.0%	12%
1931	4,188,051,189	114,250,269	2.7%	1%	8%	0.0%	11%
1932	3,923,475,368	116,055,719	3.0%	1%	9%	0.1%	10%
1933	4,012,994,852	67,239,584	1.7%	1%	6%	0.0%	7%

The final database of 649 banks has been developed from the above larger, crude dataset. Those banks that never reported any financials in the period under observation could not be brought under this investigation and they were removed from the final database. The criterion of a bank remaining in the final dataset was that it reported a financial statement in at least one year between 1926 and 1933.

APPENDIX 2

Three publications of the *Statisztikai Szemle* offer an overview of the Hungarian financial system.[40] The first from Jan 1931 covers the years 1928-29, the second from Jan 1932 adds the year 1930, while the third from Aug 1933 discusses 1930-32. These sources only report aggregate figures on the size of the financial system and do not detail the representativeness of their sources. I am using these reports to test the representativeness of my own database compiled bottom-up through aggregating the balance sheets and financial statements of individual joint-stock financial institutions.

The comparison is reported below. I am comparing the total assets, total equity, total earnings and total lending of my own database to the three issues of the *Statisztikai Szemle* and I calculate the coverage of my database vis-à-vis the three sources.

The coverage of my database if the worst based on total assets (panel 1) but even based on this indicator, my dataset captures at least 71% of the financial system. Coverage ratios based on total equity, total earnings and total lending (presented in panels 2-4) are much more in my favor and they imply that my database constitutes at least 80% of the whole financial system.

What is interesting is that the three sources contradict one another. While based on the Jan 1931 and Jan 1932 publications my database has a coverage in the range of 71% to 95%, I am actually covering the whole system, or even over-reporting based on the Aug 1933 publication.

Since the *Statisztikai Szemle* publications do not report their sources and do not assess the representativeness of their own database, it is difficult to judge which of the three papers is reliable. What can, nonetheless, be concluded is that my database covers at least 71% of the financial system and it is likely that this figure is much higher, possibly close to 100%.

[40] Dr. Szőnyi, Gyula: A magyarországi pénzintézetek az 1929. évben (Title in English: Hungarian financial institutions in 1929), *Statisztikai Szemle*, January 1931; Dr. Szőnyi, Gyula: A magyarországi pénzintézetek az 1930. évben (Title in English: Hungarian financial institutions in 1930), *Statisztikai Szemle*, January 1932; Dr. Szőnyi, Gyula: Magyarország részvénytársasági formájú hitelintézeteinek tőkeállapota és üzleteredményei az 1932. évi zárszámadások szerint (Title in English: The capitalization and earnings of Hungarian joint-stock financial institutions based on 1932 financial statements), *Statisztikai Szemle*, August 1933

Panel 1 - Calculating the coverage based on total assets

	Flora Macher database	Statisztikai Szemle, Jan 1931	Statisztikai Szemle, Jan 1932	Statisztikai Szemle, Aug 1933	Coverage 1	Coverage 2	Coverage 3
1926	2,036,051,228						
1927	2,973,305,012						
1928	3,884,011,289	4,924,360,000			79%		
1929	4,309,423,004	6,063,610,000	6,063,610,000		71%	71%	
1930	4,865,537,682		6,703,493,000	4,370,000,000		73%	111%
1931	4,188,051,189			4,040,448,000			104%
1932	3,923,475,368			3,923,303,000			100%
1933	4,012,994,852						

Panel 2 - Calculating the coverage based on total equity

	Flora Macher database	Statisztikai Szemle, Jan 1931	Statisztikai Szemle, Jan 1932	Statisztikai Szemle, Aug 1933	Coverage 1	Coverage 2	Coverage 3
1926	379,818,663						
1927	470,607,590						
1928	556,845,518	592,849,000			94%		
1929	610,277,902	667,241,000	667,241,000		91%	91%	
1930	633,439,120		708,569,000	564,469,000		89%	112%
1931	681,787,404			576,004,000			118%
1932	654,401,299			577,424,000			113%
1933	660,428,041						

Panel 3 - Calculating the coverage based on total earnings

	Flora Macher database	Statisztikai Szemle, Jan 1931	Statisztikai Szemle, Jan 1932	Statisztikai Szemle, Aug 1933	Coverage 1	Coverage 2	Coverage 3
1926	32,459,947						
1927	43,164,809						
1928	56,061,255				NA		
1929	57,181,502				NA	NA	
1930	55,195,101			55,826,000		NA	99%
1931	28,971,825			29,159,000			99%
1932	20,266,239			14,039,000			144%
1933	16,565,800						

Panel 4 - Calculating the coverage based on total lending

	Flora Macher database	Statisztikai Szemle, Jan 1931	Statisztikai Szemle, Jan 1932	Statisztikai Szemle, Aug 1933	Coverage 1	Coverage 2	Coverage 3
1926	1,584,844,210						
1927	2,419,810,747						
1928	3,177,242,324	3,882,951,000			82%		
1929	3,539,729,737	4,409,264,000	4,409,264,000		80%	80%	
1930	4,099,499,544		4,326,742,000	3,254,149,000		95%	126%
1931	3,446,333,314			2,973,130,000			116%
1932	3,269,698,777			2,849,502,000			115%

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