

**Banking Crises and Boom-Bust
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(1861-2016)**

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Banking Crises and Boom-Bust Dynamics: Evidence for Italy (1861-2016)

Abstract

The financial crises of 2007-2008 and the subsequent worldwide recession show the importance of exploring the correlation between financial and real crises. Starting from our new estimation of the Italian business cycle (Bartoletto et al., 2017), we analyze the linkage between banking crises and the business cycle in Italy over the last two centuries. The vast literature on banking crises in Italy is dominated by the narrative approach. In this work we aim to advance the argument one step further by integrating the narrative approach with an empirical VAR analysis, distinguishing between slowdown and inner-banking crises according to the business cycle phase in which they occur. Our long-run analysis proves that not all the banking crises have a connection with real activity and that not all the crises occurring close to a GDP contraction were associated to a boom-bust mechanism.

JEL-Codes: E320, E440, N130, N140.

Keywords: business fluctuations, financial cycle, bank credit, banking crisis, VAR.

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1. Introduction

Following the recent international financial crises, there is renewed interest in the relationship between financial variables and the real economy. Most studies have analyzed only recent years (Claessens et al. 2012; Borio, 2014; Drehmann et al., 2012; Jorda et al., 2012; amongst others), but few have focused on long-term series (Grossmann, 2016; Reinhart and Rogoff, 2009; Schularick and Taylor, 2012; Abildgren, 2016). In our work, we analyze the linkage between banking crises and the business (GDP) cycle in Italy in a wide historical perspective, from the unification of Italy (1861) to the present day. There is a vast narrative literature on banking crises in Italy and their macroeconomic effect, but the narrative approach is dominant (Cova et al., 2008 for a bibliographical review). In this paper, starting from a new estimation of credit and the business cycle during the last two centuries (Bartoletto et al., 2017), we integrate a descriptive analysis with a VAR time series analysis to offer further insights to the existing literature.

Although business cycle recessions are much deeper when they coincide with the contraction phase of the financial cycle (Reinhart and Rogoff, 2009), the causal ordering between the performance of real aggregates and the episodes of financial distress is far from easy to establish. As stated by Reinhart and Reinhart (2015), economic theory offers “a complicated back-and-forth connection between crises and economic growth”, with alternative explanation of the causal link (if any) between them.

With regard to the synchronization between business cycle and financial crises, Reinhart and Rogoff (2014) argue that “economic activity reaches a peak either the year before the onset of crisis or the year of the financial crisis”, thus suggesting that financial crises occur during a downturn of the economic activity, and have an impact on the intensity of the economic contraction.

With regard to the more restrictive set of banking crises alone, Grossman (2016) suggests a similar temporal pattern, with economic activity influencing the triggering of a banking crisis. This so-called “boom-bust” mechanism, documented by Grossman (2016) as the prevailing cause of the historical pattern of crises before World War I, implies that the economic boom, generated by a variety of factors, triggers an excessive growth of the credit aggregates during its cyclical upswing.¹ Hence, in this view, real economic expansion leads credit growth, and banking crises are lagging or coincident with respect to GDP peaks. Reinhart and Rogoff (2014) also classified banking crises with respect to the depth of the related recession, but they focus only on the most severe (systemic) crises.

In this article, we focus on the banking crises recorded in Italy in the period 1861-2014 and propose a classification based upon the timing of the crisis with respect to the business cycle, distinguishing between slowdown and inner-banking crises; the former occur close to a GDP contraction, whereas the latter appear to spread their effects with no substantial evidence of output loss. We recognize a new episode of banking crises (1928), in addition to those listed in the previous literature (Reinhart and Rogoff, 2009; De Bonis and Silvestrini, 2014; Schularick and Taylor, 2012; da Rocha and Solomou, 2015). We also check whether the crises occurring in proximity to a recession (slowdown

¹ As to recent decades, Mendoza and Terrones (2008) document that during the period 1970-2006 credit booms were infrequent and only seldom did they trigger banking crises. By contrast, Mendoza and Terrones (2012), adding the data from the credit booms and crises following the 2008 Global Financial Crisis, found that the peaks of credit booms are often followed by banking crises or other forms of financial market distress (currency crises, or Sudden Stop). Finally, as to the mechanisms that drive the credit boom, increase in TFP productivities are the most frequent events preceding a peak in credit in industrialized countries, followed by an upsurge in capital inflow and financial reforms.

crises) follow a boom-bust mechanism, which is considered the most common mechanism underlying (banking) crises with the worst economic consequences (Aikman, 2014). Contrary to the previous narrative literature, the descriptive analysis is supported by a VAR time series analysis in the pursuit of statistically significant regularities over time both in the timing of crises and in their causal effects.

Though aware that each banking crisis has its own genesis and development, we find that most of the crises experienced by the Italian banking system have occurred close to a GDP peak. However, in few cases is the pattern consistent with a boom-bust mechanism.

The article is organized as follows. In section 2 the episodes of banking crises are listed and the proposed classification rule is explained. The classification rule is employed to separately analyze slow-down crises and boom bust crises (section 3) and inner banking crises (section 4). In section 5 a VAR model is estimated to determine whether output and credit behave in a systematically different manner under the different crisis typologies. Section 6 concludes the paper.

2. Banking crises and GDP turning points: slowdown and inner banking crises

There is no universally accepted definition of financial crisis, nor is it easy to distinguish the different types of financial crises (e.g., banking, currency, sovereign debt), since their effects quite often play out simultaneously. A currency crisis and a currency devaluation might lead to a banking crisis. Alternatively, a banking sector or public debt crisis could raise doubts about the sustainability of an exchange rate and lead to a currency crisis.

Definitions of banking crises too are quite often vague and hard to compare. How extensive must the level of insolvency among banks be to constitute a crisis? For instance, Grossman (1994) defines a banking crisis as occurring when: (1) a high proportion of banks fails, (2) an especially large or important bank fails, (3) failures of the type described in (1) or (2) are prevented only by extraordinary and direct intervention by the government or some other actor. Bordo et al. (2001) argue that a banking crisis occurs when “most or all” of the aggregate net worth of the banking system is eroded. In addition, given the paucity of detailed data on bank failures and bank net worth from the nineteenth and early twentieth century, catalogues of banking crises that rely on quantitative definitions are liable to be inconclusive (Grossman, 2016; Reinhart and Rogoff, 2009). In this sense, da Rocha and Solomou (2015) classify the most severe banking crisis episodes of the inter-war period as systemic, but again a qualitative judgment is adopted to select relevant episodes, thus confirming the ample uncertainty in classification criteria.

Finally, there is considerable disagreement in many cases about when a particular crisis ended (it is easier in general to find information on the exact timing of the onset of a crisis) since the underlying indicators typically return to their ‘normal’ levels only gradually (Babecky et al., 2014).

As a result, we draw up our list of banking crises and their length for Italy from historical evidence and historical studies. By so doing, we avoid relying on a single specific definition of crisis, which is the approach taken in many multi-country studies (e.g. Reinhart and Rogoff, 2009; Babecky et al., 2014) and for Italy in De Bonis and Silvestrini (2014). For the historical dating of banking crises (Table 1) we consider all the crises that are listed in Reinhart and Rogoff (2009), De Bonis and Silvestrini (2014), Schularick and Taylor (2012). In addition, we analyze a new episode not considered in the above literature, namely 1928, and we propose, in the historical analysis, differently from the

previous literature, a new periodization for some crises (1887-1894 and 1930-35).² As to the recent global financial crisis, which burst in 2008 in the US and spread to Europe the following year, we propose two periods of banking distress: a) 2011, triggered by tensions in the sovereign debt market, which strongly affected the Italian banks, which had started hoarding sovereign bonds since the beginning of the crisis; b) the crisis of some important Italian banks, starting with Monte Paschi Siena in 2013³, followed by the bail-in involving four minor banks in 2015 and the still-in-progress crisis of the banking system in the northern Veneto Region.

Given this list of banking crises, we first try to classify them in relation to the business cycle phase in which they occur so as to emphasize those spreading their effects close to a GDP contraction. That is, we classify a banking crisis occurring in a specific year, denoted as T_j , as a slow-down crisis if it spreads its effects in a one-year time window around a business cycle peak, denoted as T_{peak} . In other words, the classification rule for a slow-down crisis is such that:

$$|T_j - T_{peak}| \leq 1 \quad , \quad (1)$$

Hence, all other banking crises are classified as inner banking crises. According to Equation (1), a slow-down banking crisis can occur when the economy is still in an expansionary phase. Despite the fact that this definition could seem counterintuitive, we recall the evidence in Dwyer et al. (2013), who find that a decline in GDP is not necessarily observed in the year of the crises since the investigated episodes of banking crises are not always associated with contractions in the economy.

In addition, we classify boom-bust crises as a subset of the slowdown ones. Consistently with Fisher (1932) and Grossman (2016), suggesting that in crises originating from boom-bust-macroeconomic fluctuations it is the end of the expansion which triggers the crisis, we suggest that boom-bust crises have to be coincident or lagging with respect to the business cycle upturn:

$$0 \leq T_j - T_{peak} \leq 1 \quad (2)$$

However, Equation (2) is only a necessary condition to classify a boom-bust crisis, since excessive credit growth is supposed to be associated with an economic boom. In other words, there should be evidence of an unsustainable buildup of debt during cyclical upswings. Hence, we consider as evidence that “credit booms go wrong”, in Schularick and Taylor’s (2012) words, a peak in credit-to-GDP ratio preceding/coincident with the banking crisis. In addition, faster-than-usual economic growth is also expected to be at work in a business cycle marked by a boom-bust crisis.

As a reference cycle for business and credit we refer and update Bartoletto et al. (2017), who single out the turning points of Italian credit and business cycles, using a classical definition of cycle, based on turning points in the level of variables. In this framework, contractions are defined as sequences of absolute declines in the series, and expansions are defined as sequences of absolute increases. One year being the minimum time unit, the minimum duration of a phase is one year and that of a complete cycle (peak to peak) is two years⁴.

² As ably pointed out by Chaudron and de Haan (2014), the correct identification of the start and end dates of banking crises has important consequences for the synchronization with the economic cycle.

³ In 2012 MPS was the second Italian bank by the number of branches and the third by size of assets.

⁴ This definition of cycle with annual data was initially proposed by Watson (1994).

We report, in Table 1, a summary of the main statistics recorded by Bartoletto et al. (2015)⁵. For each banking crisis episode, we show the phase during which the crisis takes place and the annual (geometric) average growth rate recorded during the phase involved in the banking crisis. These rates are reported both for the credit and business cycles.

We split the sample of banking crises according to the phase of the business cycle (see Equation 1): crisis episodes that take place close to a GDP contraction are referred to as slowdown crises. Such crises occur during the onset of a recession or, alternatively, during a GDP contraction. Conversely, crises that do not occur in proximity to a business cycle peak are classified as inner banking crises. Slowdown crises are listed in the top part of Table 1, whereas in the bottom part of the Table we list the inner crises. In the sections below a detailed description of each crisis will be provided, with details on the joint dynamics of credit and GDP.

Table 1 Banking crisis and turning points in business and credit cycles

Year of the banking crisis	Business cycle (GDP) phase affected by the banking crisis	Growth rate* (%)	Credit cycle (loans) phase affected by the banking crisis	Growth rate* (%)
Slowdown banking crises				
1866	Downturn: 1866(M) -1867(m)	(-7.8)	Upturn: ...-1872 (M)	(na)
1887	Upturn: 1884(m) -1888(M)	(+2.2)	Upturn: 1880(m) -1888(M)	(+10.7)
1914	Downturn: 1913(M) -1915(m)	(-4.5)	Downturn: 1913(M) - 1918(m)	(-10.0)
1921	Downturn:1920(M) -1921(m)	(-2.9)	Upturn: 1918(m) - 1924 (M)	(+13.0)
1928	Upturn: 1927(m) -1929(M)	(+5.7)	Upturn: 1925(m) - 1933(M)	(+9.6)
1930-31	Downturn: 1929(M) -1931(m)	(-2.9)	Upturn: 1925(m) - 1933 (M)	(+9.6)
1935	Upturn: 1934(m) -1935(M)	(+5.4)	Downturn: 1933(M) - 1938(m)	(-4.6)
1990-95	Downturn: 1992(M) -1993(m)	(-0.9)	Downturn: 1993(M) - 1996(m)	(-1.9)
2011	Downturn:2011(M)-2013(m)	(-4.5)	Downturn: 2010(M)-2016 (m)	(-13.5)
Inner banking crises				
1868	Upturn: 1867(m)-1870(M)	(+2.4)	Upturn: ...-1872 (M)	(na)
1873	Upturn: 1872(m) -1875(M)	(+2.2)	Downturn: 1872(M) - 1873(m)	(-13.2)
1891	Upturn: 1889(m) -1913(M)	(+2.0)	Downturn: 1888(M)-1891(m)	(-5.2)
1893	Upturn: 1889(m)-1913(M)	(+2.0)	Downturn: 1892(M) - 1895(m)	(-1.7)
1907	Upturn: 1889(m)-1913(M)	(+2.0)	Downturn: 1906(M) - 1907(m)	(-1.2)
2013-16	Upturn: 2013(m)	(na)	Downturn: 2010(M)-2016 (m)	(-13.5)

Source: Our classification based on Bartoletto et al. (2017); updated. (*) Growth rate is the geometric mean of growth rate during the phase. (M): denotes the peak of the cyclical phase; (m): denotes the trough. The turning point in credit series in 2016 is estimated based on preliminary evidence on loans to the private sector in the first three quarters of 2017 (Bank of Italy 2017a).

⁵ In Bartoletto et al. (2017), the dating we refer to is called “short cycle”. They also introduce a second definition of cycle, so-called “medium cycle”, in order to catch longer fluctuations, linked to financial cycles.

3. Banking crises in Italy: a boom-bust mechanism? ⁶

The occurrence of a banking crisis during a business cycle downturn (see Equation 2) is only a necessary, not a sufficient condition for a boom-bust dynamic since, consistently with the interpretation by Grossman (2016), excessive credit growth is supposed to be associated with an economic boom. Hence, in order to classify boom-bust crises it is necessary to examine the joint dynamics of credit and GDP so as to ascertain whether in the years preceding the crisis there is evidence of an economic and credit boom. For this purpose we also examine the evolution of the credit-to-GDP ratio.

The credit cycle has recently emerged as a good early-warning indicator of financial and banking crises. Schularick and Taylor (2012) conclude that credit aggregates provide information about the likelihood of future financial crises, while Borio (2012) argues that most banking crises tend to be preceded by rapid credit expansion, occurring close to the peak of the financial cycle. Aikman et al. (2014), using logit regression in a panel of countries for more than one century of data, prove that the probability of being in a state of banking crisis increases when lagged growth in the ratio of bank loans to GDP increases. De Bonis and Silvestrini (2014) carry out a similar exercise for Italy. As a result, credit cycles based on credit or credit-to-GDP ratio are among the main macroprudential tools for macrofinancial stability, although there might be other variables which can be used as early warning indicators of future financial instability (Babecky et al., 2014). Finally, it should be pointed out that when a boom-bust mechanism is at work, financial and real downturns coincide and, in these cases, as proved by Claessens et al. (2011), Bordo and Haubrich (2010) or Bartoletto et al. (2015) for Italy, recessions are more intense.

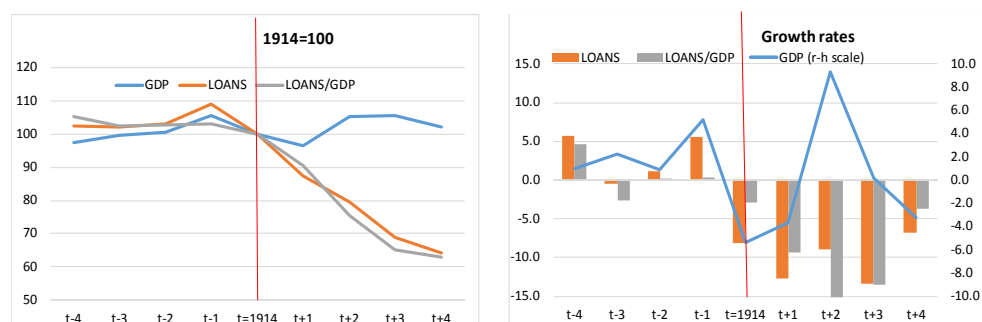
3.1. Boom-bust episodes

The 1914 crisis

The crisis of 1914 definitely has the characteristics of a boom-bust episode: the peak in GDP recorded in 1913 is associated to a sustained growth of credit aggregates, and the slowdown of the real economy triggered a persistent drop in the credit-to-GDP ratio, with severe consequences for the stability of the financial system as will be detailed shortly.

As a matter of fact, the GDP expansion which began in 1888 and ended in 1913 was one of the longest recorded in the history of unified Italy (Figure 1 and Bartoletto et al., 2017).

Figure 1 Business and credit dynamics around the 1914 crisis



⁶ We exclude from the analysis the crisis of 1866 since it occurred at the beginning of the sample and the dating of the financial cycle is not complete.

Particularly intense was the growth of the industrial sector, which was supported not only by credit policies but also by monetary, fiscal, and exchange rate policies (Toniolo, 2013). The economic expansion was fueled by a fairly intense credit growth starting from the banking reform of 1893-1894, that led to the institution of the Bank of Italy. The credit-to-GDP ratio reached a high of 27% in 1913: despite the large increase in loan aggregates (about +5% in 1913), the growth rate of the credit-to-GDP ratio in 1913 was slowing down because of turbulence in the financial system. Since 1912, many savings banks and other credit institutions had been in trouble because of excessive credit granted during the most prosperous years, in favor of companies that in the meantime had become involved in the crisis. The list of banks that had serious financial difficulties due to the high level of nonperforming loans is lengthy, and some failed (Bachi, 1914; Confalonieri, 1982).⁷

The sharp contraction of GDP in 1913, originating the short recession 1913-15, may be considered the triggering mechanism of the bust phase: it was associated to a severe credit contraction, and a persistent drop in the credit-to-GDP ratio (see right-hand side of Figure 1). The slowdown of industrial activity and economic activity especially severe in 1914 and 1915, hit large banks, especially the Banco of Roma, which suffered from a high level of nonperforming loans. The unfavorable trend in stock prices of securities held in the portfolios of banks worsened the situation (Toniolo, 1989). Large banks received capital injections from the government to cover losses also through the institution of the Consortium for Subsidies on Industrial Values (Consorzio per Sovvenzioni su Valori Industriali, CSVI) in 1914. Nonetheless, the situation worsened after Austria's declaration of war on Serbia (28 July 1914). Despite ordinary interventions by the monetary authorities (suspension of convertibility and an increase in the official rate of discount), immediate consequences were panic and bank runs. As a result, in 1914 the banking system experienced a very severe crisis, tackled with extraordinary interventions such as placing a limit of five percent on the reimbursement of deposits.

The consequences for the real economy of this banking crisis were undoubtedly softened by the political events and the economy of war. Towards the end of 1914, fiscal policy was used to counteract depression. The end of neutrality and the participation of Italy in WWI from May 1915 caused a further increase in public expenditure, with a leap in the public debt-to-GDP ratio (Bartoletto et al., 2014). The gold standard was abandoned in Italy, as in other countries, to tackle liquidity problems of the banking system and to finance military expenditures.

3.2. Slowdown crises without boom-bust dynamics

The characteristic common to all the episodes listed in this section is the absence of an evident economic and credit boom in the years immediately preceding the crisis. A graphical inspection of the years surrounding the crisis episode is helpful to better appreciate the dynamics at work during these crises.

⁷ The banks that had serious solvency problems were: Banca di Credito Popolare di Milano, Banca Popolare Cooperativa di Gubbio, Banca Cooperativa Progressista di Venafrò, Piccolo Credito Lecchese, Banca Mutua Popolare di Schio, Piccolo Credito Vicentino, Banca di Lecco, Banca Monzese, Banca Cooperativa "l'Unione" di Torino, Banca Cooperativa Romana, Banca Mutua Popolare di Savona, Banca di Varese di Depositi e Conti Correnti, Banca Popolare di Vicenza, Banca Scledense, Banca Cooperativa di Livorno, Cassa di Risparmio di Badia Polesine, Banca Piemonte di Acqui, la Banca Commerciale Pavese, and Banca Cooperativa Udinese (Confalonieri, 1982).

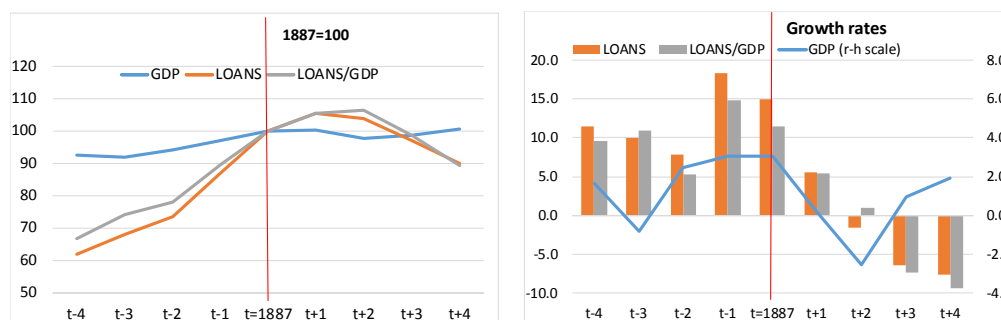
The crisis of 1887-93

Within this period, existing literature has recorded three different banking crisis episodes, namely 1887, 1891 and 1893. According to our classification rules (Equations 1 and 2), singularly taken they are classified as a slowdown crisis (1887) and inner banking crises (1891 and 1893).

In 1887, the Italian economy was experiencing a phase of expansion which started in 1884 and ended in 1888 (see Figure 2, left panel). Therefore the episode does not fulfill the conditions stated by Equation (2).

As the right-hand side of Figure 2 illustrates, the growth rate of GDP and credit reached a peak in 1886, while in 1887-88 the Italian economy suffered a slowdown. Although the slowdown of the real economy was temporary, the consequences for the Italian banking system were not short-term. Indeed, in 1887 there started a period of turbulence for credit aggregates, which led in the subsequent years to a credit contraction, which lasted until the early years of the new century.

Figure 2 Business and credit dynamics around the 1887 crisis



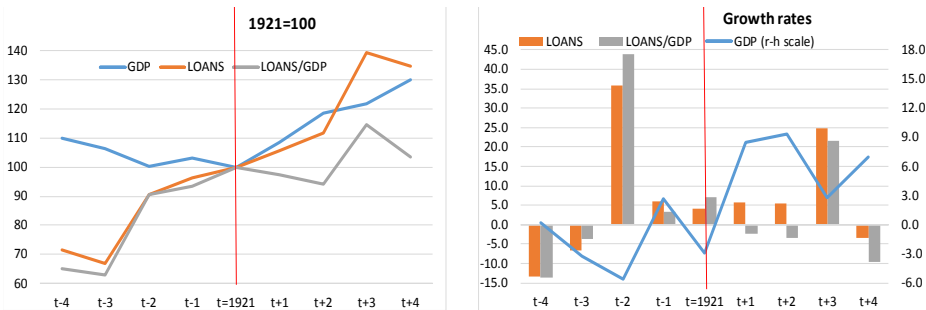
When the real estate boom slowed down in 1887-1888, both the commercial banks and the banks of issue experienced solvency problems. Financial difficulties were exacerbated by the beginning of a trade war with France, one of the most important international financial centers in that period. The impact on Italy's financial system and confidence on international capital markets was very adverse. By the late 1880s capital inflow had dried up and then reversed. Banks continued to suffer from a sharp decline in real estate prices and the increase in nonperforming loans. There were serious solvency problems in the credit system and two banks failed, namely the "Banca Tiberina" and "Banco di Sconto e Sete". Speculation in the construction sector had assumed colossal dimensions, starting with the growth of the construction industry in Florence between 1865 and 1871 and Milan between 1870 and 1880. Moreover, there was a strong acceleration of speculation from 1883, following the growth of the building industry in Rome between 1880 and 1888 and the law on restoration of the city of Naples (*risanamento Napoli*) that was approved as a consequence of the cholera epidemic in 1884. It was enough to buy building land, even by paying high interest rates, to achieve very high earnings within a few months. The Banca Tiberina was heavily involved in building speculation and to pursue its purposes largely resorted to loans from the Banco di Sconto e Sete and Banca Nazionale, which was the most important issuing bank. For this reason the failure of the Banca

Tiberina had negative consequences also on issuing banks, first the Banca Nazionale but also the Banco di Napoli which had previously been forced to grant new loans to the Banca Tiberina (Canovai, 1912; Luzzatto, 1960). The failure of the Banca Tiberina was followed by the scandal and the failure of the Banca Romana, another important issuing bank. To solve the banking system crisis a new banking law was passed in 1893 that led to the institution of the Bank of Italy, which absorbed the losses of the Banca Romana. Nonetheless, the crisis had extensive repercussions and two major private banks, the Credito Mobiliare and the Banca Generale, respectively failed in 1893 and 1894 (Pantaleoni, 1905).

The crisis of 1921

The banking crisis of 1921 might seem to be a suitable candidate for a boom-bust dynamic, since the condition stated by Equation (2) is met. The peak in the credit-to-GDP ratio recorded immediately before the crisis, and the considerable decline following the crisis are consistent with a boom-bust pattern. However, the Italian economy was experiencing, in the years immediately preceding the 1921 crisis, a very poor economic performance, with negative rates of growth (see the right-hand panel of Figure 3), which is not consistent with an economic boom. Hence we do not include this episode among the boom-bust crises.

Figure 3 Business and credit dynamics around the 1921 crisis



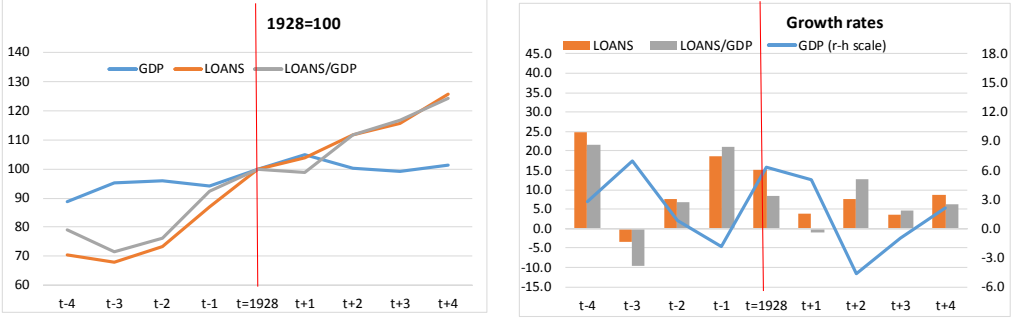
The banking system supported industry during the war, and it suffered a severe liquidity crisis when the war ended as a consequence of a sharp decline in industrial production. The percentage of nonperforming loans increased, especially for the third largest universal bank, the Banca Italiana di Sconto (BIS), which was seriously affected by the crisis of Ansaldo (one of the main steel producers). As a consequence there were bank runs. Despite the intervention of the Bank of Italy and the Government, the BIS failed after the Ansaldo crisis. The Banco di Roma was also on the verge of collapse but it was recapitalized after the rise to power of Fascism in 1922.

The 1928 crisis

The 1928 crisis originated in the default of the Catholic Banks (Banche Cattoliche) and is a newcomer to the internationally agreed banking crisis list, although Toniolo (1993) has investigated its characteristics. In 1926 the Credito Nazionale and about 50 Catholic Banks were on the verge of

bankruptcy. The crisis reached a peak between 1928-30 (Toniolo, 1993). The Banco di Napoli was also hit by the financial collapse of the Catholic Banks (Stringher, 1993). The crisis of the Catholic Banks represented a major threat to the integrity of the banking system: they were widely distributed and collected a huge amount of deposits.

Figure 4 Business and credit dynamics around the 1928 crisis



These events had non-negligible consequences for the dynamic of the credit supply, as evident in Figure 4 (right-hand panel) where a sharp decline in the growth rate of credit is recorded for 1929. The immediate recovery in credit aggregates is due to the fact that the Fascist government decided to rescue the Catholic Banks, especially to maintain good relations with the Vatican for the imminent “Concordato”. The “Istituto liquidazioni” of the Bank of Italy refinanced the Catholic Banks and the final solution for their crisis was found within the measures for the 1929 crisis.

We classify the crisis of 1928 as a slowdown crisis without boom-bust dynamic since the condition stated by Equation (2) is not binding. Indeed, if we consider the growth rate of GDP, the years immediately preceding the crisis experienced poor economic performance, which is not consistent with a boom-bust episode. In 1926 and 1927 the Italian economy experienced declining growth rates (0.8 and -1.9%, respectively). Conversely, in the years of the crisis we record a resurgence of the growth rate, peaking at 6% in 1928 and 5% in 1929.

The 1930-1935 crisis

During this period two different crisis episodes are recorded by the current literature, 1930-31 and 1935, although, as we will see below, we suggest that they are two episodes of a same crisis. Both of them meet the condition stated by Equation (2). However, we do not classify them as boom bust episodes since:

1. in the years preceding the 1930 crisis there is no evidence of a boom in the credit-to-GDP ratio (see Figure 5);
2. the crisis of 1935 occurred in the aftermath of the great recession and financial crisis of 1929, whose effect spread in Italy with some lags, with the worst performance recorded in 1930-31.

During the crisis of 1930-31 the main universal banks, Credito Italiano and Banca Commerciale, had serious solvency problems, and the intervention of the Bank of Italy and the “Istituto liquidazioni” was necessary.

As to the 1935 crisis, from visual inspection of the right-hand panel of Figure 6, it emerges that after a brief period of recovery in the dynamics of the credit aggregates, the period 1934-38 experienced a deep contraction in loans. The role of Government and the Bank of Italy was crucial to overcome the crisis. The banking system was reorganized with the 1931–1936 banking reform which established the end of universal banks. The State took over the major banks, namely Credito Italiano, Banca Commerciale and Banco di Roma and many other credit institutions, together with a significant proportion of large industrial companies.

Figure 5 Business and credit dynamics around the 1930 crisis

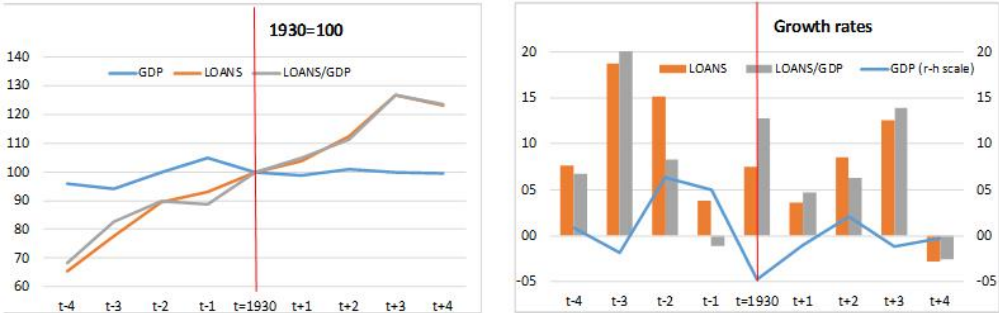
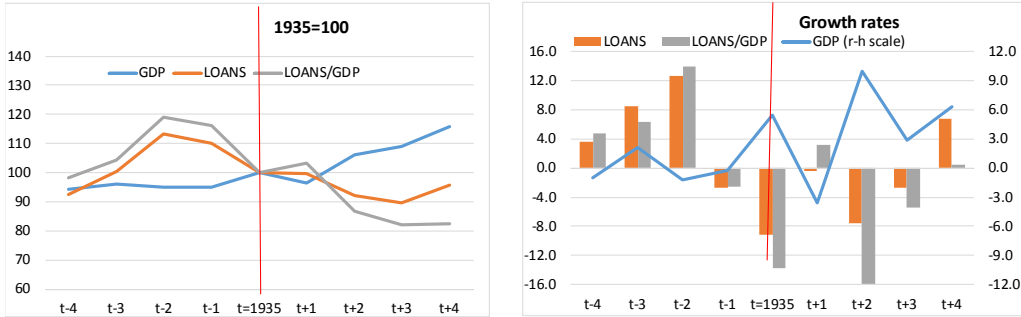


Figure 6 business and credit dynamics around the 1935 crisis



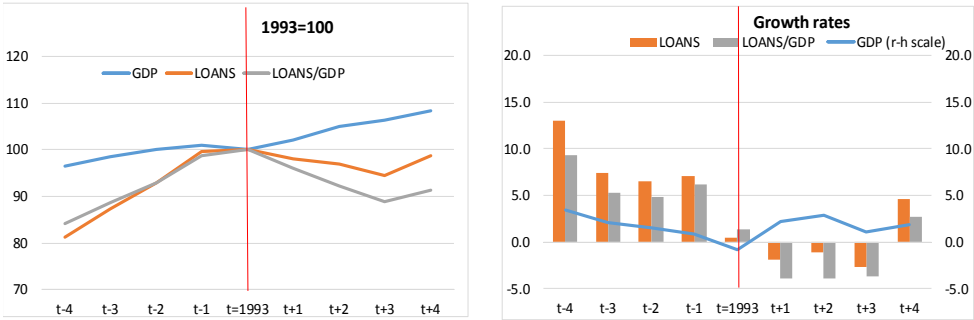
Despite the persistent difficulties encountered by the Italian financial system, the Italian economy did not suffer substantial consequences, except for a mild contraction in 1936, with a short recession that did not interrupt the positive GDP dynamic. The most reliable explanation is connected to political events, namely the war with Ethiopia, which drove up military spending from 4.7 to 10.4% of GDP, thanks to an increase in public debt financed through monetary policy.

The crisis of 1990-95

During the period 1990-95 many political events contributed to shape the severe credit and persistent contraction visible in Figure 7. There is no evidence of a boom-bust process, since during the 1990s the growth rate of GDP was not so rapid as to merit the term "boom". This type of banking crisis is

difficult to classify because it is linked exclusively to the regions in southern Italy and lasted for several years. For example, the Banco di Napoli crisis exploded between 1994 and 1995, that of the Banco di Sicilia between 1993 and 1995, but the seeds of the crisis started many years before.

Figure 7 business and credit dynamics around the crisis of 1993



The problem of the southern Italian banking system is a structural problem rather than a phenomenon linked to the situation of credit or the economy. The overall situation of the southern banking system in the first half of the 1990s has been described as catastrophic (Bodo and Viesti, 1997). Suffice it to cite the increase in bad loans/loans ratio between 1993 and 1996 for the center-north banking system from 5.7 to 7.9, while for banks in the South of Italy the same ratio rose from 10.2 to 25.4. The Banco di Napoli experienced losses of 1,147 billion lire and almost 3,200 billion lire, respectively in 1994 and 1995. The troubles of the southern Italian banks (Banco di Napoli, Banco di Sicilia, Sicilcassa, Caripuglia etc.) are related to the poor performance of the economy at the beginning of the 1990s and to the end of the “Special Intervention” (Intervento Straordinario) in the southern regions. However, other factors created system bankruptcy, such as poor management of the banking system, the massive presence of politics within the system, which largely consisted of state-owned banks, and a staff management and credit policy aiming to increase political consensus rather than pursue economic efficiency. In the same years, the banking systems of the major industrial countries (France, Spain, the USA and Japan) experienced severe crises and deep restructuring. The challenge of overcoming difficulties prompted restructuring and changes in organization to increase productivity and reduce costs, at times with the intervention of public funds of significant magnitude (Bank of Italy, 1994-1996).

The sovereign debt crisis of 2011

The impact on the Italian banking system of the financial crisis started with the explosion of defaults in the US subprime mortgage sector was initially relatively moderate compared with other countries. The limited presence in their balance sheets of structured financial products, their specialization in traditional banking, their lesser dependence on wholesale funding markets, specialization in traditional activities and a prudent regulatory and supervisory framework are the factors underpinning the soundness of Italian banks. As a matter of fact, until late 2012 early 2013, there is no evidence of a veritable banking crisis in the sense referred to by Grossman (1996).

However, Italian banks have been affected by the drying up of international liquidity and the heightened perception of the risks of banking. In addition, in 2009, bank balance sheets showed a marked deterioration in loan quality as a result of the recession that began in the second quarter of 2008. The flow of bad debts grew rapidly, especially with regard to corporate borrowers, and with the progressive deterioration in the quality of loans, credit supply conditions were tightened, also because of the difficulties in raising funds on the international wholesale markets.

In this difficult situation in 2011 came Europe's sovereign debt crisis, which originated in Greece and rekindled the financial crisis. Although 2011 is not the year of a strictly defined banking crisis, the sequence of events that occurred brought about a situation in the Italian banking system which was similar to what Bordo et al. (2001) depict as a banking crisis. The increase in sovereign risk strongly affected banks' balance sheets, leading to big losses in banks' securities portfolios and increasing the cost and availability of financing for banks on the interbank, bond and stock markets. Placements of commercial paper and certificates of deposit fell considerably and issues of bank bonds declined more sharply than in the months preceding the collapse of Lehman Brothers⁸ (FSR, 2011).

While the sovereign debt crisis affected the credit sector, the severe fiscal adjustment measures impacted on domestic demand⁹. This second recession started in 2012 (the so-called double-dip recession, IMF 2013) depressed demand for credit and deteriorated credit quality and inflated non-performing loans¹⁰, while the acceleration in firms' insolvencies increased risk aversion of intermediaries and led to a further tightening of credit supply, resulting in a credit crunch.

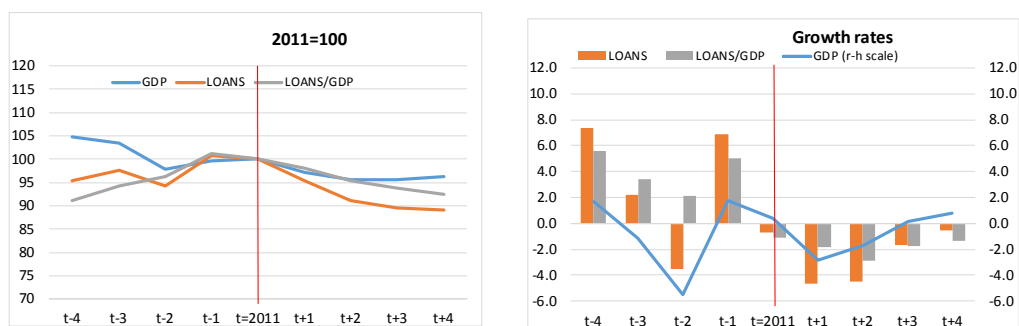
As to the 2011 crisis, from visual inspection of the right-hand panel of Figure 8, it emerges that after a brief period of recovery in the dynamics of the GDP and credit aggregates after 2009 recession, in 2010 a spike in the credit-to-GDP ratio is evident, followed in 2011 by a new contraction in loans and one year later in GDP. Although the timing of the crisis is consistent with the condition stated by Equation (2) for a boom-bust, and the credit-to-GDP ratio dynamic would support this interpretation, the crucial point that does not allow this episode to be classified as boom-bust is that in 2009 Italy had already been hit by the worst economic crisis of the post-war period.

⁸ Albertazzi et al. (2012) find that a rise in the spread between the Italian and German 10-year sovereign rates is followed by an increase in the cost of wholesale funds and of certain forms of retail funding for Italian banks, with a larger impact during the sovereign debt crisis. The Italian case is interesting because the direction of causality is clear – initially the instability of the sovereign debt market affected domestic banks, and not vice versa (Angelini et al., 2014). The stronger impact of the second part of the crisis (the sovereign one) on banks is also proved by Affinito et al. (2016).

⁹ According to the Bank of Italy (2013), the contraction of economic activity in Italy in 2012 can be ascribed almost entirely to the repercussions of the sovereign debt crisis.

¹⁰ Compared to the values observed before the crisis, the share of bad loans on total loans tripled in five years, reaching 16.0 percent in December 2013 (5.3 per cent at the end of 2007; Bank of Italy 2014).

Figure 8 business and credit dynamics around the 2011 crisis



After this spike, contraction in loans in 2012-2013 was even stronger than in 2009 (-4.6 and -4.5 per cent against 3.5 in 2009). The role of ECB was crucial to overcome the crisis. To face the strains on the sovereign debt markets, in August 2012 the ECB announced a new measure, Outright Monetary Transactions (OMTs) on the secondary market for government securities, which consisted in secondary market purchases of government securities of countries that had requested financial assistance under European Commission and IMF supervision.

4. Inner banking crisis: historical evidence¹¹

In the previous section we showed that not all the crises that occurred close to an economic peak were associated to a boom-bust mechanism. This evidence appears to suggest that, in Italy, the interaction between banking crises and output was not so harmful as suggested for recent decades by Babecky et al. (2014). Conversely, in some of the years classified as banking crises in Table 1, the Italian economy was experiencing a positive growth of GDP.

In this section we focus on crises that are not connected to a GDP peak, in the sense that they did not occur close to a GDP peak. Since there is no evident connection with the GDP dynamic, we could classify these crises as "inner banking crises". This is the case for the crises recorded in 1868, 1873, 1891-93, 1907 and 2013-16. We classify these crises as inner-banking crises, meaning that their effects are mostly spread within the banking /financial systems.

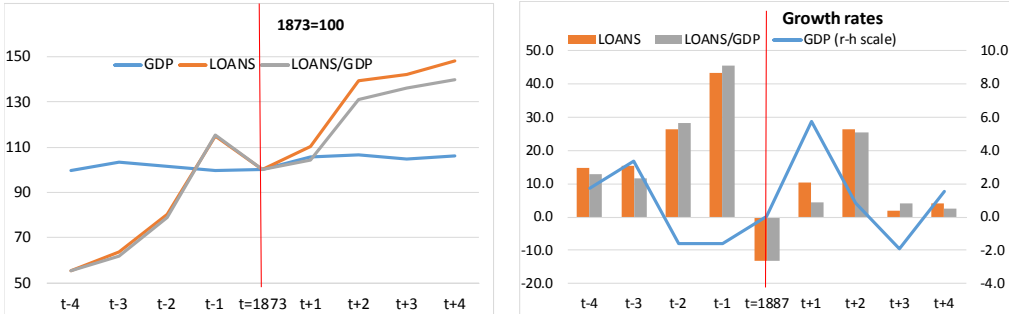
The crisis of 1873

From 1867 to 1873 (after the declaration of "corso forzoso"), money circulation doubled and the increase was particularly strong between 1871 and 1873. The growth of money circulation fueled banking speculation, not only from commercial banks but especially from issuing banks, which financed through long-term loans not only railroad construction but also other companies from different sectors (La Francesca, 2008). In 1873 the bubble burst, as shown by the strong credit

¹¹ We exclude from the analysis the crisis of 1868 since it occurred at the beginning of the sample and the dating of the financial cycle is not complete.

contraction (-13.2 % in real terms in one year). Issuing banks were especially hit by difficulties recovering past-due credit and the large amount of bad loans.

Figure 9 business and credit dynamics around the 1873 crisis

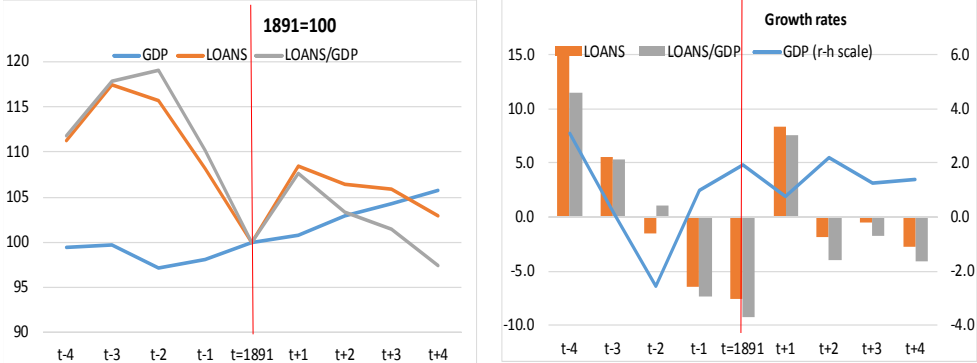


Despite the strong credit contraction, there was only a mild effect on GDP, which remained simply flat (Figure 9). The following year, GDP had resumed growth and two years later, credit had already surpassed its pre-crisis level and GDP. That was also the result of a significant stabilization attempt made with the 1874 reform of the issuing banks (Bartoletto and Garofalo, 2014).

The crisis of 1891

In 1891 the Italian economy was experiencing a moderate expansion whereas a deep credit contraction was at work (Figure 10).

Figure 10 Business and credit dynamics around the 1891 crisis

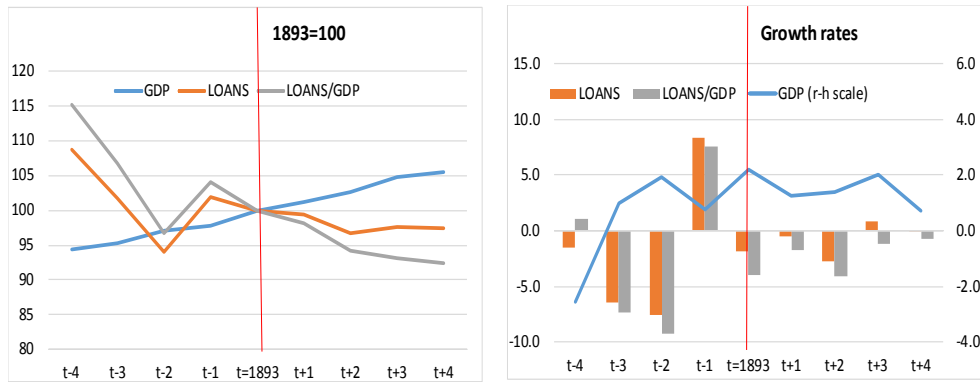


This crisis, as well as the next one, can be considered a prolongation of the credit turbulence which started in 1887, commented upon in the previous section 3.2.

The crisis of 1893

A similar situation is recorded in 1893 when the banking crisis did not interrupt the GDP rate of growth, whereas a moderate credit contraction started with the onset of the banking crisis, and credit contraction went on for many years (Figure 11; see section 3.2).

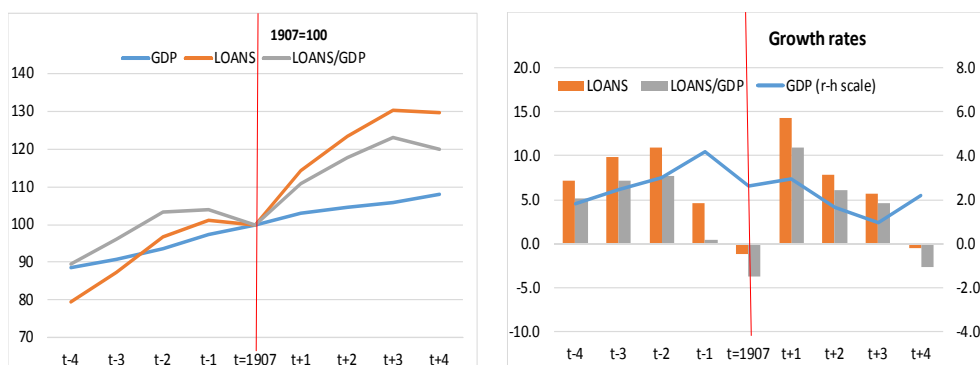
Figure 11 Business and credit dynamics around the 1893 crisis



The 1907 crisis

The banking crisis of 1907, classified by Reinhart and Rogoff (2009) as a global financial crisis, originated in turbulence in international financial markets, where stock speculation bubbles burst (especially in the US) when major European banks increased the official discount rate. In the US, where the panic of 1907 was one of the most severe according to Mishkin (1991), several banks failed, with a run on deposits and gold (Sprague, 1908). The monetary and financial crisis of the United States had a major impact on world markets. Yet for its consequences in Italy, this is classified as an inner banking crisis. There were credit restrictions and one of the main universal banks, the “Società Bancaria Italiana” (SBI), was on the verge of bankruptcy. With regard to economic performance, in 1907 we only observe a mild slowdown in the GDP growth rate. What is peculiar is that, unlike the preceding crises, there was an immediate recovery in credit aggregates.

Figure 12 Business and credit dynamics around the 1907 crisis



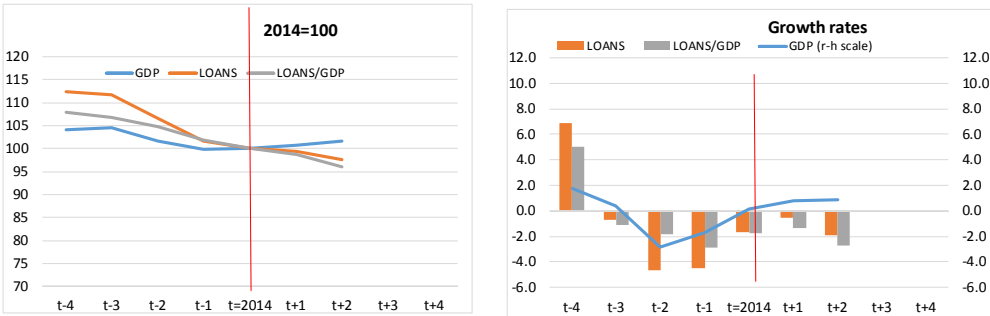
Financial stability was maintained and GDP growth did not suffer greatly (Figure 12) thanks to the Government and the Bank of Italy which intervened to provide support for the banking system. There was a major injection of liquidity: the Bank of Italy increased money circulation and the Government anticipated coupon payments. To avoid the failure of the SBI, the Bank of Italy coordinated the creation of a consortium that included other issuer banks (Banco di Napoli and Banco di Sicilia), and the main universal banks (Banca Commerciale, Credito Italiano). In the spring of 1908, the crisis was over. Moreover, the crisis of 1907 had important repercussions on Italian financial markets because

the stock exchange lost that dynamism that had characterized previous years. While in other advanced economies the Stock Exchange had been playing an increasingly important role, in contrast in Italy after the 1907 crisis the stock market suffered a setback and the financial system became definitively bank-oriented (Bartoletto and Garofalo, 2014).

The crisis of 2013-2016

This section is largely “in progress” as it concerns the present day and information is still incomplete. Yet macroeconomic data are available and it is worth including these years in our analysis.

Figure 13 Business and credit dynamics around the 2013-16 crisis



Between 2012 and 2016 many (generally small) banks were subject to special administration procedures or liquidation as a consequence of the worsening of their balance sheets, adversely hit by the prolonged economic and financial crisis.

The notable exception was the Monte dei Paschi di Siena, the third Italian bank in terms of assets, which had carried out from 2008 a series of very risky and irregular operations, hidden from the Supervisory Authority. This situation interacted with the effect of the economic crisis and caused serious liquidity problems and capital losses from 2012. At the end of 2016 the Monte dei Paschi di Siena applied for precautionary State recapitalization of about € billion after the failure of private recapitalization in 2014 (Bank of Italy 2017b).

Among other banks deserving special attention, there are four small banks (Banca delle Marche, Banca Popolare dell'Etruria and of Lazio, Cassa di Risparmio di Ferrara, Cassa di Risparmio di Chieti), which overall held about one percent of deposits of the Italian banking system, for which for the first time in Italy, the European Bank Recovery and Resolution Directive (BRRD) introduced in 2014 was applied, in order to manage the crisis. The crisis was caused by worsening loan quality after years of economic recession¹², capital losses, but also serious problem of poor management. For each of the four banks, the “good” and “bad” portions of the balance sheet are separated. The original four banks become residual boxes where the losses and their absorption instruments are confined; they are immediately liquidated. The virtuous banks (bridge banks) will continue the activity of the old ones, having been cleaned and recapitalized (Bank of Italy, 2015).

¹² Banca delle Marche was based in the Marche region where, at the end of 2014, the share of nonperforming loans (NPLs) on total loans was 34.4 per cent, 10 percentage points higher than the Italian average: clear evidence of the impact of economic recession on the local banking system.

Finally, in 2017, two main north-eastern banks in the Veneto region (Veneto Banca and Banca Popolare di Vicenza) were put into liquidation and taken over by a major Italian Bank (Intesa San Paolo). In the previous years, the two banks had been hit by the sharp increase in credit risk caused by the persistent economic crisis¹³ and had put in place irregular practices and repeatedly concealed important information from the Supervisory Authority, which had contributed to the failure of an attempt at private recapitalization in 2016 (Barbagallo, 2017c).

Despite this list of financial collapses, widespread in the Italian banking system, there was no significant spillover from the financial to the real sector, mainly thanks to the action taken by the Italian Government and Bank of Italy in order to favor an ordered “conclusion” of intermediaries in distress. As shown in Figure 13, financial trouble in the banking sector did not prevent GDP from growing again in 2014-2016, although at a very slow pace, after the recession caused by the 2011 sovereign debt crisis. The effect on the credit sector entailed a significant reduction in real credit in 2014-2016, albeit smaller than that brought about by the 2011 crisis.

5. Econometric analysis

In this section we provide support for our classification through a Vector AutoRegression (VAR) model, investigating whether episodes of banking crises that occurred in the time span considered herein played a different role in the evolution of the GDP rate of growth. In so doing, we set out to ascertain whether it is possible to detect some features that empirically define specific types of crisis. The general VAR(p) representation, where y_t is a vector of K endogenous variables, reads as follows:

$$y_t = \gamma + A_1 y_{t-1} + \dots + A_p y_{t-p} + u_t$$

where γ is a vector of $(K \times 1)$ intercept terms, and A_i are $(K \times K)$ coefficient matrices and u_t is a white noise disturbance term. In our setting, $K=2$, and the variable of interest are GDP and Loans. Differently from the narrative approach adopted in sections 3 and 4, here we are mostly interested in classifying crises according to their impact on real economy. Therefore, also in a perspective of a parsimonious estimation, we prefer not to include the credit-to-GDP ratio as an endogenous variable. As an alternative estimation strategy, we could have estimated a biVAR using GDP and the credit ratio as endogenous variables. However, we would incur the risk of not being able to classify crises according to our definition, since in some events the effect of the crisis on GDP and loans is the opposite and the final effect on the credit-to-GDP ratio would be indefinite.

Since the business cycle dating we are referring to (Bartoletto et al., 2017) is based upon the classical dating approach (NBER), we focus on the rate of growth of bank loans, the variable Δl_t , and the rate of growth of GDP, the variable Δy_t . In the appendix it is demonstrated that both variables are $I(0)$, which allows us to model a biVAR that reads as follows:

$$\begin{aligned} \Delta y_t &= \sum_{i=1}^K a_i \Delta y_{t-i} + \sum_{i=1}^K b_i \Delta l_{t-i} + \sum_{j=1}^{15} c_j D_t(T_j) + \sum_{j=1}^{15} d_j D_t^{\text{lag}}(T_j) + u_t^y \\ \Delta l_t &= \sum_{i=1}^K a'_i \Delta y_{t-i} + \sum_{i=1}^K b'_i \Delta l_{t-i} + \sum_{j=1}^{15} c'_j D_t(T_j) + \sum_{j=1}^{15} d'_j D_t^{\text{lag}}(T_j) + u_t^l \end{aligned} \quad (3)$$

¹³ At the end of 2016, the share of nonperforming loans (NPLs) on total loans was 20.9 per cent, three percentage points higher than the Italian average, witnessing again the strong impact of economic recession on the local banking system.

where K is maximum number of lags included in the VAR process, in our specification $K=2$ (see the appendix for formal test) and 15 is the number of banking crisis episodes listed in Table 1.¹⁴ Each j^{th} crisis occurs in a specific year, denoted as T_j . The goal is to test whether the different categories of banking crises have a different effect on the two endogenous variables. For this purpose, we model appropriate impulse dummy variables for each crisis episode, such that:

$$D_t(T_j) = \begin{cases} 0 & \text{for } t \neq T_j \\ 1 & \text{for } t = T_j \end{cases} \quad (4)$$

This way of modeling the dummy variables implies that a statistically significant c_j (c_j') means that the banking crisis has generated a permanent shift in the level of GDP (loans). Actually, when an isolated outlier is detected in the first difference of a time series it signals the existence of a permanent change in the level of the variable.¹⁵

In order to better appreciate, when significant, the effect of the banking crisis in our VAR process, it is of interest to establish whether the exogenous change in the level of GDP/loans triggered by the banking crisis is temporary or permanent, and, in the latter case, whether there is evidence of change in the trend of the variable. For this purpose, a second dummy variable is added to the estimated VAR model, which is formulated as follows:

$$D_t^{\text{lag}}(T_j) = \begin{cases} 0 & \text{for } t \neq T_{j+1} \\ 1 & \text{for } t = T_{j+1} \end{cases} \quad (5)$$

This specification has major implications: a) when the banking crisis has only a transitory effect on GDP and credit, the current and lagged dummies (respectively c_j and d_j) will present opposite signs; b) alternatively, when the signs of the coefficients turn out to be the same, a structural break is implied, measured by a change in the trend of the GDP/loans variable; c) finally, when the estimated coefficient for the lagged dummy, d_j , is not significant, this means that the banking crisis has triggered a change in the level of the variable, without any effect on its trend.

The estimated coefficients c_j and d_j for the equation of the GDP, and the coefficients c_j' and d_j' in the loans equation in the VAR process are reported, along with the level of significance, in Table 2.¹⁶

When examining Table 2, we observe that the episode classified as boom-bust (1914) and the sovereign debt crisis (2011) have a significant and negative effect on the GDP growth rate (coefficient c_j), respectively -10% and -3%, as well as (coefficient c_j') on the growth rate of credit (-15% and -6%). In all the remaining slowdown crises, when significant effects are found for the dummies $D_t(T_j)$, they never operate simultaneously on GDP and credit. To be precise, for all the remaining slowdown crises, there is no evidence of a negative effect on credit (c_j' and d_j' are never significant). This indirectly supports our classification separating slowdown crises from inner banking system crises.

¹⁴ By using an LR test we evaluated whether the exclusion of the dummy variables from the VAR model of Equation (3) significantly reduces the fit of the model. According to our estimates, the log-likelihood of the less restrictive model (Equation 3) is 464.54 whereas the log-likelihood of the restricted VAR (without the dummies) is 428.11. This difference is statistically significant. Thus the VAR model accounting for the banking crises fits the data significantly better than the more restrictive model.

¹⁵ See Juselius (2007) for details about modeling dummy variables in a simple regression and in a VAR model.

¹⁶ Full estimates and diagnostic test are provided in the appendix.

Table 2 Impact and persistence of slowdown crises on GDP and credit growth
(VAR estimated, c_j, c_j', d_j, d_j' coefficients)

Variable	coef.	1866	1887	1914	1921	1928	1930-31	1935	1990-95	2011
GDP	c_j	-0.02	-0.009	-0.1***	-0.02	0.04***	-0.05***	0.07***	-0.005	-0.03**
	d_j	-.08***	-0.009	-0.005	0.08***	0.03*	0.03***	-0.06***	-0.005	-0.01**
Loans	c_j	-.02	.03	-.15***	0.09	.05	-0.007	-.06	0.02	-.06**
	d_j	.06**	-.01	-.08	-0.03	-.02	0.04	-0.001	-0.03	-.05*

Note: Coefficients as estimated in VAR analysis, Table A4, see the Appendix.

As already commented above, the sudden decline in the growth rate of real activity and credit supply in the year of the banking crises implies a permanent and negative effect on the level of GDP and credit provision. This evidence of a permanent shift in the level of both variables in 1914 confirms that in boom-bust episodes banking crises have the worst economic consequences, since they negatively affect the real economy and financial intermediation simultaneously.

As to 2011, although it cannot be strictly termed a banking crisis year, it is certainly an episode of severe difficulties for the Italian banking system originating from tensions in the sovereign debt market (Albertazzi et al., 2014; Neri and Ropele, 2015), and our estimates also show that substantial and negative consequences have been recorded also for economic performance. In addition, the negative effects originating from the sovereign debt crisis of 2011 have generated a persistent change in the trend for GDP (the effect of lagged dummy, as measured by d_j is statistically significant), and, to some extent, for credit.

As for the remaining slowdown crises, in 1928 and 1935 the dummy controlling for the year of the banking crisis is estimated to have a statistically significant but positive effect on GDP growth rate. The common feature of these two episodes is the fact that GDP was still growing during the banking crisis (see Table 1), and the VAR correctly captures this anomaly. However, for the banking crisis of 1935, the estimated d_j coefficient is negative and significant, suggesting that this crisis spread its effect on aggregate economic activity with some delay.

Finally, with regard to the early 1930s crisis; not classified as boom-bust, there is no significant impact on bank credit and the effect of the shock appears to be temporary, since the estimated coefficients for current and lagged dummies have opposite signs.

Table 3 Impact and Persistence of inner-banking crises on GDP and credit
(VAR estimated, c_j, c_j', d_j, d_j' coefficients)

Variable	coef.	1868	1873	1891	1893	1907	2013-16
GDP	c_j	0.04**	-0.01	0.01	-0.03*	0.01	-0.008
	d_j	0.014	0.16***	-0.02*	0.01	0.014***	-0.0005
Loans	c_j'	0.03	-0.28***	-0.06*	-0.12***	-0.05***	-0.04
	d_j'	0.13***	0.28**	0.07**	0.00E+00	0.11***	0.002

Note: For coefficients as estimated in VAR analysis, Table A4, see the Appendix.

When we turn to inner banking crises (Table 3), we find support for the intuition that these crises unfolded without significant real effects, since none of the relevant dummy variables listed in Table 3 is statistically significant in explaining the rate of growth of GDP, with the exception of the episode in 1868, when the estimated c_j coefficient is positive, and some weak evidence of a recessionary effect in 1893. By contrast, for the loans equation, almost all the episodes classified as inner-banking crises display a significant and negative effect on the rate of growth of credit, with the exception of 1891. Notably, the 1873 banking crisis is estimated to have severely affected the growth rate of credit, with an intensity of as much as -28%, mainly due to the bust of a credit bubble, whose effect was however transitory. In this sense the VAR model correctly interprets the sequence of events commented in the previous section.

Finally, as to the current banking crisis, the available data suggest that it played no significant effect, although the fact that it coincides with the end of the sample generates some doubt as to the reliability of the estimated coefficients.

6. Concluding remarks

In this work we proposed a method to classify banking crises in terms of their connection with business cycle downturns. In order to overcome the problem of causal identification, we use a narrative approach to describe and classify the episodes of crisis in the Italian banking system. Nonetheless, the validity of the classification proposed is also confirmed through a simple VAR model, where it proves to be strictly related to GDP and bank loan dynamics.

In order to classify historically recognized banking crisis episodes, we look at credit and GDP dynamics (and their ratio) around crisis years. We avoid relying on a single definition of crisis: our classification provides an empirical rule to determine in what way banking crises differ. The classification is mostly based on the synchronization with the business cycle and, using the documented evolution of macroeconomic aggregates, it permits us to highlight the fact that a variety of interactions occur between financial and real aggregates during and around banking crises.

First of all, banking crises are not always associated to economic downturns. Especially in Italy, (but our analysis can be easily extended to other countries), they have often limited their negative effects within the financial system (“*inner*” crises), as in 1868, 1873, 1891-93, and 1907. For these episodes, the estimated VAR confirms that the financial turbulence in question only affected the growth rate of credit. Similarly, the banking crisis which led to bail-in procedures and capital downsizing in the period 2013-16 did not produce serious consequences for aggregate economic activity. However, the recent and still ongoing phase of troubles in the banking sector is less easy to interpret, also because it is exactly at the end of the sample considered here.

All other banking crises are classified as “*slowdown*” crises, because they occur close to a GDP contraction. Still, the simultaneity of macroeconomic effects (credit contraction and GDP recession) leaves the causal link undetermined. In particular, in some of the Italian banking crises (1921, 1935, 1990-95), the financial distress seems to be the result of a deterioration in economic conditions.

In 1914 the GDP recession and the credit contraction fit with the idea of a boom-bust mechanism at work, similar to that described by Grossman (2016), when a slowdown, as defined above, is preceded by a credit boom. In the crisis of 1914, the estimated VAR shows that the financial distress resulted in

a statistically significant contraction of both credit and GDP, with enduring effects on the aggregates involved.

As to the recent financial distress experienced in the Italian banking system, and to some extent still ongoing, our estimates show that the most severe consequences for intermediation and economic activity were triggered by the sovereign debt crisis of 2011. However, for this episode there is no evidence of credit boom, unless we extend our definition of excessive credit growth to include public finance aggregates. However, this goes beyond the scope of this research.

The empirical and narrative analyses that we performed testify that boom-bust mechanisms are an exception in the panorama of (Italian) banking crises, although when the economy experiences such episodes, the economic and social consequences are not only severe but also enduring.

Acknowledgements

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Appendix

Figure A1
GDP, level (left) and first difference (right)
(log transformed, constant prices 2005)

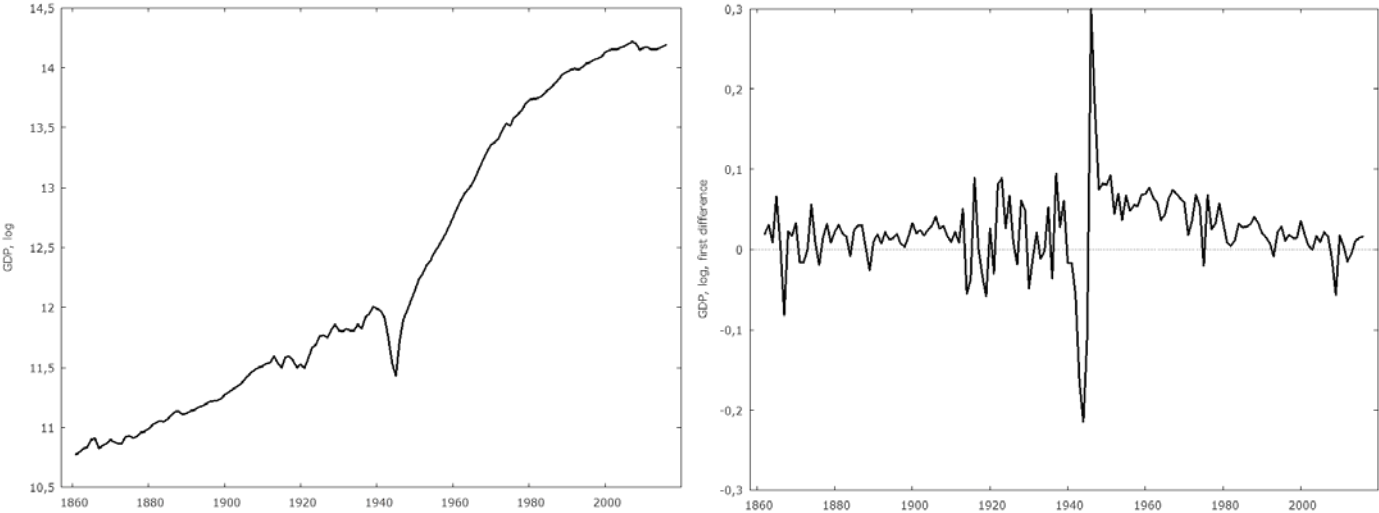


Figure A2
Loans, level (left) and first difference (right)
(log transformed, constant prices 2005)

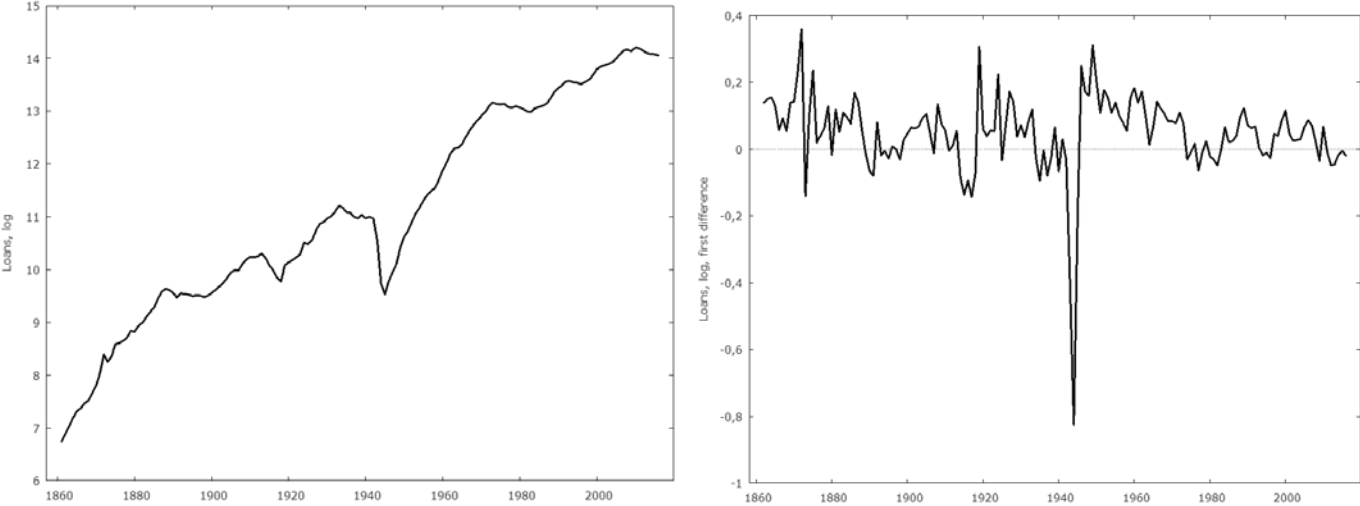


Table A1
ADF test
(null *hp*: unit root)

Model	GDP level	GDP first diff	Loans level	Loans first diff
constant	0.249852	-7.52742***	-127,165	-5.23898***
<i>pvalue</i>	0.976	0.000	0.645	0.000
Constant and trend	-185,369	-7.55075***	-3.14616*	-5.26689***
<i>pvalue</i>	0.6783	0	0.09563	0

Table A2
Lag selection VAR1

Lag	Log Ver.	pv(LR)	AIC	pv	BIC	pv
1	420.16	0.00	-5.09		-4.37	
2	437.04	0.00	-5.26		-4.46	*
3	444.03	0.01	-5.30	*	-4.42	
4	445.42	0.60	-5.26		-4.30	

Table A3
Lag selection VAR2

Lag	Log Ver.	pv(LR)	AIC	pv	BIC	pv	HQC	pv
1	433.20		-4.86		-3.54		-4.33	
2	458.41	0.00	-5.14		-3.75	*	-4.58	
3	466.45	0.00	-5.20	*	-3.72		-4.60	*
4	469.21	0.24	-5.18		-3.62		-4.55	

Notes: pv=p-value; * <10%; **<5%; <1%.

Table A4

Model VAR with contemporary and lagged crisis dummies

AIC = -5.1574					Lags	2			
BIC = -3.7709					OBS	153			
HQC = -4.5942					Log ver	464.54			
	test	pvalue							
Portmanteau	181.61	0.02							
Robust s.e.									
Eq.1 d_I_Loans_tot_K	Coef.	s.e.	t-test	p-value	Eq.2 d_I_GDP_K	Coef.	s.e.	t-test	p-value
const	0.020	0.022	0.90	0.37	const	0.015	0.008	1.99	0.05 **
ld_loans_k_1	0.576	0.234	2.46	0.02 **	ld_loans_k_1	0.175	0.064	2.75	0.01 ***
ld_loans_k_2	-0.320	0.203	-1.58	0.12	ld_loans_k_2	-0.253	0.125	-2.03	0.05 **
ld_GDP_k_1	0.399	0.414	0.96	0.34	ld_GDP_k_1	0.398	0.127	3.14	0.00 ***
ld_GDP_k_2	0.319	0.290	1.10	0.27	ld_GDP_k_2	0.088	0.106	0.83	0.41
d1866	-0.017	0.023	-0.74	0.46	d1866	-0.019	0.012	-1.55	0.12
d1866_1	0.057	0.024	2.34	0.02 **	d1866_1	-0.082	0.010	-8.37	0.00 ***
d1887	0.026	0.023	1.13	0.26	d1887	-0.009	0.007	-1.37	0.17
d1887_1	-0.014	0.022	-0.61	0.54	d1887_1	-0.009	0.011	-0.81	0.42
d1914	-0.156	0.014	-10.81	0.00 ***	d1914	-0.098	0.007	-14.96	0.00 ***
d1914_1	-0.083	0.054	-1.54	0.13	d1914_1	-0.006	0.013	-0.45	0.65
d1921	0.091	0.070	1.29	0.20	d1921	0.017	0.035	0.49	0.63
d1921_1	0.036	0.031	1.15	0.25	d1921_1	0.084	0.009	9.50	0.00 ***
d1928	0.050	0.034	1.50	0.14	d1928	0.042	0.011	3.71	0.00 ***
d1928_1	-0.027	0.030	-0.89	0.38	d1928_1	0.030	0.015	1.96	0.05 *
d1930_31	-0.007	0.043	-0.16	0.87	d1930_31	-0.053	0.009	-5.78	0.00 ***
d1930_31_1	0.040	0.050	0.81	0.42	d1930_31_1	0.033	0.012	2.82	0.01 ***
d1935	-0.056	0.044	-1.27	0.21	d1935	0.075	0.014	5.20	0.00 ***
d1935_1	0.001	0.036	0.03	0.98	d1935_1	-0.062	0.009	-7.07	0.00 ***
d1990_95	0.018	0.030	0.59	0.56	d1990_95	0.005	0.013	0.40	0.69
d1990_95_1	-0.03	0.03	-1.02	0.31	d1990_95_1	-0.01	0.01	-0.45	0.65
d2011	-0.07	0.03	-2.55	0.01 **	d2011	-0.03	0.01	-2.38	0.02 **
d2011_1	-0.05	0.03	-1.82	0.07 *	d2011_1	-0.02	0.01	-2.16	0.03 **
d1868	0.03	0.05	0.59	0.56	d1868	0.04	0.02	2.35	0.02 **
d1868_1	0.13	0.04	3.27	0.00 ***	d1868_1	0.01	0.01	0.97	0.34
d1873	-0.28	0.06	-4.37	0.00 ***	d1873	-0.01	0.02	-0.55	0.59
d1873_1	0.28	0.11	2.56	0.01 **	d1873_1	0.16	0.05	3.20	0.00 ***
d1891	-0.06	0.03	-1.78	0.08 *	d1891	0.01	0.01	1.23	0.22
d1891_1	0.07	0.03	2.50	0.01 **	d1891_1	-0.02	0.01	-1.81	0.07 *
d1893	-0.12	0.03	-4.15	0.00 ***	d1893	-0.03	0.02	-1.68	0.10 *
d1893_1	2.44	0.03	82.31	1.00	d1893_1	0.01	0.01	1.32	0.19
d1907	-0.05	0.02	-3.09	0.00 ***	d1907	0.01	0.01	1.33	0.19
d1907_1	0.11	0.02	5.58	0.00 ***	d1907_1	0.01	0.01	2.71	0.01 ***
d2013_16	-0.04	0.03	-1.14	0.26	d2013_16	-0.01	0.01	-1.02	0.31
d2013_16_1	0.00	0.02	0.16	0.87	d2013_16_1	0.00	0.01	-0.10	0.92
R-squared	0.44	R-squared adj	0.28	R-squared	0.50	R-squared adj	0.36		
rho	0.04	Durbin-Watson	1.92	rho	0.16	Durbin-Watson	1.68		
F-tests (lags)				F-tests (lags)					
d_I_Loans_tot_K =0	F(2, 118)	3.04	0.05	d_I_Loans_tot_K =0	F(2, 118)	3.79	0.02		
d_I_GDP =0	F(2, 118)	1.19	0.31	d_I_GDP =0	F(2, 118)	6.02	0.00		
All variables	F(2, 118)	1.32	0.27	All variables	F(2, 118)	2.09	0.13		

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