

# Intergrated Financial Crises Database – Technical Note<sup>1</sup>

Maria Siranova<sup>2,3</sup> – Karol Zelenak<sup>4,5</sup>

Current version: January, 2020

---

<sup>1</sup> Siranova and Zelenak acknowledge support from the APVV Science Foundation under grant APVV-17-0551. Siranova also gratefully acknowledges kind hospitality provided by the IES FSS, Charles University. We are thankful for extraordinary research assistance provided by Tiffany Kajbova.

<sup>2</sup> Institute of Economic Research, Slovak Academy of Sciences. Corresponding author: maria.siranova@savba.sk

<sup>3</sup> Faculty of National Economy, University of Economics in Bratislava.

<sup>4</sup> National Bank of Slovakia.

<sup>5</sup> Faculty of Social and Economic Sciences, Comenius University in Bratislava.

## Introduction

This document presents the comprehensive database of financial crises integrating the most prominent and widely-used partial databases as produced by various economists and institutions. The need to create such a comprehensive database is driven by the necessity to provide a more comprehensive insight into the various aspects of financial crises, as demonstrated by the most recent experience of 2008 financial crisis as well as its long-lasting consequences. This database was compiled in order to serve as the source of data for research activities related to the project APVV-17-0551 titled “Balancing out the imbalances: Redefining the view on macroeconomic imbalances under the European governance framework”. **When using data from this database, please, always cite the original source of data.** We do not own the data compiled by the original sources.

This version (January 2020) includes papers that predominantly focus on databases dealing with fiscal and banking crises as two of the most recently live-through events. In the future the database is envisioned to further incorporate wider list of publications identifying external (balance of payments) and currency crises, as well as the events characterized by significant financial markets pressures. Nevertheless, the database might also serve as the limited source of external and currency crisis events due to the fact, that some of the databases already account for these types of events. In particular cases, some authors refer to a broad category of financial crisis, or to systemic crisis notion. In this database, these two cases are both labelled as the financial crisis.

## Structure of the database

The database distinguishes among five broad categories of crises - sovereign, banking, currency, external and financial. This taxonomy represents an amalgam of possible categorization found in several studies incorporated in this database. However, since each of the included papers and sources work with their customized definition of crisis event we advise the user to consult technical note provided in this paper or in the excel (stata) file.

The database covers the period 1800-2017, as the two most comprehensive databases up to this date (Reinhart and Rogoff, 2009 and Reinhart and Rogoff, 2011) choose this year as their starting point. Given the fact, that these two centuries have seen creation and establishment of plentiful new sovereign states, we provide information on year of the establishment for all countries included into the sample. We draw upon two relevant sources - for the pre-1940 period we use Reinhart and Rogoff (2009), for the post-1940 period Iltetzki et al. (2018). For few missing countries we provide our own identification. By default, we set “no observation available” marker in all country-year-study combinations before the year of establishment.

The database covers 194 countries. If the country was not included in the original study the marker “no observation available” is imputed.

In general, studies investigating crisis events identify the beginning of the crisis event or the entire duration of the crisis events. From this reason we also provide taxonomy of original sources distinguishing between two types of studies (beginning, duration). If the original source identifies only the starting year of an event, this particular county-year observation is set to “one” with the consequent years reset back to “zero”. If, however, the original source also estimates the duration of the crisis event, all the relevant country-year observations are coded as “one”. In the case when original source does not identify precisely the beginning or the duration of the event, we subjectively assign crisis events to country-year observations that embodies the verbal definition used by authors as best as possible (i.e. mid-80ies are assigned to years 1983-1987). In this case the database includes two separate variables, one with the zero/one identification and one with the verbal identification of events.

## Overview of relevant sources

The very well-known paper that includes the database of fiscal crises is “This Time is Different: Eight Centuries of Financial Folly “(**Reinhart and Rogoff, 2009**)<sup>6</sup>, where the authors bring the comprehensive historical review of international debt and banking crises, inflation, currency crashes and debasements. Within the paper authors have identified 215 sovereign default episodes covering the 66 countries (including 17 later EU countries) in all around the world. This database has been composed of various databases, as well as the authors’ analyses. The authors have distinguished between the external and domestic crises. While external crisis was defined as a sovereign default, what is understood as a failure to meet a principal or interest payment on the due date or within the specified grace period. These kinds of episodes also include cases where rescheduled debt is ultimately extinguished in terms less favorable than the original obligation. For the domestic crisis, the definition applied for the external crisis applies, with reservation that this type of crisis usually does not involve external creditors. In these types of crises, the domestic part of the debt is usually subject of suspension of payments (or in extreme case defaulted), or is often relegated to footnotes. The freezing of bank deposits and or forcible conversions of such deposits from foreign to local currency could take a part, too. The debt data covers the central government public debt. The authors have identified for 21 later EU countries 25 fiscal crises since year 1900. Within their analysis Reinhart and Rogoff argue against opinion that external defaults are less likely in the present period because governments are now relying more on domestic debt. According to their findings, the domestic debt is comparatively as significant as external debt in meeting emerging market financing needs and defaults on domestic debt appear to be associated with similar magnitudes of output loss as defaults on external debt. They also found that the median duration of defaults during the 1800-1945 period was twice length longer in comparison with those in the post–World War II period (6 years vs. 3 years). They also conclude that global economic factors, such as commodity prices and interest rates, play a major role in precipitating sovereign debt crises.

The continuation of research by significantly expanding the scope of crisis events is presented in the **Reinhart and Rogoff (2011)** paper. The new version incorporates data on not only debt, but also banking and currency crashes related events. Dataset covers 70 countries over the period 1800-2009 and includes 290 banking crises and 209 sovereign default episodes. Aside from the three traditionally documented crisis types, authors collect information on the periods of elevated inflation rates (medium to high or hyper-inflation) and term these events as inflation crisis. As they argue, the inflation and currency crises are often coupled together and serve as a tool to debase value of the accumulated (private and public) debt. Due to the long time span and highly limited supply of relevant historical data, use of quantitative indicators to identify onset and duration of banking crisis becomes a very difficult task. From this reason, the identification strategy is heavily based on qualitative assessment that specifies crisis event when there is a bank run present, or important financial institution(s) is subject to closure, merge, take-over or large-scale government intervention, an event which further triggers adverse shock transmitted to other financial institutions. According to the key findings, the prevalent chain of causal events originates in rapidly rising private indebtedness preceding banking crisis which, in turn, often signalize increase likelihood of a sovereign crisis.<sup>7</sup>

---

<sup>6</sup> With an update of the data in the database, May 2013.

<sup>7</sup> The data used in this integrated database are collected from the most recent update of Reinhart and Rogoff (2009), Reinhart and Rogoff (2011) and other relevant sources which is available at the official webpage of the Behavioral Finance & Financial Stability Project, Harvard Business School (<https://www.hbs.edu/behavioral-finance-and-financial-stability/data/Pages/global.aspx>).

Another paper that presents the database of fiscal crises is an IMF paper named “Fiscal Crises (**Gerling et al. 2017**). Authors construct a new database of fiscal crises, by identifying the periods of fiscal stress when governments were not able to handle with large fiscal imbalances what led them to the adoption of extreme measures, such as e.g. debt default or monetization of the deficit. For identification of the fiscal stress or crises periods the authors have defined 4 criteria on credit event, exceptionally large official financing, implicit domestic public default and loss of market confidence. According to formulated criteria they have reviewed 188 countries during the period of years 1970-2015 and identified 436 fiscal crisis episodes with countries facing on average two crises during the 1970 and 2015 with the highest frequency in low-income developing countries (LIDCs, 3.4) and lowest in advanced economies (0.7). While more than 80% of crises were classified as pure fiscal crises, 5% were accompanied by banking crises and 11% by currency crises. In 3% of events the crises were combination of fiscal, banking and exchange rate crises. Surprisingly, the decline in GDP growth during the crisis periods was lower in LIDCs (decline by 0.5 percentage points)<sup>8</sup> and larger in advanced economies (decline by 4.3 percentage points). Advanced economies thus face greater turbulence (growth declines sharply in the first two years of the crisis), with half of them experiencing economic contractions. According to findings of the authors, the fiscal policy usually acts pro-cyclically, since governments are forced to curtail the expenditure growth due to weakened economic activity. Authors’ findings showed that a fiscal crisis tends to be preceded by a loose fiscal policy. Countries seek the IMF support to find a help to manage the crisis when facing twin (fiscal and external) deficits.

One of the most comprehensive databases of crisis events, including sovereign debt crises, is encompassed in the **Laeven and Valencia (2018)**<sup>9</sup> paper “Systemic Banking Crises Revisited”. Within this paper the authors investigate the systemic banking crises episodes by compiling the detailed database of the crises, information on crisis dates, policy responses to resolve banking crises, and the fiscal and output costs of crises. Starting with the 2013 update, the newest version of the database includes banking, sovereign as well as currency crisis events. In total, they identify 461 (151 banking, 236 currency, 74 sovereign) crises all around the world during the period of years 1970-2017. Within the number, 75 crises were classified as sovereign debt crises, 11 of which took place since 2007. Within reviewed period, 5 sovereign debt crises have occurred in 5 later EU countries. Authors classify the sovereign debt crisis an event (year) when sovereign default to private creditors and/or restructuring has occurred. If public debt was restructured without a suspension of payments, the sovereign crisis year is recorded as the year of the restructuring. Authors also found that banking crises in high-income countries tend to last longer and be associated with higher output losses, lower fiscal costs, and more extensive use of bank guarantees and expansionary macro policies than crises in low- and middle-income countries.

Similar time span as in previous paper covers **Baldacci et al. (2011)** in their analysis “Assessing Fiscal Stress”, where they provide database of 176 events of fiscal stress. They have analyzed 29 advanced economies and 52 emerging economies within the period of years 1970-2010. They defined the fiscal stress episode as a period of extreme government funding difficulties that may appear as a result of one or multiple of following events: public debt build-up, contingent liabilities that become outright fiscal costs, negative revenue shocks, or unaddressed demographic-related spending pressures. For identification of these events the authors combine the debt default and restructuring data obtained from Standard and Poor, information on exceptional IMF-supported programs, and data on spreads of long-term domestic bond spreads relative to comparable U.S. bonds, 5-year credit default swap (CDS)

---

<sup>8</sup> Pre-crisis period covers from t-3 to t-2 years before the crisis, while post-crisis period covers years from t to t+2.

<sup>9</sup> This paper is an update of its earlier versions published in 2008 and 2013.

spreads. They differ the definition of fiscal stress episode for advanced economies and emerging economies. Within 20 later EU countries they have identified 38 periods of fiscal stress, two third of which had duration up to two years. In the paper the authors have constructed the fiscal stress index that depends on a set of fiscal indicators, aggregated using the approach proposed by Kaminsky et al. (1998). The index is used to assess the buildup of fiscal stress over time since the mid1990s in advanced and emerging economies reflecting. Their results show that while in advanced countries the top predictors of fiscal stress are indicators of gross financing needs and fiscal solvency risks, in emerging economies, as the best predictors of fiscal stress serve risks associated with public debt structure and exposure to spillovers from financial markets.

One of the first databases compiled in the literature on banking crisis is that of **Caprio et al. (2003)** which updates the work by Caprio and Klingebiel (1996, 1999). Instead of using any pre-determined automatic algorithm for crisis identification the database is based on narrative approach gathering qualitative information from numerous sources. As a consequence, authors acknowledge that there are likely to exist several smaller events that might not have been present in their dataset. The expert judgment has to be applied especially when deciding about the timing of bank insolvencies. From these reasons and, contrary to other newer sources, in many instances one does not find exact country-year specification of crisis outburst or termination but only a period-based wording.

Paper by **Schularick and Taylor (2012)** belongs to studies that focus on narrow (country coverage) and long (period coverage) perspective. New dataset for 14 developed countries spans over 140 years (1870-2008). The identification approach detects crisis events that might be considered systemic meaning that the significant part of the banking sector must have been affected. During this severe stress periods, country's banking sector must experience bank run, increase in default rates associated with drop in capital leading to public intervention as well as forced mergers or individual bankruptcies. Altogether, the database identifies 79 major banking crises in 14 developed countries. According to the results, the costs of banking crises have not, surprisingly, been diminished over time despite the presence of more active policy makers' response. This finding might be potentially explained by the substantial increase in financial sector size and leverage which, in turn, makes any turbulence more costly. As a follow-up, the identification of systemic financial crisis is further included in the newest version of a database incorporating also information on other relevant real sector data (**Jorda et al., 2017**).

Another comprehensive database is constructed by **Babecky et al. (2014)**. Contrary to other studies, authors present data on higher frequency (quarterly) which enables them to investigate performance of set of early warning indicators aiming at signaling the income crisis events. The database covers crisis episodes in 40 developed countries over 1970–2010 and distinguishes among three types of crises: banking, debt and currency crises. In terms of the crisis event specifications, authors rely on concepts and approaches presented by comprehensive list of other, already published, studies. The cross-validation of dataset is further done by opinions of country experts. As authors conclude, not only there exists the substantial variation in definitions used by various studies, the data also show higher discrepancy in the determination of crisis endpoints compared to crisis onsets. On top of that banking and debt crises are interrelated and both typically precede currency crises, but not vice versa.

In his work, **Jing (2015)** argues that identification of banking crisis should be based on the idea of observed liquidity shortage in the money market rather than ad-hoc specifications used in many event studies. Given this perspective author constructs the money market pressure index (MPI), similar to that in von Hagen and Ho (2007), which combines two elements, the central bank reserves and nominal money market interest rate. The selection of countries is similar to those covered by Laeven and Valencia (2008, updated in 2018) and covers 109 countries from 1975 to 2009. This approach

identifies more banking crisis events than those included in the database of Laeven and Valencia (2008, updated in 2018). According to author, this is due to the fact that Laeven and Valencia (2008, updated in 2018) neglects events characterized by less systemic risk or those that reflect increased stress in the banking system that has not yet materialized into the system-wide severe adverse shock.

Long time series on banking crisis for 46 countries covering the period 1870-2016 are collected in **Baron et al. (2018)**. Contrary to other event-based studies, banking crises are identified as periods characterized by bank equity crashes. Authors argue that this approach provides an objective, quantitative, and theoretically-motivated measure of crisis events. This identification strategy has a benefit of uncovering the outburst of potential crisis sooner than other schemes based on credit spreads or nonfinancial equity measures, hence expanding the available databases of by newly identified crisis as well as purifying them of spurious events. Final findings show that depth of banking crisis tends to be more severe than that usually reported by other sources.

Database by **do Luca et al. (2018)** focuses solely on European countries and covers the period of 1970-2016. While limited in country coverage, this database provides a uniquely comprehensive insight into the occurrence of four basic subtypes of financial crisis (banking, sovereign, currency, asset price corrections) along with estimates of their duration, costs of crises measured by absolute output losses and its relevance for utilization of macroprudential measures. The database also specifically distinguishes particular periods related to transition process in many CEE countries. As such, the identification strategy combines both, the quantitative approach relying on financial stress index calculation as well as assessment provided by country experts. As a novelty, authors control for source of stress periods, originating either in domestic environment or being transmitted to domestic economy due to materialization of external shocks. As in the case of other relevant databases, authors aim to primarily detect systematically important events rather than small scale negative shocks. However, the information on residuals events is also provided as part of the database. Addressing the post-crisis bias (Bussiere and Fratzcher, 2008), databases distinguishes between two phases of post-crisis transition process, the acute one (between start of the crisis and end of crisis management) and the back-to-normal period (return to sustainable level of growth). In total, authors identify 50 systemic crises and 43 residual events, while 16 events have not been previously recognized in the relevant sources (Laeven and Valencia, 2008). All the above mentioned features makes this database one of a kind source of information for all relevant parties involved, therefore should represent the state-of-the art example for future research aiming at expanding the, rather limited, country coverage.

## References

Babecky, J., Havranek, T., Mateju, J., Rusnak, M., Smidkova, K., and Vasicek, B. 2014. Banking, debt, and currency crises in developed countries: Stylized facts and early warning indicators. *Journal of Financial Stability*, No. 15, pp. 1-17.

Baldacci, E., I. Petrova, N. Belhocine, G. Dobrescu, and S. Mazraani. 2011. *Assessing Fiscal Stress*. IMF Working Paper No. 11/100 (International Monetary Fund).

Baron, M., Verner, E., and Xiong, W. 2018. *Identifying Banking Crises*, Princeton University manuscript.

Bussière, M., and Fratzscher, M. 2008. Low probability, high impact: Policy making and extreme events, *Journal of Policy Modeling*, Vol. 30, No 1, pp. 111-121.

Caprio, G., and Klingebiel, D. 1996. *Bank Insolvencies: Cross-Country Experience*, World Bank Policy Research Working Paper No. 1620, July 1996.

- Caprio, G., and Klingebiel, D. 1999. Bank Insolvencies: Cross-Country Experience, World Bank Policy Research Working Paper, update.
- Caprio, G., Klingebiel, G., Laeven, L., and Noguera, G. 2005. Appendix: Banking Crisis Database. In Patrick Honohan and Luc Laeven (eds.), *Systemic Financial Crises: Containment and Resolution*. Cambridge, U.K.: Cambridge University Press.
- Gerling, K., Medas, P., Poghosyan, T., Farah-Yacoub, J. and Xu, Y. 2017. Fiscal Crises. IMF Working Paper No. 17/86.
- Ilzetzki, E., Reinhart, C. M., and Rogoff, K. S. 2017. Exchange Arrangements Entering the 21st Century: Which Anchor Will Hold? NBER Working Paper No. 23134, February 2017, National Bureau of Economics Research.
- Jing, Z. 2015. Banking crises: identification, propagation, and prediction. Groningen: University of Groningen, SOM research school.
- Jorda, O., Schularick, M., and Taylor, A. M. 2017. Macrofinancial History and the New Business Cycle Facts. In NBER Macroeconomics Annual 2016, volume 31, edited by Martin Eichenbaum and Jonathan A. Parker. Chicago: University of Chicago Press.
- Kaminsky, G., Lizondo, S., and Reinhart, C. 1998. Leading Indicators of Currency Crisis, IMF Staff Papers, Vol. 45, No. 1, pp. 1-48.
- Laeven, L. and Valencia, F. 2018. Systemic Banking Crises Revisited. IMF Working Paper No. 18/206.
- Lo Duca, M., Koban, A., Basten, M., Bengtsson, E., Klaus, B., Kusmierczyk, P., Lang, J. H., Detken, C., and Peltonen, T. 2017. A new database for financial crises in European countries. ECB/ESRB EU crises database. Occasional Paper Series No 13/July 2017. ESRB.
- Reinhart, C., and Rogoff, K. S. 2009. *This time is different: Eight centuries of financial folly*. Princeton, NJ: Princeton University Press.
- Reinhart, C. M., and Rogoff, K. S. 2011. From Financial Crash to Debt Crisis. *American Economic Review*, No. 101, pp. 1676-1706.
- Schularick, M., and Taylor, A. M. 2012. Credit Booms Gone Bust: Monetary Policy, Leverage Cycles, and Financial Crises, 1870-2008. *American Economic Review*, 102(2), 1029-1061.
- Von Hagen, J., and Ho, T. K. 2007. Money market pressure and the determinants of banking crises. *Journal of Money, Credit and Banking*, No. 39, pp. 1037–1066.