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A new comprehensive database of financial crises: Identification, frequency, and duration☆

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ABSTRACT

This paper introduces a new database of financial crises, providing an important insight into the causes, duration, and consequences of different types of financial crises. Besides extending the systemic banking crises database by Laeven and Valencia (2020) to the period 1970–2019, we develop new approaches for the identification of currency and sovereign debt crises, which we regard as preferable in some respects to those in the literature. Covering 206 countries, our crises database draws on 151 systemic banking crises (1970–2019), 414 currency crises (1950–2019), 200 sovereign debt crises (1960–2019), 75 twin crises (1970–2019), and 21 triple crises (1970–2019). We provide evidence that banking and debt crises tend to coincide or precede currency crises, while debt crises and banking crises are less likely to coincide with or precede each other. We also find that advanced countries experienced longer banking crises but shorter currency, debt, twin, and triple crises.

1. Introduction

Having a proper method to identify financial crises is a big challenge. This task becomes even more complex as so far there has been no consensus in the literature on the general definition of a financial crisis, especially due to their multifaceted nature. Some studies provide general definitions for financial crises without clearly pointing out how they were identified. For example, Bordo et al. (2001) define financial crises as episodes that experience significant problems of illiquidity and insolvency of financial-market participants and/or significant government interventions. Some recent studies identify financial crises by measuring the levels of systemic financial stress constructed by the country-level index of financial stress and the industrial production index (see, e.g., Duca et al., 2017; Duprey et al., 2017).

However, financial crises can come in various shapes and forms, which means that research on financial crises can be incomplete if we rely on only a single definition of financial crisis. Given the diverse forms of financial crises, the existing literature agrees on three main types of financial crises: systemic banking, currency, and sovereign debt crises (Laeven and Valencia, 2008, 2013, 2020; Jing et al., 2015; Nguyen et al., 2020, 2021a,b).[1] The various combinations of these types can also lead to what is called twin or triple crises. What is lacking in the recent literature is a worldwide database of different types of financial crises over a long period of time. Hence, this paper compiles a comprehensive database of the occurrence and duration of banking, currency, debt, twin, and triple crises during the period 1950–2019.

We complement the only cross-country database of financial crises available compiled by Laeven and Valencia (2020) and that provides a global database on systemic banking, currency, and debt crises over the period 1970–2017. However, we depart from their work in four fundamental ways. First, we provide a thorough review and discussion of the existing methods for the identification of different types of financial crises, which are ignored by these authors. Second, we extend their systemic banking crises database to the period 1970–2019 and find that several banking crises ended in 2018, whereas no banking crisis episode is found in 2019. Third, by using different approaches and data to identify currency and sovereign debt crises, we detect more currency and debt crises, which are unnoticed by these authors. In this regard, our crises database not only identifies more crises but also covers more countries over a longer period of time. Fourth and final, besides

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[1] Some studies classify financial crises into four types, including the additional sudden stops or balance of payments crises (see, e.g., Claessens and Kose, 2013; Calvo et al., 2004). However, sudden stops crises can be included within currency crises (see Section 2.2).

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discussing the channels through which one type of financial crisis can evolve into another form, we employ a logit model to test for the sequencing effects between the three types of financial crises, which previous literature makes no attempt to account for.

Our database also provides information about the frequency and duration of different types of financial crises. We find that currency crises occur more frequently than other types of financial crises, but their duration, on average, is the shortest. This contrasts with debt crises, which tend to last more than a decade, on average. We also find that financial crises have a natural tendency to come in waves. Our analysis shows that banking crises tend to precede currency and, to a lesser extent, debt crises, while debt crises tend to coincide or precede currency crises. This is further confirmed by the regression results indicating that the three types of financial crises tend not only to coincide but also precede each other. Moreover, we document that advanced countries experienced shorter currency, debt, twin, and triple crises but longer banking crises than emerging/developing countries.

The rest of the paper is organised as follows. Section 2 provides an overview of how previous studies identify the three types of financial crises and the linkages between them. Section 3 presents the methods we develop to identify the three types of financial crises. Section 4 shows the frequency and sequencing of financial crises. Section 5 discusses the duration of financial crises. Section 6 concludes.

2. Types of financial crises

2.1. Systemic banking crises

Banking crises receive more attention than other types of financial crises as their consequences on the economy are more severe (Hutchison and Noy, 2005). Moreover, banks are special financial institutions and their insolvency causes more harm to the economy than firm insolvency. In particular, the possibility that bank insolvency can spread and lead to the insolvency of other banks and then the collapse of the payment system distinguishes between bank insolvency and nonfinancial firm insolvency.[2] The failures of several banks might not be considered as a systemic problem; however, the contagion effect of bank insolvency can result in a systemic banking crisis. Despite the need to have an insight into the causes, duration, and consequences of systemic banking crises, a methodological challenge for researchers and policymakers is to identify them properly.

Scholars have different views regarding the definition of a systemic banking crisis. Caprio and Klingebiel (1996) define systemic banking crises as episodes when loan losses are large enough to wipe out almost all or entire banking system capital. Under this definition, they identified 86 systemic banking crises in 69 countries from the late-1970s to 1995.[3] They are the first to provide a database of systemic banking crises. However, they admit that a crisis could be dated too late because the negative net worth – a situation that loan losses are higher than the banking system's capital – can persist for some time before being detected. The information used to date banking crises has highly relied on the general acceptance of financial experts familiar with the examined countries, which cannot guarantee accuracy. In addition, they also face difficulties in determining when a systemic banking crisis ends and whether there are multiple crises in a country.

In the same spirit, Demirguc-kunt and Detregiache (1998) attempt to distinguish between episodes of distress and crises, and between localised and systemic crises. They define a distress period to be identified as a systemic banking crisis when at least one out of the four following conditions holds: (1) the ratio of non-performing assets to total assets in the banking system is higher than 10%; (2) the cost of the rescue operation exceeds 2% of GDP; (3) large scale nationalisation of troubled banks; and (4) extensive bank runs take place or emergency measures such as deposit freezes, prolonged bank holidays, or generalised deposit guarantees are enacted by the government in response to a crisis.

Among the definitions of systemic banking crises that rely on qualitative methods, those of Laeven and Valencia (2008, 2013, 2020) appear to be more precise. They use both quantitative and qualitative methods to measure the severity of bank losses and the degree of government interventions. They define a banking crisis to be systemic when two conditions hold: (1) significant signs of financial distress in the banking system, as reflected by significant bank runs, losses in the banking system, and or bank liquidations; (2) significant government policy interventions in response to significant losses in the banking sector.

2.2. Currency crises

Existing studies define currency crises either by the degree of currency depreciation (Frankel and Rose, 1996) or the intensity of the exchange market pressure under speculative attacks (Eichengreen et al., 1995). Some studies suggest that speculative attacks are the main reasons behind most currency crises. This can be reflected by a massive and sudden selling of domestic currency, which results in sharp currency depreciation. A speculative attack creates a surge in the exchange market pressure and normally associates with one of the following outcomes: (1) a sharp depreciation of domestic currency if the speculative attack is successful; (2) a significant decline in international reserves; (3) an increase in the interest rate (Kaminsky et al., 1998; Claessens and Kose, 2013; Goldstein, 2013).

The purpose of currency speculators is to profit from the significant depreciation of the targeted currencies, which, most of the time, leads to the depletion of central banks' international reserves. When central banks run out of foreign reserves, they are unable to purchase the domestic currency at the prevailing price and will allow the exchange rate to float based on the market demand and supply. This often results in a large depreciation of the domestic currency. To defend the currency peg, central banks must hold adequate international reserves to purchase all of their liabilities in urgent situations.[4] An additional method that central banks can use to defend their currencies is increasing the interest rate. Speculators often short domestic currency and cover the short once the currency is highly devaluated. Increasing the interest rate can make it prohibitively costly for shorting a domestic currency. Moreover, increasing short-term interest rates can reduce capital outflows and stimulate capital inflows (Dreher et al., 2006).

Given the responses of governments to currency crises, some studies rely on the degree of the exchange market pressure to identify currency crises. Eichengreen et al. (1995) developed the exchange market pressure index (EMPI) based on the work of Girton and Roper (1977) to measure the extent to which international reserves, exchange rate, and interest rate of a country change in comparison with a reference country. A currency crisis is then defined when the EMPI exceeds a certain threshold. However, the EMPI appears to have some drawbacks. First, data for the interest rate are unavailable in many low- and middle-income countries. In practice, several studies ignore the changes in the interest rate due to data limitation (see, e.g., Kaminsky et al., 1998; Kaminsky and Reinhart, 1999; Coudert and Gex, 2008). However, using the EMPI without considering the change in the interest rate can ignore a

[2] Nonfinancial firms can continue to operate when they are insolvent because they may have core business activities, which may remain profitable, and new investment opportunities as well as sizeable illiquid fixed capital. Moreover, they can lower the imbalances between assets and liabilities by issuing new and lower-value assets. For example, a part of their liabilities can be converted into new equity for debtholders.

[3] The authors also use qualitative methods to identify systemic banking crises in several countries due to the limitation and credibility of data. This is because authorities can understate the real size of bank losses.

[4] Adequate foreign reserve is often referred to as a "war chest", which is a collection of a large amount of money stored to address a dangerous situation.

large number of unsuccessful speculative attacks, which are often followed by a significant increase in the interest rate. Second, there is no theoretical support in determining the threshold of the EMPI. Previous studies tend to choose different thresholds (β) to meet their particular objectives (Pérez, 2005). For instance, Eichengreen et al. (1995) chose $\beta = 1.5$, while Kim et al. (2013) set the threshold based on $\beta = 2$. Nevertheless, they do not provide any explanation for their choices.

Another strand of literature identifies currency crises based on the depreciation of the domestic currency against a reference country, normally the US dollar. The method was first proposed by Frankel and Rose (1996), who use a threshold of 25% depreciation vis-à-vis US dollar. Other studies slightly adjust the threshold to meet their particular objectives. For instance, Laeven and Valencia (2013, 2020) define a currency crisis when a nominal depreciation of the domestic currency against the US dollar is at least 30% and at least a 10% depreciation compared to the year before. The main advantage of this method is the availability of data over a long period of time.

It is worth noting that this method also allows accounting for sudden stops which share some similarities with currency crises. Calvo et al. (2004) define sudden stops as a phenomenon of a large and sudden reduction in capital inflows resulting in a sharp decline in a country's outputs. In fact, sudden stops often coincide with or lead to currency crises. This is why some studies interchangeably use the terms of sudden stops and currency crises (see, e.g., Kaminsky and Reinhart, 1999; Kaminsky, 2006; Willett and Wihlborg, 2013). As already mentioned, a currency crisis relates either to a sharp depreciation of a country's currency value (Frankel and Rose, 1996) or an exceptional high exchange market pressure under speculative attacks (Eichengreen et al., 1995). Though the definitions of sudden stops and currency crises are not identical, sudden stops crises can be identified by the same means as currency crises.

Recall that a currency crisis is often associated with one (or more) of the following outcomes: (1) a sharp depreciation of domestic currency (if the speculative attacks are successful); (2) a significant decline in international reserves; and (3) a sharp increase in the interest rate. A successful speculative attack results in a significant depreciation of the domestic currency, while an unsuccessful attack does not as the governments can successfully defend their currencies by either raising the interest rate and/or having a sufficiently large war chest. Similarly, a sudden stop will not turn into a crisis when the government can successfully prevent a currency depreciation (Zhao et al., 2014).

Therefore, a sudden stop crisis is not considered as one of the main types of financial crises in this study because it can be identified through a currency crisis. More specifically, if a sudden stop is severe, it will turn into a sudden stop crisis reflected by a sharp depreciation in a domestic currency, which is also the definition of currency crises.

2.3. Sovereign debt crises

Most studies consider a country to be in a sovereign debt crisis when it fails to meet its principal and/or interest payments on the due date and/or when it reschedules its debts with less favourable terms. (see, for example, De Bonis et al., 1999; Reinhart and Rogoff, 2009, 2014; Claessens and Kose, 2013; Ureche-Rangau and Burietz, 2013). This definition, however, also considers many sovereign defaults – which are too small compared to the size of the economy – as debt crises. This means that many identified debt crises can be negligible and may not indicate real debt crises. To address this problem, Detragiache and Spilimbergo (2001) identify a sovereign debt crisis when the arrears of principal or interest on the external obligations towards commercial creditors exceed 5% of total commercial outstanding debt.

Moreover, existing studies on sovereign debt crisis identification tend to ignore some important creditors due to the lack of data. This may undermine the real size of sovereign defaults as a country can raise its external debts from both official and commercial creditors. Balteanu and Erce (2018) are among the first to resolve this problem. They use the sovereign defaults information from the Standard & Poor's, which also defines sovereign defaults as situations where: (i) a country fails to meet their principals or interest payments on the due date or (ii) a country uses either debt rescheduling or a debt exchange (bond debt) with less favourable terms than the original ones. However, as the S&P's dataset includes only defaults on private external debt, Balteanu and Erce (2018) add their crises events with those of Reinhart and Trebesch (2016a) to provide a full dataset on external debt, which includes both official and private external debts, coupled with data for countries that are not rated by the S&P agency.

2.4. Twin crises and triple crises

A financial crisis may not be a single event. Existing studies provide empirical evidence that different types of financial crises could be related (see, e.g., Babecky et al., 2014; Alexakis and Pappas, 2018; Balteanu and Erce, 2018; Laeven and Valencia, 2020). We, therefore, review the linkages through which different types of financial crises can precede or coincide with each other.

2.4.1. The linkage between banking and currency crises

Kaminsky and Reinhart (1999) are among the first to study the linkage between banking and currency crises and find that banking crises can precede currency crises within 24 months. They suggest that governments' bailouts of inefficient banks during a banking crisis are associated with higher credit creation because those bailouts are financed by printing more money (Velasco, 1987; Demirguc-Kunt and Detragiache, 1998). This, however, comes at the cost of a significant currency depreciation, which is an antecedent of a currency crisis. In addition, as banking crises tend to be associated with credit crunches and worse economic conditions, international investors may withdraw their funds suddenly, causing capital flights and then a sharp depreciation of the domestic currency (Babecky et al., 2014; Qin and Liu, 2014; Dimitriou et al., 2017). Conversely, currency crises can also precede banking crises. In particular, a significant increase in the interest rate could imply governments' attempts to defend their currencies. This exposes banks to a vulnerability of maturity mismatch between assets and liabilities, especially those holding a large proportion of unhedged foreign liabilities (Obstfeld, 1994; Glick and Hutchison, 2001). This pushes banks on edge to bankruptcy and, in the worse scenario, triggers a systemic banking crisis (Goldstein, 2013).

2.4.2. The linkage between currency and debt crises

Dreher et al. (2006) suggest that currency and debt crises tend to coincide with each other. They argue that international investors and lenders are sensitive to macroeconomic shocks. In this regard, when they realise that the macroeconomic conditions are becoming worse, they tend to stop rolling over maturing debts and withdraw their investment. In that case, sovereign debt crises occur when governments have no further access to the international capital market or are unable to accept new debts at a prohibitively high interest rate.

Some studies argue that currency crises often precede sovereign debt crises as a sharp depreciation of domestic currency can significantly increase the cost of outstanding sovereign debts denominated in foreign currencies (Kaminsky and Reinhart, 1999; Reinhart and Rogoff, 2011). Moreover, as governments often increase the interest rate as a measure to defend their currencies (Dreher et al., 2006), their debt burden will be greater, and this will expose them to a debt crisis. With respect to the transmission of sovereign debt crises to currency crises, the linkage is not well understood. De Bonis et al. (1999) suggest that sovereign defaults send negative signals to international investors. This results in capital flights when they withdraw their investment on a large scale, thereby increasing the probability of a currency crisis.

2.4.3. The linkage between banking and debt crises

The recent literature shows two channels through which banking

crises can precede sovereign debt crises. First, fiscal costs associated with government interventions during a systemic banking crisis can significantly drive up budget deficit and public debt (Balteanu and Erce, 2018; Laeven and Valencia, 2020).[5] If budget deficits are large, there will be inadequate fiscal space to finance those interventions. In the case that governments sacrifice their creditworthiness for their crisis interventions by issuing additional debt, they are more likely to experience a sovereign debt crisis (Acharya et al., 2014). Second, a banking crisis might evolve into a debt crisis due to its adverse effects on tax revenue. Reinhart and Sbrancia (2015) find that tax proceeds tend to be lower during a systemic banking crisis, which deteriorates a country's fiscal position. Also, governments will spend more on social securities and measures designed to stimulate demand. Those automatic stabiliser mechanisms can substantially drive up budget deficit and public debt. Furthermore, credit crunches which are often observed in times of banking crisis can also increase the interest rates and then governments' debt burden (Balteanu and Erce, 2018).[6]

On the contrary, a few studies argue that sovereign debt crises might precede banking crises. In particular, there has been a growing trend that emerging countries are more reliant on debt issued in their local markets, i.e., domestic public debts (Reinhart and Rogoff, 2011, 2014). Sovereign defaults will, in turn, influence domestic banks first as they hold a significant share of government bonds. This is in line with Balteanu and Erce (2018) who find that the consequences of sovereign defaults on the banking system are more severe in times of financial repression.[7] In that sense, banks are forced to hold more government bonds, leading to a higher likelihood of bankruptcy.[8] This is because they cannot escape the captive market, where governments impose capital controls and raise reserve requirements (Reinhart and Sbrancia, 2015).[9]

3. Financial crisis identification

Based on the review of the definitions of different types of financial crises presented above, this section provides details for the methods employed in this study to identify financial crises.

3.1. Systemic banking crisis identification

The systemic banking crises database by Laeven and Valencia (2008, 2013, 2020) provides information on 151 banking crisis episodes around the globe over the period 1970–2017. The database has become standard in the literature for banking crisis identification (see, e.g., Kim et al., 2013; Caprio et al., 2014; Perugini et al., 2016; Nguyen et al., 2020, 2021a,b). Chaudron and de Haan (2014) are the first to compare the reliability of different systemic banking crises databases by examining four banking crisis events: the United States savings and loan crises during the 1980s, Japan's banking crisis of the 1990s, Norway's banking crisis during the early 1990s, and Turkey's crisis during the late 1990s. Based on the data of bank failures and losses, they find that the Laeven and Valencia's (2008, 2013) banking crises database is more accurate than that of Caprio et al. (2005) and Reinhart and Rogoff (2009).

Laeven and Valencia (2020) define a systemic banking crisis as an event that meets two conditions: (1) significant signs of financial distress in the banking system, as reflected by significant bank runs, losses in the banking system, and/or bank liquidations; (2) significant government policy interventions in response to significant losses in the banking sector. However, as highlighted by the authors, it is not always straightforward to measure financial distress in a timely and precise manner. This is because financial losses can be significantly reduced and addressed by effective crisis mitigation policies. Moreover, capturing financial distress by examining bank balance sheets could have some delay in low- and middle-income countries (Laeven and Valencia, 2013). To address these issues, Laeven and Valencia (2020) provide six policy interventions that cover all responses of a government to a banking crisis.[10] They argue that financial distress turns into a systemic banking crisis when at least three out of six policy interventions are significant. They define end dates for each crisis episode in the years before both real GDP growth and real credit growth are positive for at least two consecutive years. Specific details of significant policy interventions are provided in Table A1 in Appendix.

Following Laeven and Valencia's (2020) definition of banking crisis, we extend this database to 2019. Using intense reading of economic and financial stability reports from various reliable sources such as the IMF, World Bank, and central banks, we find no new systemic banking crisis around the globe during the period 2018–2019. Several countries are facing a significant problem in the banking sector such as Iran, Sudan, and Zimbabwe. However, we do not identify them as being in a systemic banking crisis because their government responses have not met at least three significant policy interventions given by Laeven and Valencia (2020). We also find that banking crises in Moldova and Ukraine ended in 2018. In fact, these crises could last longer as their real GDP growth and real credit growth have not been positive for at least two consecutive years. However, as Laeven and Valencia (2020) truncate the duration of a banking crisis at 5 years, these crises (that started in 2014) should have ended in 2018.

3.2. Currency crisis identification

Following Frankel and Rose (1996), we identify currency crises based on the depreciation of the domestic currency against the US dollar. The authors identify a currency crisis when the nominal dollar depreciation of a currency against the US dollar at least 25% a year. Using this definition, Laeven and Valencia (2008, 2013, 2020) adjust the threshold to 30%. Note that the higher the thresholds, the lower the number of currency crises identified. As mentioned earlier, a country experiencing a sharp currency depreciation tends to have a high level of inflation, which leads to a higher expectation of depreciation. These authors avoid counting depreciation as an independent crisis by requiring that the change in the exchange rate must be greater than the previous year's change by at least 10 percentage points. In addition, to avoid counting the same currency crisis, they allow for a three-year 'window" around the first date of a currency crisis. However, as Laeven and Valencia (2008, 2013, 2020) use the end-of-period exchange rates, a number of currency crises that end before the last date of the crisis year will be ignored. This can be addressed by using the average exchange rate, as is evident from Eichengreen et al. (1995) and Frankel and Rose (1996). However, the average exchange rate could identify some currency crises too late,

[5] Government's debt burden could be more severe than the level that the public can be aware of because the debt raised can be kept off the balance sheet (Reinhart and Rogoff, 2011). Most of these "hidden debts" are undocumented domestic public debt.

[6] A credit crunch is associated with the deterioration of the bank's assets because banks must reduce the size of loan portfolios due to the increased capital losses and loan loss provisions or due to stricter lending regulations.

[7] Financial repression refers to measures that governments use to keep the interest rate lower than the inflation rate (negative real interest rate) with the aim to borrow cheaper and hence reduce debt burden (Reinhart and Sbrancia, 2015).

[8] Reinhart and Sbrancia (2015) estimate the reduction in government debt burden from financial repression measures in 12 advanced and emerging countries from 1945 to 1980 and find that interest expenses saved from the negative real interest rate is around 1–5% of GDP.

[9] Raising reserve requirements and imposing capital restrictions to limit transfers of assets abroad are also measures of financial repression.

[10] Those six policy interventions are: deposit freezes and/or bank holidays; significant bank nationalizations; bank restructuring fiscal costs (at least 3% of GDP); extensive liquidity support (at least 5% of deposits and liabilities to non-residents); significant guarantees put in place; and significant asset purchases (at least 5% of GDP). See Laeven and Valencia (2020) for further details.

whereas using the end-of-period exchange rate can resolve this problem.

Hence, we define a currency crisis when the nominal depreciation of a domestic currency against the US dollar is at least 30% a year and higher than the previous year's change by at least 10% but we use both the average and end-of-period exchange rates to date currency crisis episodes. This allows us to capture crises that were ignored by Frankel and Rose (1996) and Laeven and Valencia (2020). Taking this advantage, we identified 414 currency crises around the globe during the years 1950–2019. During the period 1970–2017, we identified 341 currency crises in 134 countries, while Laeven and Valencia (2020) only report 236 currency crises in 118 countries, indicating that a large number of currency crises was unnoticed. Besides, several currency reforms that are identified as currency crises will be removed, such as Burundi (1965), Vietnam (1985), Guinea (1986), and China (1994).

3.3. Sovereign debt crisis identification

The existing literature identifies sovereign debt crises when governments fail to meet their principals or interest payments on the due date or when they postpone their obligations by rescheduling their debts with less favourable terms to them (De Bonis et al., 1999; Detragiache and Spilimbergo, 2001; Reinhart and Rogoff, 2014). However, due to the lack of data on worldwide sovereign defaults, existing studies face three main problems.

First, most studies have examined sovereign debt crises in a few countries or a group of limited countries. Second, some studies focus on only external debt crises. These ignore some domestic debt crises, despite the fact that there is a growing trend that emerging market governments are more reliant on debt denominated in domestic currency (Reinhart and Rogoff, 2014). This explains why many sovereign debt crises are unrecorded. For example, Balteanu and Erce (2018) only examine external defaults from private and official creditors and ignore domestic defaults. Third, most studies rely on a few sources of sovereign defaults, which undermine the real size of sovereign defaults and hence provide false identifications of these crises. For example, Laeven and Valencia's (2020) sovereign debt crises database relies on defaults from private creditors and ignores those from official creditors.

These problems emphasise the importance of having sufficient worldwide data on sovereign defaults of both domestic and external sectors for all types of creditors.[11] For this reason, we rely on the Bank of Canada's Credit Rating Assessment Group's (CRAG) sovereign defaults database published by the Bank of Canada and the Bank of England for debt crisis identification. The database provides detailed sovereign defaults of all types of creditors, including the value of debt rescheduling and/or restructuring on a global basis from 1960 to 2019. This is the first database of sovereign defaults that contains different types of creditors and fills this information gap of sovereign defaults (Beers and Mavalwalla, 2018).

We identify a sovereign default when a country either: (i) fails to pay its interest and/or principal obligations by the due date or (ii) postpones its obligations by rescheduling or restructuring debts with less favourable terms than the original ones. This is consistent with the definitions of De Bonis et al. (1999), Detragiache and Spilimbergo (2001), Reinhart and Rogoff (2014), and Balteanu and Erce (2018).

However, the CRAG database shows a lot of sovereign defaults which are too small to be considered as sovereign debt crises. Thus, we follow Balteanu and Erce (2018) and Reinhart and Trebesch (2016a, 2016b) to use the threshold of 1% of GDP for at least three consecutive years to remove defaults that are negligible. To detect any missing crisis episodes, we compare the results of existing sovereign debt crises databases such as those of Balteanu and Erce (2018) and Laeven and Valencia (2020). We find that the proposed condition does not account for several sovereign debt crises that occurred in less than three years such as Belize (2012–2013), Greece (2012–2013), St. Kitts and Nevis (2011–2012), and Uruguay (1990–1991; 2003). We recognise that those missing crises appeared to be more intense than countries experiencing sovereign defaults in more than three consecutive years. The lowest degree of default is 7% of GDP. Thus, in order to include serious debt crises like Greece that would otherwise have been excluded, we apply the second condition that sovereign defaults exceeding 7% of GDP in less than three consecutive years are considered debt crises.

Therefore, we define sovereign debt crises as episodes when either of the two following conditions holds: (1) total sovereign defaults exceed 1% of GDP in at least three consecutive years, or (2) total sovereign defaults exceed 7% of GDP. The first year in which either of these conditions meets is the onset of a sovereign debt crisis. A debt crisis ends when total sovereign defaults, including debt restructuring or rescheduling, are smaller than 1% of GDP.

3.4. Twin and triple crisis identification

While it is accepted that a twin crisis is defined as a simultaneous occurrence of banking, currency, and/or sovereign debt crisis, existing studies use different lengths of the time window to identify simultaneous episodes. The literature shows that the lengths vary from one year (Laeven and Valencia, 2008, 2013, 2020), two years (Kaminsky and Reinhart, 1999), to three years (Balteanu and Erce, 2018).

Following the definition of twin and triple crises by Laeven and Valencia (2008, 2013, 2020), we identify a twin crisis in year t when a banking crisis in year t is preceded or followed by a currency or sovereign debt crisis within $[t\text{-}1, t+1]$. Similarly, a triple crisis is identified when a banking crisis in year t follows or precedes a currency crisis during the period $[t\text{-}1, t+1]$, and a sovereign debt crisis during the period $[t\text{-}1, t+1]$. Using the same approach, currency and sovereign debt crises are set at time t to identify twin and triple crises. One-year length is chosen because contagion effects can spread rapidly. For example, investigating the linkages between currency and debt crises, Dreher et al. (2006) find that investors are sensitive to macroeconomic conditions, and they tend to withdraw their investment as soon as they realise that economic conditions are worsening.

4. The frequency of financial crises

Full details of our crises database are provided in Table A2 in Appendix, while Table A3 reports the numbers of financial crises by year. Below we provide a detailed analysis on the frequency of different types of financial crises for which we use the methods described in Section 3.

4.1. Banking crises episodes during the period 1970–2019

The systemic banking crises database includes 151 banking crises over the period 1970–2019 in 201 countries. More than half of the examined countries experienced at least one systemic banking crisis. We also find that 29 countries experienced more than one banking crisis, while only three countries experienced more than two banking crises over this period: Argentina, the Democratic Republic of Congo, and Ukraine. Moreover, banking crises (started in 2014) in Moldova and Ukraine ended in 2018. No systemic banking crisis episode found in 2019 around the globe, even though some countries, such as Iran, Sudan, and Zimbabwe, are on the edge of a systemic banking crisis.

Fig. 1 shows the frequency of systemic banking crises from 1970 to 2019. It can be seen that banking crises tend to come in waves. The first wave arose during the period 1982–1983, reflecting the influence of the Latin American crises. A few years later, the second wave took place from the mid-1980s to the late 1990s, indicating the adverse effects of the

[11] CRAG database reports sovereign defaults from the following types of creditors: International Monetary Fund, International Bank for Reconstruction and Development (a part of the World Bank Group), Paris Club, other official creditors, private creditors, foreign currency bank loans, foreign currency bonds, and local currency debt.

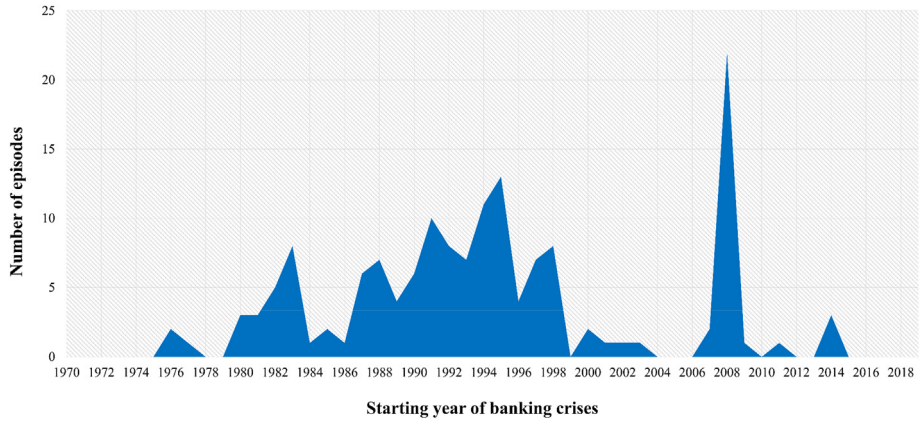

Fig. 1. Banking crises episodes (1970–2019).
Source: Systemic banking crisis database by Laeven and Valencia (2020) and authors' extension.

breakup of the Soviet Union, the Mexico peso crisis, and the Asian financial crisis. The third wave came during the period 2007–2008 as consequences of the recent Great Recession. This period also witnessed the highest number of systemic banking crises (22).

4.2. Currency crises episodes during the period 1950–2019

Based on the definition described above, we identify 414 currency crises in a sample of 206 countries over the period 1950–2019. In our database, there are 72 out of 206 countries that did not experience any currency crisis. This means that most countries experienced at least one currency crisis during this period. Moreover, 84 countries are reported to have more than one currency crisis, which makes up around 63% of countries that experienced a currency crisis. Brazil has the highest number of currency crises (13) since 1950.

Fig. 2 shows the frequency of currency crises we have identified for the period 1950–2019. Currency crises mainly occurred from the early 1980s to the early 2000s. There are 25 currency crises that started in 1994 – the year that witnessed the highest number of currency crises. Some widely known currency crises in 1994 are the Mexican peso and the Turkish Lira crises. The waves of currency crises came again in the early 2000s and 2008 due to the influence of the Dot-com bubble (2000–2002) and the recent Great Recession of 2007/08. More recently, the wave of currency crises emerged during the period 2015–2016 in emerging/developing countries such as Egypt, Venezuela, Nigeria, and Kazakhstan. They were triggered by the currency depreciation of many commodity-exporter countries in 2015 (Kohlscheen et al., 2017).

4.3. Sovereign debt crises episodes during the period 1960–2019

By using a different method for debt crisis identification coupled with a more comprehensive database of sovereign defaults – the CRAG database – we detect more sovereign debt crises than those reported by Laeven and Valencia (2020). In particular, while they identify debt crises based on the data of sovereign defaults from only private creditors, we rely on data from both private and official creditors. We identify 200 sovereign debt crises in 203 countries for the years 1960–2019. For the period between 1970 and 2017, we identify 177 debt crises, while Laeven and Valencia (2020) only report 79 debt crises. There are 124 countries experiencing single sovereign debt crises, and 46 countries of which had multiple debt crises. Note that many countries experienced a single long-lasting debt crisis such as Cuba (1982–2016), Côte d'Ivoire (1983–2013), and Guinea (1986–2016).

Fig. 3 illustrates the frequency of sovereign debt crises from 1960 to 2019. Similar to currency and banking crises, debt crises also come in waves. The most noticeable wave occurred from the late 1970s to the late 1990s. The year that witnessed the highest number of sovereign debt crises is 1983, which can be explained by the influence of a series of debt crises in Latin American countries such as Brazil, Argentina, and Mexico.

Under the definitions of banking, currency, and debt crises, Fig. 4 shows the number of financial crises occurred around the world. It is clear that countries in Latin America and Africa experienced more financial crises than countries in other continents. In general, we find 151 banking crises (1970–2019), and 414 currency crises (1950–2017) 200 debt crises (1960–2019) around the globe. These crises are more than those of Laeven and Valencia (2020) who report 151 banking crises, 236 currency crises, and 79 debt crises over the period 1970–2017. One

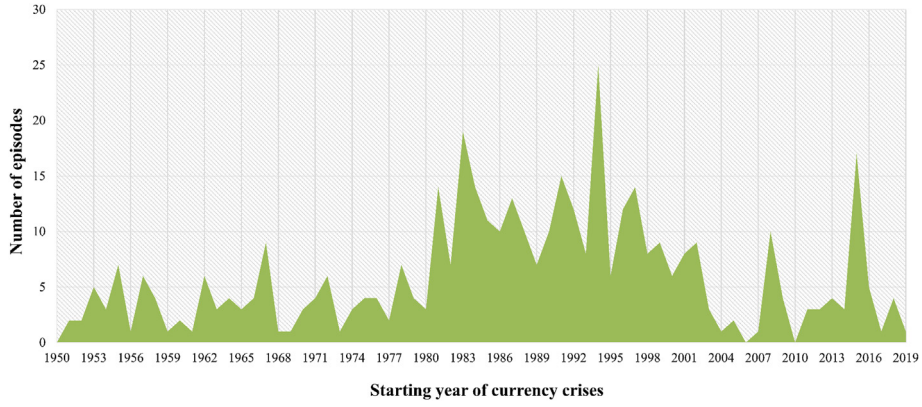

Fig. 2. Currency crises episodes (1950–2019).
Source: Authors' calculations.

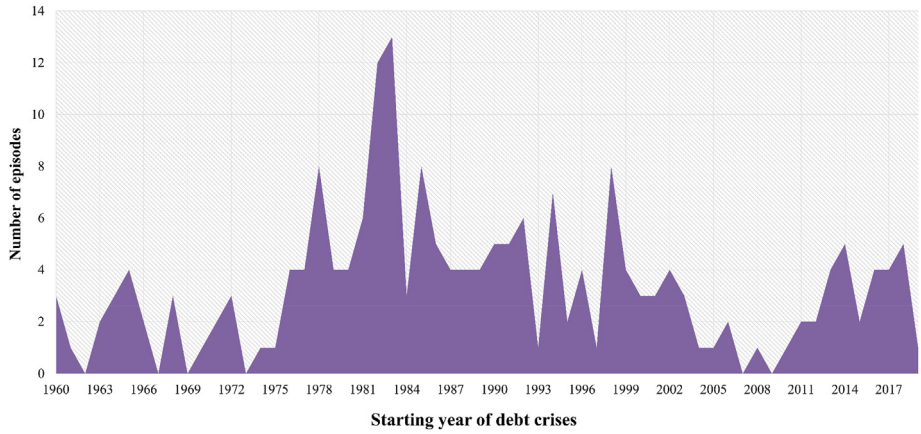

Fig. 3. Sovereign debt crises episodes (1960–2019).
Source: Authors' calculations.

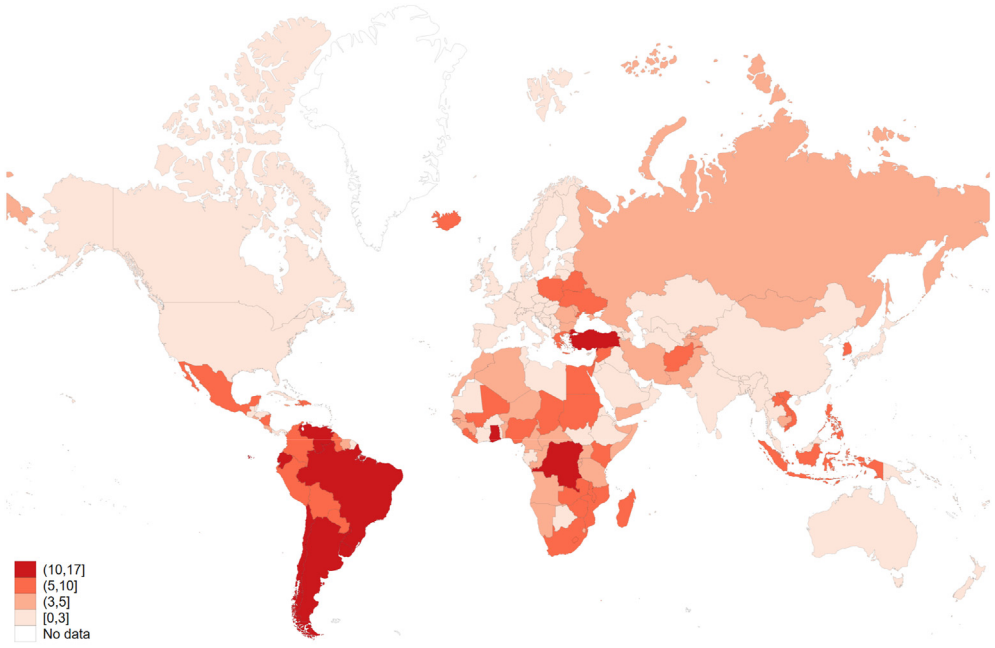

Fig. 4. Frequency of financial crises around the world (1950–2019).

explanation for the higher number of currency and debt crises is the longer time periods that we consider in our database. Moreover, we identify more debt crises as sovereign default data from CRAG database allows capturing defaults from both private and official creditors, while Laeven and Valencia (2020) only focus on private creditors. Thus, many debt crises were ignored by these authors such as Algeria (1991–1998), Belarus (1994–1996), Lao PDR (1991, 2013), Papua New Guinea (2016–2018), South Sudan (2014–2019), Zimbabwe (2000–2018), among others.

4.4. Financial crises sequencing

To provide a complete picture of different types of financial crises, Fig. 5 shows the frequency of banking, currency, and debt crises over the period 1970–2019. Currency crises are generally more frequent than the other types of crises. The period between the early 1980s and the late 1990s witnesses the highest number of financial crises.

As different types of financial crises tend to come in waves, which implies that financial crises may not be single events and can evolve into other forms, special attention should be paid to twin and triple crises. Fig. 6 shows the number of single-event and twin and triple crises from 1970 to 2019.[12] During this period, we identify 263 single currency, 123 single sovereign debt, 88 single systemic banking, 75 twin, and 21 triple crises. It is clear that currency crises tend to coincide with systemic banking crises and sovereign debt crises. In contrast, systemic banking crises rarely coincide with debt crises which, in this case, is consistent with the findings of Laeven and Valencia (2020).

While Fig. 5 shows how banking, currency, and debt crises coincide with each other, it also important to explore how they precede and/or follow each other. In doing so, Fig. 7 provides more details for the percentage of banking crises that were followed by, coincided with, and preceded by currency and sovereign debt crises. It is worth stressing that despite the different definitions of financial crises, the results of crisis sequencing are consistent with those of Kaminsky and Reinhart (1999), Komulainen and Lukkarila (2003), Reinhart and Rogoff (2011), and Laeven and Valencia (2020). That is, banking crises tend to coincide or precede currency crises within one year.

[12] The period is chosen to avoid missing observations of twin and triple crises.

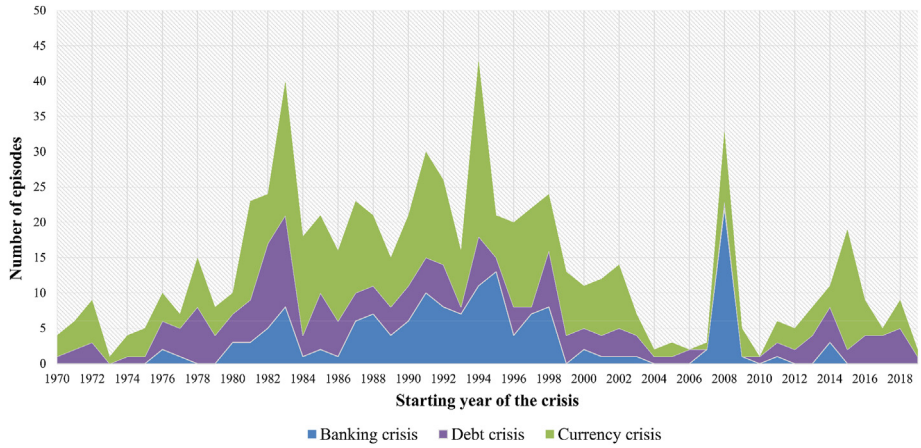

Fig. 5. Financial crises by type (1970–2017).
Source: Laeven and Valencia (2020) and authors' calculations.

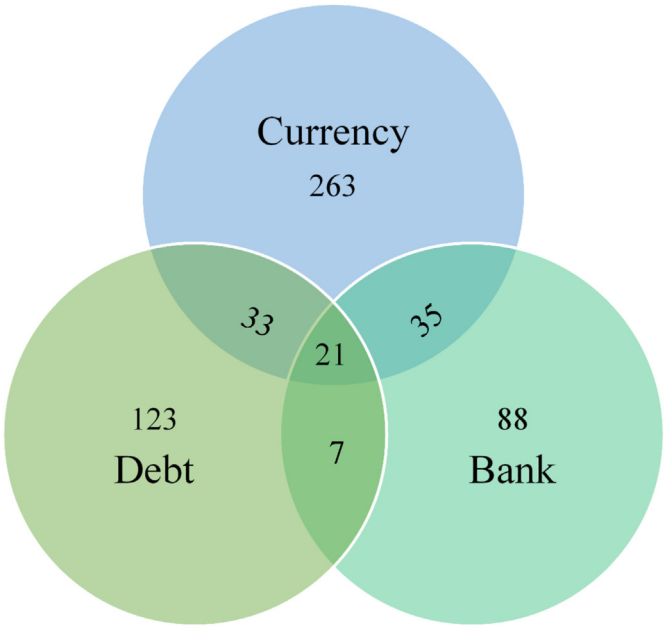

Fig. 6. Financial crises sequencing (1970–2019).
Source: Authors' calculations.

Looking at the percentage of currency crises to banking crises, around 16% of banking crises coincided with currency crises. In particular, more than 8% of banking crises were followed by currency crises, while around 13% of banking crises preceded currency crises within a year.[13] Furthermore, around 5% of systemic banking crises follow, precede, and coincide with debt crises. The percentages of currency crises to banking crises or banking crises to debt crises are much smaller in the second (T+2) and the third year (T+3), justifying the choice of one-year interval for the definitions of twin and triple crises.

Regarding the linkages between sovereign debt and currency crises, Fig. 8 shows the percentage of currency to debt crises from 1970 to 2019. Debt crises are more likely to follow, coincide, and precede currency crises. Particularly, more than 11% of debt crises coincided with currency crises, and around 9% of debt crises preceded and followed currency crises.

In general, most financial crises are not single events. In fact, they tend to coincide with and/or precede each other. In particular, banking and debt crises tend to coincide or precede currency crises. Evidence from crisis sequencing indicates the need for research on financial crisis should account for twin and triple crises.

While our crisis sequencing statistics reveal that different types of financial crises are related, a more sophisticated econometric method is needed to further check the relationships between them. In doing so, we employ a pooled logit model to examine how banking, currency, and debt crises can coincide or predict each other. Table 1 reports the sequencing effects of different types of financial crises and provides a comparison between emerging/developing and advanced countries. In this table, Panel B focuses on the onset of financial crises, which means that crisis dependent variables only include observations of tranquil periods and the onsets of financial crises. All observations for the duration of financial crises are excluded. The results of Table 1 generally imply that the three types of financial crises do coincide with each other. For example, in the sample of all countries (Panel A), a currency crisis is associated with 3.48 ($= e^{1.249}$) times higher likelihood of a banking crisis occurs. However, the magnitude of the coefficients indicates that banking crises and debt crises are less likely to coincide with each other, which is also evident from the low number of twin crises between banking and debt crises in Fig. 5.

The relationships between the three types of financial crises remain robust for emerging/developing countries when the sample is split into two different groups of countries.[14] By contrast, the crisis sequencing effects almost disappear in advanced countries. Nevertheless, our regressions for advanced countries are problematic. As debt and currency crises occur rarely in those countries, debt and currency crises variables cannot be performed in the regression models due to the insufficient numbers of observations and the lack of variability. The small values of Wald tests for the sample of advanced countries also indicate that crisis variables might not contribute significantly to the models.

In Table 2 we use the explanatory variables lagged one period to explore how financial crises precede each other. The results indicate that the different types of financial crises do precede each other within one year in the whole sample and in emerging/developing countries. These findings are robust when our dependent variables include only the onsets of financial crises (Panel B). In summary, results from Tables 1 and 2 confirm that financial crises may not be single events. Instead, they tend

[13] In particular, at time T+1 (T is the starting year of banking crises) there were 19 banking crises preceding currency crises. As we have 151 banking crises in total, around 13% (19/151) banking crises preceded currency crises. At time T-1, 13 currency crises preceded banking crises, which means that 8.6% (13/151) banking crises were followed by currency crises.

[14] The country classification by the International Monetary Fund divides the world into advanced and emerging/developing countries. See https://www.imf.org/external/pubs/ft/weo/2018/02/weodata/groups.htm.

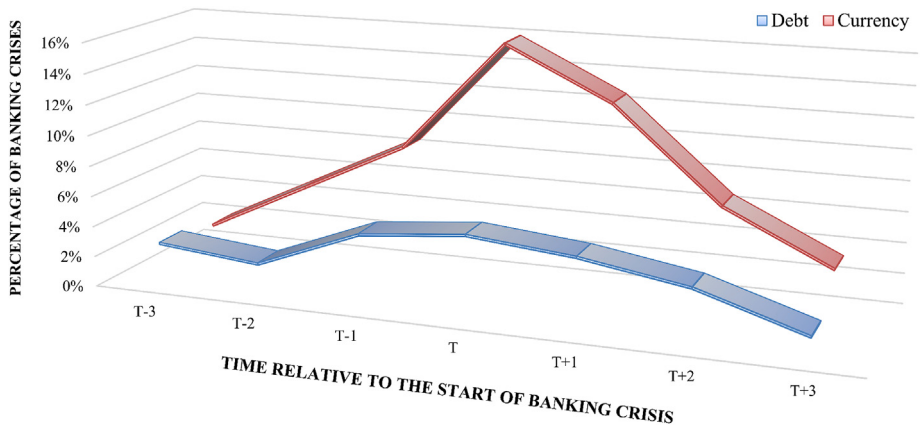

Fig. 7. The percentage of banking relative to currency and debt crises (1970–2019).
*Source:*Authors' calculations and Laeven and Valencia (2020). *Notes*: The figure shows the percentages of currency and debt crises to banking crises to illustrate how banking crises were followed, coincided, and preceded by sovereign or currency crises. T indicates the start year of banking crises.

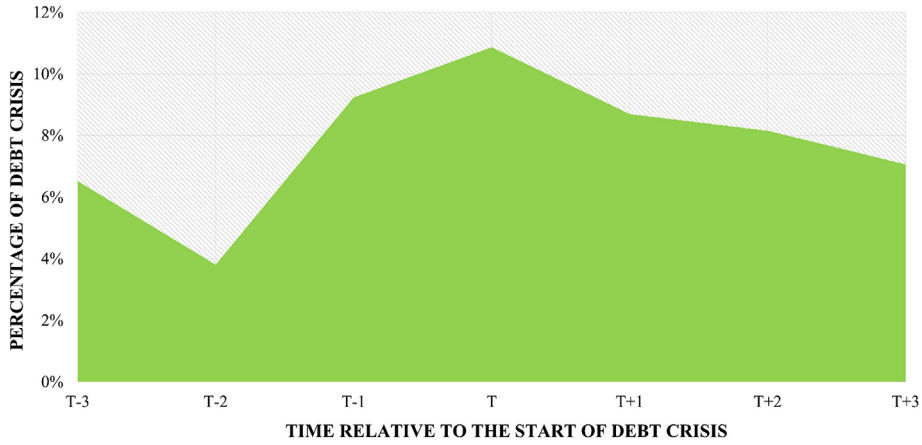

Fig. 8. The sequencing of debt crises relative to currency crises (1970–2019).
*Source:*Authors' calculations. *Notes*: The figure shows the percentages of currency to debt crises, showing how debt crises were followed, coincided, and preceded by currency crises. T indicates the start year of banking crises.

to coincide and precede each other, suggesting the need for future research to pay more attention to twin and triple crises.[15]

5. Financial crises duration

Table 3 shows the average duration of financial crisis by type and provides a comparison between advanced and emerging/developing countries. On a global basis, most countries experienced at least one banking, currency, and debt crisis. Currency crises occurred more frequently than other types of financial crises – which account for 48.1% of total financial crises – but their duration is the shortest, at only 1.53 years on average. While banking, currency, twin, and triple crises tend to last for a few years, the average duration of debt crisis is more than 12 years. Some emerging/developing countries even experienced debt crises for several decades such as Cambodia (1971–2019), the Democratic Republic of Congo (1976–2011), and Liberia (1980–2019), just to name a few. It is worth stressing that debt crises can be prolonged as indebted countries are unwilling to pay rather than unable to pay (Reinhart and Rogoff, 2009, p.54; Nguyen et al., 2020). A sovereign default or restructuring could trigger sanctions and cause reputational damage and output losses (Aguiar and Gopinath, 2006; Reinhart and Trebesch, 2016a). However, as some indebted countries have already defaulted, they may have less incentive to honour their obligations when they consider the relative costs and benefits of default (Manasse and Roubini, 2009). Debt relief may further discourage those countries to implement economic reforms and service their remaining debts (Easterly, 2002).

Financial crisis can be seen as a phenomenon of emerging/developing countries as only approximately 9% of financial crises occurred in advanced countries. Regarding the types of financial crises, 8% of currency crises, 4% of debt and twin crises, and 0% of triple crisis were recognised in those countries. Only 39% of emerging/developing countries have not experienced a debt crisis. Banking crisis occurred more frequently than other types of financial crises in advanced countries, at around 22.5% of total bank crises in the world. However, only five advanced countries experienced more than one banking crisis. Financial crises are also shorter in advanced countries, especially debt crises. Nevertheless, advanced countries experienced longer systemic banking crises than emerging/developing countries. This is possibly because

[15] Despite using longer time periods and additional financial crises, these results remain consistent when we replicate our analyses using the financial crisis database by Laeven and Valencia (2020). Those results are not reported here to keep the analysis parsimonious, but they are available upon reasonable request.

Table 1
Crises sequencing: The coincidence of financial crises.

	All countries			Emerging/developing countries			Advanced countries		
	Banking crisis	Currency crisis	Debt crisis	Banking crisis	Currency crisis	Debt crisis	Banking crisis	Currency crisis	Debt crisis
Panel A: Full length of financial crises									
Currency crisis	1.249***		1.377***	1.364***		1.155***	0.829		[omitted]
	(0.134)		(0.0929)	(0.145)		(0.0982)	(0.549)		
Debt crisis	0.836***	1.377***		1.210***	1.155***		0.541	[omitted]	
	(0.104)	(0.0929)		(0.125)	(0.0982)		(1.065)		
Banking crisis		1.249***	0.836***		1.364***	1.210***		0.829	0.541
		(0.134)	(0.104)		(0.145)	(0.125)		(0.549)	(1.065)
Observations	8489	8489	8489	6801	6801	6801	1688	1679	1660
Wald test	221.92***	367.64***	301.28***	281.56***	305.63***	235.97***	2.51	2.28	0.26
Pseudo-LL	−1671.411	−1851.052	−4696.126	−1215.176	−1688.965	−4128.265	−424.086	−141.45	−55.819
Panel B: Onset financial crises (dependent variables)									
Currency crisis	1.316***		1.467***	1.342***		1.303***	1.495**		[omitted]
	(0.223)		(0.192)	(0.235)		(0.195)	(0.758)		
Debt crisis	0.708***	1.097***		0.908***	0.860***		[omitted]	[omitted]	
	(0.186)	(0.116)		(0.210)	(0.122)				
Banking crisis		1.176***	0.713***		1.271***	0.756***		1.078*	1.525
		(0.161)	(0.239)		(0.172)	(0.249)		(0.644)	(1.159)
Observations	8489	8489	8489	6801	6801	6801	1679	1679	1660
Wald test	85.66***	183.58***	77.76***	91.67***	151.59***	65.86***	3.89**	2.80*	1.73**
Pseudo-LL	−699.474	−1333.413	−775.541	−546.674	−1223.293	−728.220	−149.120	−93.877	−27.456

Notes: Pseudo-LL implies the log pseudolikelihood statistics. Robust standard errors are in parentheses. ***, **, * indicate significant levels at 1%, 5%, and 10%, respectively.

Table 2
Crises sequencing: The precedent of financial crises.

	All countries			Emerging/developing countries			Advanced countries		
	Banking crisis	Currency crisis	Debt crisis	Banking crisis	Currency crisis	Debt crisis	Banking crisis	Currency crisis	Debt crisis
Panel A: Full length of financial crises									
Currency crisis	1.233***		1.480***	1.340***		1.270***	0.825		[omitted]
	(0.135)		(0.0935)	(0.145)		(0.0990)	(0.549)		
Debt crisis	0.728***	1.146***		1.077***	0.913***		[omitted]	[omitted]	
	(0.105)	(0.0922)		(0.123)	(0.0971)				
Banking crisis		0.906***	0.886***		1.051***	1.243***		0.00600	2.627***
		(0.143)	(0.104)		(0.152)	(0.125)		(0.740)	(0.714)
Observations	8466	8356	8329	6784	6699	6676	1673	1647	1625
Wald test	189.03***	234.67***	339.70***	241.02***	187.30***	266.28***	2.26	0.01	13.53***
Pseudo-LL	−1666.378	−1892.557	−4604.145	−1216.187	−1724.590	−4046.724	−420.525	−141.847	−45.027
Panel B: Onset financial crises (dependent variables)									
Currency crisis	0.796***		0.909***	0.893***		0.770***	[omitted]		[omitted]
	(0.236)		(0.226)	(0.244)		(0.226)			
Debt crisis	0.664***	0.950***		0.821***	0.716***		[omitted]	[omitted]	
	(0.173)	(0.115)		(0.194)	(0.120)				
Banking crisis		0.675***	0.638**		0.809***	0.537*		−0.204	3.719***
		(0.182)	(0.259)		(0.190)	(0.280)		(1.036)	(1.159)
Observations	8466	8356	8329	6784	6699	6676	1645	1647	1625
Wald test	29.73***	94.58***	26.47***	35.91***	70.54***	17.92***	–	0.04	10.29***
Pseudo-LL	−699.032	−1349.464	−776.016	−545.235	−1236.565	−728.712	−149.854	−94.641	−22.167

Notes: Pseudo-LL implies the log pseudolikelihood statistics. Explanatory variables are lagged one period (year). Robust standard errors are in parentheses. ***, **, * indicate significant levels at 1%, 5%, and 10%, respectively.

banking crises are deeper in advanced countries as they are associated with higher output losses (Laeven and Valencia, 2020). Moreover, their complex financial systems might undermine the effectiveness of their crisis mitigation policies, which result in more prolonged banking crises (Nguyen et al., 2021a).

6. Conclusions

The identification of financial crises is crucial for further research on the causes, duration, and consequences of financial crises. Without proper methods to identify different types of financial crises, research on these areas may end up futile. Focusing on a sample of 206 countries, we compile a comprehensive database of systemic banking, currency, sovereign debt, twin, and triple crises over the period 1950–2019, depending on each type of financial crisis. In doing so, we extend the systemic banking crises database by Laeven and Valencia (2020) and develop new methods to identify currency and sovereign debt crises. It is worth stressing that our methods allow capturing many currency and debt crises that are unnoticed in previous studies. The contribution of this paper to the existing literature is twofold. On the conceptual side, besides providing a thorough review and discussion of methods to date financial crises, it provides an organised view of the channels through which one type of financial crisis can evolve into another different form. On the empirical side, it empirically shows a broad view of the rising of different

Table 3
Financial crisis frequency and duration.

	Crises	Average duration	Countries in crisis	Countries >1 crisis	Countries no crisis	Min duration	Max duration
All countries (total)	861	6.72	211	178	28	1	49
Systemic banking crises	151	3.13	118	29	83	1	5
Currency crises	414	1.53	134	84	72	1	9
Sovereign debt crises	200	12.11	124	46	79	1	49
Twin crises	75	1.96	62	9	139	1	5
Triple crises	21	2.33	17	4	184	1	5
Advanced countries (total)	77	3.03	38	20	6	1	6
Systemic banking crises	34	3.74	29	5	9	1	5
Currency crises	32	1.44	10	6	26	1	5
Sovereign debt crises	8	2.63	6	1	33	1	5
Twin crises	3	1.67	4	0	35	1	2
Triple crises	0	0	0	0	0	0	0
Developing countries (total)	784	7.27	173	158	22	1	49
Systemic banking crises	117	2.95	89	24	74	1	5
Currency crises	382	1.53	124	78	46	1	9
Sovereign debt crises	192	12.51	118	45	46	1	49
Twin crises	72	1.97	58	9	104	1	5
Triple crises	21	2.33	17	4	146	1	5

Notes: The table reports the number of financial crises by type (Crises), the average duration of financial crises (Average duration), the number of countries experienced financial crises (Countries in crisis), the number of countries that experienced more than one financial crisis (Countries >1 crisis), the number of countries that have not experienced a financial crisis (Countries no crisis), the minimum duration of financial crisis (Min duration), and the maximum duration of financial crisis (Max duration).

types of financial crises, their sequencing effects, and their duration over years. As far as the authors are aware, this study is the first to provide such a complete database of financial crises over a long period of time.

Declaration of competing interest

None.

APPENDIX

Table A1
Significant policy interventions (Laeven and Valencia, 2013)

1	*Deposit freeze and bank holidays*: determine whether a government imposes restrictions on deposit withdrawals or installs a bank holiday. In the case that a government use these interventions, the authors observe the duration of deposit freeze and/or bank holidays and which types of deposits are affected.
2	*Significant nationalisations*: the situation that the government takeover major financial institutions or large shares of their capital to protect the financial system.
3	*Significant bank guarantees*: indicate that the government provides guarantees on bank liabilities, which can be full protection on liabilities or only non-deposit liabilities. The authors do not provide a specific threshold on the degree of government guarantees. However, they are significant when the government commitments on bank liabilities are extensive compared to the size of the corresponding economies. Policy interventions that only raise the degree of deposit insurance coverage are not included.
4	*Liquidity support*: indicate the liquidity provided by the central banks, which is measured by the ratio of central bank claims on deposit money bank and liquidity support from the Treasury to total deposits and liabilities to nonresidents. Total deposits are the sum of demand deposits, other deposits, and liabilities to nonresidents. It is significant when the ratio exceeds 5% and more than doubles relative to its level in the previous year.
5	*Bank restructuring costs*: the gross fiscal outlays directed to the restructuring of the financial sector. The authors exclude liquidity support from the Treasury because it is taken into account of liquidity support measure. They suggest that restructuring cost is considered to be significant when it exceeds 3% of GDP. Gross fiscal cost is preferred to net fiscal cost because it shows the intensity of the government intervention.
6	*Asset purchases*: refer to the value of assets purchased by the central bank, the Treasury, or government entity. The intervention is significant when purchased assets exceed 5% of GDP.

Table A2
Crises dates by country and type

Country	Banking crises	Debt crises	Currency crises	Twin crises	Triple crises
	(1970–2019)	(1960–2019)	(1950–2019)	(1970–2019)	(1970–2019)
Afghanistan		1964–1966; 1976; 2000–2008; 2010–2012; 2014–2019	1963		
Albania	1994	1991–2002	1997		
Algeria	1990–1994	1991–1998	1988; 1990–1991; 1994		1990–1991
Angola		1989–2006; 2018–2019	1991–1999; 2015–2016; 2018	2018	
Anguilla					
Antigua and Barbuda		1985–1986; 1996–2011; 2014–2016			
Argentina	1980–1982; 1989–1991; 1995; 2001–2003	1982–1993; 2001–2016	1955; 1958; 1962; 1967; 1975; 1981–1982; 1984; 1987–1989; 2002; 2013–2016; 2018		1980–1982; 2001–2002
Armenia	1994	1993–1998		1993–1994	
Aruba					
Australia					
Austria	2008–2012				
Azerbaijan	1995		1994; 2015–2016	1994–1995	
Bahamas					
Bahrain					
Bangladesh	1987		1975		
Barbados		2018–2019			
Belarus	1995	1994–1996	1996–2000; 2009; 2011; 2015		1994–1996
Belgium	2008–2012				
Belize		2006–2007; 2012–2013; 2017			
Benin	1988–1992	1965–1981; 1983–2000; 2003	1994		
Bermuda					
Bhutan		1991–1993	1966; 1991	1991	
Bolivia	1986; 1994	1960–1969; 1980–1998; 2001	1953; 1956; 1958; 1972–1973; 1982–1985		
Bosnia and Herzegovina	1992–1996	1994–2000			
Botswana			1984–1985; 2001		
Brazil	1990–1993; 1994–1998	1983–1994	1953; 1957–1958; 1961; 1964; 1968; 1976; 1979–1983; 1987–1990; 1992–1993; 1999; 2002; 2008; 2015		
Brunei Darussalam					
Bulgaria	1996–1997	1990–1999	1990–1991; 1993–1994; 1996–1997	1991–1992; 1996–1997	
Burkina Faso	1990–1994	1986–2006	1994		
Burundi	1994–1998	1996–2009	1983; 1988		
Cabo Verde	1993	1985–2003			
Cambodia		1971–2019	1969; 1971–1972; 1992–1993		
Cameroon	1987–1991; 1995–1997	1985–2007	1994	1994–1995	
Canada					
Cayman Islands			1972		
Central African Republic	1976; 1995–1996	1972–1985; 1987–2019	1994	1994–1995	
Chad	1983; 1992–1996	1974–2004; 2014–2015; 2018–2019	1994		
Channel Islands					
Chile	1976; 1981–1985	1972–1975; 1983–1990	1951; 1955–1956; 1962–1963; 1967; 1971–1975; 1982–1983; 1985	1971–1975	1981–1983
China, P.R.: Mainland	1998		1984; 1994		
China, P.R.: Hong Kong					
China, P.R.: Macao					
China, P.R.: Taiwan			1955		
Colombia	1982; 1998–2000		1957–1958; 1962–1963; 1965; 1985; 2015		
Comoros		1984–2013	1994		
Congo, Democratic Republic	1983; 1991–1993; 1994–1998	1960–1965; 1976–2011	1963–1964; 1967; 1976; 1979; 1981; 1983–1984; 1987–1994; 1996; 1998–2001; 2009; 2016–2017	1976; 1983	
Congo, Republic	1992–1994	1971–1979; 1982–2019	1994		
Costa Rica	1987–1991; 1994–1995	1981–1996	1981; 1991	1981	
Cote d'Ivoire	1988–1992	1983–2013	1994		
Croatia	1998–1999	1992–1996			
Cuba		1982–2018			
Curaçao					
Curaçao and Sint Maarten					
Cyprus	2011–2015	2013			

(*continued on next page*)

Table A2 (*continued*)

Country	Banking crises	Debt crises	Currency crises	Twin crises	Triple crises
Czech Republic	1996–2000				
Denmark	2008–2009				
Djibouti	1991–1995	1992–2010; 2017–2019		1991–1995	
Dominica		2002–2018			
Dominican Republic	2003–2004	1961–1964; 1966–1969; 1982–1999	1985; 1987–1988; 1990–1991; 2003	2003	
Ecuador	1982–1986; 1998–2002	1982–1995; 1999–2000; 2008–2009	1970; 1982–1983; 1985–1986; 1988; 1992; 1998–1999		1982–1983; 1998–1999
Egypt	1980	1964–1970; 1977; 1979–1994	1979; 1989–1991; 2003; 2016–2017		1979–1980
El Salvador	1989–1990	1981–1993; 2017	1986; 1990	1989–1990	
Equatorial Guinea	1983	1981–2002; 2017	1994		
Eritrea	1993	2002–2018	1992–1993; 2001	1992–1993; 2001–2002	
Estonia	1992–1994				
Ethiopia		1990–2011	1992–1993		
Faroe Islands					
Fiji			1998		
Finland	1991–1995		1957; 1967		
France	2008–2009				
French Polynesia					
Gabon		1986–2007	1994		
Gambia, The		1982–1989; 2001–2014; 2019	1957; 1984; 1986; 2002–2003	2001–2003	
Georgia	1991–1995	1994–2006	1998–1999		
Germany	2008–2009				
Ghana	1982–1983	1965–1977; 1979; 1982; 1987–1996; 1998–2004; 2015–2018	1967; 1971; 1978; 1983–1984; 1986–1987; 1992–1993; 1996; 1999–2000; 2009; 2014	1970–1971; 1978–1979; 1986–1987; 1998–2000; 2014–2015	1982–1983
Gibraltar			2008		
Greece	2008–2012	1960–1965; 2012–2013; 2018	1953; 1981; 1983		
Grenada		1984–2018			
Guatemala		1986–2006	1986; 1990	1986	
Guinea	1985; 1993	1986–2018	1999; 2005		1985–1986
Guinea-Bissau	1995–1998; 2014–2017	1979–2018	1994	1994–1995	
Guyana	1993	1976–2018	1984; 1987; 1989; 1991		
Haiti	1994–1998	1963–1965; 1968–1972; 1985–1995	1991–1992; 2002–2003; 2019		
Honduras		1982–2007	1990		
Hungary	1991–1995; 2008–2012				
Iceland	2008–2012		1960; 1967–1968; 1974–1975; 1978; 1980–1983; 1989; 2008	2008	
India	1993		1966; 1991		
Indonesia	1997–2001	1966–1970; 1998–2002	1978–1979; 1983; 1986; 1997–1998; 2000		1997–1998
Iran		1987–1991	1955; 1957; 1993; 2013		
Iraq		1988–2019			
Ireland	2008–2012	2013			
Israel	1983–1986		1953; 1962; 1974–1975; 1977–1981; 1983–1984	1983–1984	
Italy	2008–2009		1981		
Jamaica	1996–1998	1978–2013	1978; 1983–1984; 1991–1994	1978	
Japan	1997–2001				
Jordan	1989–1991	1988–2008	1988–1989		1988–1989
Kazakhstan	2008		1999; 2015–2016		
Kenya	1985; 1992–1994	1989–1994; 1998–2002; 2004–2007	1981; 1993	1992–1993	
Kiribati					
Korea	1997–1998		1951; 1953; 1955; 1960–1961; 1964; 1980; 1997–1998	1997–1998	
Kosovo					
Kuwait	1982–1985				
Kyrgyz Republic	1995–1999	1994–1996; 1999–2005	1996–1999		1994–1996
Lao PDR		1991; 2003	1959; 1964; 1972; 1978; 1981; 1985–1989; 1997–1999		
Latvia	1995–1996; 2008–2012				
Lebanon	1990–1993	1985–1992	1983–1987; 1990; 1992	1990	
Lesotho			1984–1985; 2001; 2008; 2015		
Liberia	1991–1995	1963; 1968–1969; 1980–2019	1993; 2002		
Libya		2011–2019	1994; 2002		

(*continued on next page*)

Table A2 (*continued*)

Country	Banking crises	Debt crises	Currency crises	Twin crises	Triple crises
Liechtenstein					
Lithuania	1995–1996				
Luxembourg	2008–2012				
Macedonia, FYR	1993–1995	1992–1997	1997		
Madagascar	1988	1981–2016	1984; 1987; 1994; 2004	1987–1988	
Malawi		1982–1983; 1987–1990; 1998–2006	1992; 1994; 1997–1998; 2000; 2012; 2015–2016	1997–1998	
Malaysia	1997–1999		1997–1998	1997–1998	
Maldives			1975		
Mali	1987–1991	1964; 1970–1980; 1983–2006; 2015–2017	1994		
Malta					
Marshall Islands					
Mauritania	1984	1978–2019	1992–1993		
Mauritius			1981		
Mexico	1981–1985; 1994–1996	1982–1990	1954; 1976–1977; 1982; 1985–1986; 1994–1995	1994–1995	1981–1982
Micronesia					
Moldova	2014–2018	1996; 1998–2018	1988–1999; 2015	1998–1999; 2014–2015	
Monaco					
Mongolia	2008–2009	1997–2004	1993; 1996–1997	1996–1997	
Montenegro					
Montserrat					
Morocco	1980–1984	1983–1992; 1999–2002	1981	1980–1981	
Mozambique	1987–1991	1980; 1984–2018	1987; 1991–1993; 1995; 2001; 2015–2016	1987	
Myanmar		2000–2018	1975; 2012		
Namibia			1984–1985; 2001; 2008; 2015		
Nauru		1994–2019			
Nepal	1988		1967; 1991		
Netherlands	2008–2009				
Netherlands Antilles					
New Caledonia			1958–1959		
New Zealand			1984; 2008		
Nicaragua	1990–1993; 2000–2001	1978–2018	1979; 1985; 1988; 1990	1978–1979; 1990	
Niger	1983–1985	1983–2014; 2016–2018	1994	1983–1985	
Nigeria	1991–1995; 2009–2012	1982–2006	1986–1987; 1989; 1992; 1999; 2016	1991–1992	
Norway	1991–1993				
Oman					
Pakistan		1972–1978; 1998–2002	1955; 1972	1972	
Palau					
Panama	1988–1989	1983–2003			
Papua New Guinea		2016–2018	1997–1998		
Paraguay	1995	1985–1994	1952–1953; 1955–1956; 1984; 1986–1987; 1989; 2001–2002	1984–1985; 1985–1987	
Peru	1983	1968–1970; 1978–1980; 1983–1998	1967; 1976–1978; 1981–1985; 1987–1990	1983	
Philippines	1983–1986; 1997–2001	1983–1992	1962; 1970; 1983–1984; 1997–1998	1997–1998	1983–1984
Poland	1992–1994	1981–1994	1978–1980; 1982; 1986–1990; 1992	1981–1982; 1992	
Portugal	2008–2012	2013	1982–1983		
Puerto Rico		2016–2019			
Qatar					
Romania	1998–1999		1973; 1990–1993; 1996–1997; 1999	1996–1997	
Russian Federation	1998; 2008–2009	1991–2004	1998–1999; 2014–2015	1998	
Rwanda		1992–2007	1966; 1990–1991; 1995		
Samoa		1982–1985	1983	1982–1983	
San Marino			1981		
Sao Tome and Principe	1992	1985–2019	1987–1988; 1991; 1994–1997	1991–1992	
Saudi Arabia					
Senegal	1988–1991	1981–1987; 1989–1996; 2006–2007	1994	1988–1989	
Serbia, Republic of		1995–2005	2000		
Seychelles		1986–2013	2007–2008		
Sierra Leone	1990–1994	1976–2019	1964; 1983; 1985–1986; 1988–1990; 1995; 1997–1999	1988–1990	
Singapore					
Sint Maarten					
Slovak Republic	1998–2002				
Slovenia	1992; 2008–2012	1992–1996			
Solomon Islands		1995–2011	1997; 2002		
Somalia		1977–2019	1982; 1984–1986; 1988–1989		

(*continued on next page*)

Table A2 (*continued*)

Country	Banking crises	Debt crises	Currency crises	Twin crises	Triple crises
South Africa		1985–1987; 1989	1984–1985; 2001; 2008; 2015	1984–1985	
South Sudan		2014–2019	2015–2016	2014–2016	
Spain	1977–1981; 2008–2012		1983		
Sri Lanka	1989–1991	1996–2002	1977–1978		
St. Kitts and Nevis		2011–2012			
St. Lucia					
St. Vincent and the Grenadines		2002–2005			
Sudan		1977–2019	1981–1982; 1985; 1987–1988; 1991–1992; 1994–1996; 1998; 2012; 2018		
Suriname		1998–2010	1994; 1999; 2016	1998–1999	
Eswatini	1995–1999		1984–1985; 2001; 2008; 2015		
Sweden	1991–1995; 2008–2009		1993		
Switzerland	2008–2009				
Syrian Arab Republic		1990–2001; 2005	1954; 1988; 2011; 2013; 2015–2016		
Tajikistan		1994–2006	1995; 1997; 1999; 2015	1994–1995	
Tanzania	1987–1988	1978–2018	1983–1984; 1986; 1992	1986–1987	
Thailand	1983; 1997–2000		1997	1997	
Timor-Leste					
Togo	1993–1994	1977–2011	1994	1993–1994	
Tonga		2002–2004; 2013–2014; 2018			
Trinidad and Tobago		1988–1990	1985–1986; 1993		
Tunisia	1991				
Turkey	1982–1984; 2000–2001	1978–1980; 1999	1958–1959; 1970; 1978–1980; 1983–1984; 1988; 1991; 1994; 1996–1997; 1999; 2001; 2008; 2018	1978–1980; 1982–1984	1999–2001
Turkmenistan		1994–2002	1995–1996	1994–1996	
Tuvalu					
Uganda	1994	1978–2006	1981; 1983–1987; 1991		
Ukraine	1998–1999; 2008–2010; 2014–2018	1998–2003; 2014–2019	1998–1999; 2008–2009; 2014–2015	2008–2009	1998–1999; 2014–2015
United Arab Emirates					
United Kingdom	2007–2011				
United States	1988; 2007–2011				
Uruguay	1981–1985; 2002–2005	1965; 1983–1986; 1988; 1990–1991; 2003	1957; 1963; 1965; 1967–1968; 1972; 1974–1975; 1983–1985; 1987–1990; 2002	1987–1988	1981–1985; 2002–2003
Uzbekistan			1996–1997; 2000; 2017		
Vanuatu					
Venezuela, RB	1994–1998	1983–1990; 1992–1994	1984; 1986–1987; 1989; 1993–1994; 1996; 2002; 2011; 2013; 2016	1983–1984	1992–1994
Vietnam	1997	1975; 1978; 1980–2005	1962; 1966; 1972; 1981; 1987–1989	1980–1981	
Virgin Islands					
Yemen, Republic of	1996	1990–2009; 2016–2018	1995	1995–1996	
Yugoslavia, SFR		1983–1991	1952; 1954; 1965; 1971; 1980–1981; 1983; 1987–1989; 1991	1983	
Zambia	1995–1998	1979–2018	1983; 1985–1986; 1989–1992; 1996; 1998; 2000; 2009; 2015	1995–1996	
Zimbabwe	1995–1999	1965–1980; 2000–2018	1983–1984; 1991; 1997–1998; 2000; 2003; 2005–2008	2000	

Notes: An Excel spreadsheet with the crises database is provided as supplementary material to this paper.

Table A3
The number of financial crises by year

Year	Banking crisis	Debt crisis	Currency crisis	Twin crisis	Triple crisis
1950			0		
1951			2		
1952			2		
1953			5		
1954			3		
1955			7		
1956			1		
1957			6		
1958			4		
1959			1		

(*continued on next page*)

Table A3 (*continued*)

Year	Banking crisis	Debt crisis	Currency crisis	Twin crisis	Triple crisis
1960		3	2		
1961		1	1		
1962		0	6		
1963		2	3		
1964		3	4		
1965		4	3		
1966		2	4		
1967		0	9		
1968		3	1		
1969		0	1		
1970	0	1	3	1	0
1971	0	2	4	1	0
1972	0	3	6	1	0
1973	0	0	1	0	0
1974	0	1	3	0	0
1975	0	1	4	0	0
1976	2	4	4	1	0
1977	1	4	2	0	0
1978	0	8	7	4	0
1979	0	4	4	0	1
1980	3	4	3	2	1
1981	3	6	14	2	3
1982	5	12	7	2	2
1983	8	13	19	6	1
1984	1	3	14	2	0
1985	2	8	11	1	1
1986	1	5	10	3	0
1987	6	4	13	3	0
1988	7	4	10	2	1
1989	4	4	7	1	0
1990	6	5	10	2	1
1991	10	5	15	5	0
1992	8	6	12	3	1
1993	7	1	8	2	0
1994	11	7	25	7	2
1995	13	2	6	2	0
1996	4	4	11	3	0
1997	7	1	14	5	1
1998	8	8	8	4	2
1999	0	4	9	0	1
2000	2	3	6	1	0
2001	1	3	8	2	1
2002	1	4	9	0	1
2003	1	3	3	1	0
2004	0	1	1	0	0
2005	0	1	2	0	0
2006	0	2	0	0	0
2007	2	0	1	0	0
2008	22	1	10	2	0
2009	1	0	4	0	0
2010	0	1	0	0	0
2011	1	2	3	0	0
2012	0	2	3	0	0
2013	0	4	4	0	0
2014	3	5	3	3	1
2015	0	2	17	0	0
2016	0	4	5	0	0
2017	0	4	1	0	0
2018	0	5	4	1	0
2019	0	1	1	0	0

Notes: The figure reports the total number of sovereign debt crises (1960–2019), currency crises (1950–2019), systemic banking crises (1970–2019), twin and triple crises (1970–2019) by years.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.econmod.2022.105770.

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