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The Fiscal Costs of Contingent Liabilities:  
A New Dataset

by Elva Bova, Marta Ruiz-Arranz, Frederik Toscani, and H. Elif Ture

I N T E R N A T I O N A L M O N E T A R Y F U N D

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Fiscal Affairs Department

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**Prepared by Elva Bova, Marta Ruiz-Arranz, Frederik Toscani, and H. Elif Ture**

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**Abstract**

We construct the first comprehensive dataset of contingent liability realizations in advanced and emerging markets for the period 1990–2014. We find that contingent liability realizations are a major source of fiscal distress. The average fiscal cost of a contingent liability realization is 6 percent of GDP but costs can be as high as 40 percent for major financial sector bailouts. Contingent liability realizations are correlated among each other and tend to occur during periods of growth reversals and crises, accentuating pressure on the budget during already difficult times. Countries with stronger institutions are able to better control and address the underlying risks so that they are less exposed to contingent liability realizations.

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## I. INTRODUCTION<sup>1</sup>

Contingent liabilities have been one of the largest sources of fiscal risk. In several cases, failure to disclose and prepare for such risks has led to large increases in public debt and triggered fiscal crises (Cebotari, 2008; IMF, 2012). The materialization of contingent liabilities, together with exchange rate depreciations, have been found to be behind major unexpected increases in the debt-to GDP ratio over the last 10 to 15 years (IMF, 2003; Cebotari and others, 2009; and Jaramillo and Mulas-Granados, 2015), and the associated fiscal costs (in terms of fiscal outlays) can be very high. During the Asian and Latin American crises, for example, these fiscal costs amounted to up to 50 percent of GDP (Honohan and Klingebiel, 2000); fiscal costs related to contingent liabilities from natural disasters have historically been as high as 10 percent of GDP (Freeman and others, 2003). More recently, the global financial crisis and the numerous episodes of bank restructuring or recapitalization have again had a major toll on public finances, making clear the large implicit guarantees that governments tend to give to the financial sector (Amoglobeli and others, 2015; and IMF, 2015).

This study provides the first comprehensive dataset on contingent liability materializations, encompassing a broad range of contingent liabilities, from financial ones to those originating from subnational governments, natural disasters, public-private partnerships (PPPs), legal cases, state-owned enterprises and private enterprises. The dataset collects information for 80 advanced and emerging economies for the period 1990–2014. For each year and country where a contingent liability materialized, the dataset provides information on the start and end year of the episode, on the type of contingent liability, type of fiscal response, fiscal cost and triggers as well as some additional descriptive information.

We use this novel dataset to describe a number of previously not available stylized facts about contingent liability realizations. We find a total of 230 contingent liability episodes, and for 174 of those we were able to identify the associated fiscal cost. We find that the financial sector accounts for the largest fraction of those episodes with highest costs, but subnational government bailouts, support to State-Owned Enterprises (SOEs) and legal liabilities can also impose very substantial costs. The distribution of fiscal cost is highly skewed indicating that very large costs are rare (namely fiscal costs above 20 percent of GDP), but still the average fiscal cost amounts to about 6 percent of GDP while the median fiscal cost is about 2 percent of GDP. We find that contingent liability realizations are highly correlated with each other and with major crises. In particular, emerging markets suffered a large number of costly contingent liability realizations during the Asian Crisis while the same was true for advanced economies during the Global Financial Crisis.

Our dataset indicates that a *macro-relevant* contingent liability realization occurs on average every 12 years per country. They tend to occur at times of crisis and additionally many of these materializations happen concurrently—*when it rains it pours*—putting considerable strain on government finances. Through basic logit regressions, we highlight that contingent liability materializations tend to follow periods of high growth and coincide with low growth periods and

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<sup>1</sup> We thank Jason Harris and participants of the FAD seminar for very useful comments. Younghun Kim provided excellent research assistance.

banking crises. Lastly, we show that countries with stronger institutions and low growth volatility tend to suffer less from contingent liability realizations, indicating that much can be done at an institutional level to prevent costly shocks to the public finances.

The paper is structured as follows. Section II provides the definition of contingent liabilities employed and relates our work to the literature. Section III explains the methodology we use to create the dataset and illustrates some descriptive statistics. Section IV studies the impact of macroeconomic and institutional factors on the probability of a contingent liability realization and average fiscal costs. Section V concludes.

## **II. BACKGROUND**

### **A. Defining Contingent Liabilities and Their Fiscal Cost**

The Public Sector Debt Statistics Guide (IMF, 2011) defines contingent liabilities (CLs) as obligations that do not arise unless particular discrete events occur in the future. As such, they differ from direct liabilities where the settlement date is fixed at the time when the nominal obligation is set (Towe, 1991). On a contractual basis, we can distinguish between explicit and implicit CLs, whereby the former entail obligations which have been set by a particular law or contract; whereas the latter involve a moral obligation or expected responsibility of the government which is not established by law or contract but is based on public expectations, political pressures, and the overall role of the state as society understands it.

Within the range of explicit CLs, one can distinguish guarantees for non-sovereign borrowing and obligations issued to subnational governments and public and private sector entities. These include state guarantees as part of public-private partnership contracts; guarantees for various types of loans, such as mortgages, student, and small business loans; state insurance schemes (for commercial bank deposits, minimum returns from private pension funds, to protect farmers against droughts or floods, for airline disaster or war risk); and export trade guarantees. Implicit CLs encompass default of a subnational government and public or private entity on nonguaranteed debt and other liabilities; this includes bank failure, investment failure of a nonguaranteed pension fund, employment fund or social security fund, and environmental damage, disaster relief, and military financing.<sup>2</sup>

Under *accrual accounting*, CLs are not recognized as liabilities and expenses in government accounts. However, for each class of CL the government is in theory required to disclose in notes to financial statements (except when the possibility of any payment is remote) a description of the nature of the contingent liability and, where practicable: (i) an estimate of the financial effect,

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<sup>2</sup> No consensus has been reached regarding the treatment of pension liabilities. As not grounded in any legal document, future public pension benefits are not explicit liabilities but rather implicit ones. Polackova (1998) considers them as direct liability, as the liability is not contingent, since it is certain that the overall obligation of the government will occur (unless the pension system is reformed). The Public Sector Debt Statistics Guide (IMF, 2011) classifies "net obligations of government for payments of future social security benefits (such as retirement benefits and healthcare)" as implicit contingent liabilities. However, liabilities for non-autonomous unfunded employer pension schemes are direct liabilities and part of public sector debt when the employer is a public sector unit (e.g., government).

e.g., the present value of any payments; (ii) an indication of the uncertainties about amounts or timing; and (iii) possible reimbursement. On the other hand, if the probability that payments would have to be made is more than 50 percent, and the payments can be reliably estimated, then the government is required to recognize in its accounts a liability (referred to as *provision*) and a *corresponding expense*. Disclosure requirements include: (i) stocks at the beginning and end of the period; (ii) breakdown of the flows during the period; (iii) description of the nature of the obligation and the timing of payments; (iv) indication of uncertainties regarding amount and timing; and (v) the amount of any reimbursement. Under *cash accounting*, standards allow, but do not require, disclosure of information about contingent liabilities along the lines set out above.

In practice, only the most advanced countries provide a comprehensive overview of their CLs and even then implicit CLs are often not fully addressed. In fact, it is not even obvious whether a government should be disclosing and discussing all implicit CLs for fear of making a vague commitment stronger and thus creating moral hazard (see Irwin, 2015 on the issues surrounding the discussion of fiscal risks related to the financial sector in fiscal reporting). CLs thus often get realized “out of the blue” and inflict substantial costs on government finances. The Fiscal Transparency Code (IMF, 2014) indicates as best practice identifying, quantifying and disclosing all government guarantees and their probability of being called, total obligations under public-private partnership contracts, explicit government support to financial sector, and all direct and indirect support between the government and public corporations at least annually. Regarding implicit contingent liabilities, the Transparency Code endorses disclosing the main specific risks to the fiscal forecast in a summary report, along with estimates of their magnitude and, where practicable, their likelihood. The fiscal risks from natural disasters should also be managed according to a published strategy.

The materialization of contingent liabilities can have various impacts and associated costs on the economy. The literature distinguishes between direct and indirect fiscal costs, as well as gross and net fiscal costs. Following Laeven and Valencia (2012), we consider here as fiscal costs gross fiscal outlays and immediate changes in the government financial position directly due to the CL realization.<sup>3</sup> Prime examples include a government bailout of a bank, emergency assistance after an earthquake or debt assumption of a troubled state-owned enterprise (SOE).

## **B. Literature Review**

Governments that want to avoid the danger of sudden fiscal instability and accomplish their long-term policy objectives must have a good understanding of both their direct and contingent liabilities and must be able to handle them appropriately. There exists a sizeable literature on how to define, estimate, disclose, manage, and contain contingent liabilities. Early contributions

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<sup>3</sup> The direct cost is to be distinguished from indirect cost, where the former identifies direct government outlays related to the shock and the latter identifies the total change in public debt over the time of the shock and its impact. We consider gross fiscal costs as data on net fiscal costs, after asset recoveries for example, are limited and gross fiscal costs reflect better the immediate budgetary pressure. The coverage depends on the country and year. In the 1990s coverage tends to be central government while in the 2000s coverage expanded to general government mainly in advanced economies.

include Polackova (1998) and Polackova-Brixi and Schick (2002), who delineate direct and contingent fiscal risks, and discuss some country experiences. Cebotari (2008) in a thorough overview paper, outlines the issues and practices related to the accounting and management of contingent liabilities. Cebotari and others (2009) present a comprehensive analysis of the sources of contingent liabilities, and practical guidelines for the disclosure and management of (contingent) fiscal risks in light of existing country experiences. They conclude that contingent liabilities are a key source of fiscal risk.

Indeed, within the range of fiscal risks, contingent liabilities have often been claimed to have one of the costliest impacts on the budget (IMF 2003), and to account for the bulk of so-called "hidden deficits," i.e., increases in public debt that are not explained by headline fiscal balances (Kharas and Mishra, 2001).<sup>4</sup> Studies such as Weber (2012) and Jaramillo and Mulas-Granados (2015) show that factors other than low growth and headline fiscal deficits were the main contributors to the increase in public debt in low income, emerging and advanced economies since the 1980s. These could reflect several (residual) factors, such as contingent liability realizations and exchange rate developments, which are difficult to disentangle without a detailed look at the data.<sup>5</sup>

Financial sector related contingent liability realizations have often been a major burden for government finances. Through cross-country panel regressions, Weber (2012) finds that fiscal costs arising from banking crises (using the dataset by Laeven and Valencia, 2012) were significant sources of discrepancy between debt stock variations and deficit changes. Similarly, there exists a large literature that attempts to quantify the fiscal costs of CL realizations related to the financial sector (Honohan and Klingebiel, 2000; Hoelscher and Quintyn, 2003; Laeven and Valencia, 2008 and 2012; and Amoglobeli and others, 2015).<sup>6</sup>

Apart from the financial sector, however, evidence on the cost and frequency of CL realizations is limited. Relevant papers include Cordes and others (2014) who identify a number of episodes of subnational government bailouts over the past three decades in nine advanced and emerging countries. Flanagan (2008) discusses large Eastern European (legal) contingent liabilities largely related to frozen saving or foreign currency deposits following the breakup of the Soviet Union and Yugoslavia. An important study and closest in spirit to our work is Cebotari and others (2009), who list examples for a broad range of contingent liability realizations compiled from various sources. On natural disasters, the International Disasters Database (2015) contains a detailed overview of the human cost and physical damages of all large natural disasters but does not have information on fiscal costs. An IMF (2012) Board Paper analyzes in detail the sources of

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<sup>4</sup> As indicated in Cebotari (2008), hidden deficits from contingent liabilities are often recorded below the line because of their one-off nature, leading to increases in debt that are not mirrored in the headline fiscal deficits.

<sup>5</sup> Note that contingent liability realizations can be costly to the budget below or above the line, and stock flow adjustments cannot capture deficit generating contingent liability realizations.

<sup>6</sup> Landier and Ueda (2009) offer a review of these studies and distill recommendations on the management of bank restructuring on the grounds of the experience of several advanced economies hit by the financial crisis. More recently, Lucas (2014) provides insights on how OECD governments assess the costs related to their explicit and implicit guarantee or credit insurance programs.

large unexpected increases in general government debt in 10 advanced countries between 2007 and 2010. The analysis shows that financial sector and other type of contingent liabilities related to quasi-fiscal activity of SOEs and PPPs account for one fifth of the unexpected rise in debt in these countries during the recent crisis.<sup>7</sup> However, such detailed analysis is still limited to a few advanced economies and to recent years.

This lack of data has made it difficult to study issues related to the timing and likelihood of CL realizations, their fiscal impact and average fiscal cost. In addition, insights on the skewness of the distribution of fiscal risks associated with CL realizations (Gaspar and others, 2015), and information regarding the institutional frameworks that could reduce the probability of occurrence are similarly crucial for the management of CL shocks. This paper aims to fill this gap by constructing a comprehensive database of gross direct fiscal costs of a broad set of macro-relevant contingent liability realizations in advanced and emerging countries since the 1990s.

### III. DATASET

#### A. Methodology

Our dataset spans a total of 80 countries—34 advanced economies (AEs) and 46 emerging market economies (EMEs)—over the period 1990–2014.<sup>8</sup> We use a broad definition of CLs. Specifically, we follow the definition in Cebotari and others (2009) to obtain seven contingent liability categories: Financial Sector, SOEs, Subnational Government, Natural Disasters, Private non-Financial Sector, Legal, and PPPs.<sup>9</sup>

Our main sources of information are IMF Staff Reports (SRs). SRs are written as part of the annual IMF Article IV surveillance mission of member states and contain detailed observations on all macro-economic sectors of the economy; (when available, reports from quarterly or semi-annual reviews of an IMF program were also considered). As such, SRs are excellent sources of information on the realization of CLs. To guide our search of SRs we identify countries and years with high positive stock-flow adjustments or large and unexpected debt increases. Additionally, we rely on information from previously published databases relating to specific types of CL realizations. To summarize, we adopt a data collection strategy relying on three pillars:

- 1) We build a baseline database combining all previously available data on CL realizations and cross-check these data using SRs;

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<sup>7</sup> Unreported deficits hidden within the general government, often at the local government level or in the social security sector account for another one fifth of the unexpected rise in debt in these countries, which could classify as another source of contingent liability related to subnational governments.

<sup>8</sup> See Appendix A for a full list of countries. We use the definition of Advanced and Emerging Economies employed by the IMF's *Fiscal Monitor*. We exclude Libya from that list because of data issues and add a number of emerging countries not included in the Fiscal Monitor definition, namely Bosnia and Herzegovina, Bulgaria, Jordan, Lithuania, Macedonia, Moldova, and Serbia.

<sup>9</sup> As in Cebotari and others (2009, p.4) we use a statistical rather than an accounting definition of contingent liabilities referring to "spending that may be triggered by a future event."



- 2) We use stock-flow analysis and debt forecast error decomposition to guide us towards country-years with potential CL episodes;
- 3) We conduct key word searches of all remaining SRs;

### **Combining existing data sources**

As discussed in section II, there already exists a fairly large, but scattered, amount of information on CL realizations. We combined information from Laeven and Valencia (2008, 2012) and Eurostat (2015) on the fiscal cost of financial sector CL realizations with data from Cordes and others (2014) on subnational government bailouts, data on contingent liability realizations in Eastern Europe from Flanagan (2008), data on natural disasters from the International Disasters Database hosted by the University of Leuven, and lastly data on various different episodes from Cebotari and others (2009).<sup>10</sup>

Laeven and Valencia (2008) provide a detailed overview of systemic banking crises and the associated fiscal costs, building on previous work by Hoelscher and Quintyn (2003) and Honohan and Klingebiel (2000). In 2012, the database was updated to include the Global Financial Crisis (Laeven and Valencia, 2012). We rely on the Laeven and Valencia data for the fiscal cost of all large banking crises, except for episodes in the European Union after 2007 for which we use Eurostat (2015) data. Eurostat provides a very detailed assessment of the fiscal cost of financial sector support for each EU country for the period 2007–14, differentiating between deficit generating expenditures and below-the-line items. Lastly, we complement the Laeven and Valencia and Eurostat data with additional information from Honohan and Klingebiel (2000), relating to non-systemic banking crises.

On subnational government bailouts, we take Cordes and others (2014) data and crosscheck it using SRs for consistency when necessary. Similarly, we crosscheck the data provided by Flanagan (2008) on large Eastern European contingent liabilities. Using the data on natural disasters from the International Disasters Database, we identify all episodes that caused damages of at least one percent of GDP. We then consult to the SRs for the relevant years and countries to identify the associated fiscal costs. Lastly, we take and crosscheck the detailed information provided by Cebotari and others (2009) on a variety of contingent liability realizations.

### **Stock-flow adjustments and forecast error decomposition**

To guide our search towards countries and years that might have experienced a CL realization we use two different techniques: stock flow adjustments and forecast error decomposition of debt.

A stock-flow adjustment is the discrepancy between the annual change in gross public debt and the budget deficit (Weber, 2012). Changes in debt that are not explained by the deficit could indicate a CL realization but can also reflect changes in the exchange rate among other factors. The definition follows from the basic debt accumulation equation:

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<sup>10</sup> Appendix B provides a detailed list of sources for all data used in this study.

$$D_t = D_{t-1} - OB_t + SF_t \quad (1)$$

where  $D_t$  denotes gross public debt in nominal terms at time  $t$ ,  $OB_t$  denotes the overall balance and  $SF_t$  denotes the residual term referred to as the stock flow adjustment. Dividing both sides by nominal GDP at time  $t$  and rearranging we get

$$\begin{aligned} d_t &= \frac{1}{1 + \gamma_t} d_{t-1} - ob_t + sf_t \\ d_t - d_{t-1} &= -\frac{\gamma_t}{1 + \gamma_t} d_{t-1} - ob_t + sf_t \\ \Delta d_t &= -\lambda_t d_{t-1} - ob_t + sf_t \end{aligned} \quad (2)$$

where  $\gamma_t$  denotes the nominal GDP growth rate at time  $t$ , and small letters denote variables in percent of GDP.  $\Delta d_t$  denotes the annual change in gross public debt to GDP ratio, which depends negatively on GDP growth (captured by the term  $\lambda_t = \frac{\gamma_t}{1 + \gamma_t}$ ) and the overall balance, with other factors such as debt assumptions captured in the residual  $sf_t$ .

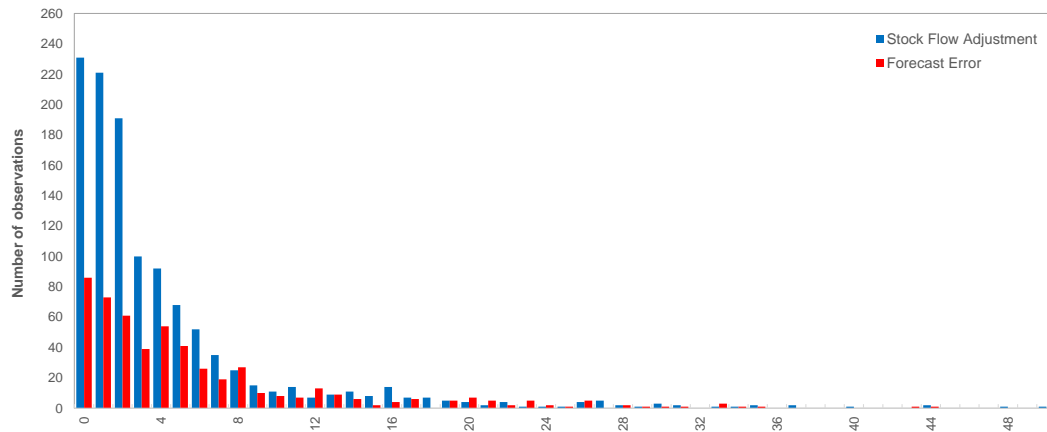
To calculate the forecast error we go one step further. We decompose unexpected rises in the debt-to-GDP ratio into an unexpected rise in the deficit and an unexpected growth slowdown, with the residual term capturing the unexpected increase in debt due to factors such as the realization of contingent liabilities. The decomposition follows from the stock flow adjustment equation:

$$\Delta \tilde{d}_t = -\tilde{\lambda}_t d_{t-1} - \tilde{ob}_t + \varepsilon_t \quad (3)$$

where  $\tilde{x}_t = x_t - E_{t-1}x_t$  is the difference between the IMF *World Economic Outlook* (WEO) forecast of variable  $x$  for year  $t$  made in year  $t-1$  and outturns for year  $t$  based on WEO data submitted in year  $t+1$  (Cebotari and others, 2009). The variable  $\varepsilon_t$  is the forecast error residual. To calculate our variables of interest ( $\varepsilon_t$  and  $sf_t$ ) we use data on fiscal balances, interest payments, public debt, and GDP coming from the IMF's WEO and Fiscal Monitor databases. We compare forecast data to actual realizations when checking for the forecast error.

We then compile a database where we identify country-years with large forecast errors and/or stock-flow adjustments. Figure 1 plots the distribution of positive stock flow adjustments and forecast errors, which is heavily right skewed. For those observations in the right tail of the distribution we follow-up with as many sources as possible to verify whether indeed a CL realization occurred.

**Figure 1. Distribution of Positive Stock Flow Adjustment and Forecast Error (Percent of GDP)<sup>11</sup>**



Source: Author's calculations.

While this is a useful exercise and allows us to identify some likely CL episodes, it is nevertheless no more than a first indicator. For example, if a CL realization is fully captured as an expenditure and thus enters the deficit, then the stock-flow adjustment will be zero. In this case, we would miss it by relying on the above analysis. At the same time, changes in debt may be not due to contingent events but actually planned by an explicit contract. Furthermore, CL realizations might sometimes be forecast, if for instance the shock occurs at time  $t$  but the assumption of debt by the government is set for time  $t+1$ . In this case, they would not be a source of forecast error. Stock flow adjustment and forecast error decompositions of debt might thus point to false positives or might miss true realizations. This leads us to our next and key pillar in the data construction methodology.

### Key word searches

The last pillar is a "brute force" approach. Only in recent years (and then also not consistently) have CLs been receiving explicit attention in SRs, so we rely on key word searches to try and identify and/or verify CL realizations. We search for terms such as "recapitalization," "capital injection," "restructuring," "natural disaster," "contingent," "SOEs," "PPP," etc. Furthermore, footnotes to the fiscal tables in the SRs often provide important information. When necessary (and available) we complement the information obtained from the SRs with additional sources such as country-specific Debt Sustainability Analyses and Selected Issues Papers, IMF Fiscal Transparency Evaluations, academic papers and reports by Ministries of Finance and Central Banks.

For each contingent liability episode identified, we record (as far as possible): the start year, the end year, whether it was an implicit or explicit contingent liability, the type (financial sector, SOE, etc.), the type of fiscal response (recapitalization, etc.), the fiscal cost, the trigger, the source and a short verbal description. Appendix D provides an overview of all the data collected.

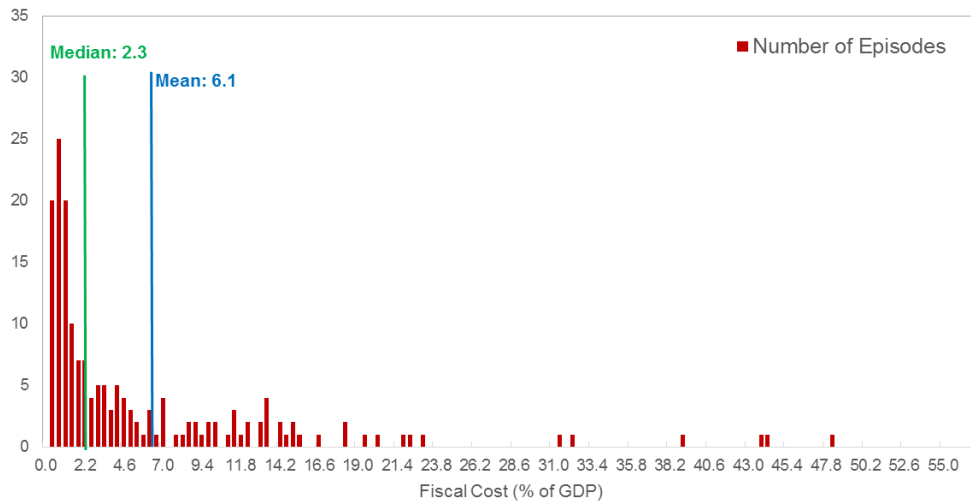
<sup>11</sup> The distribution is truncated below 0 and above 50 percent of GDP.

## B. Descriptive Statistics

We capture a total of 230 CL realizations, including 174 for which we were able to identify the fiscal cost.<sup>12</sup> Figure 2 plots the distribution of the fiscal cost of these CL realizations.<sup>13</sup> The distribution is highly skewed—the mean CL realization is 6.1 percent of GDP while the median is significantly smaller, but not trivial, at 2.3 percent.<sup>14</sup> The distribution has a long tail, with a few episodes exceeding a fiscal cost of 20 percent of GDP and a fairly large number of realizations with a fiscal cost over 10 percent of GDP. CL realizations can thus have a very significant impact on countries' public finances.

**Figure 2. Distribution of Contingent Liability Realizations 1990–2014**

(AEs and EMEs)



Source: Authors' calculations.

Figure 3 plots the 174 CL realizations by year and type of CL while Table 1 shows the number of episodes, as well as the average and maximum fiscal cost by type of CL realization to shed some more light on the data. The evidence reported highlights that financial sector CL realizations tend to be the most costly, with an average cost of 9.7 percent of GDP and a substantial number of episodes with fiscal costs of over 20 percent of GDP.<sup>15</sup> Nevertheless, several of the other types of CL realizations also pose significant risks. More than half of the episodes in our dataset stem

<sup>12</sup> When no fiscal cost figure was available, we leave the column blank in the database. For natural disasters, we report a damage estimate for each episode in the additional information column but this is not to be confused with the fiscal cost.

<sup>13</sup> While many episodes entail costs over several years, for the purpose of presenting the data concisely in the stylized facts below we report total costs per episode unless otherwise specified.

<sup>14</sup> We do not look at contingent asset realizations such as bandwidth auctions, nor at contingent “windfalls” in the form of debt write-offs and defaults. Thus, the distribution is truncated at 0 by construction.

<sup>15</sup> The recent IMF Crisis Program Review (2015) puts the cost of bank recapitalizations in the subsample of countries with IMF programs in the aftermath of the global financial crisis at 19 percent of GDP.

from non-financial sector related CL realizations. Subnational government bailouts, SOE support and legal CLs stand out, leading to costs as high as 12–15 percent of GDP.<sup>16, 17</sup> Figure 3 also highlights that CL realizations tend to be bunched together; the Asian Crisis in 1997–98 and the Global Financial Crisis in 2008 are both clearly visible. One interesting observation is that the emerging market economies that experienced large financial sector related CL realizations during the Asian Crisis did not experience such large fiscal costs arising from CLs during the Global Financial Crisis.

**Table 1. Average Fiscal Cost of Contingent Liability Realizations**

Type of Contingent Liabilities	Number of Episodes	Number of Episodes with Identified Fiscal Costs	Avg. Fiscal Costs (% GDP)	Maximum Fiscal Costs (% of GDP)
Financial Sector	91	82	9.7	56.8
Legal	9	9	7.9	15.3
Subnational Government	13	9	3.7	12.0
SOEs	32	31	3.0	15.1
Natural Disaster(s)	65	29	1.6	6.0
Private Non-Financial Sector	7	6	1.7	4.5
PPPs	8	5	1.2	2.0
Other	5	3	1.4	2.5
<b>Total</b>	<b>230</b>	<b>174</b>	<b>6.1</b>	<b>56.8</b>

Source: Authors' calculations.

To illustrate the bunching of CL realizations during crisis times further, both across types and across countries, consider Figure 4, which plots the total number of CL realizations by type and year. In particular, 2008–09 stand out with over 30 CL realizations in 2008 alone. The figure also shows that during the Asian crisis and the Global Financial Crisis, total CL realizations were above 3 percent of the total GDP of the 80 countries in our sample. As one would expect, the largest part of these episodes are linked to the financial sector, but there was also a substantial increase in the number of episodes with government support for SOEs and private non-financial entities in that period.

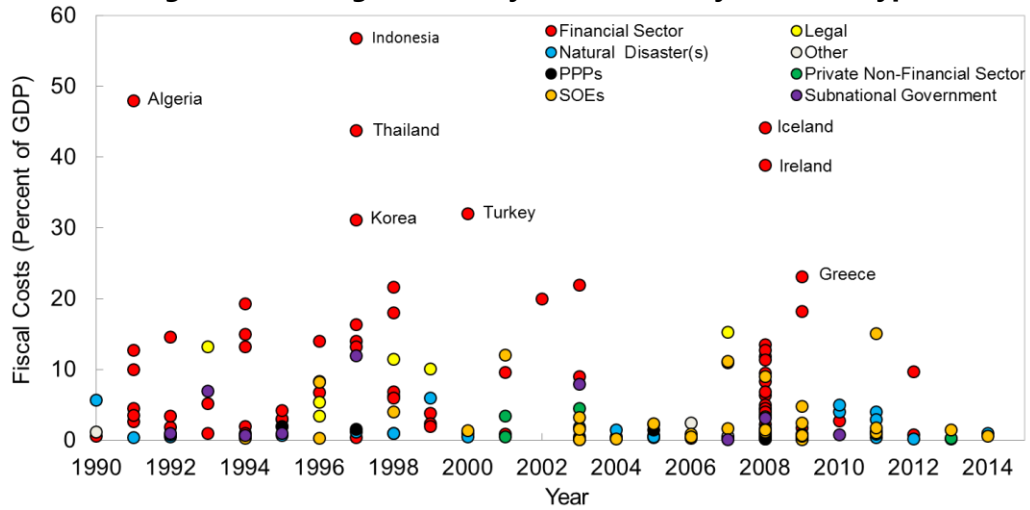
Figure 5 highlights that both AEs and EMEs were affected in 2008, but the largest fiscal costs were concentrated in AEs. On the other hand, during the Asian crisis, CL realizations were concentrated nearly exclusively in EMEs. Figure 6 stresses the point that the largest risk for AEs is clearly associated with the financial sector, while for EMEs the picture is somewhat more mixed, with legal and natural disaster related CLs also standing out. Lastly, it is worth pointing out that the vast majority of CL realizations we find stems from implicit rather than explicit CLs (over 80

<sup>16</sup> One might be surprised by the relatively low number of PPP episodes. This is related to the fact that we do not qualify a CL realization as macro-relevant when the fiscal cost is below 0.2 percent of GDP. Individual PPP failures tend to create fairly small costs to the budget. Additionally, the number of PPPs has only recently started to increase significantly globally. We might thus expect more and larger fiscal costs from PPPs in the future.

<sup>17</sup> Many costly legal CL realizations resulted from court decisions mandating compensation payments for domestic and foreign currency deposits frozen in Eastern Europe economies during the collapse of the Soviet Union.

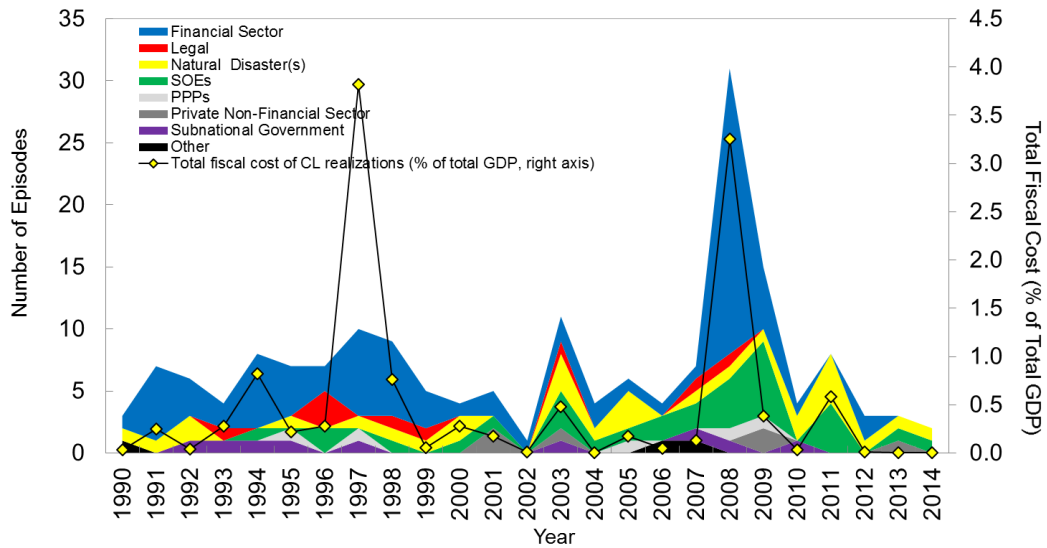
percent). This underscores that assessments of CL realizations need to go well beyond the explicit stock of government guarantees.

**Figure 3. Contingent Liability Realizations by Year and Type**



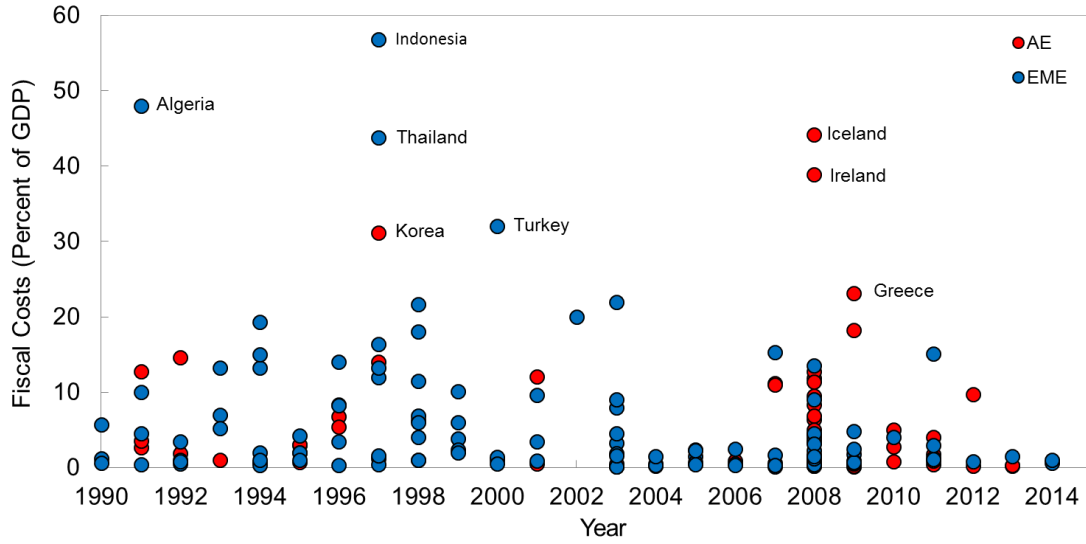
Source: Authors' calculations.

**Figure 4. Number of Contingent Liability Realizations by Year and Type**



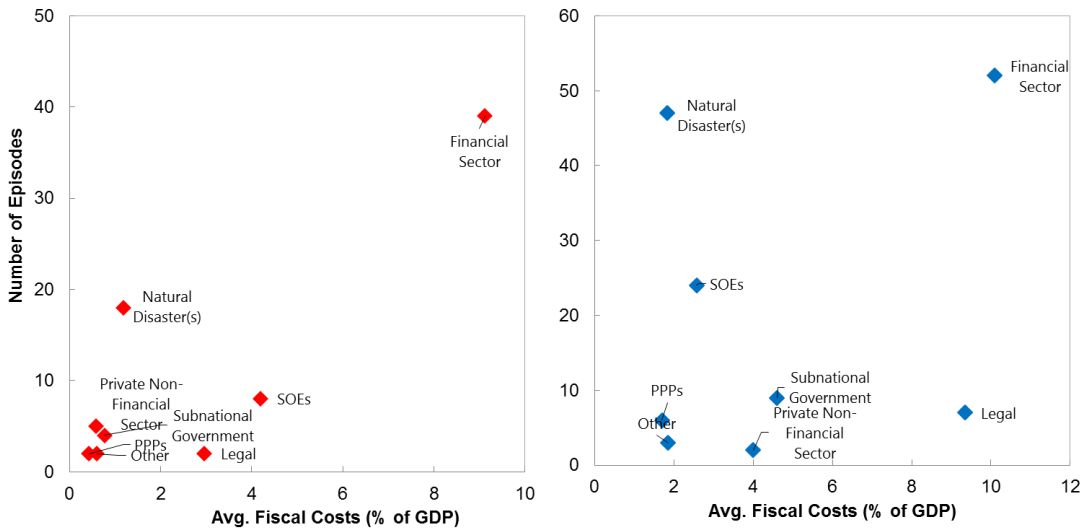
Source: Authors' calculations.

**Figure 5. Contingent Liability Realizations by Year and Country Group (AEs vs EMEs)**



Source: Authors' calculations.

**Figure 6. Contingent Liability Realizations by Type and Country Group (AE=Red, EME=Blue)**



Source: Authors' calculations.

Using our data on contingent liability realizations, it is possible to calculate the (ex-post) probability of a CL realization and the average fiscal cost conditional on a realization.<sup>18</sup> To be able to have a dataset that only has one observation per country and year, we sum all episodes that start in exactly the same year in the same country. Table 2 below then shows that the average country in our sample has an 8.7 percent probability of incurring a macro relevant CL realization in any given year.<sup>19</sup> This translates into one CL realization every 12 years. In other words, the average country would be expected to have experienced a CL realization twice in the twenty five-year sample period, with a fiscal cost of 6.1 percent of GDP per episode. Similarly, the average country has a 2.8 percent probability of suffering a CL realization of at least 5 percent of GDP and the fiscal cost conditional on the realization is then 15.5 percent of GDP. These numbers make clear that while a truly large event is fairly rare, it can potentially cause substantial damage to a country's debt sustainability when it occurs.<sup>20</sup>

**Table 2. Probability of Contingent Liability Realizations**

Size In percent of GDP	Probability of CL Realization	Average CL Realization in percent of GDP	Number of Years until CL Realization on average = (1/probability)
>5	2.8%	15.5	36
>1	5.6%	9.2	18
Any	8.7%	6.1	12

Source: Authors' calculations.

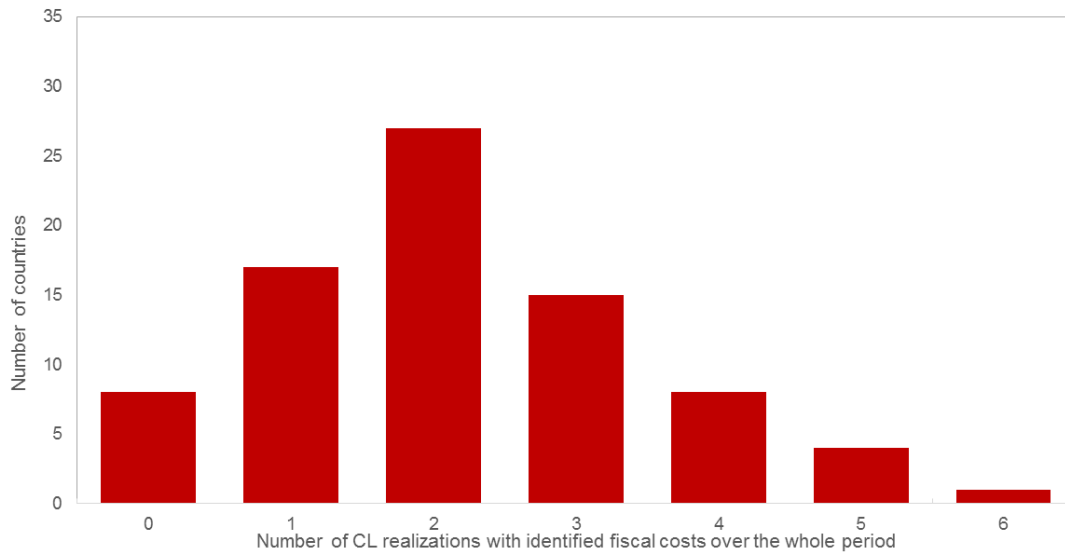
One should note that averages mask important heterogeneity. Figure 7 shows that over the twenty five-year period we analyze, countries have experienced an average of about 2 CL realizations (median of 2). Several countries have suffered up to 4–5 CL realizations. Table 3 below depicts some specific country experiences in our sample. Brazil, for example, experienced a CL realization of 8.3 percent of GDP on average every five to six years. Ukraine similarly suffered a CL realization of average 2.9 percent of GDP every six years. These repeated large realizations represent a very significant burden on government finances. In the following section we analyze in more detail when CL realizations occur and how country characteristics impact realizations.

<sup>18</sup> Note that the dataset includes macro relevant contingent liability materializations (with a cost over 0.2 percent of GDP) that are explicitly reported in various data sources, but not the universe of actual contingent liability materializations.

<sup>19</sup> For the purpose of this exercise and subsequent regression analysis we sum all CL realizations which start in one country and in the same year to obtain the number of country-years with CL realizations.

<sup>20</sup> Note that the probabilities provided here are backward looking. For policy decision it is also necessary to take into account current country specific conditions such as vulnerabilities to banking crises and weaknesses in SOE balance sheets.



**Figure 7. Distribution of Number of CL Realizations by Country<sup>1</sup>**

Source: Authors' calculations.

<sup>1</sup> Number of CL realizations with identified fiscal costs is zero for countries in which there were CL realizations with unidentified fiscal costs, and for those in which no CL realizations were identified.

**Table 3. Contingent Liability Realizations: Country Cases**

	Episodes over 1 percent of GDP	Total number of episodes	Average cost per episode ( percent of GDP)
Argentina	4	5	7.9
Brazil	4	6	8.3
China	2	10	4.7
Hungary	4	4	1.5
Indonesia	3	6	15.8
Ukraine	4	4	2.9

Source: Authors' calculations.

#### **IV. CONTINGENT LIABILITY REALIZATIONS: WHEN, HOW, WHY**

This section is divided into two subsections. First, we show that CL realizations tend to occur during times of crisis and are associated with a significant worsening in the overall fiscal balance and large increases in the debt to GDP ratio. Moreover, we study the triggers of contingent liability realizations in more detail and show that even when controlling for systemic crises, boom-bust cycles have high explanatory power in accounting for the timing of CL realizations. Overall, we highlight that CL realizations tend to follow periods of high growth and coincide with periods of low growth, and thus have a magnifying effect when the budget is already strained. The second subsection studies the link between institutions and CL realizations. We show that

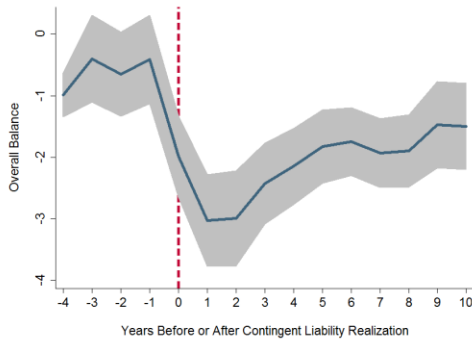
countries with stronger institutions and lower volatility of growth are less exposed to CLs. Strengthening institutions thus appears to be a key step in preventing costly CL realizations.

### **A. The Macro-Economy and Contingent Liability Realizations**

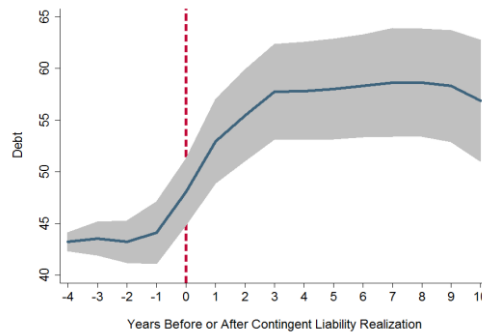
The recent global financial crisis and the subsequent spike in government debt have highlighted how vulnerable government debt sustainability can be to large shocks. Figure 8 uses event study graphs to show that contingent liability realizations are associated with a significant worsening in the overall fiscal balance, a large increase in debt and a short but steep drop in growth. To obtain these graphs, we regress the variable of interest on a set of period fixed effects while controlling for event fixed effects for our sample of CL realizations. We then plot the coefficients on the period fixed effects five years prior and 10 years after a contingent liability realization. On average, debt increases by over 15 percent of GDP during a CL realization. It rises for roughly three years and then stabilizes, albeit at a higher level than before the CL realization. The overall fiscal balance falls by about 2 percentage points as a share of GDP on average and then stays below the pre-event level for an extended period of time. Lastly, GDP growth drops sharply for two years and then reverts to trend.

**Figure 8. Contingent Liability Realizations and the Macroeconomy**

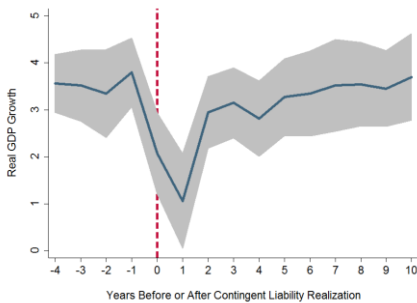
7.A. CL Realizations and the Fiscal Balance



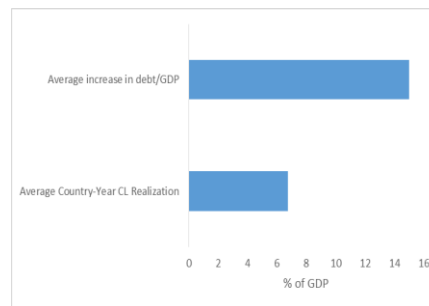
7.B. CL Realizations and Government Debt



7.C. CL Realizations and Growth



7.D. Fiscal Cost of CL Realizations vs Debt Increase During Average Episode



Source: Authors' calculations.

These results offer some preliminary indication that CL realizations tend to occur during periods of economic stress, which they potentially amplify. Consider the average increase in the debt to GDP ratio. While the average fiscal cost of a CL realization is 6 percent of GDP, debt increases by 15 percent of GDP on average. To shed some more light on this issue we calculate the correlation between CL realizations and the occurrence of major crises. Table 4 highlights that the two are highly correlated. In particular, banking crises coincide with financial sector CL realizations. Moreover, Table 5 shows that different types of CL realizations are also correlated among each other; although the correlation coefficients are relatively small, they tend to be significant except for non-financial private sector CLs.<sup>21</sup> Financial sector CL realizations, for example, are significantly correlated with SOE, subnational and PPP CLs. Overall, we can observe that contingent liability realizations tend to occur during times of crisis and also tend to be correlated among each other—all these factors compounding the negative impact on the government budget. From a fiscal perspective: *When it rains, it pours.*

<sup>21</sup> We construct a panel containing all active CL episodes by country in a given period and then calculate pairwise correlations.

**Table 4. Correlation between Contingent Liability Realizations and Crises**

VARIABLES	(1) All CL Realization	(2) Financial Sector CL Realization
Systemic Banking Crisis	4.439*** (0.410)	5.553*** (0.379)
Currency Crisis	0.795 (0.507)	0.806 (0.680)
Sovereign Debt Crisis	0.729 (1.398)	-0.722 (1.111)
Constant	-2.465*** (0.0853)	-4.137*** (0.183)
Observations	2,000	2,000
Robust standard errors in parentheses		
*** p<0.01, ** p<0.05, * p<0.1		

Source: Authors' calculations.

**Table 5. Correlation between Different Types of Contingent Liability Realizations**

	Financial	Private non-financial	SOE	Subnational	Legal	PPP
Financial	1					
Private non-financial	0.0032 (0.8843)	1				
SOE	0.0760* (0.0006)	-0.012 (0.5903)	1			
Subnational	0.0634* (0.0043)	-0.0086 (0.6989)	0.1117* (0)	1		
Legal	0.0005 (0.9808)	-0.0137 (0.537)	0.1796* (0)	0.0527* (0.0177)	1	
PPP	0.1643* (0)	-0.0068 (0.7584)	0.1220* (0)	0.2178* (0)	-0.021 (0.3442)	1

P-values in paranthesis. \* indicates signficance at 5 percent level.

Source: Authors' calculations.

To understand whether it is only during times of systemic crisis that CL realizations are more likely or whether general economic downturns are also associated with a higher probability of a CL realization we estimate the following equation:

$$\text{logit}(E(Y_i|X_i)) = x_i'\beta \quad (4)$$

where  $Y_i$  is an indicator for a CL realization,  $x_i$  is a vector of covariates and  $\beta$  is a vector of regression coefficients. In particular, we include measures of GDP growth, inflation, and exchange rate in the set of covariates to see how the macroeconomic environment affects the probability of a CL realization. We exclude natural disasters from the analysis since they are likely orthogonal to macroeconomic variables.

Column 1 of Table 6 shows that the probability of a CL realization is positively correlated with lagged growth and negatively correlated with contemporaneous growth.<sup>22</sup> This finding may suggest that economic booms or overheating may coincide with excessive risk taking (e.g., in credit markets), which eventually may trigger a CL realization when a sudden growth reversal takes place. Weak growth may make it more likely that banks suffer from NPLs and need to be recapitalized, and that SOEs are loss making and need central government support. Yet, the reverse could also be true, namely that the CL realization as a large fiscal shock (e.g., triggered by a banking crisis) could negatively affect growth performance. To check whether this result is robust to the inclusion of other covariates we first add contemporaneous and lagged monetary variables (inflation and exchange rate) together with a dummy for country specific systemic banking crises in columns 2 and 5, and contemporaneous and lagged volatility of growth in columns 3 and 6.<sup>23</sup> Country fixed effects are included in columns 4 and 7. The result for GDP growth remains statistically significant in all specifications. Controlling for crises does not alter the result even though the magnitude is somewhat reduced, and confirms that CL realizations are correlated with crises. On the other hand, past inflation and depreciations do not seem to affect the probability of CL realizations, neither does volatility of growth. Thus, it seems to be mainly episodes of growth reversals that can act as triggers for CL realizations.<sup>24</sup> Future work could usefully study these linkages in more detail.

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<sup>22</sup> Using the output gap instead of GDP growth yields very similar regression results.

<sup>23</sup> The volatility of growth is measured as the five-year rolling average for the coefficient of variation of GDP growth.

<sup>24</sup> Table C.1 in Appendix C shows further robustness tests such as including past fiscal variables (debt and deficit) and oil prices, including year fixed effects, using the linear probability model instead of a logit estimation and using the cost rather than the occurrence of CLs as the dependent variable. Interestingly the relationship between weak contemporaneous growth and CL realizations always remains significant while past growth does not always enter with a significant coefficient. Table C.2 in Appendix C shows another robustness check replicating Table 6 but including natural disasters. The results are qualitatively unchanged.

**Table 6. Triggers of Contingent Liability Realizations**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	CL Realization	CL Realization	CL Realization	CL Realization	CL Realization	CL Realization	CL Realization
GDP Growth	-0.111*** (0.0236)	-0.0726*** (0.0262)	-0.0882** (0.0359)	-0.0948** (0.0411)	-0.0930*** (0.0260)	-0.115*** (0.0337)	-0.144*** (0.0435)
GDP Growth, lagged	0.0627*** (0.0195)	0.0502** (0.0219)	0.0714* (0.0395)	0.0833* (0.0475)	0.0585*** (0.0203)	0.0953** (0.0378)	0.117** (0.0499)
Inflation		-2.89e-05 (3.20e-05)	-2.08e-05 (3.58e-05)	-7.86e-05 (0.000789)			
Change in Real Exchange Rate		0.000260 (0.000796)	0.000153 (0.000795)	-0.000509 (0.00151)			
Systemic Banking Crisis		4.077*** (0.363)	3.941*** (0.383)	4.476*** (0.542)			
Volatility of Growth (s.d. past 5 years)			-0.000650 (0.0342)	0.0121 (0.0493)			
Inflation, lagged					-5.42e-05 (5.97e-05)	-1.75e-05 (3.68e-05)	-0.000529 (0.000553)
Change in Real Exchange Rate, lagged					-0.00102 (0.00131)	-0.00121 (0.00147)	-0.00400 (0.00316)
Systemic Banking Crisis, lagged					0.782** (0.390)	0.804* (0.446)	0.569 (0.501)
Volatility of Growth (s.d. past 5 years), lagged						-0.0333 (0.0510)	-0.0252 (0.0501)
Country FE Estimation	No Logit	No Logit	No Logit	Yes Logit	No Logit	No Logit	Yes Logit
Constant	-2.510*** (0.107)	-2.916*** (0.136)	-2.879*** (0.174)	-2.793** (1.317)	-2.559*** (0.123)	-2.510*** (0.187)	-2.166*** (0.705)
Observations	1,832	1,628	1,459	1,249	1,571	1,389	1,169

Robust standard errors in parentheses

\*\*\* p&lt;0.01, \*\* p&lt;0.05, \* p&lt;0.1

Source: Authors' calculations.

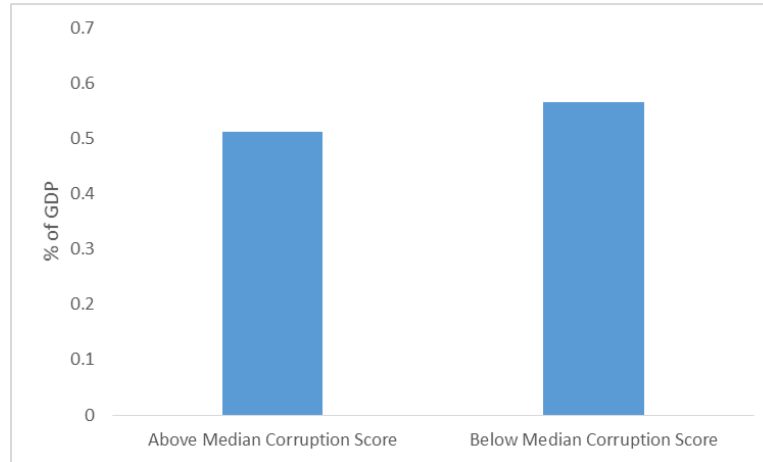
## B. Institutions and Contingent Liability Realizations

Fiscal transparency and accountability have long been advocated by institutions such as the IMF as a way to identify, monitor, and ultimately prevent fiscal risks. In this section we study how the quality of government institutions and thus ultimately the ability and will of government to deal with the underlying problems that can generate CL realizations relates to the average fiscal cost of CLs. Recall from Table 2 above, that countries have on average an 8.7 percent probability of suffering a CL realization in any given year and the average fiscal cost of such realization is then 6.1 percent of GDP. This gives an expected cost of 0.53 percent of GDP each year.<sup>25</sup> The expected cost is a convenient way of summarizing in one metric both the frequency as well as the size of CL realizations. Note that this means countries should expect on average ½ percent of GDP of debt annually due to CL materializations, and roughly 10 percentage points rise in debt to GDP ratio over a twenty-year period.

Figure 9 below compares the expected fiscal cost for countries with above and below average corruption scores. It becomes immediately apparent that countries with a lower corruption score have a lower expected cost.

<sup>25</sup>  $E(CL) = pr(CL \text{ realization}) * cost(CL|realization)$ .

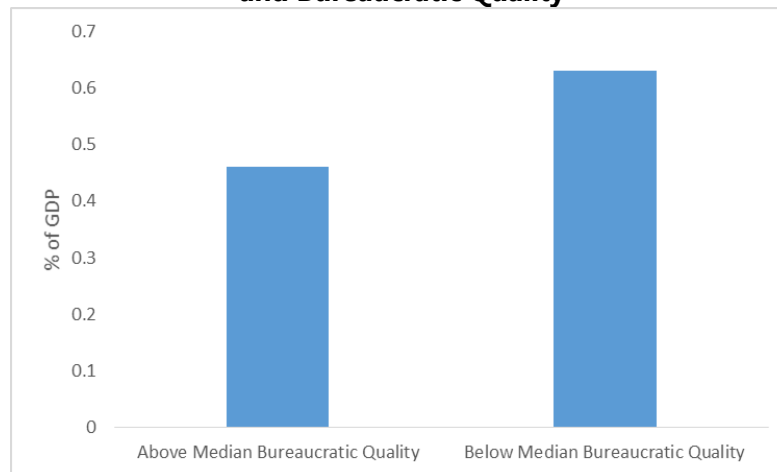
**Figure 9. Expected Yearly Cost of Contingent Liability Realizations and Corruption**



Source: Authors' calculations.

Figure 10 conducts the same exercise, this time using bureaucratic quality as the discriminating variable.<sup>26</sup> Again, a significant difference between good and bad performers becomes apparent. The difference is of a much larger magnitude, which seems intuitive given that one would expect bureaucratic quality to be much more directly important for strong fiscal institutions than corruption. The difference is quantitatively important—the expected fiscal cost is over 30 percent higher in countries with below median bureaucratic quality than in those with an above median score.

**Figure 10. Expected Yearly Cost of Contingent Liability Realizations and Bureaucratic Quality**



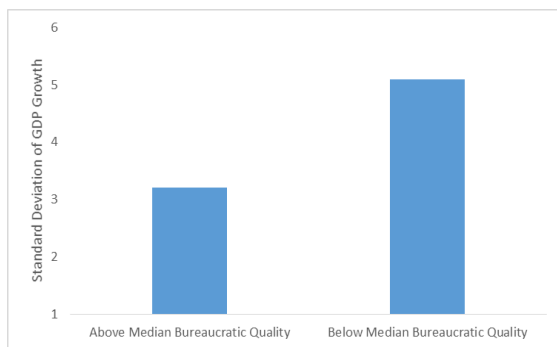
Source: Authors' calculations.

<sup>26</sup> Data taken from ICRG. A high bureaucratic quality score indicates a country where the bureaucracy has the strength and expertise to govern without drastic changes in policy or interruptions in government services.

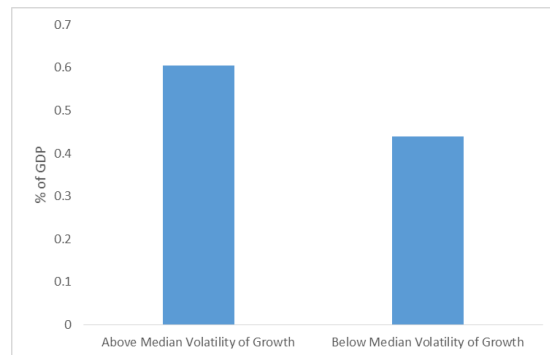
One possible mechanism that could link low bureaucratic quality to higher fiscal costs of CL realizations is the higher volatility of growth in countries with weak institutions. While this is a well-known phenomenon (Acemoglu and others, 2003) Figure 11 also illustrates the point. Panel 11(a) shows that the standard deviation of growth in countries with below median bureaucratic quality is nearly double that in countries with an above median score, while panel 11(b) illustrates that the expected cost of CL realizations is nearly 50 percent higher in countries with above median volatility of growth than in those with below median volatility.<sup>27</sup>

**Figure 11. Bureaucratic Quality, Volatility of Growth and Cost of Contingent Liability Realizations**

11 (a) Volatility of Growth by Bureaucratic Quality



11 (b) Fiscal Cost of CLs by Volatility of Growth



Source: Authors' calculations.

An alternative hypothesis for the link from institutions to CL realizations could be that weak institutions allow the sort of disequilibria to build, which ultimately lead to government bailouts. Alternatively, countries with weak governance abilities might not be able to solve the moral hazard problem inherent in implicit government guarantees, therefore (ex post) leading to more and more costly CL realizations. Similarly, countries with weaker institutions are less likely to analyze and understand risks from CLs; and therefore they are not always able to take mitigating action before they occur, either by not entering into contracts or through policy-actions such as regulation, risk-sharing, and stronger governance (see Cebotari and others, 2009).

## V. CONCLUSION

In this study we presented the first comprehensive database on realizations of contingent liabilities. We constructed the dataset by compiling pre-existing datasets and adding novel information coming mostly from IMF country-specific reports. The database documents more than 200 episodes across 80 countries over the period 1990–2014. For each episode it provides information regarding the size and type of liability and the type of fiscal response.

<sup>27</sup> We repeated the analysis in Figures 9–11 excluding natural disasters and results are virtually unchanged.



A first analysis of the data reveals that the costliest CL shocks are related to the financial sector; CL realizations tend to occur at times of crisis and many of these materializations occur at the same time (*when it rains it pours*); boom-bust cycles can act as triggers for the materialization of CLs; and countries with stronger institutions and lower volatility of growth tend to suffer less from CL realizations, indicating that much can be done institutionally to prevent costly shocks to the government budget.

In this context, fiscal frameworks could be strengthened, together with the analysis and understanding of these risks and the reporting of CLs. Once fiscal risks, including CLs, are well understood, governments could consider what steps can be taken to minimize the probability that they are realized. A few possible measures include limiting the direct exposure of public sector entities, requiring beneficiaries of guarantees to post collateral and requiring banks to hold sufficient capital.

While being the most comprehensive dataset so far, some episodes may not have been captured in the present paper. Extending the dataset to pre-1990 periods and including low-income countries would be worthwhile extensions and would allow for a more comprehensive picture of contingent liability realizations.

The dataset as it stands already opens several avenues for research. It allows for more analytical work on the causes and consequences of contingent liability realizations and comparisons across countries and time. Ultimately, the aim would be to provide grounds for a better understanding on how to prevent these shocks and how to manage them once they materialize.

## **APPENDIX A. LIST OF COUNTRIES**

Algeria, Angola, Argentina, Australia, Austria, Azerbaijan, Belarus, Belgium, Bosnia-Herzegovina, Brazil, Bulgaria, Canada, Chile, China, Colombia, Croatia, Cyprus, Czech Republic, Denmark, Dominican Republic, Ecuador, Egypt, Estonia, Finland, France, Germany, Greece, Hong Kong SAR, Hungary, Iceland, India, Indonesia, Iran, Ireland, Israel, Italy, Japan, Jordan, Kazakhstan, Korea, Kuwait, Latvia, Lithuania, Luxembourg, Macedonia, Malaysia, Malta, Mexico, Moldova, Morocco, the Netherlands, New Zealand, Norway, Oman, Pakistan, Peru, the Philippines, Poland, Portugal, Qatar, Romania, Russia, Saudi Arabia, Serbia, Singapore, Slovak Republic, Slovenia, South Africa, Spain, Sri Lanka, Sweden, Switzerland, Thailand, Turkey, Ukraine, United Arab Emirates, the United Kingdom, the United States, Uruguay, and Venezuela.

## **APPENDIX B. DATA SOURCES**

### **CL Realizations:**

IMF Staff Reports for all types of CL realizations and the whole period 1990-2014, when available (see the dataset for specifics).

Laeven and Valencia (2008, 2012), Eurostat (2015), Honohan and Klingebiel (2000) on financial sector CLs.

Cordes and others (2014) on subnational government CLs.

Flanagan (2008) for legal CLs in Eastern Europe.

International Disasters Database (2015) on damage generated by natural disasters.

IMF (2012) for information on various important episodes of CL realizations and associated fiscal costs.

Other country-specific sources are listed in the database whenever used.

### **GDP growth, output gap, inflation, exchange rate, debt, fiscal balance, oil price:**

All from IMF WEO database.

### **Systemic Banking Crises:**

Laeven and Valencia (2012)

### **Bureaucratic Quality and Corruption:**

International Country Risk Guide.

### APPENDIX C. ROBUSTNESS TESTS

Columns 1 and 2 add lagged changes in oil prices and lagged fiscal variables to the baseline regressions. Column 2 additionally controls for country and year fixed effects.

Columns 3 and 4 replicate the regressions in columns 1 and 2 but using a linear probability model.

Columns 5 and 6 use the cost, rather than the occurrence of contingent liabilities as the dependent variable.

**Table C1. Robustness Tests**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)
	CL Realization	CL Realization	CL Realization	CL Realization	Cost of CL Realizations	Cost of CL Realizations
GDP Growth	-0.103*** (0.0356)	-0.0950* (0.0550)	-0.00757*** (0.00279)	-0.00582* (0.00301)	-0.120*** (0.0456)	-0.143*** (0.0550)
GDP Growth, lagged	0.101** (0.0446)	0.00234 (0.0710)	0.00607** (0.00275)	-0.000290 (0.00311)	0.0943** (0.0375)	0.0219 (0.0349)
Inflation, lagged	-2.46e-05 (5.77e-05)	-0.000609 (0.000554)	-3.66e-07 (3.29e-07)	-3.84e-05 (5.36e-05)	-6.95e-07 (2.22e-06)	-0.000504 (0.000418)
Change in Real Exchange Rate, lagged	-0.00175 (0.00185)	-0.00554 (0.00419)	-6.70e-05 (4.33e-05)	-6.23e-05 (5.26e-05)	-0.000546 (0.000350)	-0.000701 (0.000732)
Systemic Banking Crisis, lagged	-0.194 (0.645)	-0.666 (0.714)	-0.00814 (0.0630)	-0.0348 (0.0572)	-0.673 (0.526)	-0.835 (0.550)
Volatility of Growth (s.d. past 5 years), lagged	-0.106 (0.0752)	0.136 (0.0891)	-0.00403* (0.00215)	0.00462 (0.00294)	-0.0256 (0.0176)	0.0196 (0.0330)
Change in Oil Prices, lagged	0.00424 (0.00434)	-0.226 (0.324)	0.000275 (0.000298)	-0.00898 (0.00930)	-0.00357 (0.00260)	-0.0700 (0.0636)
Debt/GDP, lagged	0.00185 (0.00349)	-0.0149 (0.0129)	9.73e-05 (0.000265)	-0.000547 (0.000611)	-0.00274 (0.00248)	-0.0187** (0.00760)
Deficit/GDP, lagged	0.0272* (0.0165)	0.212*** (0.0613)	0.00234 (0.00162)	0.00702*** (0.00252)	0.00982 (0.0110)	0.0345 (0.0225)
Constant	-2.278*** (0.305)	-0.405 (1.821)	0.0970*** (0.0199)	0.316** (0.129)	0.857*** (0.262)	1.881*** (0.705)
Estimation	Logit	Logit	OLS	OLS	OLS	OLS
Country FE	No	Yes	No	Yes	No	Yes
Year FE	No	Yes	No	Yes	No	Yes
Observations	1,242	1,073	1,242	1,242	1,242	1,242

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Authors' calculations.

Table C.2 shows the regression analysis reported in Table 6 but including natural disasters.

**Table C2. Robustness Tests**

VARIABLES	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	CL Realization	CL Realization	CL Realization	CL Realization	CL Realization	CL Realization	CL Realization
GDP Growth	-0.100*** (0.0209)	-0.0597** (0.0233)	-0.0794** (0.0315)	-0.0776** (0.0351)	-0.0925*** (0.0248)	-0.124*** (0.0319)	-0.152*** (0.0389)
GDP Growth, lagged	0.0639*** (0.0173)	0.0525*** (0.0192)	0.0864** (0.0351)	0.0966** (0.0426)	0.0631*** (0.0189)	0.107*** (0.0328)	0.129*** (0.0437)
Inflation		-3.45e-05 (3.93e-05)	-2.49e-05 (3.61e-05)	-3.02e-05 (0.000707)			
Change in Real Exchange Rate		0.000187 (0.000766)	0.000131 (0.000776)	-0.000157 (0.00139)			
Systemic Banking Crisis		4.396*** (0.418)	4.354*** (0.445)	5.244*** (0.600)			
Volatility of Growth (s.d. past 5 years)			-0.0216 (0.0329)	0.00539 (0.0459)			
Inflation, lagged					-8.96e-05 (0.000225)	-4.37e-05 (0.000179)	-0.000555 (0.000559)
Change in Real Exchange Rate, lagged					-0.00126 (0.00129)	-0.00144 (0.00141)	-0.00426 (0.00307)
Systemic Banking Crisis, lagged					0.0867 (0.449)	-0.182 (0.526)	-0.495 (0.585)
Volatility of Growth (s.d. past 5 years), lagged						-0.0458 (0.0459)	-0.0192 (0.0430)
Constant	-2.332*** (0.0979)	-2.694*** (0.122)	-2.654*** (0.160)	-1.786** (0.790)	-2.305*** (0.113)	-2.216*** (0.169)	-1.302** (0.558)
Observations	1,832	1,628	1,459	1,354	1,571	1,389	1,289

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## APPENDIX D. DATASET

The following pages list the main elements of the dataset.

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Algeria	1991	2002	Financial Sector	48.0	SR 2003, SR 2000, SR 1995, Laeven and Valencia (2012)	Since 1991 state owned banks required numerous bailouts by the government. Total cost for 1991-2002 was estimated at roughly 48% in 2003.
Algeria	2003	2003	Natural Disaster(s)	1.9	SR 2003, EM-DAT International Disasters Database	EM-DAT reports total damage of 7.4% of GDP. In reaction to the earthquake, a supplementary budget law was adopted, providing for additional expenditures of DA 100 billion (about 2.5 percent of GDP).
Angola	1991		Financial Sector	...	World Bank (2003) [WB database of banking crises, version October 6, 2003]	Two state-owned commercial banks have experienced solvency problems.
Argentina	1989	1991	Financial Sector	6.0	Laeven and Valencia (2008), Laeven and Valencia (2012)	To fund its credit operations the Central Bank imposed reserve and investment requirements on deposits, and in August 1988 deposits were frozen at the Central Bank. Central bank debt grew through the issuance of short-term paper (CEDEPS) to financial entities for purposes of monetary control, and later to finance interest payments on the Central Bank's own debt. By mid-1989 the quasi-fiscal deficit of the Central Bank reached almost 30% of GDP, although most of it was reversed by end-year. On January 1, 1990, the Government announced the bond conversion of time deposits and public sector debt coming due in 1990 (BONEX 89). Losses accumulated at the Central Bank reached 6% of GDP by 1989.
Argentina	1992	1996	Subnational Government	1.0	Cordes and others (2014), Cebotari and others (2009), Nicolini and others (2002)	The SNGs were bailed out, with an estimated cost of 1% of GDP cumulative in the mid-90s (Cebotari and others, 2009). According to Nicolini and others (2002) nationalization of provincial pensions (1994-1996) cost the government 1.5bn pesos (worth around 0.5% of GDP). Additionally, USD800m of loans were extended to 7 provinces between 1992-1994 (worth around .25% of GDP). Cordes and others (2014) put these loans at around USD750m.

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Argentina	1993	2001	Legal	13.2	SR 2002	Debt recognition not recorded in expenditures added an annual average of over 1% of GDP to the debt between 1993-2001 (total 13.2% of GDP over 9 years). These mainly reflected bond financed expenditures mandated by the judiciary, including compensation payments after the social security reform of the early 1990s and payments to suppliers.
Argentina	1995	1995	Financial Sector	2.0	Laeven and Valencia (2012)	State-owned provincial banks were suffering from high non-performing loans as they were used for financing the provincial governments' deficits. On top of that, with the Mexican devaluation, funds moved towards larger foreign banks perceived as more solvent. Several measures were implemented at alleviating liquidity pressures. The fiscal cost of the crisis was small. Eight banks were suspended and three banks collapsed. Out of the 205 banks in existence as of end of 1994, 63 exited the market through mergers, absorptions, or liquidation by end 1997.
Argentina	2001	2003	Financial Sector	9.6	Laeven and Valencia (2012)	Argentina had accumulated important fiscal imbalances, and experienced a competitiveness problems following the crisis in Brazil. Restructuring of public debt and the announcement of a modification to the parity under the convertibility plan (from being pegged to the dollar, to being pegged to a basket composed of the US dollar and Euro) initiated bank runs by mid-2001, which intensified towards the second half of the year, leading to a deposit freeze, a bank holiday, riots, and major political instability in December 2001. There were no liquidations. Most banks continued to operate due to forbearance. However, a number of banks, accounting for 12% of deposits were intervened, or taken over by other Public banks. Credit Agricole, Bisel, Entre Rios were intervened and their administration transferred to Banco La Nación to be privatized later.
Argentina	2003	2004	Subnational Government	7.9	Cordes and others (2014), Miguel Braun (2006), "The political Economy of Debt in Argentina or Why History Repeats Itself".	Ongoing process between 2001-2004. Made up of various elements such as outright debt assumption of provincial governments vis-a-vis banks and local government bonds. Cordes and others (2014) report cost of USD 12.1bn between 2003-2004 (Federal government takes over US\$9.7bn of bank debt of the provinces, and a liability of US\$2.4bn with the Central Bank). Braun (2006) puts the same cost of USD12.1bn for 2002-2003.

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Australia	1989	1992	Financial Sector	2.0	World Bank (2003) [WB database of banking crises, version October 6, 2003]	Two large banks received capital from the government to cover losses. Nonperforming loans rose to 6 percent of assets in 1991–92. Rescuing state-owned banks was estimated to cost 2 percent of GDP.
Australia	2011	2016	Natural Disaster(s)	0.4	SR 2011	Floods in mining regions in Queensland and Western Australia. Over six years, around \$A 6½ billion (or about 0.5 percent of GDP) was provided for immediate relief and assistance, and to support rebuilding of affected communities.
Austria	2003	2003	Natural Disaster(s)	0.2	SR 2003, EM-DAT International Disasters Database	Total damages were 1.1 % of GDP (EMDAT). The fiscal cost had an upper bound of 0.3% of GDP (including other one-off items in 2003), assumed to be about 0.15%.
Austria	2008	2014	Financial Sector	8.4	Eurostat (2015)	Large support to financial sector in the wake of the global financial crisis.
Austria	2009	2009	SOEs	0.2	<a href="http://www.law360.com/articles/119383/eu-clears-lufthansa-austrian-air-merger-for-takeoff">http://www.law360.com/articles/119383/eu-clears-lufthansa-austrian-air-merger-for-takeoff</a>	Lufthansa bought Austrian Airlines from the Austrian state, as part of the deal the government contributed 500m Euros in state aid to cover part of Austrian's debt.
Austria	2013	2014	Natural Disaster(s)	0.2	SR 2014	One-off transfers to compensate 2013 flood damages. Flood-related expenditure was 0.1 percent of GDP in both 2013 and 2014.
Azerbaijan	1995	1995	Financial Sector	...	Laeven and Valencia (2012)	Substantial problems in state-owned banks
Azerbaijan	1999	2002	Financial Sector	3.8	World Bank Transition Report (2002), SR 2000	Recapitalization of state owned banks with a range of US\$175-200m estimated fiscal cost.
Azerbaijan	2000		Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damages estimated at 2.1% of GDP
Azerbaijan	2009	2010	SOEs	4.8	SR 2010, SR 2011	Capital injection and a government guaranteed loan to the state oil company (SOCAR) and state-owned aluminum company who were faced with difficulty in repaying foreign debt obligations.
Belarus	1993		Natural Disaster(s)	...	EM-DAT International Disasters Database	Impact of flood 2.7% of GDP. Could not find fiscal number.
Belarus	1995	1995	Financial Sector	...	Laeven and Valencia (2012)	Undercapitalized state owned banks

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Belarus	1999	1999	Financial Sector	2.4	SR 1999, SR 2000	Recapitalization of two major state owned banks (Belarusbank and Belagroprombank) in 1999, equivalent to 2.4% of GDP.
Belarus	2008	2011	Financial Sector	13.5	SR 2012, SR 2013, World Bank (2012)	Recapitalization of SOBs between 2008 and 2011.
Belgium	2005	2005	SOEs	2.4	SR 2006, SR 2007, SR 2008, Eurostat 2006	Eurostat classifies the assumption by government Railway Infrastructure Fund (FIF - Fonds de l'Infrastructure Ferroviaire) in 2005 of EUR 7 400 million (2.5% of GDP) of the debt of the national railway company SNCB as expenditure (capital transfer).
Belgium	2008	2011	Financial Sector	6.4	Eurostat (2015)	Bailout of the largest banks in the country.
Bosnia and Herzegovina	2004	2004	Financial Sector	0.5	SR 2005	Recapitalization of a SOB.
Bosnia and Herzegovina	2007	2009	Legal	15.3	Flanagan (2008), SR 2008, SR 2007, SR 2006	Increase in debt by 11.5 percent of GDP in 2007 due to the recognition of frozen foreign currency deposits and war claims. Part cash compensation, part bonds. Total NPV of settlement 15.3% of GDP.
Bosnia and Herzegovina	2008	2009	SOEs	1.5	SR 2008	Assumption of public enterprise debt of the mining sector.
Brazil	1990	1994	Financial Sector	...	Laeven and Valencia (2012)	Restructuring of public banks and resolution of private ones
Brazil	1993	1993	Subnational Government	7.0	Cordes and others (2014), Cebotari and others (2009)	Subnational debt amounting to R\$39.4bn was refinanced with federal public banks (federal loans) as part of a substantial bailout package. Cebotari and others (2009) put the cost at 7% of GDP.
Brazil	1994	1998	Financial Sector	13.2	Laeven and Valencia (2012)	The problems in the banking sector triggered a restructuring of public banks and the resolution of private institutions. Most of the closures were medium to small-sized banks, while large banks were resolved under a "good bank/bad bank" approach.

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Brazil	1996	2002	Legal	8.4	SR 2000, Cebotari et al. (2009), SR 2005, the IMF and Recent Capital Account Crisis, Goldstein (2003)	Recognition of old debt as part of a move towards fiscal transparency, amounting to around 8.4 percent of GDP cumulative for 1996-2002, often due to legal proceedings, such as temporary suspension of the widespread indexation mechanisms under previous stabilization plans. [SR 2000 puts the cost at 2% of GDP in 1996, 1.7 in 1998, 1.5 in 1999. "The IMF and Recent Capital Account Crises: Indonesia, Korea, Brazil" puts debt recognition at 0.8% of GDP in 2000, 1.5% of GDP in 2001 and 0.9% of GDP in 2002. Goldstein (2003) puts the cost at 1% of GDP in 2002. SR 2001 exemplifies a court ruling declaring an inflation indexation adjustment illegal, which costs 0.5% of GDP (MEFP 2001).]
Brazil	1997	1997	Subnational Government	12.0	Cordes and others (2014), Peru 2004 SIP, Cebotari and others (2009)	Cebotari and others 2009 put the cost of subnational government bailout at 12% of GDP in 1997.
Brazil	2001	2001	Financial Sector	0.9	MEFP 2001	After inspection of the main four federal/state banks, a recapitalization of R\$12.5bn (1% of GDP) was agreed.
Bulgaria	1996	1997	Financial Sector	14.0	Laeven and Valencia (2012)	Bailout and recapitalization mainly of state-owned banks (Two ailing state banks required ongoing refinancing from the Bulgarian National Bank (BNB) and the State Savings Bank (SSB) until they were bailed out in mid-1995.)
Bulgaria	2006		PPPs	...	Cuttaree (2008)	Bulgaria Trakia Motorway Project
Canada	2009	2009	Private Non-Financial Sector	0.9	2010 SIP	9.7 CAD billion from Federal Government and 4.9 CAD billion from Ontario (to Chrysler and General Motors) in the form of transfers of debt obligations and equity shares.
Chile	2006	2010	Other	2.5	SR 2008	0.5% of GDP per year to recapitalize the Central Bank over 5 years.
Chile	2008	2009	Financial Sector	0.3	SR 2009	Recapitalization of a state owned bank.
Chile	2009	2009	SOEs	0.6	SR 2009	Recapitalization of state owned copper corporation.
Chile	2010	2013	Natural Disaster(s)	4.0	EM-DAT International Disasters Database, SR 2010	Damage from earthquake estimated at US\$30bn by EMDAT (13.8% of GDP). Government's contribution to reconstruction 4% of GDP from 2010 to 2013.
China	1994		Natural Disaster(s)	...	EM-DAT International Disasters Database	Damage estimated at 4% of GDP



Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
China	1996	1996	SOEs	0.3	SR 1997, SIP 1997	By mid-1996, Y 24.2 billion of enterprise debt had been transformed into state equity in the form of State Development Bank Assets. In key industries such as coal, hydroelectric power and the military sector, all debt was apparently converted to state equity by end-1996.
China	1996		Natural Disaster(s)	...	EM-DAT International Disasters Database	Damage estimated at 2.4% of GDP
China	1998	1998	Financial Sector	18.0	Laeven and Valencia (2012), SR 1998, 2003 SIP	Capital injections and restructuring of largest state-owned banks in 1998, accounting for about 70 percent of banking system assets, had a fiscal cost estimated at 3.4% of GDP (discussed in 1999 SR and 2003 SIP on the financial system). Laeven and Valencia (2012) put the total fiscal cost in 1998 at 18 percent of GDP.
China	1998		Natural Disaster(s)	...	EM-DAT International Disasters Database	Damage estimated at 3.2% of GDP
China	2003	2003	SOEs	0.1	SR 2003	The 2003 budget set aside 11 billion yuan (0.1 percent of GDP) for subsidizing bankrupt SOEs. The funds were used mainly to pay overdue wages and severance payments, as well as re-employment subsidies for laid-off workers.
China	2003	2005	Financial Sector	9.0	SR 2006, SR 2005, SIP 2005	Two of the four large SOBs (BOC and CCB) recapitalized with USD45bn of foreign exchange reserves in 2003. USD15bn capital injection from foreign exchange reserves for the largest bank ICBC approved in 2005. Total financial support to ICBC estimated at USD\$80bn (4.3% of GDP). Support to Rural Credit Cooperatives (RCC) estimated at USD24bn (SIP 2005).
China	2003	2003	Natural Disaster(s)	...	EM-DAT International Disasters Database, SR 2003	Floods and SARS. No precise figure available, absolute upper bound is 0.75% of GDP, probably significantly lower
China	2007	2009	Subnational Government	0.1	Canuto and Liu (2013)	Between 2007 and 2009, a nationwide plan was implemented to write off compulsory education debt of local administrations. Central government contributed 30bn Yuan towards writing off 80bn.
China	2008	2008	Natural Disaster(s)	0.5	EM-DAT International Disasters Database, SR 2008	Total damages from earthquake in Sichuan province estimated at up to 2.4% of GDP. Earthquake-related spending about ½ percentage point of GDP.

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Colombia	1995	2004	PPPs	2.0	Cebotari and others (2009)	During the 1990s, calls on demand guarantees related to PPPs in power, telecoms, and toll roads in Colombia resulted in cumulative payments of 2 percent of GDP by 2004.
Colombia	1996	1997	Subnational Government	...	Echavarría et al (2002)	Bailout of three small regions
Colombia	1998	2000	Financial Sector	6.3	Laeven and Valencia (2012)	Falling asset values and rise in real interest rates led to widespread bank weakness. The already weak large public banks faced a severe asset quality deterioration, which spread to private banks and other financial entities.
Colombia	1999	1999	Natural Disaster(s)	...	EM-DAT International Disasters Database, SR 1999	Damage from earthquake estimated at 1.9% of GDP. Upper bound for additional capital expenditure due to earthquake probably around 0.7% of GDP but no specific figure available
Colombia			SOEs	...	Cebotari and others (2009)	Medellin Metro
Croatia	1998	1999	Financial Sector	6.9	Laeven and Valencia (2012)	Mainly SOB bailout. Four state-owned banks, accounting for 46 percent of total bank assets (as of 1995) entered rehabilitation, with an overall cost of 6.1% of GDP. However, a new wave of problems began in March 1998 with the failure of the 5th largest bank, Dubrovacka (5% of total assets). Problems at this bank triggered political turmoil, which in turn induced runs at other banks, perceived indirectly related to Dubrovacka. In July 1998, the sixth largest bank ran into problems and several medium- and small-sized institutions experienced liquidity difficulties in the second half of 1998 and early 1999 as well.
Croatia	2000		Natural Disaster(s)	...	EM-DAT International Disasters Database	Estimated total damage 1.2% of GDP
Croatia	2003		Natural Disaster(s)	...	EM-DAT International Disasters Database	Estimated total damage 1% of GDP
Croatia	2007	2012	SOEs	1.7	SR 2011, SR 2012	Payment of guarantees called by the ship building industry amounted to 1.7 percent of GDP between 2008 and 2012.

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Croatia	2008	2012	Legal	3.4	Flanagan (2008), SR2011, SR 2005	The "pensioners' debt" arose from a 1998 Constitutional Court ruling that the state was liable for unpaid pension indexation entitlements during 1993-98. Although during that period pensions were legally indexed to nominal wages (the law was changed in July 1998), governments through various means capped indexation payments. The Court ruled that these practices did not override pensioners' entitlement to nominal wage indexation through June 1998. The liability resulting from the gap between entitlements and actual payments, which successive governments failed to address, became known as "pensioners' debt". In July 2005, parliament approved a scheme to repay this debt. Each eligible pensioner was offered a choice between cash payments of half the amount over 2006-07 or full repayment over 2008-2013.
Cyprus	2012	2012	Financial Sector	9.7	Eurostat (2015), 2014 SIP	Exposure of Cypriot banks to Greece as well as highly leveraged local property developers lead to serious problems in the local banking sector, requiring large recapitalizations.
Czech Republic	1996	2000	Financial Sector	6.8	Laeven and Valencia (2012); BIS (2006)	Recapitalization /restructuring of small private banks to avoid spillovers to the financial system and large state owned banks. In 1994 a small bank failed (Banka Bohemia), due to fraud. While all depositors were covered, a partial deposit insurance coverage was introduced shortly after this first failure. The likelihood of facing material losses triggered runs at other small banks, until by the end of 1995 2 small banks failed (ceska and AB Banka), which triggered a second phase of bank restructuring, aimed at 18 small banks (9% of industry's assets).
Czech Republic	1997	1997	Natural Disaster(s)	1.3	EM-DAT International Disasters Database, SR 1997	Total damages were estimated at 3-4% of GDP (EM-DAT: 3%, SR: 4%) The impact of floods on general government deficit was estimated about 1.25 percent of GDP.
Czech Republic	2003	2003	Natural Disaster(s)	0.3	2003 SR, EM-DAT International Disasters Database	Total damage estimated at 3% of GDP and the flood-related spending added about 1/4 percentage points to the deficit.
Czech Republic	2003	2003	Legal	0.5	2003 SR, Cebotari and others (2009)	Restitution payments to a foreign investor related to a lost arbitration added about 1/2 percentage points to the deficit.
Czech Republic	2007	2007	Other	0.6	SR 2005	A CNB guarantee called in 2004, payment in 2007 (value 0.6% of GDP)

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Denmark	1987	1992	Financial Sector	...	World Bank (2003) [WB database of banking crises, version October 6, 2003]	Cumulative loan losses over 1990–92 were 9 percent of loans; 40 of the 60 problem banks were merged.
Denmark	1999	1999	Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damages estimated at 1.5% of GDP
Denmark	2008	2009	Financial Sector	4.4	Eurostat (2015)	Two subsequent bank support packages in 2008-09.
Dominican Republic	1998	1999	Natural Disaster(s)	1.0	EM-DAT International Disasters Database, SR 1999	Total damages from hurricane were estimated at 8.8% of GDP. Reconstruction efforts boosted government expenditure by about 1 percent of GDP in 1998-1999.
Dominican Republic	2003	2003	SOEs	1.6	SR 2005	Re-nationalization of two electricity companies. The government assumed a debt of about US\$350 million of the electricity distribution companies acquired/nationalized in 2003. A MoU has been signed giving the government the option to buy back/restructure the debt with external creditor Union Fenosa.
Dominican Republic	2003	2004	Financial Sector	22.0	Laeven and Valencia (2012), SR 2003, SR 2005	Public assistance during banking crisis ultimately amounted to 22 percent of GDP, including an unprecedented 15 percent of GDP to resolve a single institution.
Dominican Republic	2004	2004	Natural Disaster(s)	...	EM-DAT International Disasters Database	Total estimated damage 1.3% of GDP
Ecuador	1992	1993	Other	...	SR 1993, SR 1994	Takeover by the Treasury in August 1992 of certain central bank debts
Ecuador	1993	1993	Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damages estimated at 2.8% of GDP
Ecuador	1998	2002	Financial Sector	21.7	Laeven and Valencia (2012)	The failure of a small bank in April 1998 triggered runs on other banks. It gained momentum in August when another bank failed, followed by the request of liquidity assistance from the largest bank. 16 out of 40 banks ran into problems, including most of the largest institutions. These 16 financial institutions accounting for 65% of assets had to either be closed or taken over by the government.
Ecuador	2004	2004	SOEs	0.2	SR 2004	Support to electricity distribution companies.
Ecuador	2008	2008	Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damages estimated at 1.6% of GDP

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Egypt	1991	1991	Financial Sector	4.5	World Bank (2003), SR 1992	Four public banks were given capital assistance. The Government recapitalized the public sector banks and closed their foreign exchange exposure by providing them with U.S. dollar-denominated bonds (amounting to US\$2,090 million) in 1991.
Egypt	1992	1993	Natural Disaster(s)	0.5	EM-DAT International Disasters Database, SR 1993	Total damages estimated at 2.9% of GDP. Earthquake expenditure relief totaled 0.6 percent of GDP in 92-93, and 0.7bn Egyptian pound.
Estonia	1992	1994	Financial Sector	1.9	Laeven and Valencia (2012)	In the fall of 1992, a number of SOBs became illiquid. One major bank was closed and liquidated and two other major banks were merged (into North Estonia Bank) and recapitalized. In 1993 problems showed up in smaller banks. 20 small credit institutions were either liquidated or merged.
Estonia	1998	1998	Financial Sector	1.0	World Bank (2003) [WB database of banking crises, version October 6, 2003] ), SR 1999, SIP 1999	Three banks failed in 1998: Maapank (Agricultural Bank), which accounted for 3 percent of banking system assets, and two smaller banks: EVEA and ERA. Maapank's deposits were compensated by the government for a total amount of EEK 366 million or about 0.5 percent of GDP/ The state budget suffered further losses amounting to EEK 427 million as a result of lost deposits. Deposits of the other banks were managed by the Deposit Insurance Fund.
Finland	1991	1995	Financial Sector	12.8	Laeven and Valencia (2012)	The adverse consequences of higher German interest rates were exacerbated by the collapse of exports to the Soviet Union. Government took control of three banks that together accounted for 31% of system deposits.
France	1994	1995	Financial Sector	0.7	World Bank (2003) [WB database of banking crises, version October 6, 2003]	Credit Lyonnais experienced serious solvency problems. According to unofficial estimates, losses totaled about \$10 billion, making it the largest bank failure up to that time.
France	2008	2008	Financial Sector	0.6	Eurostat (2015)	Some support to financial sector in the wake of the global financial crisis.
Germany	1994	2004	Subnational Government	0.7	Cordes and others (2014)	The transfers to Bremen amounted to EUR 8.5bn from 1994-2004; and to Saarland EUR 6.6bn from 1994-2004; total of about 0.7% of GDP. Transfers were based on a judicial decision attesting those two states serious budgetary difficulties due to a very high interest payment to tax revenue ratio.

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Germany	2008	2010	Financial Sector	11.9	Eurostat (2015)	Substantial bank bailout as a consequence of the global financial crisis.
Greece	1990		Natural Disaster(s)	...	EM-DAT International Disasters Database	Estimated total damages estimated at 1% of GDP
Greece	1991	1995	Financial Sector	...	World Bank (2003) [WB database of banking crises, version October 6, 2003]	Localized problems required significant injections of public funds into specialized lending institutions.
Greece	1999		Natural Disaster(s)	...	EM-DAT International Disasters Database	Estimated total damages estimated at 2.8% of GDP
Greece	2007	2010	SOEs	11.2	FAD Board paper "Fiscal Transparency, Accountability and Risk" (2012)	Various SOE debt reclassified to the general government (correction of inaccuracies including on arrears are also reflected in this episode).
Greece	2009	2013	Financial Sector	23.1	Eurostat (2015)	Large bank recapitalization in 2012-13.
Hungary	1991	1995	Financial Sector	10.0	Laeven and Valencia (2012)	Eight banks were insolvent. SOBs portfolio cleaned and recapitalized.
Hungary	2000	2002	SOEs	1.4	Cebotari et al. (2009), SIP 2007	Debt takeover of the loss-making state railway and Budapest public transport company. There have been occasional debt takeovers, 0.3% of GDP for MAV in 2000, 0.7% of GDP for MAV in 2002 and 0.4% of GDP for BKV in 2002 (see 2007 SIP).
Hungary	2005	2005	PPPs	1.5	Cebotari and others (2009), OECD Report on Transport Infrastructure Investment: Options for Efficiency (2008)	M1 motorway was nationalized in 1999 and M15 motorway received a significant equity contribution in 2004 since both roads turned out to be unprofitable due to lower than expected traffic. In September 2005 Eurostat determined that the transfer of existing and half-finished roads could not be considered off-budget, meaning that the country's deficit increased by 1.5%. In addition, as the half-finished roads were thus not transferred, the government needed to continue financing these, resulting in additional payments of HUF 125 billion (close to EUR 500 million) in that year.
Hungary	2009	2009	Financial Sector	1.8	Eurostat (2015)	Support to financials sector in the wake of the global financial crisis.

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Hungary	2011	2012	SOEs	1.3	SR 2011	Assumption of the debt of the public transport and national railway companies MAV and BKV, respectively, had a total fiscal cost of 1.3% of GDP in 2011.
Iceland	1993	1993	Financial Sector	1.0	World Bank (2003) [WB database of banking crises, version October 6, 2003] ), SR 1993	The government was forced to inject capital into one of the largest state-owned commercial bank after it suffered serious loan losses. Between late 1992 and March 1993 the largest bank, Landsbanki, received a capital injection totaling ISK4.25 billion in order to meet capital adequacy standards.
Iceland	2008	2012	Financial Sector	44.2	Laeven and Valencia (2012)	Large, systemic banking crisis. Most financial institutions affected, large central bank recapitalization. Highest fiscal cost of any episode in an advanced economy since at least 1990.
India	1993	1993	Financial Sector	...	Laeven and Valencia (2012)	Non-performing assets 11% in 1993-04.
India	1993		Natural Disaster(s)	...	EM-DAT International Disasters Database	Estimated total damages estimated at 2.8% of GDP
India	2008	2008	Financial Sector	0.4	SR 2008	Post-crisis stabilization measures included 0.4% of GDP of recapitalization of public banks
India	2014		Natural Disaster(s)	...	EM-DAT International Disasters Database	Estimated total damages estimated at 1.1% of GDP
Indonesia	1994	1994	Financial Sector	2.0	World Bank (2003) [WB database of banking crises, version October 6, 2003]	Non-performing assets equaled to more than 14 percent of banking system assets, with more than 70 percent in state banks. Recapitalization costs for five state banks amounted to nearly 2 percent of GDP.
Indonesia	1997	2001	Financial Sector	56.8	Laeven and Valencia (2012)	Widespread systemic banking crisis associated with the Asian crisis affected both SOBs and private commercial banks. The government declared a temporary blanket guarantee and a bank restructuring package that ultimately implied the closure of more than 60 banks and gross outlays of over 50 percent of GDP.
Indonesia	1997	1998	Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damages from huge fires estimated at 3.1% of GDP in 1997 and 1.3% of GDP in 1998
Indonesia	1998	1998	SOEs	4.0	Cebotari et al. (2009)	During the 1998 crisis the central government paid for the electricity company's fuel costs, amounting to 4% of GDP.
Indonesia	1998		PPPs	...	Cebotari et al. (2009)	Substantial obligations on PPP contracts in power plants and roads became due during the Asian crisis

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Indonesia	2005	2007	Natural Disaster(s)	0.7	EM-DAT International Disasters Database, SR 2005	Total damages estimated at 1.6% of GDP. Total cost of reconstruction estimated at US\$ 4.5bn but a large part donor financed (around \$4bn pledged for 2005-2009 on and off budget). Total impact on overall balance (considering on budget disaster related expenditures minus on budget grants and concessional loans) for 2005-2009 was 0.7 percent of GDP.
Iran	1990	1991	Other	1.2	SR 1991	Following the refugee crisis due to the Iraqi war, an expenditure of US\$1.1 billion has been incurred on account of the refugees in 1990-1991.
Iran	1990	1991	Natural Disaster(s)	5.7	EM-DAT International Disasters Database, SR 1991	Total damage due to large earthquake estimated at 9%. The World Bank estimated the total reconstruction costs at US\$5.25 billion, of which US\$990 million would be in foreign exchange.
Iran	1992		Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damage due to flood estimated at 2.8% of GDP
Iran	1993		Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damage due to flood estimated at 1.3% of GDP
Iran	1999		Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damage due to droughts estimated at 3% of GDP
Iran	2003	2005	Private Non-Financial Sector	4.5	SR 2004	Contingent liabilities related to letters of credit opened by domestic banks for trade financing was 7% of GDP by end March-2014 (\$9.2bn). Realization/coverage of these contingent liabilities was 2.2% of GDP in 2002/03, and 1.3% of GDP in 2003/04.
Ireland	2008	2011	Financial Sector	38.9	Eurostat (2015)	One of the largest bank bailouts ever. Recapitalization of the three largest banks.
Italy	2006	2006	SOEs	0.9	SR 2006, SR 2005, SIP 2005	Government assumptions of railroad related debt.
Italy	2009	2009	Financial Sector	0.3	Eurostat (2015)	Some support to financial sector in the wake of the global financial crisis.
Italy	2009	2010	Natural Disaster(s)	0.7	OECD (2013)	3bn EUR immediate disaster relief and an additional 8bn EUR for reconstruction efforts following the 2009 Abruzzo earthquake
Italy	2012	2012	Natural Disaster(s)	0.2	Article IV SR 2012	Reconstruction efforts of 0.2 percent of GDP in response to an earthquake in the north of the country.
Japan	1987	ongoing	SOEs	4.0	Cebotari and others (2009), SIP 1997, SR 1997	At privatization of the national railway company JNR in 1987 the state assumed the debts of the old company, amounting to Y9 trillion. They have been kept off-budget until now.



Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Japan	1995	1995	Natural Disaster(s)	0.7	SR 2012, SR 2011	Reconstruction efforts amounted to 0.7-1% of GDP after the Kobe earthquake.
Japan	1997	2001	Financial Sector	14.0	Laeven and Valencia (2008), Laeven and Valencia (2012)	Significant public funds were used for loan losses, bank recapitalizations, and depositor protection, when the stock market crash in 1990 and the subsequent recession and real estate price collapse led to a weakening in asset quality of the banks, downgrading of banks, and eventually bank failures by mid-95.
Japan	2011	2014	Natural Disaster(s)	4.0	Article IV SR 2012, SR 2011	Fiscal cost of 4 percent of GDP over a few years following the Great East Japan Earthquake of 2011.
Jordan	2004	2005	Financial Sector	0.3	SR 2004	After fraud case one of the banks was restructured, requiring capital injections of 0.3-0.8% of GDP
Jordan	2011	2014	SOEs	1.1	SR December 2014, SR December 2010, Article IV SR 2012	Debt assumption and transfers to loss making Water Authority.
Jordan	2011	2014	SOEs	15.1	SR December 2014, SR December 2010, Article IV SR 2012	Debt assumption and transfers to heavily loss making electricity company, strongly affected by the interruptions in gas supply from Egypt.
Kazakhstan	1994	1995	SOEs	0.3	SR 1994, SR 1995	The Government eliminated the external arrears of enterprises under government guarantees for loans undertaken in 1992-1993--which were of the order of US\$27 million by end-October 1994, and another US\$12 million by end-July 1995.
Kazakhstan	1997	1997	Financial Sector	0.4	SR 1997	In an effort to deal with the difficulties of the banking system, the two big state banks, Turan and Alem, were merged (Turan-Alem Bank) and recapitalized in the first quarter of 1997 (in an amount of T 6.5 billion), and then privatized in 1998.
Kazakhstan	2008	2012	Financial Sector	3.7	Laeven and Valencia (2012)	Recapitalization of various banks in the aftermath of the global financial crisis.
Korea	1997	1998	Financial Sector	31.2	Laeven and Valencia (2008), Laeven and Valencia (2012)	Large, systemic banking crisis related to the Asian crisis led to difficulties for the banks in rolling over their short-term borrowing.
Kuwait	2008	2009	Financial Sector	1.6	SR 2010	Kuwait Investment Authority participated with 32% in the recapitalization of Gulf Bank. Additionally, 0.5bn of 1.5nm stock market support fund used.

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Latvia	1995	1996	Financial Sector	3.0	Laeven and Valencia (2008), Laeven and Valencia (2012), Fleming and others (1997)	Large, systemic banking crisis involving the loss of roughly 40% of bank assets. Urgent changes in the legal, regulatory, supervisory, and institutional frameworks were made. To restore confidence in the banking sector, the government promised to compensate household depositors who lost funds in failed banks with an initial amount of up to Lat 500 (\$1,000) per depositor (Fleming and others 1997).
Latvia	2005		Natural Disaster(s)	...	EM-DAT International Disasters Database	Total estimated damage from storm 1.9% of GDP.
Latvia	2008	2010	Financial Sector	9.5	Eurostat (2015)	Nationalization of the second largest bank in the country.
Latvia	2013	2013	Private Non-Financial Sector	0.3	SR 2014	Latvia's biggest steelmaker, Liepajas Metalurgs (LM), ceased operations in May 2013 after several quarters of deteriorating performance, and was later declared insolvent. The government assumed liability for a loan to LM that was guaranteed in 2009 to support the firm's expansion, resulting in a fiscal expenditure of about 0.3 percent of GDP.
Lithuania	1995	1996	Financial Sector	3.1	Laeven and Valencia (2008), Laeven and Valencia (2012), Fleming and others (1997)	Banking crisis, necessitating support to both private and state-owned banks. This plan envisaged full recapitalization and renationalization of the majority state-owned banks, liquidation or a combination of existing shareholder and government support for private banks, and the transfer of bad loans to a newly created government-owned asset management institution. Longer-term measures to further strengthen banking legislation, regulation, and supervision, as well as to improve corporate governance in the banks, were also part of the plan (Fleming and others 1997).
Lithuania	1996	2010	Legal	5.4	Flanagan (2008)	Compensation related to frozen domestic currency deposits during collapse of Soviet Union. NPV of settlement was estimated at 5.4% of GDP, with settlement over a 10 year period.
Lithuania	2010	2011	Financial Sector	2.8	Eurostat (2015)	Financial sector support in the wake of the global financial crisis.
Luxembourg	1990		Natural Disaster(s)	...	EM-DAT International Disasters Database	Total estimated damage from storm 2.9% of GDP. No info on storm in SR 1991
Luxembourg	2008	2009	Financial Sector	6.9	Eurostat (2015)	Luxembourg participated in the bailouts of Fortis and Dexia.

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Macedonia FYR	1999	2010	Legal	10.1	Flanagan (2008)	Cash servicing of frozen foreign currency deposits, which were taken over by the government shortly after independence, beginning in 2000. The stock of these deposits at end-1999 amounted to about DM 1.1 billion (about 17% percent of GDP). The authorities planned to settle the liabilities to small depositors in cash, and swap the liabilities to larger depositors for negotiable government bonds. NPV of settlement estimated at 10.1% of GDP to be settled over a 12 year period.
Macedonia FYR	2005	2005	Financial Sector	0.4	SR 2006	Government recapitalized the central bank in a one-off operation.
Macedonia FYR	2006	2008	SOEs	0.5	SIP 2008	Government was forced to supply the electricity company with additional funds.
Malaysia	1997	1999	Financial Sector	16.4	Laeven and Valencia (2008), Laeven and Valencia (2012)	Large systemic banking crisis (associated with the Asian crisis) with non-performing loans peaking at 25-35% led to substantial government support.
Malaysia	2001	2001	Private Non-Financial Sector	3.5	SR 2002	An assumption of debt by the government (equivalent to about 3.5% percent of GDP) associated with the debt restructuring of Malaysia Airline System and two other large infrastructure projects (Putra and Star Light Rail), which until then were managed and operated by the private sector.
Malta	2003	2003	SOEs	3.3	SR 2003	Malta Shipyards restructuring expenditures
Malta	2008	2009	SOEs	1.7	SR 2010	Assumption of Malta Shipyards Debt. 1.1 percent of GDP in 2008 and 0.6 percent in 2009
Malta	2011	2015	SOEs	1.8	SR 2014	Restructuring of Airmalta (involving a total government injection of €130 million, about 1¾ percent of GDP, to be completed by 2016).
Mexico	1994	1996	Financial Sector	19.3	Laeven and Valencia (2008), Laeven and Valencia (2012)	By end-1994 a number of vulnerabilities built up and developed into a currency and a banking crisis. To contain systemic bank risk and preserve the payments system, significant direct support and liquidity facilities were provided to banks. Policy measures included a blanket guarantee, recapitalization of banks, special lines of credit, intervention of 15 banks (1994-2001), and loan restructuring programs.

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Mexico	1995	1998	Subnational Government	1.0	Cordes and others (2014), Cebotari and others (2009)	In the aftermath of the Tequila Crisis, extraordinary cash transfers to states of about 0.5% of GDP between 1995-1998 (Cordes et al 2014). FAD (2009) put the total cost of the SNG bailout at 1% of GDP.
Mexico	1995	1999	Financial Sector	4.2	SR 2000	Direct assistance to severely impaired selected debtor groups (such as mortgage debtors).
Mexico	1997	1997	PPPs	1.6	FAD "Public-Private Partnerships and Fiscal Risks" (2007)	Mexico's toll road plans created significant costs for the treasury, including a final USD7.7bn debt assumption in 1997.
Mexico	2004	2006	Subnational Government	...	Cordes and others (2014)	Up to 25% of government fund, which holds 1.4% of federal revenue sharing.
Moldova	1996	1998	SOEs	8.3	Flanagan (2008), SR 2008	USD140 million of government securities issued to Gazprom in settlement of arrears of energy enterprises in Q2 1997, repayment of the bonds issued to Gazprom were due in 1999-2003.
Moldova	2006	2006	Financial Sector	0.3	SR 2007	Recapitalization of the National Bank of Moldova (0.3% of GDP).
Morocco	2000	2000	Natural Disaster(s)	0.5	EM-DAT International Disasters Database, SR 2000	Severe drought in 1999/2000. Measures to counter the effects of the drought expected to add some DH 2 billion (0.6 percent of GDP) in spending in 2000. [EM-DAT database estimates the impact of natural disasters in 1999 as 2.3 percent of GDP].
Morocco	2000	2000	Financial Sector	...	SR 2000	Severe drought in 1999/2000.
Netherlands	2008	2008	Financial Sector	12.8	Eurostat (2015)	Bailout of large banks (Fortis, ABN Amro and ING Group) at the height of the financial crisis.
New Zealand	1987	1990	Financial Sector	1.0	World Bank (2003) [WB database of banking crises, version October 6, 2003]	One large state-owned bank (BNZ) accounting for one-quarter of banking assets experienced serious solvency problems due to high nonperforming loans. The bank required a capital injection equal to 1 percent of GDP.
New Zealand	2008	2010	Financial Sector	1.0	SR 2011, <a href="http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&amp;objectid=10670276">http://www.nzherald.co.nz/business/news/article.cfm?c_id=3&amp;objectid=10670276</a>	Under the retail deposit guarantee scheme introduced in October 2008 and closed in December 2010, the government paid \$NZ 1.8 billion (0.9 percent of GDP) to depositors with failed nonbank financial institutions, mostly finance companies, by end-2010. Largest cost for failure of South Canterbury

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
New Zealand	2010	2015	Natural Disaster(s)	5.0	SR 2013, SR 2014	Total cost of the earthquakes (sept-10/feb-11) was 15 percent of GDP, 10 percent was funded by international companies through insurance, the public sector (the central government and Earthquake Commission) financed around one-third of the reconstruction. Costs spread over 5 years. Costs to central government estimated at 2.8% of GDP.
Norway	1991	1993	Financial Sector	2.7	Laeven and Valencia (2008), Laeven and Valencia (2012)	Financial deregulation led lending boom and high German interest rates affected 3 Nordic countries, including Norway. Followed an important banking crisis, which led the government to inject capital into three of the four largest banks.
Norway	2009	2010	Financial Sector	0.3	SR 2009	Post-global financial crisis capital injections. The public capital injection took the form of Tier I preference shares or hybrid Tier I capital.
Oman	2007	2007	Natural Disaster(s)	0.4	EM-DAT International Disasters Database, SR 2007	Total damage estimated at 9.57 percent of GDP. 55 million rials (0.36 percent of GDP) of cyclone-relief spending in 2007. Data for other years not available.
Oman	2010		Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damage from storm estimated at 1.8% of GDP.
Pakistan	1992	1992	Natural Disaster(s)	0.8	EM-DAT International Disasters Database, SR 1992	EMDAT estimates the total damage due to flood at 1.6 percent of GDP. Reconstruction outlays amounted to PRs 9 billion, and relief expenditure to PRs 4 billion.
Pakistan	2005	2010	Natural Disaster(s)	2.3	EM-DAT International Disasters Database, SR 2006	EMDAT estimates the total damage at 4.4 percent of GDP. Earthquake related one expenditures of 2.3% of GDP.
Pakistan	2007		Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damage from storm/flood estimated at 1.3% of GDP.
Pakistan	2010		Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damage from flood estimated at 5.4% of GDP.
Pakistan	2011		Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damage from flood estimated at 1.2% of GDP.
Pakistan	2012		Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damage from flood estimated at 1.1% of GDP.

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Pakistan	2013	2013	SOEs	1.5	SR 2013	Government cleared circular debt of energy companies. Circular debt came from interenterprise arrears.
Philippines	1991	1991	Natural Disaster(s)	0.4	EM-DAT International Disasters Database, SR 1990	EMDAT estimates the total damage at 1.7 percent of GDP. A powerful earthquake in July 1990 and a strong typhoon in November interrupted export production and inflicted heavy damage on infrastructure. A sharp rise in capital outlays for earthquake reconstruction (by P\$ 5 billion, or 0.4 percent of GNP) was included in the 1991 budget.
Philippines	1995		Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damage from storm estimated at 1.2% of GDP.
Philippines	1997	2001	Financial Sector	13.2	Laeven and Valencia (2008), Laeven and Valencia (2012), Albuero (1999)	The crisis raised the magnitude of non-performing loans (NPL) in bank portfolios. This in turn necessitated recapitalization to restore asset qualities (Albuero 1999).
Philippines	2014	2014	Natural Disaster(s)	1.0	EM-DAT International Disasters Database, SR 2014	Typhoon Yolanda, the strongest storm ever to make landfall, struck the central Philippines on November 8, 2013. EMDAT estimates the total damage at 4.6 percent of GDP. The government earmarked about ₱ 120 billion (1 percent of GDP) for reconstruction spending in 2014.
Poland	1992	1994	Financial Sector	3.5	Laeven and Valencia (2008), Laeven and Valencia (2012)	In 1991 a large number of state owned banks, with commercial banks accounting for 90 percent of the credit, experienced solvency problems and received liquidity support in the following years.
Poland	1997		Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damage from floods estimated at 2.2% of GDP
Portugal	2001	2013	SOEs	12.1	Portugal Fiscal Transparency Evaluation (2014)	Reclassification of SOE debt into the general government.
Portugal	2003		Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damage from wildfires estimated at 1% of GDP.
Portugal	2007	2014	Financial Sector	11.0	Eurostat (2015)	Recapitalization of all major banks.

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Portugal	2009	2014	PPPs	0.6	Portugal Fiscal Transparency Evaluation (2014)	Large stock of PPPs which had to be reclassified into central government debt.
Portugal	2010	2015	Subnational Government	0.8	SR July 2012, SR December 2011, <a href="http://portugalresident.com/madeira-negotiating-multi-million-euro-bailout-with-portugal">http://portugalresident.com/madeira-negotiating-multi-million-euro-bailout-with-portugal</a>	1.5bn Euro financial assistance program to Madeira.
Romania	1990	1992	Financial Sector	0.6	Laeven and Valencia (2008), Laeven and Valencia (2012)	High non-performing loans in the SOBs, many loans to SOEs were doubtful. Agricultural bank recapitalized on a flow basis.
Romania	1999	1999	Financial Sector	2.0	<a href="https://en.wikipedia.org/wiki/Bancorex">https://en.wikipedia.org/wiki/Bancorex</a>	The bank failed due to non-performing loans that were related to political corruption, especially behind-the-scenes political dealings.[1] The bank was bailed out by the Romanian state, its good assets being then merged with the more solvent Banca Comercială Română.
Romania	2000		Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damage due to drought/flood estimated at 1.6% of GDP.
Romania	2005		Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damage due to floods estimated at 1.3% of GDP.
Russia	1998	1998	Financial Sector	6.0	Laeven and Valencia (2008), Laeven and Valencia (2012)	720 banks (accounting for 4% of sector assets and 32% of retail deposits) were deemed insolvent.
Russia	2008	2012	Financial Sector	2.3	Laeven and Valencia (2012)	Recapitalization of various banks.
Serbia	1998	2015	Legal	11.5	Flanagan (2008)	Frozen foreign currency deposits (over 30 percent of GDP at end-2001) are repaid over the next decade via mandatory conversion of citizens FX Deposits into Public Bonds ( <a href="http://www.nbs.rs/internet/english/30/33/index.html?cmsframe=printerfriendly">http://www.nbs.rs/internet/english/30/33/index.html?cmsframe=printerfriendly</a> ). Total settlement period is 1998-2016, with NPV of 11.5% of GDP at least.
Serbia	2009	2012	SOEs	0.8	SR 2013	Called SOE guarantees.

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Serbia	2012	2012	Financial Sector	0.8	SR 2013	Recapitalization of nonviable SOBs.
Slovak Republic	1998	2002	Financial Sector	...	Laeven and Valencia (2008), Laeven and Valencia (2012)	Bank restructuring program involving the major SOBs
Slovenia	1992	1994	Financial Sector	14.6	World Bank (2003) [WB database of banking crises, version October 6, 2003], Laeven and Valencia (2008), Laeven and Valencia (2012)	Three banks—accounting for two-thirds of banking system assets—were restructured.
Slovenia	2009	2014	Financial Sector	18.2	Eurostat (2015)	Three largest banks (all publicly owned) needed substantial capital injections. Largest bulk of costs incurred over 2012-2014.
South Africa	2009	2010	SOEs	0.8	SR 2010	0.75 percent of GDP for one-off lending to the state-owned electricity company Eskom. There was an electricity crisis in South Africa in 2008 and since then Eskom's situation has progressively gotten worse.
South Africa	2014	2014	SOEs	0.6	SR 2014	0.6 percent of GDP equity injection into the electricity company Eskom.
Spain	2002		Other	...	EM-DAT International Disasters Database	Total damage due to oil spill estimated at 1.4% of GDP.
Spain	2008	2013	Financial Sector	5.0	Eurostat (2015)	Financial sector support at the height of the European debt crisis. High NPLs as consequence of burst property bubble.



Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Spain	2012	2012	Subnational Government	...	Cordes and others (2014), SR 2012	Rescue fund with central government loans of EUR18bn (1.4% pf GDP) for nine regions, loans for payment of outstanding commercial debt of EUR18bn (1.4% of GDP) for 14 regions. The central government declared that no region would default, and raised the possibility of mutualizing issuance via, for example, "hispanobonos" (central-government guaranteed debt to cover regional amortizations). Liquidity pressures were reduced by advancing transfers and extending the repayment of past revenue overpayment from five to ten years. Two financing facilities were created with favorable terms, also to be used for repaying suppliers and rolling over maturing debt. The deficit target was also relaxed from 1.3 percent in 2011 (and 2012) to 1.5 percent of GDP under the 2012 SGP.
Sri Lanka	1992		Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damage due to flood estimated at 2.6% of GDP.
Sri Lanka	1993	1996	Financial Sector	5.2	SR 1997	In 1993, the Government recapitalized SOBs at a cost of 3.4 percent of GDP so that they could meet the 8 percent capital adequacy requirement. Subsequently political interference continued, and in 1996 the Government was forced to issue subordinated bonds equivalent to 1.8 percent of GDP in exchange for politically motivated loans that had gone bad.
Sri Lanka	2004	2007	Natural Disaster(s)	1.5	EM-DAT International Disasters Database, SR 2005	EMDAT estimates the total damage at 6.4 percent of GDP. Government spending on reconstruction and relief amounted to 1½ percentage points of GDP.
Sweden	1991	1995	Financial Sector	3.6	Laeven and Valencia (2008), Laeven and Valencia (2012)	As in the case of Finland and Norway, the pre-crisis period was characterized by rapid lending expansion following financial liberalization, and increased German interest rates. Three large banks, one of which was largely state owned, were nationalized due to sizeable loan losses, especially in commercial property. In the absence of formal deposit insurance, a blanket guarantee was announced in the fall of 1992. Note that according to Englund (2015) the crisis started in 1990.
Sweden	2008	2009	Financial Sector	0.2	Eurostat (2015)	The fiscal response implied no deficit generating capital injections.

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Switzerland	1997	2003	Private Non-Financial Sector	...	SR 2002, SR 1999	The government assumed the debt and has begun to capitalize the pension funds of public enterprises that were commercialized. The largest operation related to Swiss Rail.
Switzerland	2001	2002	Private Non-Financial Sector	0.5	SR 2002	The Swissair failure is estimated to have resulted in 4,500 job losses and entailed fiscal costs of SwF 2.5 billion (0.6 percent of GDP).
Switzerland	2008	2012	Financial Sector	1.1	Laeven and Valencia (2012)	UBS recapitalization.
Thailand	1993		Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damage due to flood estimated at 1.7% of GDP.
Thailand	1997	2000	Financial Sector	43.8	Laeven and Valencia (2008), Laeven and Valencia (2012)	Finance companies had large exposure to the property sector and were severely affected by the economic downturn. Widespread nationalizations and bank closures took place amidst large systemic crisis and very high non-performing loans.
Thailand	1998		PPPs	...	Cebotari and others (2009)	Substantial obligations on PPP contracts in power plants and roads became due during the Asian crisis
Thailand	2011	2014	Natural Disaster(s)	3.0	EM-DAT International Disasters Database, SR 2012	EMDAT estimates the total damage at 11.7 percent of GDP. 3% of GDP reconstruction investment program initiated as a response.
Turkey	1994	1994	Financial Sector	1.0	World Bank (2003) [WB database of banking crises, version October 6, 2003]	Three banks failed in April 1994 due to short foreign currency positions. Government declared full deposit guarantee to avoid a bank run.
Turkey	1999	2002	Natural Disaster(s)	6.0	EM-DAT International Disasters Database, LOI (1999)	EMDAT estimates the total damage at 8.4 percent of GDP. Earthquake related costs estimated at about 0.8 percent of GNP in 1999, 1 1/2 percent of GNP in 2000, and 3.7 percent of GNP for 2001-2002.

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Turkey	2000	2001	Financial Sector	32.0	Laeven and Valencia (2008), Laeven and Valencia (2012)	Banks had a high exposure to the government through large holdings of public securities, sizeable maturities and exchange rate risk mismatches, making them highly vulnerable to market risk. In Nov 2000, one large bank cut its credit lines to a few smaller banks, which in turn reacted by liquidating public securities in the market. A sharp drop in price of such securities caused panic among foreign investors triggering a reversal in capital flows and a sharp increases in interest rates and declines in the value of the currency. Two banks were closed and 19 taken over by the Savings Deposit Insurance Fund.
Ukraine	1996	2008	Legal	3.5	Flanagan (2008), SR 2008	Compensation related to frozen domestic currency deposits during collapse of Soviet Union. In the early 1990s contingent liability related to frozen deposit were estimated up to 160% of GDP. At end 2007 the estimate was 18% of GDP (reduction mainly due to GDP growth). Some small one-off payments were made leading up to 2008. In 2008, Hr 20bn was included in budget to resolve the liability but 14bn was contingent on privatization proceeds. The total fiscal cost was estimated at 3.5% of GDP by Flanagan (2008).
Ukraine	2008	2008	SOEs	1.2	SR2009	1.2 percent of GDP debt payment for Naftogaz.
Ukraine	2008	2012	Financial Sector	4.5	SR2009 & SR2010 & Laeven and Valencia (2012)	Public recapitalization program.
Ukraine	2009	2009	SOEs	2.5	SR 2010	2.5 percent of GDP in recapitalization bonds to Naftogaz.
United Arab Emirates	2008	2009	Subnational Government	3.2	SR 2009	Emergency bailout loan from Abu Dhabi to Dubai in the wake of Dubai World debt distress.
United Arab Emirates	2008	2010	SOEs	9.0	SR 2010, SIP 2010. "Policy Coordination in Fiscal Federalism: Drawing Lessons from the Dubai Debt Crisis" WP/11/147	Support to Government related enterprises, mainly by the government of Abu Dhabi. The number represents a rough approximation (upper bound).
United Kingdom	2008	2010	PPPs	0.2	Cebotari and others (2009), House of Commons (2012)	Nationalization of the London Underground PPP in 2008 and 2010.
United Kingdom	2008	2010	Financial Sector	11.4	Eurostat (2015)	Substantial purchases of shares of troubled banks at the height of the financial crisis.

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
United States	1988	1991	Financial Sector	3.2	World Bank (2003) [WB database of banking crises, version October 6, 2003]	During the saving and loan crisis of the 1980-90 in the US, more than 1,400 saving and loan institutions and 1,300 banks failed. Cleaning up savings and loan institutions cost around 3 percent of GDP.
United States	1996	1996	Subnational Government	...	Cordes and others (2014)	DC borrowed directly from the treasury
United States	2005	2007	Natural Disaster(s)	0.5	EM-DAT International Disasters Database, CBO Report, <a href="https://www.cbo.gov/publication/44601">https://www.cbo.gov/publication/44601</a>	Total damage from hurricanes (Katrina) estimated at 1.2% of GDP. Fiscal cost range of US\$62.3bn-100bn. We use the lower bound.
United States	2008	2012	Financial Sector	4.0	Laeven and Valencia (2012)	Financial crisis bailouts and support excluding support to automotive industry.
United States	2009	2009	Private Non-Financial Sector	0.6	Article IV SR 2009/SIP 2010	80 billion in financial support to two stressed auto manufacturers and the auto-finance company GMAC
United States	2011	2013	Natural Disaster(s)	0.9	<a href="https://www.americanprogress.org/issues/green/report/2013/04/29/61633/disastrous-spending-federal-disaster-relief-expenditures-rise-amid-more-extreme-weather/">https://www.americanprogress.org/issues/green/report/2013/04/29/61633/disastrous-spending-federal-disaster-relief-expenditures-rise-amid-more-extreme-weather/</a>	Total spending for various disaster relief over the period (large part due to Hurricane Sandy)
Uruguay	1999	1999	Natural Disaster(s)	...	EM-DAT International Disasters Database	Total damage from droughts estimated at 1% of GDP
Uruguay	2002	2005	Financial Sector	20.0	Laeven and Valencia (2008), Laeven and Valencia (2012)	Deposits were highly dollarized and an important fraction was of non-residents (namely Argentinians). The introduction of capital controls and deposit freezes in Argentina in Dec. 2001 triggered liquidity problems at the two largest private banks Banco Galicia Uruguay (BGU) and Banco Comercial (BC) (with combined assets of 20 percent of the total) as a result of their high level of exposure to Argentina (owned by Argentinean financial groups). Uruguay was downgraded from investment grade status. Runs on both private and public banks required significant state intervention.

Country	Start 1/	End 2/	Subtype of CL	Impact amount (percent of GDP)	Sources	Additional info 3/
Venezuela	1994	1998	Financial Sector	15.0	Laeven and Valencia (2008), Laeven and Valencia (2012)	A weak oil market, a persistently lax fiscal policy, high interest rates, and increased political tensions exacerbated economic problems in the early 1990s, while asset quality at banks deteriorated sharply. The trigger of the crisis was the closure of Banco Latino (2nd largest in terms of deposits), in mid-January 1994. In total, 19 banks (55% of system's deposits) were either nationalized or closed.
Venezuela	2000	2001	Natural Disaster(s)	1.0	EM-DAT International Disasters Database, SR 2000	Total estimated damage due to floods was 3.2% of GDP. Outlays related to reconstruction in the Vargas State are estimated at about one percentage point of GDP over 2000-01.

<sup>1</sup> The start date reflects the date reported in IMF SRs or external sources and may at times not exactly coincide with the actual start date of a contingent liability realization.

<sup>2</sup> The end date reflects the date reported in IMF SRs or external sources and may at times not exactly coincide with the actual end date of a contingent liability realization. For episodes that were still ongoing while the data was being collected, 2014 was chosen as the cut-off year.

<sup>3</sup> For natural disasters, estimated damages from EMDAT are reported. These are not the fiscal costs.

## References

- Acemoglu, D., S. Johnson, J. Robinson, and Y. Thaicharoend, 2003, "Institutional Causes, Macroeconomic Symptoms: Volatility, Crises and Growth," *Journal of Monetary Economics*, Vol. 50, pp. 49–123.
- Arslanalp, S., and Y. Liao, 2015, "Contingent Liabilities and Sovereign Risk: Evidence from Banking Sectors," CAMA Working Paper 43/2013 (Canberra: Centre for Applied Macroeconomic Analysis).
- Amaglobeli, D., N. End, M. Jarmuzek, and G. Palomba, 2015, "From Systemic Banking Crises to Fiscal Costs: Risk Factors," IMF Working Paper 15/166 (Washington: International Monetary Fund).
- Cebotari, A., 2008, "Contingent Liabilities: Issues and Practice," IMF Working Paper 08/245 (Washington: International Monetary Fund).
- , J. Davis, L. Lusinyan, A. Mati, P. Mauro, M. Petrie, and R. Velloso, 2009, "Fiscal Risks: Sources, Disclosure and Management," IMF Departmental Paper 9/01 (Washington: International Monetary Fund).
- Cordes, T, M. Guerguil, L. Jaramillo, M. Moreno-Badia, and S. Ylaoutinen, 2014, "Subnational Fiscal Crises," Chapter 6 in *Designing a European Fiscal Union: Lessons from the Experience of Fiscal Federations*, ed. by C. Cottarelli and M. Guerguil (London: Routledge).
- European Commission (Eurostat), 2015, "Eurostat Supplementary Table for the Financial Crisis," Background Note (Brussels). Available at: <http://ec.europa.eu/eurostat/documents/1015035/2022710/Background-note-fin-crisis-OCT-2015-final.pdf>.
- Flanagan, M., 2008, "Resolving a Large Contingent Fiscal Liability: Eastern European Experiences," IMF Working Paper 08/159 (Washington: International Monetary Fund).
- Freeman, P., M. Keen, and M. Mani, 2003, "Dealing with Increased Risk of Natural Disasters: Challenges and Options," IMF Working Paper 03/197 (Washington: International Monetary Fund).
- Gaspar, V., R. Hughes, and L. Jaramillo, 2015. "Dams and Dikes for Public Finances", *IMFdirect* blog post, March 18. Available at: <http://blog-imfdirect.imf.org/2015/03/18/dams-and-dikes-for-public-finances/>.
- Hoelscher, D., and M. Quintyn, 2003, "Managing Systemic Banking Crises," IMF Occasional Paper 224 (Washington: International Monetary Fund).
- Honohan, P., and D. Klingebiel, 2000, "Controlling the Fiscal Costs of Banking Crises," World Bank Policy Research Working Paper 2441 (Washington: World Bank).
- Emergency Events Database (EM-DAT), 2015, "International Disaster Database," Centre for Research on the Epidemiology of Disasters (CRED) (Brussels: Université Catholique de Louvain). Available at: <http://www.emdat.be/database>.

- International Monetary Fund (IMF), 2003, September 2003 *World Economic Outlook—Public Debt in Emerging Markets* (Washington).
- , 2011, “The Public Sector Debt Statistics Guide: Guide for Compilers and Users,” Inter-Agency Task Force on Finance Statistics (Washington).
- , 2012, “Fiscal Transparency, Accountability and Risk,” IMF Policy Paper (Washington). Available at: <http://www.imf.org/external/np/pp/eng/2012/080712.pdf>.
- , 2014, “The Fiscal Transparency Code,” IMF PFM blog (Washington). Available at: <http://www.imf.org/external/np/fad/trans/index.htm>.
- , 2015, “From Banking to Sovereign Stress: Implications for Public Debt,” IMF Policy Paper (Washington). Available at: <https://www.imf.org/external/np/pp/eng/2014/122214.pdf>.
- Jaramillo, L., and C. Mulas-Granados, 2016, “Always lurking: Drivers of debt spikes since WWII,” IMF Working Paper (Washington, forthcoming).
- Kharas, H., and D. Mishra, 2000, “Hidden Deficits and Contingent Liabilities,” Part 1 of the study “Opportunities and Risks in Central European Finances,” co-sponsored by the European Commission and the World Bank (Washington: World Bank).
- Landier, A., and K. Ueda, 2009, “The Economics of Bank Restructuring: Understanding the Options,” IMF Staff Position Note 09/12 (Washington: International Monetary Fund).
- Leaven, L., and F. Valencia, 2012, “Systemic Banking Crises Database: An Update,” IMF Working Paper 12/163 (Washington: International Monetary Fund).
- Lucas, D., 2014, “Evaluating the cost of government credit support: the OECD context,” *Economic Policy*, Vol. 29, No. 79, pp. 553–97.
- Polackova, H., 1998, “Government Contingent Liabilities: A Hidden Risk to Fiscal Stability,” Policy Research Working Paper 1989 (Washington: World Bank).
- Polackova-Brix, H., and A. Schick, 2002, “Government at Risk: Contingent Liabilities and Fiscal Risks,” Co-publication of the World Bank and Oxford University Press (Washington).
- Towe, C. M., 1991, “The Budgetary Control and Fiscal Impact of Government Contingent Liabilities,” *IMF Staff Papers*, Vol. 38, No. 1 (March), pp. 109–34.
- Weber, A., 2012, “Stock Flow Adjustments and Fiscal Transparency: A Cross Country Comparison,” IMF Working Paper 12/39 (Washington: International Monetary Fund).