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Private and Public Debt: Are Emerging Markets at Risk?

by Marco Bernardini and Lorenzo Forni

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Abstract

Using a dataset covering a large sample of emerging economies (EMEs), we study the relationship between debt and economic performance in bad times. While previous research has shown that private debt buildups exacerbate the duration and intensity of recessions in advanced economies (AEs), we document that this effect is very pronounced in EMEs as well. Moreover, although rapid public debt buildups are unlikely to be the primary trigger of financial crises, in EMEs they are associated with deeper and longer recessions than in AEs. Part of this difference is explained by a less supportive fiscal policy in EMEs during crises.

JEL classification: C23, E32, E44, E62, F44, G21, H63

Keywords: private-public debt, recessions, banking crises, emerging markets

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1 Introduction

> *"It is close to ten years since America's housing bubble burst. It is six since Greece's insolvency sparked the euro crisis. Linking these episodes was a rapid buildup of debt, followed by a bust. A third installment in the chronicles of debt is now unfolding. This time the setting is emerging markets."*
>
> — "The Never-Ending Story," *The Economist,* November 2015

In the past few years, especially since the 2007-09 global financial crisis, emerging market economies (EMEs) have amassed significant amounts of private and public debt (Figure 1). Private debt has been increasing since before the global financial crisis, but it has accelerated afterwards due to the very easy global financial conditions. Public debt dynamics instead reflects more the softening of growth and the worsening of fiscal balances, related to various shocks that have hit EMEs in the last few years, from the fall in oil prices to exchange rate depreciations.[1] These trends are different from the recent experience in advanced economies (AEs). In this latter group, the crisis set in motion a deleveraging process that is starting to slowly reduce the levels of private debt. At the same time, the fall in GDP and, to a lesser extent, the supportive fiscal interventions in some countries have brought about a surge in public debt. While in both groups of countries the levels of private and public debts are at historically high levels, there is a fundamental difference between the two. AEs are currently past the pre-crisis debt buildups, while in EMEs there is no clear sign of a slowdown in debt accumulation. Actually, some EMEs have recorded very significant increase in private debt in recent years. This is raising concerns among scholars and policymakers, especially at a time when economic activity in these countries is slowing down.

A consolidated body of literature has pointed out the dangers of excessive credit growth in triggering banking crises and in extending and deepening recessions. Among others, two recent studies have investigated this link. On the

[1] For a description of recent trends see International Monetary Fund (2016).

one hand, Mian and Sufi (2010) focus on one particular slump, the 2007-09 Great Recession, and explore the cross-regional variation in household debt and economic activity across 450 U.S. counties. On the other hand, Jordà, Schularick and Taylor (2013) analyze a large sample of more than 200 recessions which took place in 14 AEs between 1870 and 2008. Despite exploiting very different information in terms of number of episodes, type of variation and time-span, both studies find robust evidence of a systematic link running from credit booms to financial crisis and harsh downturns. Excessive private debt impedes the recovery primarily because it constrains consumption and investment and limits the transmission of monetary policy.[2] Accordingly, calls have been made for greater use of fiscal policy, at least in countries that have fiscal space, i.e. countries which can sustain increases in public debt without putting at risk economic and financial stability.

Quite surprisingly the available empirical evidence refers mostly to the AEs. This study is an attempt to fill this gap and to shed light on the roles played by private and public debt, and their interaction, in affecting EME's economic performance in bad times. There are a number of reasons why we should expect the transmission mechanism of large debt buildups into financial crisis and recessions to be different in EMEs as compared to AEs. First of all, EMEs have been less able than AEs to borrow externally in domestic currency (the so-called "original sin") and therefore have been more exposed to risks of sudden stops. Second, credit booms might trigger financial crisis in EMEs more easily than in AEs given their earlier stage of financial development. Finally, the way a financial crisis would play out in EMEs might be different, both because of smaller financial systems in EMEs as compared to AEs, and also as EMEs might have more limited capacity to deploy effectively monetary and fiscal policies in times of crisis.

In this paper we use a large sample of recessions which took place in AEs and EMEs in the post World War II era and make use of the local projection framework proposed by Jordà, Schularick and Taylor (2016). In particular, we first analyze if and to what extent buildups in private and public debt prior to recessions can influence the intensity of the slump and the speed of the recovery. In a second stage,

[2]High indebted firms and households might not increase borrowing in reaction to reductions in interest rates, therefore the main tool of monetary policy might be weakened in these circumstances.

we also split recessions according to the presence or not of a banking crises, as the literature has shown that the role played by debt is more substantial in "financial recessions". Our analysis addresses three questions: (1) Do debt buildups prior to recessions predict deeper slumps and slower recoveries also in EMEs? (2) How does this link change when recessions are financial in nature (i.e. they follow credit booms)? (3) Do rapid private and public debt accumulations and ensuing crises develop differently in EMEs than in AEs?

Our findings point to an important role of debt in increasing the likelihood of financial crisis and in making the ensuing recession longer and deeper. Moreover, we find that some of these effects are more marked in EMEs as compared to AEs. In particular, our evidence shows that the higher the pre-crisis private and public debt buildups in EMEs the lower the available external financing when a crisis hits. This severely restricts the capacity of the government to sustain its economy in times of crisis, which has a substantial effect on activity. By contrary, we find that AEs are able to run counter-cyclical fiscal policy during financial crisis. That is, while in AEs debt mainly constrains the private sector, either by triggering a deleveraging phase or by limiting further private borrowing, in EMEs excessive private and public debt buildups also constrain the public sector. Indeed, our evidence show that in EMEs the larger the pre-crisis borrowing is, the stronger is the reduction in financing possibilities for governments when crises strike.[3]

This paper is organized as follows. In the next section, we show how buildups in private and public debt-to-GDP levels prior to recessions affect slumps and recoveries in EMEs and AEs. In section 3, we focus on a subset of recessions–financial recessions–that occur during banking crises. In section 4, we show how excessive debt buildups in EMEs tend to be associated with tighter financing constraints and a simultaneous retrenchment of public and private demand. Section 5 concludes the paper.

[3]In recent years, some EMEs have tried to protect themselves from capital outflows by building up official reserves. However, after significant increases since 2000, EMEs official reserves started to decline since mid-2014 due to changes in capital flows and commodity prices.

2 The Role of Private and Public Debt in Recessions

The relation between debt and macroeconomic performance has drawn renewed interest, especially after the 2007-09 global financial crisis. Concerning private debt, Mian and Sufi (2010) and Jordà, Schularick and Taylor (2013) have shown that rapid private debt buildups in good times shape economic performances in bad times. When recessions occur, countries with larger buildups in private debt levels tend to perform relatively worse. Concerning public debt, Reinhart and Rogoff (2010) and Reinhart, Reinhart and Rogoff (2012) have shown that countries with high levels of public debt tend to experience slower economic growth than countries with lower levels of public debt. More recently, Pescatori, Sandri and Simon (2014) and Chudik, Mohaddes, Pesaran and Raissi (forthcoming) have found evidence that it is the trajectory of public debt, rather than its level, that affects growth. While countries with rising levels of public debt are found to grow less in the future, countries with high but declining levels of public debt experience growth rates that are similar to those of their peers. Chudik, Mohaddes, Pesaran and Raissi (forthcoming), in particular, confirm this finding both in a sample of advanced economies and, separately, in one of emerging markets. Therefore, while the literature on private debt has reached a consensus that rapid debt accumulations lead to crisis and recessions, whether it is the level or the accumulation of public debt that is more significant in leading to crisis and recessions is less clear.

In this paper we focus on the pre-crisis increase in both private and public debt. In particular, we show how larger-than-average buildups in private and public debt-to-GDP levels in the years preceding slumps relate to the economic performance in the years following the start of the recession. This specification choice is motivated by three reasons. First, looking at changes in both private and public debt facilitates the comparisons of results related to the two debt types. Second, this specification accommodates the presence of trends that often characterize the long-run dynamics in private debt-to-GDP levels. In particular, the ratio of global debt to GDP has seen a continuous increase globally over the past century. The development of long-run trends is partly attributable to phenomena such as financial progress, which can generate increases in debt levels

without necessarily creating financial stress. From a practical point of view, the use of changes instead of levels allows the minimization of the impact of those factors.[4] Third, our background analysis (not presented in this paper) suggests that, in the case of EMEs, the use of the pre-crisis debt level as a measure of public debt imbalance does not deliver strong effects. As discussed in Reinhart, Rogoff and Savastano (2003), "safe debt levels" can be quite heterogeneous, especially in developing economies. Since our focus is on this country-group, the use of the change in debt, instead of its level, allows us to circumvent this delicate issue.

There are a number of reasons why we look at EMEs and AEs separately. First, EMEs are historically more vulnerable than AEs to private and public debt buildups. On one hand, they often borrow in foreign currencies abroad because institutional weaknesses prevent them from borrowing in their own currency (this is what Eichengreen et al., 2007, have named the "original sin"). Clearly, this makes them more vulnerable to sudden stops in credit. On the other hand, Reinhart, Rogoff and Savastano (2003) argue that a country's record of repeated crises and defaults, a condition which typically characterize EMEs' history, makes its institutions more "debt-intolerant", i.e. less capable to sustain apparently moderate debt burdens. Accordingly, the recent buildups in debt in EMEs raises concerns about the sustainability of this process. Second, EMEs are characterized by less developed or less tested financial systems, a structural difference which may potentially alter the transmission mechanism through which debt interacts with the real economy. Finally, the set of banking crises in our sample is rather different for EMEs and AEs. While most of the observations for AEs refer to the global financial crisis and therefore are concentrated around 2008, the episodes for EMEs have occurred in waves over long periods of time or have been idiosyncratic and only a few of them refer to 2008 and its aftermath (Table A1). However, we will show that the average drop in GDP during banking crises is surprisingly similar in EMEs and AEs, notwithstanding differences in the set of crises.

[4] In particular, we use country-demeaned changes in debt to further minimize the impact of different rates of financial development across countries and types of debt.

2.1 Debt Buildups Amplify Recessions in Both EMEs and AEs

Our first question asks whether rapid private and public debt buildups prior to recessions predict deeper contractions and slower recoveries. To address this issue, we use IFS data on bank credit to the private sector and IMF data on public debt covering a large set of EMEs and AEs (see Appendix A) and the Local Projection Method (LPM) pioneered by Jordà (2005) and applied in a similar context in Jordà, Schularick and Taylor (2016). Mian, Sufi and Verner (2015) use a similar approach to assess the effect of private debt, specifically household debt, on growth.

Our baseline model regresses the cumulative change in the variables of interest y (e.g. real per capita GDP) in bad times on a predetermined information set. The LPM facilitates the identification of the effect of a starting condition, that is, the accumulation of debt prior to a recession, on the dynamics during the ensuing recession, by running a sequence of regressions for different horizons. Specifically, we estimate the following local projection model:

$$\begin{aligned}\frac{\Delta_h y_{i,p+h}}{y_{i,p}} = \theta_h &+ \beta_h^{PR}\left(\Delta_{\bar{5}} PRY_{i,p}\right) + \beta_h^{PU}\left(\Delta_{\bar{5}} PUY_{i,p}\right) + \\ &+ \beta_h^{PRPU}\left(\Delta_{\bar{5}} PRY_{i,p}\Delta_{\bar{5}} PUY_{i,p}\right) + \\ &+ \sum_{l=0}^{L}\gamma_{h,l} Y_{i,p-l} + \alpha_{hi} + u_{i,p+h},\end{aligned} \tag{1}$$

for $h = 1, \ldots, 5$, where $\Delta_h y_{i,p+h}/y_{i,p}$ is the cumulated percentage change in real per-capita GDP h years after a peak p in the business cycle, θ_h is the intercept, $\Delta_{\bar{5}} PRY_{i,p}$ and $\Delta_{\bar{5}} PUY_{i,p}$ measure the average annual change in the private and public debt ratios over the five years preceding a downturn, $Y_{i,p-l}$ are a set predetermined control variables, α_{hi} are fixed country effects, and $u_{i,p+h}$ is the residual.[5] All variables are expressed in real per-capita terms. Controls include annual growth rates of GDP, private debt, public debt, and government expenditures. In our baseline specification we use three lags, i.e. we set $L = 2$. Following Jordà, Schularick and Taylor (2016), standard errors are clustered at the country-level as a conservative fix for the leftover

[5] We present results based on the growth of debt in the five years prior to recessions, but we find similar results using four-year or six-year windows. The use of "not-too-small" windows reduces the risk of capturing short-run fluctuations in the debt ratios.

serial correlation typical of local projections. The business cycle peaks are identified using the Bry and Boschan (1971) algorithm. Formally, a generic year t is identified as a "peak year" p if the level of real per-capita GDP grows in year t and drops in year $t+1$.

To allow for a meaningful interpretation of the intercept θ_h, all the right hand side (RHS) variables are expressed in difference from their pooled means and the set of country-dummies is normalized to satisfy the condition $\sum_{i=1}^{N} \alpha_{hi} = 0$.[6] In this way, θ_h measures the GDP path in "average-debt" recessions, that is, slumps associated with private and public debt accumulation at their respective sample averages (along with the remaining set of regressors). β_h^{PR} (β_h^{PU}), instead, measures how the path deviates when a country enters a recession with larger-than-average private (public) debt accumulation and public (private) debt accumulation at its sample average. Finally, β_h^{PRPU} measures the marginal (additional) effect of entering a recession with both debt buildups at the same time. In the rest of the discussion, we simulate illustrative scenarios in which debt buildups amount to five percentage points. We use the same five percentage points buildups across models, types of debt, country-groups, and types of recessions in order to ease comparisons.[7]

Figure 2 shows the path of real per capita GDP during downturns under different scenarios in EMEs and AEs. The estimation uses information from a set of more than 300 recessions in 80 countries. First, we focus our discussion on the solid lines, which denotes our baseline. In AEs, an average recession lasts for one year and is associated with a 2 percent decrease in real per capita GDP. Between years 2 and 3, output fully recovers; at year 5, it is 5.5 percent higher than at the peak. Although the duration of the recession is the same, it is slightly deeper in EMEs, reaching a negative of -3 percent. Also, the recovery takes longer and it is only completed at year 4. Finally, five years from the start of the recession, output is only 2.2 percent higher than its pre-peak level.

[6] To avoid multicollinearity, we arbitrarily drop the last country-dummy. However, notice that the dummy normalization shown above guarantees that the estimated value of the intercept is not affected by this choice.

[7] This value is approximately close to the standard deviation of both private and public debt buildups (see Table A1 in the appendix for further details). The GDP paths associated to debt buildups in the (i) private, (ii) public or (iii) both sectors are respectively given by (i) $\theta_h + 5\beta_h^{PR}$, (ii) $\theta_h + 5\beta_h^{PU}$ and (iii) $\theta_h + 5\beta_h^{PR} + 5\beta_h^{PU} + 5^2\beta_h^{PRPU}$.

How does this pattern change when a country enters a recession after rapid private or public debt buildups? The dotted lines in the figure show three alternative scenarios. When a country enters a recession after a rapid private debt buildup (left panel), while AEs recover at year 4, EMEs still have not completed the recovery at year 5. A similar scenario occurs in the event of a public debt buildup (middle panel). The effect is especially marked in EMEs, where GDP drops and stays below the prerecession level five years from its start. Not surprisingly, prospects deteriorate further when both private and public debt buildups are present at the start of a recession (right panel). While AEs recover around year 5, GDP remains persistently lower than the pre-crisis levels in EMEs.

Overall, we find that rapid debt accumulation prior to recessions, both private and public, predicts deeper recessions and slower recoveries also in EMEs. Thus, it appears that the interaction between debt dynamics and business cycles is a global phenomenon. Moreover, such interaction appears to be particularly strong in EMEs. The next section looks deeper into this issue by focusing on a particularly severe type of recession in which private debt plays an important role–the banking crisis or financial recession.

3 Banking Crises and Debt Accumulation

So far we have shown evidence that both private and public debt buildups amplify recessions in EMEs, in a way similar if not magnified with respect to AEs. However, a large literature has pointed to the fact that private debt buildups can have more negative effects when the recession after the boom is associated with a banking crisis or more generally a financial crisis. In this case the size of the pre-crisis debt accumulation matters straightforwardly in shaping the ensuing crisis. Specifically, debt buildups affect recessions in two ways. First, they can be at the root of the slump (Boissay, Collard and Smets, 2016). In particular, recent research has shown that excessive private sector debt is the leading indicator of banking crises, credit market disruptions that are usually followed by extremely acute downturns (Reinhart and Rogoff, 2009; Jordà, Schularick and Taylor, 2011; Gourinchas and Obstfeld, 2012). Second, private debt can aggravate recessions,

through amplification effects (Bernanke and Gertler, 1989; Eggertsson and Krugman, 2012). A debt overhang can constrain the ability of households, firms, and governments to save in good times and to borrow in bad times, increasing their vulnerability to unexpected shocks. Therefore, banking crises are natural episodes to consider in addressing the impact of private debt buildups. Moreover, by focusing on banking crises, we can compare patterns in EMEs and AEs more fairly as we focus on the same type of recessions. In the previous sections, we pooled together all recessions, which have different characteristics in EMEs and AEs (for example, some recessions in EMEs are followed by sovereign crises, which are rare events in AEs).

From an econometric point of view, analyzing banking crises requires very large datasets because they occur only rarely. One option is to go back in time, taking advantage of historical records. This is the strategy followed by Jordà, Schularick and Taylor (2016), where they assemble a historical dataset of 17 AEs from 1870 to 2011. A drawback of this approach is that it is not clear to what extent crises that occurred at the turn of the twentieth century still offer relevant lessons for today's economy.[8] A different strategy, usually made unfeasible by lack of data availability, consists of expanding the cross-section to be able to focus on a larger set of countries. Our large dataset on private and public debt allows us to look into this unexplored dimension. Our discussion is organized into two parts. First, we check whether the dynamics of private debt is indeed a worldwide driver of banking crises. Second, we study the role played by private and public debt buildups inside and outside of banking crisis episodes.

3.1 Public Debt Buildups Do Not Predict Banking Crises...

To analyze the role of debt in predicting banking crises, we follow Jordà, Schularick and Taylor (2016) and estimate the following probabilistic model:

$$\ln \frac{P\left(B_{i,t}=1\right)}{1-P\left(B_{i,t}=1\right)} = \alpha + \alpha_i + \beta^{PR}\left(\Delta_{\bar{5}} PRY_{i,t-1}\right) + \beta^{PU}\left(\Delta_{\bar{5}} PUY_{i,t-1}\right) + u_{i,t}, \quad (2)$$

[8] In their sample, 83% of the financial recessions occurred before World War II. An advantage of their approach, though, is that they are able to work with a relatively homogeneous set of countries.

where $\ln \frac{P(B_{i,t}=1)}{1-P(B_{i,t}=1)}$ is the log-odds ratio of a banking crisis for a country i at year t, $\Delta_{\bar{5}}PRY_{i,t-1}$ and $\Delta_{\bar{5}}PRY_{i,t-1}$ measure the average annual change in the private and public debt ratios over the five years before year t, α and α_i are the intercept and a set of fixed country effects, and $u_{i,t}$ is the residual. Financial crises episodes $B_{i,t}$ are taken from Reinhart and Rogoff (2009), Jordà, Schularick and Taylor (2016), and Laeven and Valencia (2013).[9]

Table 1 shows the results for different specifications of the general model in equation (2). In particular, we report the marginal effects on the probability of a banking crisis when all predictors are at the mean. The main finding is that while private debt buildups are likely to trigger banking crises in both EMEs and AEs, public debt buildups do not predict such events.

In particular, we find that for every percentage point increase in the average annual change of private debt-to-GDP, the predicted probability of a banking crises goes up by about 0.35 – 0.72 percentage points. This effect is estimated with high precision, that is, it passes the 3-standard deviations threshold. The effect associated to an increase in the average annual change of public debt-to-GDP, instead, is slightly negative around -0.25 – -0.04 percentage points and is significantly different from zero at the one-standard deviation level. This result is rather surprising although in line with Jordà, Schularick and Taylor (2016). In principle, our estimate might be capturing the fact that public debt tends to rise sharply right after crises and therefore one might erroneously conclude that relatively low public debt levels make crises more likely, as discussed in Gourinchas and Obstfeld (2012). However, we obtain qualitatively similar results if we drop the first 4-8 years after the start of each financial crisis. An alternative possible explanation for the negative coefficient on public debt is that countries might pre-empt banking crises via recapitalizations that, despite having an impact on the public balance sheet, reduce the probability of hitting a banking crisis.

[9] Since the three datasets cover different time periods and sets of countries, we merge them using the following criteria: when at least one source documents the presence of a banking crisis, we take it. Moreover, if alternative sources document starting years of a banking crisis that differ by one year, we use the earliest one. Since definitions and methodologies slightly differ among sources, our final list of dates includes both systemic and non-systemic crises. The list of events used in the logistic model is reported in the appendix (Table A3).

3.2 ... But Exacerbate Non-financial and Financial Recessions

To isolate the effects of private and public debt buildups during banking crises, we slightly change the benchmark local projection model as follows:

$$\begin{aligned}\frac{\Delta_h y_{i,p+h}}{y_{i,p}} &= \theta_h^N \left(1 - F_{i,p}\right) + \theta_h^F F_{i,p} + \\ &+ \beta_h^{NPR} \left[\left(1 - F_{i,p}\right) \Delta_{\bar{5}} PRY_{i,p}\right] + \beta_h^{FPR} \left[F_{i,p} \Delta_{\bar{5}} PUY_{i,p}\right] + \\ &+ \beta_h^{NPU} \left[\left(1 - F_{i,p}\right) \Delta_{\bar{5}} PRY_{i,p}\right] + \beta_h^{FPU} \left[F_{i,p} \Delta_{\bar{5}} PUY_{i,p}\right] + \\ &+ \beta_h^{NPRPU} \left[\left(1 - F_{i,p}\right) \Delta_{\bar{5}} PRY_{i,p} \Delta_{\bar{5}} PUY_{i,p}\right] + \\ &+ \beta_h^{FPRPU} \left[F_{i,p} \Delta_{\bar{5}} PRY_{i,p} \Delta_{\bar{5}} PUY_{i,p}\right] + \\ &+ \sum_{l=0}^{L} \gamma_{h,l} Y_{i,p-l} + \alpha_i + u_{i,p+h}.\end{aligned} \tag{3}$$

The structure of the model in equation (3) is similar to the one in equation (1). The only difference is that now each parameter of interest is interacted with a 0-1 financial peak indicator $F_{i,p}$ and its complement $(1 - F_{i,p})$.[10] Accordingly, we now center all of the RHS variables with respect to their means in the non-financial and financial recession bins, respectively.

Figure 3 reports the evolution of real per capita GDP from the year preceding non-financial and financial recessions in EMEs and AEs. The solid line shows the dynamics in banking crisis recessions (red lines) and in other recessions (blue lines). The dashed lines, as before, show how GDP deviates from the respective average paths when the preceding expansion is accompanied by a private credit boom (left panel), a public debt boom (middle panel), or both (right panel). As expected, financial recessions are considerably more painful than non-financial recessions in general, both in EMEs and AEs. This points to the importance of looking at financial and non-financial recessions separately.

In line with Jordà, Schularick and Taylor (2016), pre-recession buildups in

[10] We classify a peak as financial if a banking crisis erupts at the peak of the business cycle or at the start of the recession. The use of a relatively small window minimizes the risk of erroneously identifying a non-financial recession as financial, especially in highly volatile economies. However, we experimented with a larger window, allowing the peak to be classified as financial also if the banking crisis happens two years before the start of the recession (the year before the peak), without major changes in the results.

private debt are found to be more toxic in financial crises. This finding suggests that when private debt is the underlying problem driving the recession, it plays a more prominent role in slowing down the recovery. Nevertheless, the most striking results stem from the marginal effects of debt. When a country enters a banking crisis recession with rapid debt accumulations in both sectors, its economic performance tends to deteriorate further, slowing down the recovery. This result can be appreciated by looking at how the dashed lines lie below the solid lines in the right-hand-side panels in Figure 3. Moreover, the marginal effects of debt appear especially strong in EMEs. The case of a country entering a financial recession with both debt buildups is striking. Three years after the recession is started, the drop in GDP is twice as large in EMEs than in AEs, -16 percent and -8 percent, respectively.

Interestingly, our results point to a significant effect of public debt accumulations also in non-financial recessions. The blue dashed lines are consistently below the blue solid line in both EMEs and AEs. This suggests that the constraints that a pre-crisis loose fiscal stance might impose on the policymakers after the start of the crisis can be at times significant. Private debt accumulations, on the contrary, appears not to have any significant effect in amplifying the GDP fall during non-financial recessions. To summarize, we have shown that when we control for the same type of recessions, focusing on rare events typically associated with extremely acute downturns, we still find that rapid debt buildups can add further slack to economies and that this effect is especially amplified in EMEs. In the next section, we look into the determinants of these different results.

4 The Drive to Amplification

4.1 Limited Fiscal Support in EMEs...

Economic history and empirical studies have suggested that fiscal policy often tends to be pro-cyclical in EMEs (Gavin and Perotti, 1997; Lane, 2003; Kaminsky, Reinhart and Végh, 2004). This differs from the experience of AEs, where fiscal policy is usually a-cyclical or countercyclical. At the same time, the literature on

EMEs suggests that monetary policy in these countries is often constrained (for example, by an exchange rate policy) or limited in its effectiveness (either because the financial systems are small or because the transmission mechanism of interest rates is poor). Accordingly, the main policy tool to address cyclical considerations in many EMEs has been fiscal policy. A natural question therefore arises. Can the large and significant effects of public and private debt buildups in EMEs that we uncovered be partly due to a different response of fiscal policy during crises? To explore this question, we look at the evolution of fiscal variables during non-financial and financial recessions in EMEs and AEs. Our analysis contributes to the literature on fiscal pro-cyclicality in EMEs by linking pro-cyclicality during crisis to pre-crisis debt accumulation.

The path of fiscal variables during non-financial and financial recessions is estimated using the regression model (3). We look first at the evolution of public debt, and we then try to identify the fiscal policy stance by looking at per capita real government spending. The literature on EMEs fiscal policy has identified real per capita government spending as the best available indicator to assess the stance of fiscal policy (Kaminsky, Reinhart and Végh, 2004). The reason is that the cyclically adjusted primary balance (CAPB) is not available for a large set of emerging economies going back in time. Moreover, EMEs tend to have a rather volatile growth, and more so during financial crisis, therefore output gap estimates necessary to compute the CAPB are subject to high uncertainty. At the same time, most of the impact to the fiscal accounts of recessions in EMEs works through the revenues, as these countries tend to have limited automatic stabilizers on the spending side (as for example large unemployment schemes). For all these reasons, real per-capita government spending seems to be the best measure to assess the discretionary fiscal stance, as it is the fiscal measure which is more independent from GDP fluctuations.[11]

To allow for a natural comparison across variables and country groups, prior to the estimation we scale the LHS variables using $y_{i,p}$, the level of real per capita GDP

[11] This is not to say that nominal GDP fluctuations do not affect the spending to GDP ratio. But as long as these effects are not compensated by policy measures, we interpret them as discretionary changes. For example, if a spike in inflation is allowed to erode the real value of public spending, our interpretation is that policymakers have decided not to compensate for it by increasing nominal spending allocations.

at the peak (Hall, 2009; Barro and Redlick, 2011). Formally, by denoting with v real per-capita government spending or real per capita public debt, the LHS variable is now given by the following formula:

$$\frac{\Delta_h v_{i,p+h}}{y_{i,p}}. \tag{4}$$

Figure 4 shows how public debt, scaled by the pre-downturn level of GDP, evolves during non-financial and financial recessions, with and without the presence of larger-than-average debt buildups. Three main results emerge from this exercise. First, recessions are typically associated with increases in public debt, which tend to be larger during banking crises. Second, the increase in public debt is found to be more marked in AEs than in EMEs. This is not only the case for banking crises (Laeven and Valencia, 2013); it applies to non-financial recessions as well. Finally, if a country enters a non-financial or financial recession with higher private debt buildups, the increase in public debt tends to be larger. This suggests that, especially for financial recessions, private sector support generally weights on the government balance sheet, determining a relocation of debt from private to public debt.

The analysis in Figure 4 gives a first indication that fiscal support in AEs, measured as the change in public debt with respect to pre-slump GDP levels, could be more intense than in EMEs, as the profile of public debt grows less in EMEs than in AEs after both non-financial and financial recessions. However, despite providing interesting insights on the relationship of debt, downturns, and fiscal policy, the evolution of public debt during recessions is not a clear indicator of the fiscal stance. The public debt dynamics is largely affected by the pre-crisis fiscal position (i.e. if a country enters a financial crisis with a large fiscal deficit, the public debt will keep increasing even if the country embarks in fiscal consolidation). Accordingly, in Figure 5 we also look at the dynamics of real per capita government spending.

From looking at Figure 5, we see that real per-capita government spending appears to be an important source of heterogeneity between EMEs and AEs. In particular, while non-financial and financial recessions in AEs are typically associated with relatively large increases in real government spending, the

corresponding dynamic is more muted in EMEs. Interestingly, large buildups of both private and public debt are associated with a significant negative growth of real government spending after the start of the crisis in EMEs. During financial crises characterized by public and private debt overhangs, we find that fiscal policy tends to react asymmetrically between country-groups: while AEs increase government spending, EMEs decrease it pro-cyclically.

Overall, we find that the fiscal policy stance can act as an amplifier of debt-recession cycles, particularly in EMEs. Our analysis uses government spending as a proxy for discretionary fiscal policy, which admittedly is not completely exogenous from the GDP dynamics. Therefore, our results regarding the effect of public spending on GDP should be considered more as a finding that the two variables are correlated more than causally linked. Still, in our setup the GDP dynamics is initially mainly affected by the outbreak of a banking crisis. Therefore, the chain of causality between larger debt buildups, deeper recessions and larger reductions in real public spending is rather clear in our setup. The start of the recession is triggered by a banking crisis which is exogenous from the impact of public spending on the economy. Reductions in public spending therefore are not the driving force of the recessions, although they certainly contribute to propagate the initial shock.

4.2 ... Driven By Tighter Financial Constraints

In this section we present evidence regarding the transmission mechanism between debt accumulation and fiscal policy stance during crises in EMEs. Our goal is to assess why countries that enter a financial recession with larger debt buildups tend to cut real public spending more. In particular, we will show evidence suggesting that countries entering a financial recession with a larger accumulation of private and public debts tend to be more constrained in financing the government deficit once the crisis starts and are therefore forced to contain public spending more. This evidence is particularly in line with our analysis, as financing constraints should indeed be tighter if the country enters a crisis with larger private and/or public debt buildups.

The link that we highlight between large debt buildups on one side and, on the other, tighter financing constraints and larger reduction of public spending during crises contributes to our understanding of the nature of pro-cyclicality of fiscal policy in EMEs. But some clarifications are in order. First, our result point to a pro-cyclical fiscal stance during financial crises and not in general. Gavin and Perotti (1997) for example focus on the experience of Latin America and argue that "the pro-cyclicality of fiscal policy in Latin America has to do with a loss during macroeconomic bad times of the market access that would be required to support a more countercyclical fiscal policy". This interpretation is not inconsistent with alternative explanations of fiscal pro-cyclicality in EMEs. For example, Ilzetzki (2011) shows how the presence of polarized political systems can account for the pro-cyclical stance of fiscal policy, while Frankel, Vegh and Vuletin (2013) find evidence of a causal link running from institutional quality to fiscal stance. It is not unconceivable that countries with highly polarized political systems and low institutional quality are more prone to debt accumulations and might therefore end up with tighter access to financial markets in bad times.

But how do we assess whether financing constraints were indeed tighter for financial recessions burdened by excessive pre-crisis accumulation of debt? To provide some evidence on this issue, we follow Gavin and Perotti (1997) and look at the access to official emergency credit during financial crisis. The main source of official credit of last resort for countries is IMF loans. We therefore re-run our regressions in equation (3) using as a dependent variable the use of IMF credit.[12] IMF credit measures the net outstanding debt of a country toward the IMF and includes normal and exceptional financing under all IMF facilities.[13] Figure 6 shows that the use of IMF credit, scaled by the pre-downturn level of public debt $pub_{i,p}$, is higher in EMEs, and more so during financial recessions.[14] It is particularly high during financial recessions with high private and public debt buildups. This suggests that during these types of recessions, government

[12] In the spirit of local projections, we add lagged controls of the dependent variable in our set of regressors.

[13] We have also performed a similar exercise with net capital flows as a share of GDP and found that they fall in financial recessions. However, net capital flows are a very imperfect measure of public financing constraints as they include also IMF credit and flows to the private sector.

[14] The LHS variable in equation (3) is equal to $\Delta_h v_{i,p+h}/pub_{i,p}$. This scaling allows for a fair evaluation of the loan amount.

financing needs could not be possibly met by borrowing on the market. Resort to the IMF was the only way to secure financing. Clearly, with rising public debt (Figure 4) and no access to financial markets, countries were not able to run counter-cyclical fiscal policy and had to restrain spending.[15]

Our evidence so far underscores an important difference between EMEs and AEs, i.e. their capacity to run counter-cyclical fiscal policy during recessions and crises. This might be related to institutional differences that make EMEs more prone to public debt accumulation and that constraint their fiscal response when crises explode. In the case of AEs, Jordà, Schularick and Taylor (2016) have highlighted a rather different transmission mechanism, one that works mainly through the reduction of the availability of credit during a banking crisis causing a fall in investment. A reduction in credit and investment is not inconsistent with the fiscal pro-cyclicality interpretation that we have highlighted. Indeed, in the following we report evidence showing that the fall in investment is a characteristic also of EMEs financial crisis.

As a proxy for investment we look at the National Account series for gross fixed capital formation, which includes both private and public investment. Given the higher volatility of private as opposed to public investment, gross fixed capital formation is mainly driven by private investment, whose dynamic substantially reflects credit market conditions as the financing of new capital usually requires the use of credit. Figure 7 shows that indeed countries with the most rapid debt accumulations before recessions are the ones with the highest reductions in gross fixed capital formation once the crisis starts. This effect is particularly significant after large private debt accumulations. This confirms that the fall in GDP after pre-crisis buildups in debt is accompanied by a severe decline in investment spending, particularly in EMEs.

Overall, our evidence suggests that the transmission mechanisms through which large pre-crisis debt buildups amplify recessions in EMEs is somewhat similar to that of AEs and somewhat different. It is similar to the extent that investment falls

[15]This does not imply that IMF credit led to a cut in spending. The counterfactual of no available financing would likely have resulted in even larger spending reductions. The evidence shows that IMF supported programs have a neutral effect on education and health spending, once other factors are controlled for (Nozaki, Clements and Gupta, 2011).

considerably. It is different to the extent that the response of fiscal policy tends to be pro-cyclical or, more generally, less supportive than in AEs.

5 Conclusions

In this paper we have used a large dataset on private and public debt to assess the relation between debt accumulation in good times and economic performance in bad times. Our analysis has focused in particular on emerging economies as for these countries the available evidence on the role played by debt accumulations is limited while at the same time some of them are experiencing very steep debt buildups.

We find three main results. First, debt buildups amplify recessions in both EMEs and AEs. In particular, larger-than-average private and public debt accumulations in the years prior to a recession deepen the extent and extend the duration of the drop in GDP in the following five years. Second, we find that these effects are particularly strong in EMEs, even when the analyzed recessions are restricted to those following banking crises. Third, an important source of heterogeneity between EMEs and AEs comes from fiscal policy. While AEs tend to support the decrease in private spending by increasing government expenditures during a recession, EMEs have been subject to tighter borrowing constraints that have reduced their ability to use fiscal policy to stabilize the business cycle. The difference in the fiscal stance of EMEs and AEs is particularly evident when countries enter the recession with larger-than-average private and public debt buildups.

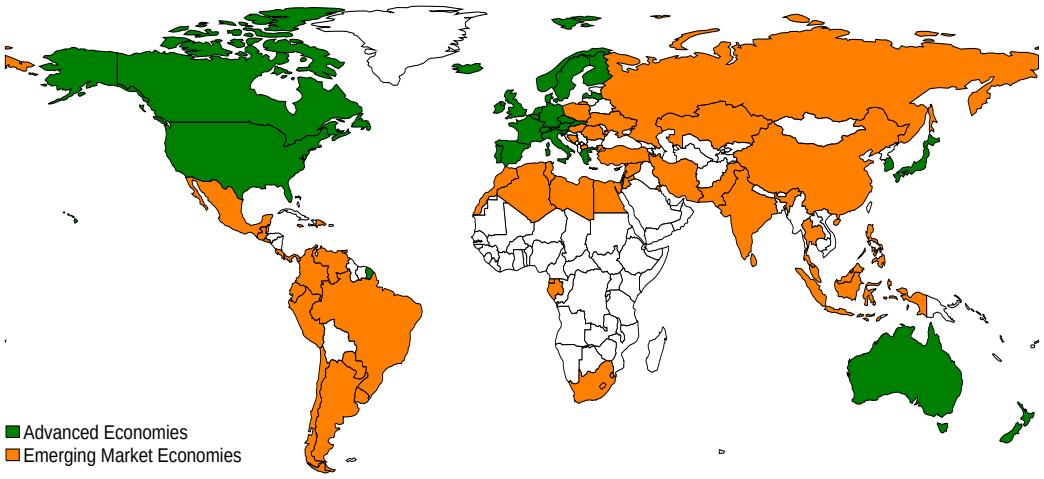
Our results have important policy implications. While it is difficult to assess "how much is too much" for the debt-to-GDP ratios, our evidence is rather clear regarding the role of rapid buildups in credit in leading financial crisis. Moreover, once the financial crisis struck, it is difficult for an emerging economy with excessive pre-crisis private or public debt accumulations to tap the financial market. Therefore, our results underscore the importance of accumulating debt at a moderate and sustainable pace and the need to build fiscal buffers in normal times to avoid simultaneous retrenchment of private and public sector borrowing in times of crisis.

Although the emerging market landscape is rapidly changing, and our evidence

is based on data over the past sixty years, we think that our findings are still relevant for understanding today's challenges. Indeed, while some emerging economies have more recently displayed a less pro-cyclical fiscal stance in normal times, most of them have not (Frankel, Vegh and Vuletin, 2013). Moreover, if confronted with a financial crisis following financial excesses, most emerging economies would likely still be subject to external borrowing constraints and capital flights. Putting it differently, the graduation process from debt intolerance "may take decades or even centuries", since it has to be accompanied by institutional reforms and renewed creditworthiness (Reinhart, Rogoff and Savastano, 2003). Finally, while some EMEs have accumulated foreign exchange reserves in the last few years and have used them to counteract exchange rate volatility, it is difficult to foresee that these will be enough to shield them from significant capital outflows and sudden stops in case of crisis. In this paper we have provided some initial evidence, but more research will be necessary to reach a comprehensive view on the causes and implications of recessions and financial crises in emerging economies.

A Data

Figure A1. Worldwide Data Coverage



Note. The figure shows the worldwide country coverage of our dataset, which is exploited either in the local projections analysis or for the estimation of the probabilistic models.

As a proxy for private debt, we use International Financial Statistics (IFS) data on banks' claims on the private sector (line 22d in IFS) for 36 AEs and 77 EMEs, starting as early as 1950 and, on average, from 1964. This coverage is much larger than the widely used Bank for International Settlements (BIS) data, which cover 27 AEs and 14 EMEs. Claims include relatively minor items other than loans, such as securities and shares, financial derivatives, and trade credit advances. With the exception of shares, these other items are part of private sector debt. However, the difference between claims and loans is generally small. Loans accounted, on average, for 98 percent of bank claims in countries reporting to the IFS Standardized Reporting Forms in 2015 (for which the decomposition between loans and other item is available). Data on public debt come from an updated version of the IMF historical debt dataset (Abbas et al., 2010). The original historical dataset has been updated with the April 2015 World Economic Outlook (WEO) data on general government debt. The data cover 37 AEs and 87 EMEs, starting, on average, in 1940. Figure 1 summarizes the data on private and public debt as a share of GDP. It takes simple averages across EMEs and AEs of bank credit and public debt

starting in 2002. It shows very different patterns in the two groups of countries. In AEs, private debt started to decline after the global financial crisis; in EMEs, it continued to increase at a fast pace. In EMEs, public debt also increased rapidly after the global financial crisis, inverting the previous trend. These data on private and public debt are combined with data on real per capita GDP from the WEO database complemented by data from the Penn Word Tables. Data on government expenditures are taken from Mauro, Romeu, Binder and Zaman (2015). Data on IMF credit are from the IMF Financial Flows Analytics database. Finally, data on gross fixed capital formation are from the IMF IFS database, complemented in the case of a few countries by data from the WEO database. The map in Figure A1 shows the country coverage of our dataset.

B Additional Information

In this section we report additional information on some key variables used throughout the analysis.

Table A1. Summary Statistics for the Debt Variables Used in the Local Projection Models

	Advanced Economies		Emerging Market Economies	
	$\Delta_{\bar{5}}PRY_{i,p}$	$\Delta_{\bar{5}}PUY_{i,p}$	$\Delta_{\bar{5}}PRY_{i,p}$	$\Delta_{\bar{5}}PUY_{i,p}$
Peaks	125	125	152	152
Mean	0.82	-0.71	0.30	-0.91
Std. Dev	4.25	3.54	2.45	5.29
95%	7.95	3.27	4.11	8.18
99%	15.61	6.07	7.23	14.94

Note. The list shows the summary statistics for the debt variables that are used, at least once, in the local projection models (equations (1) and (3)). A generic country i at time p is included only if (a) all the corresponding LHS and RHS observations are available, and (b) the country in question has experienced at least two recessions in the available sample.

Table A2. List of Business Cycle Peaks ($t = p$) Used in the Local Projections

Advanced Economies		Emerging Market Economies	
Australia	1973, 1981, 1990, 2008	Algeria	1996, 2008
Austria	1974, 1977, 1980, 1992, **2008**, 2012	Argentina	1969, 1974, 1977, **1979**, 1984, 1987, **1994**, 1998, 2008, 2011
Belgium	1974, 1980, 1992, **2007**, 2011	Barbados	2000, 2008
Canada	1956, 1981, 1989, 2007	Belize	2004, 2006, 2010, 2012
Czech Republic	2008, 2011	Bosnia and Herzegovina	2008, 2011
Denmark	1973, 1979, **1987**, 1992, **2007**, 2011	Brazil	1969, 1980, 2000, 2002, 2008
Finland	1975, 1989, 2008, 2011	Brunei	2006, 2011
France	1974, 1992, **2007**, 2011	Chile	1971, **1981**, 1998, 2008
Germany	1966, 1974, 1980, 1992, 2001, **2008**	Colombia	1974, 1979, **1981**, **1997**
Greece	1973, 1979, 1986, 1989, **1991**, **2007**	Costa Rica	1974, 1979, 1984, 1990, 1995, 2000, 2008
Iceland	1960, 1966, 1982, 1987, 1990, 1994, 2001, **2007**	Dominican Republic	1977, 1981, 1983, 1987, 1989, **2002**, 2008
Ireland	1974, 1982, **2007**, 2011	Ecuador	**1998**, 2008
Israel	1988, 1990, 2000, 2008	Equatorial Guinea	2005, 2008, 2012
Italy	1974, 1992, 2002, **2007**, 2011	Gabon	1998, 2008
Japan	1973, 2007, 2010	Hungary	**2008**, 2011
Korea	1979, **1997**	India	1970, 1973, 1975, 1978
Luxembourg	**2007**, 2011	Iran	2007, 2011
Netherlands	2001, **2008**, 2011	Jamaica	1999, 2001, 2007, 2011
New Zealand	1975, 1978, 1982, 2007	Kuwait	1994, 1998, 2000, 2006, 2008, 2012
Norway	1977, 1981, **1987**	Lebanon	1998, 2001, 2004, 2010
Portugal	1974, 1983, 1992, 2002, **2008**, 2010	Libya	1996, 2000
Singapore	1997, 2000, 2007	Macedonia	2008, 2011
Slovak Republic	**1998**, 2008	Malaysia	**1997**, 2000, 2008
Slovenia	**2008**, 2011	Mexico	**1981**, 1985, **1994**, 2000, 2008
Spain	1978, 1980, 1992, **2007**	Morocco	1996, 1998
Sweden	1976, **1990**, **2007**, 2011	Pakistan	2000, 2008
Switzerland	1974, 1981, **1990**, 1994, 2001, **2008**	Panama	1957, 1973, 1979, 2000, 2008
United Kingdom	1957, **1973**, 1979, **1990**, **2007**	Paraguay	**1995**, 1997, 2008, 2011
United States	1956, 1969, 1973, 1979, 1981, 1990, 2000, **2007**	Peru	1975, 1981, 1984, 1987, 1991, 1997, 2000, 2008
		Serbia	2008, 2011
		Seychelles	1993, 1998, 2000, 2007
		South Africa	1971, 1974, 1981, 1984, **1989**, 1997, 2008
		Syria	1996, 1998, 2002
		Thailand	**1996**, 2008
		Trinidad and Tobago	1991, 2008
		Turkey	1977, 1979, **1982**, 1988, **1990**, **1993**, 1997, **2000**, 2007
		Uruguay	**1981**, 1989, 1994, 1998
		Venezuela	1970, 1974, **1977**, 1984, 1988, **1992**, 2008, 2012

Note. The list shows the peaks ($t = p$) that are used, at least once, for the estimation of the local projection models. A generic country i at time p is included only if (a) all the corresponding LHS and RHS observations are available, and (b) the country in question has experienced at least two recessions in the available sample. The years in blue are non-financial peaks. The boldfaced years in red are financial peaks.

Table A3. List of Banking Crises Episodes ($B_{i,t} = 1$) Used in the Logistic Models

Advanced Economies		**Emerging Market Economies**	
Australia	1989	Algeria	1990
Austria	2008	Argentina	1980, 1989, 1995, 2001
Belgium	2008	Brazil	1963, 1985, 1990, 1994
Canada	1983	Chile	1976, 1981
Denmark	1987, 2008	China	1992, 1998
Finland	1991	Colombia	1982, 1998
France	1994, 2008	Costa Rica	1987, 1994
Germany	1977, 2008	Dominican Republic	1996, 2003
Greece	1991, 2008	Ecuador	1981, 1998
Iceland	1985, 1993, 2007	Egypt	1980, 1990
Ireland	2007	El Salvador	1989
Israel	1977	Guatemala	1990, 2001, 2006
Italy	1990, 2008	Hungary	1991, 2008
Japan	1992, 1997	India	1993
Korea	1983, 1985, 1997	Indonesia	1992, 1994, 1997
Latvia	2008	Jamaica	1996
Luxembourg	2008	Jordan	1989
Netherlands	2008	Kazakhstan	2008
New Zealand	1987	Kuwait	1982
Norway	1987, 1991	Lebanon	1990
Portugal	2008	Malaysia	1985, 1997
Singapore	1982	Mexico	1981, 1994
Slovak Republic	1998	Morocco	1980, 1983
Slovenia	2008	Panama	1988
Spain	1977, 2008	Paraguay	1995, 2002
Sweden	1991, 2008	Peru	1983, 1999
Switzerland	1991, 2008	Philippines	1981, 1983, 1997
United Kingdom	1974, 1984, 1991, 1995, 2007	Poland	1991
United States	1984, 1988, 2007	Romania	1990
		Russia	1998, 2008
		South Africa	1977, 1989
		Sri Lanka	1989
		Swaziland	1995
		Thailand	1980, 1983, 1996
		Tunisia	1991
		Turkey	1982, 1991, 1994, 2000
		Ukraine	1998, 2008
		Uruguay	1971, 1981, 2002
		Venezuela	1978, 1993

Note. The list shows the banking crises episodes ($B_{i,t} = 1$) that are used, at least once, for the estimation of the probabilistic models. A banking crisis episode is included only if all the corresponding LHS and RHS observations are available.

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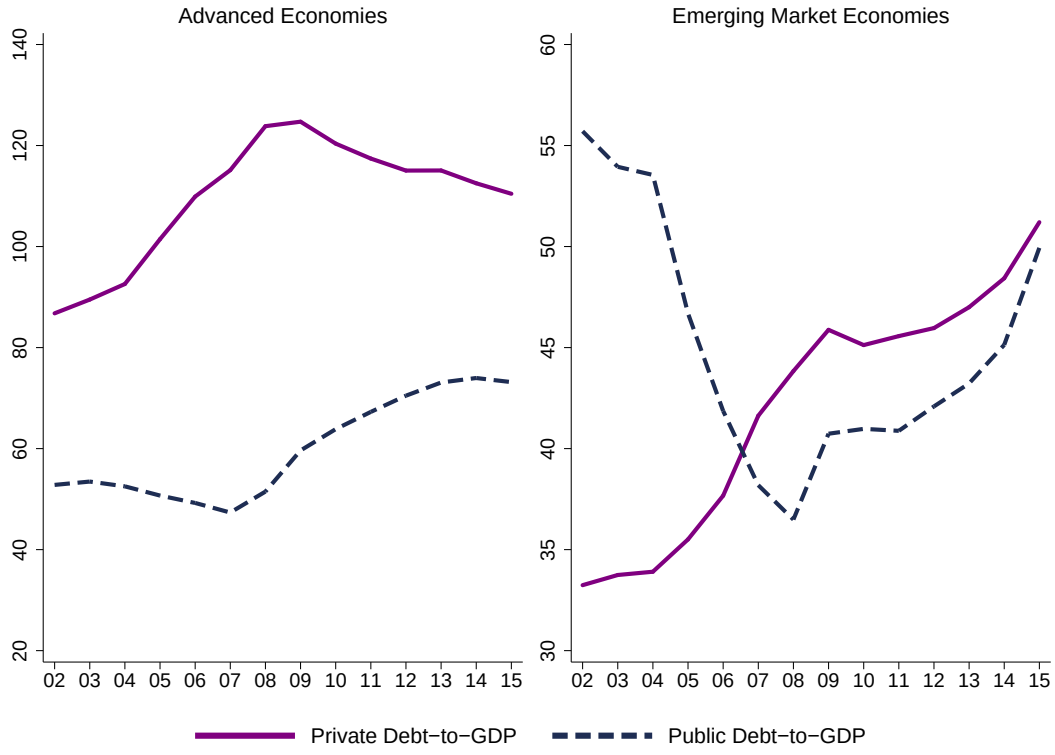
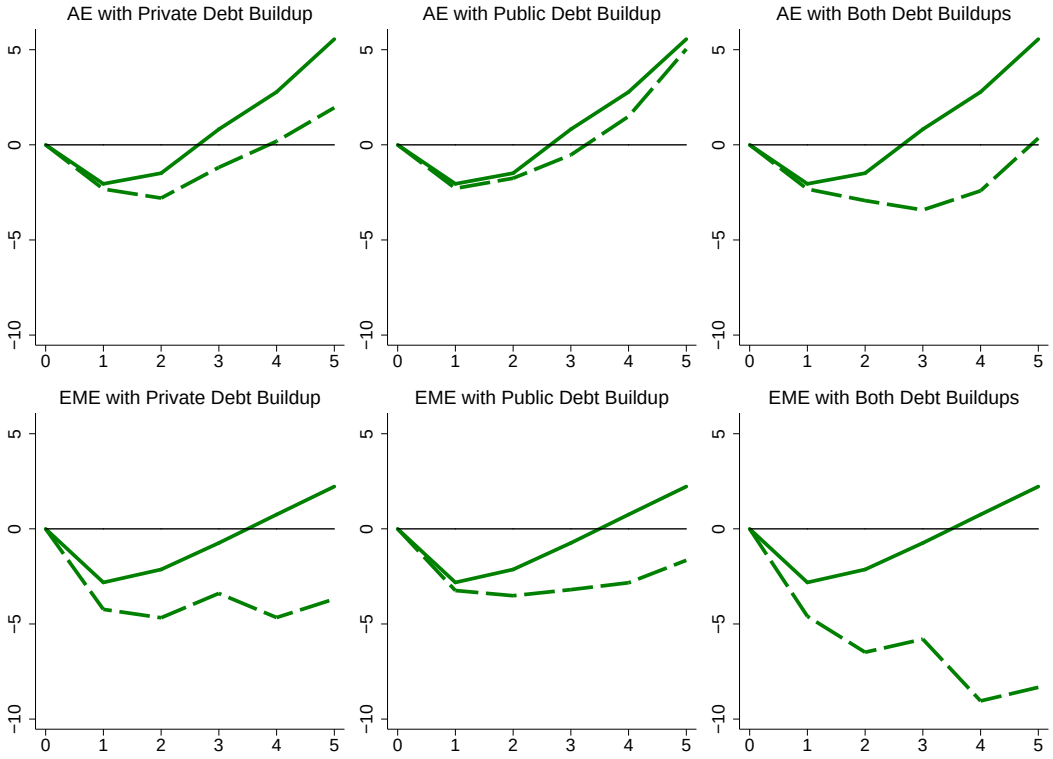
Figures and Tables

Figure 1. Private and Public Debt Dynamics in AEs and EMEs, 2002-15



Note. The figure shows cross-country simple averages. Similar trajectories are obtained using cross-country medians.

Figure 2. Debt Buildups and Recessions in Advanced and Emerging Economies



	Advanced Economies (AEs)					Emerging Market Economies (EMEs)				
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
θ_h	-2.05	-1.49	0.82	2.78	5.56	-2.82	-2.14	-0.74	0.75	2.22
	(0.06)	(0.11)	(0.13)	(0.17)	(0.22)	(0.07)	(0.14)	(0.17)	(0.27)	(0.32)
β_h^{PR}	-0.06	-0.26	-0.40	-0.52	-0.72	-0.28	-0.51	-0.53	-1.08	-1.18
	(0.09)	(0.15)	(0.18)	(0.25)	(0.28)	(0.14)	(0.39)	(0.50)	(0.47)	(0.55)
β_h^{PU}	-0.05	-0.05	-0.27	-0.26	-0.10	-0.09	-0.28	-0.49	-0.72	-0.78
	(0.09)	(0.22)	(0.26)	(0.35)	(0.43)	(0.07)	(0.14)	(0.19)	(0.17)	(0.19)
β_h^{PRPU}	0.01	0.01	-0.04	-0.05	-0.04	0.00	-0.02	0.00	-0.03	-0.03
	(0.02)	(0.04)	(0.04)	(0.06)	(0.07)	(0.02)	(0.04)	(0.05)	(0.05)	(0.06)
R^2	0.73	0.52	0.51	0.58	0.66	0.69	0.42	0.42	0.45	0.54
Obs	125	125	125	124	110	152	152	152	148	133

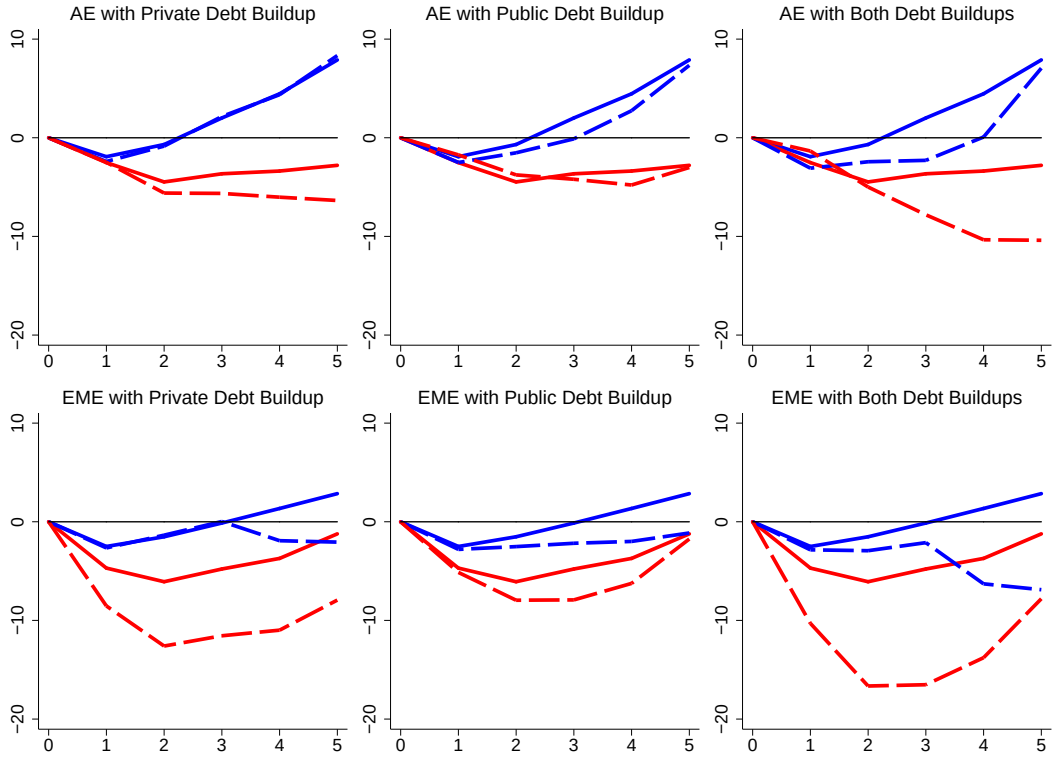
Note. *Top panel.* Dynamics of real per capita GDP in advanced economies and emerging market economies, starting from the year preceding a recession (peak). The solid line shows the average path in recessions while the dashed line shows how the path deviates when the recession is preceded by a rapid debt buildup. *Bottom panel.* Robust standard errors, clustered by country, are reported in parentheses.

Table 1. Marginal Effects of Debt Buildups on the Probability of a Banking Crisis

	Advanced Economies $P(B_{i,t}=1)\,\%$			Emerging Market Economies $P(B_{i,t}=1)\,\%$		
β^{PR}	0.35		0.35	0.39		0.72
	(0.09)		(0.09)	(0.22)		(0.19)
β^{PU}		-0.08	-0.04		-0.25	-0.18
		(0.15)	(0.17)		(0.12)	(0.13)
Obs	1239	1417	1178	1548	1470	1259

Note. The table shows the marginal effects of private and public debt buildups on the probability of a banking crisis (percent), for every percentage point increase in the average annual change of private credit-to-GDP and public debt-to-GDP over five years. Predicted probabilities are calculated with the assumption that all predictors in equation (2) are at their mean values. Robust standard errors are reported in parentheses.

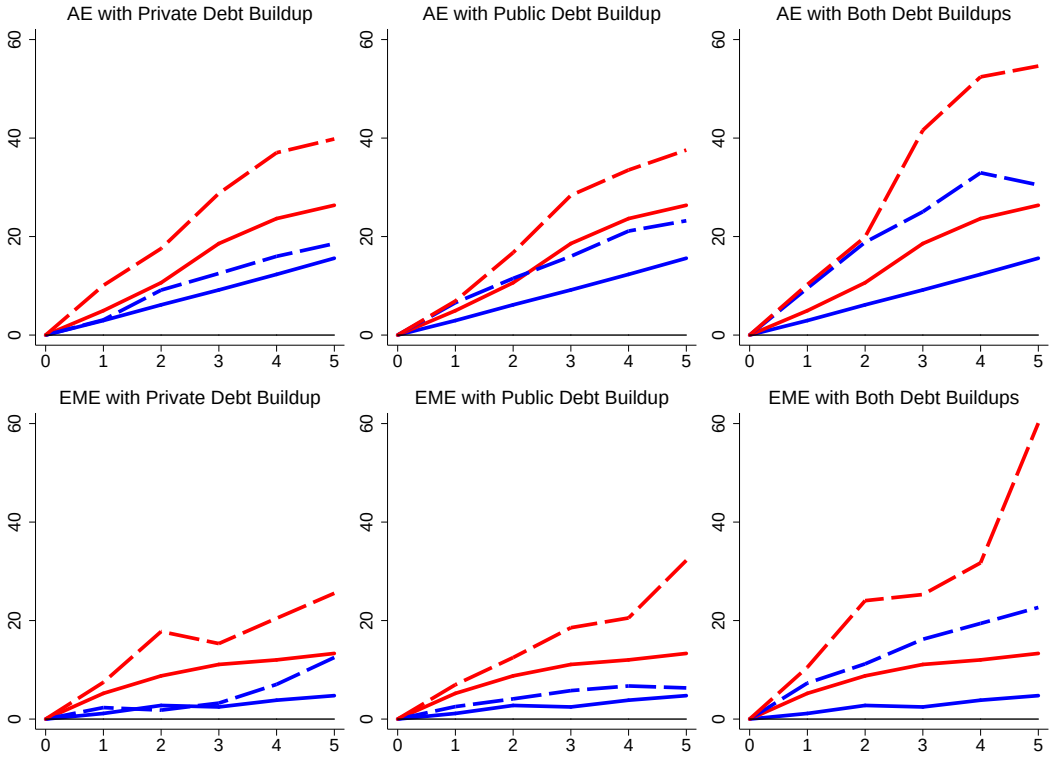
Figure 3. Non-financial and Financial Recessions



	Advanced Economies (AEs)					Emerging Market Economies (EMEs)				
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
θ_h^N	-1.92	-0.68	2.01	4.46	7.89	-2.50	-1.52	-0.13	1.35	2.85
	(0.12)	(0.17)	(0.22)	(0.27)	(0.40)	(0.17)	(0.20)	(0.32)	(0.49)	(0.46)
θ_h^F	-2.52	-4.48	-3.65	-3.37	-2.79	-4.69	-6.08	-4.79	-3.71	-1.23
	(0.38)	(0.58)	(0.66)	(1.05)	(1.77)	(0.84)	(1.02)	(1.87)	(2.44)	(2.56)
β_h^{NPR}	-0.10	-0.03	0.03	-0.02	0.09	-0.03	0.03	0.03	-0.65	-0.98
	(0.10)	(0.24)	(0.28)	(0.42)	(0.52)	(0.20)	(0.46)	(0.66)	(0.69)	(0.83)
β_h^{FPR}	0.01	-0.23	-0.40	-0.53	-0.71	-0.77	-1.30	-1.35	-1.45	-1.34
	(0.12)	(0.15)	(0.18)	(0.23)	(0.29)	(0.39)	(0.33)	(0.43)	(0.36)	(0.43)
β_h^{NPU}	-0.12	-0.17	-0.42	-0.34	-0.11	-0.06	-0.20	-0.41	-0.67	-0.80
	(0.09)	(0.21)	(0.22)	(0.30)	(0.44)	(0.07)	(0.15)	(0.20)	(0.19)	(0.21)
β_h^{FPU}	0.16	0.14	-0.11	-0.28	-0.04	-0.09	-0.38	-0.63	-0.51	-0.10
	(0.15)	(0.39)	(0.42)	(0.53)	(0.56)	(0.22)	(0.29)	(0.43)	(0.47)	(0.71)
β_h^{NPRPU}	-0.00	-0.03	-0.09	-0.10	-0.03	0.00	-0.02	-0.00	-0.04	-0.03
	(0.03)	(0.04)	(0.05)	(0.07)	(0.09)	(0.02)	(0.04)	(0.05)	(0.05)	(0.07)
β_h^{FPRPU}	0.01	-0.00	-0.06	-0.12	-0.15	-0.05	-0.09	-0.07	-0.01	0.03
	(0.04)	(0.04)	(0.05)	(0.09)	(0.14)	(0.06)	(0.10)	(0.13)	(0.11)	(0.16)
R^2	0.74	0.62	0.64	0.68	0.77	0.74	0.50	0.47	0.49	0.56
Obs	125	125	125	124	110	152	152	152	148	133

Note. *Top panel.* Dynamics of real per capita GDP in AEs and EMEs, starting from the year preceding non-financial (blue lines) and financial (red lines) recessions. The solid line shows the average path in recessions, while the dashed line shows how the path deviates when the recession is preceded by a rapid debt buildup. *Bottom panel.* Robust standard errors, clustered by country, are reported in parentheses.

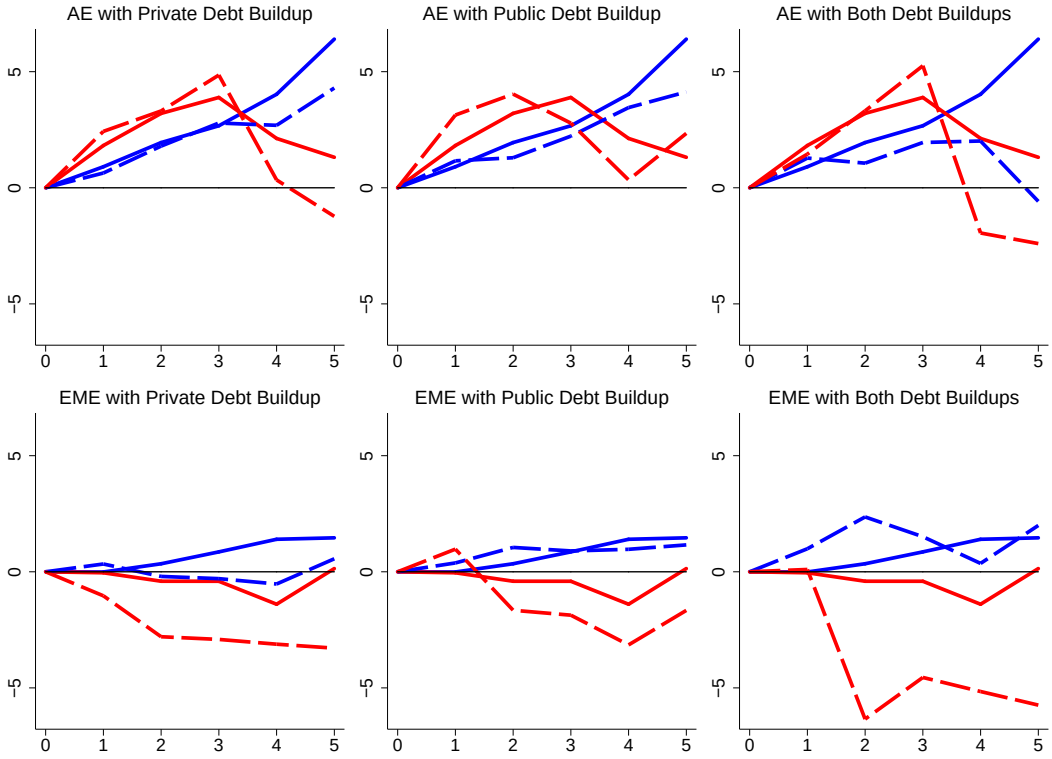
Figure 4. Public Debt Dynamics



	Advanced Economies (AEs)					Emerging Market Economies (EMEs)				
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
θ_h^N	2.95	6.14	9.16	12.33	15.60	1.14	2.77	2.46	3.84	4.76
	(0.25)	(0.36)	(0.52)	(0.65)	(0.73)	(0.41)	(0.74)	(0.88)	(0.79)	(1.03)
θ_h^F	4.95	10.63	18.58	23.66	26.36	5.22	8.77	11.09	12.02	13.33
	(0.74)	(1.05)	(1.94)	(2.35)	(2.60)	(2.41)	(4.04)	(5.04)	(4.51)	(5.19)
β_h^{NPR}	0.03	0.60	0.67	0.73	0.60	0.24	-0.19	0.16	0.64	1.55
	(0.26)	(0.34)	(0.53)	(0.70)	(0.71)	(0.47)	(0.76)	(0.81)	(1.23)	(1.57)
β_h^{FPR}	1.03	1.39	2.04	2.68	2.69	0.45	1.80	0.85	1.69	2.44
	(0.15)	(0.26)	(0.55)	(0.68)	(0.61)	(0.68)	(1.17)	(1.41)	(1.81)	(1.49)
β_h^{NPU}	0.73	1.07	1.37	1.76	1.52	0.28	0.27	0.66	0.58	0.31
	(0.26)	(0.36)	(0.47)	(0.58)	(0.52)	(0.22)	(0.38)	(0.51)	(0.64)	(0.74)
β_h^{FPU}	0.39	1.22	1.96	1.97	2.24	0.35	0.74	1.49	1.70	3.78
	(0.43)	(0.75)	(0.97)	(1.19)	(1.19)	(0.86)	(1.05)	(1.30)	(1.86)	(1.62)
β_h^{NPRPU}	0.11	0.17	0.23	0.33	0.17	0.14	0.32	0.39	0.38	0.34
	(0.06)	(0.07)	(0.08)	(0.12)	(0.12)	(0.05)	(0.11)	(0.11)	(0.13)	(0.17)
β_h^{FPRPU}	-0.07	-0.15	0.12	0.22	0.14	0.05	0.10	0.10	0.11	0.63
	(0.08)	(0.10)	(0.14)	(0.17)	(0.17)	(0.19)	(0.27)	(0.32)	(0.47)	(0.43)
R^2	0.73	0.84	0.85	0.86	0.88	0.46	0.46	0.47	0.50	0.54
Obs	125	125	125	124	110	152	151	151	147	132

Note. *Top panel.* Dynamics of real per capita public debt in AEs and EMEs, starting from the year preceding non-financial (blue lines) and financial (red lines) recessions. The solid line shows the average path in recessions, while the dashed line shows how the path deviates when the recession is preceded by a rapid debt buildup. *Bottom panel.* Robust standard errors, clustered by country, are reported in parentheses.

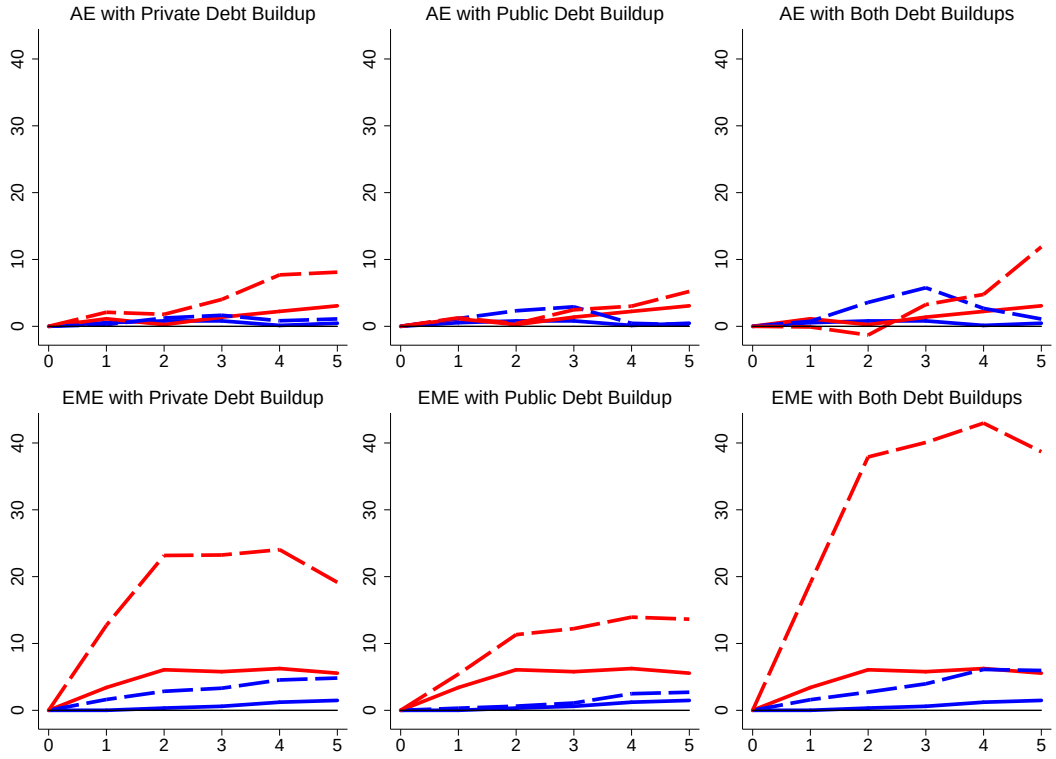
Figure 5. Government Spending Dynamics



	Advanced Economies (AEs)					Emerging Market Economies (EMEs)				
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
θ_h^N	0.91	1.95	2.67	4.03	6.40	-0.01	0.35	0.86	1.40	1.46
	(0.12)	(0.17)	(0.29)	(0.28)	(0.35)	(0.13)	(0.15)	(0.19)	(0.28)	(0.35)
θ_h^F	1.82	3.20	3.89	2.13	1.31	-0.04	-0.41	-0.41	-1.40	0.14
	(0.30)	(0.50)	(1.40)	(1.22)	(1.25)	(0.65)	(0.67)	(1.17)	(1.66)	(1.37)
β_h^{NPR}	-0.05	-0.03	0.02	-0.27	-0.42	0.07	-0.11	-0.23	-0.39	-0.18
	(0.11)	(0.21)	(0.26)	(0.29)	(0.31)	(0.22)	(0.27)	(0.28)	(0.40)	(0.46)
β_h^{FPR}	0.12	0.02	0.19	-0.36	-0.51	-0.20	-0.48	-0.50	-0.34	-0.69
	(0.10)	(0.16)	(0.40)	(0.22)	(0.19)	(0.21)	(0.32)	(0.34)	(0.41)	(0.51)
β_h^{NPU}	0.05	-0.13	-0.09	-0.11	-0.45	0.08	0.14	0.01	-0.09	-0.06
	(0.19)	(0.21)	(0.26)	(0.25)	(0.30)	(0.11)	(0.16)	(0.17)	(0.19)	(0.22)
β_h^{FPU}	0.26	0.17	-0.22	-0.36	0.21	0.20	-0.25	-0.29	-0.35	-0.36
	(0.19)	(0.23)	(0.57)	(0.59)	(0.40)	(0.17)	(0.27)	(0.39)	(0.37)	(0.51)
β_h^{NPRPU}	0.02	-0.00	-0.02	-0.00	-0.10	0.01	0.07	0.07	0.05	0.07
	(0.04)	(0.04)	(0.05)	(0.05)	(0.06)	(0.02)	(0.05)	(0.04)	(0.06)	(0.07)
β_h^{FPRPU}	-0.09	-0.03	0.06	-0.02	-0.09	0.00	-0.09	-0.01	-0.01	-0.03
	(0.04)	(0.03)	(0.11)	(0.09)	(0.10)	(0.04)	(0.07)	(0.09)	(0.09)	(0.13)
R^2	0.60	0.69	0.66	0.64	0.71	0.51	0.53	0.53	0.45	0.46
Obs	125	125	124	123	109	152	152	151	147	132

Note. *Top panel.* Dynamics of real per capita government spending in AEs and EMEs, starting from the year preceding non-financial (blue lines) and financial (red lines) recessions. The solid line shows the average path in recessions, while the dashed line shows how the path deviates when the recession is preceded by a rapid debt buildup. *Bottom panel.* Robust standard errors, clustered by country, are reported in parentheses.

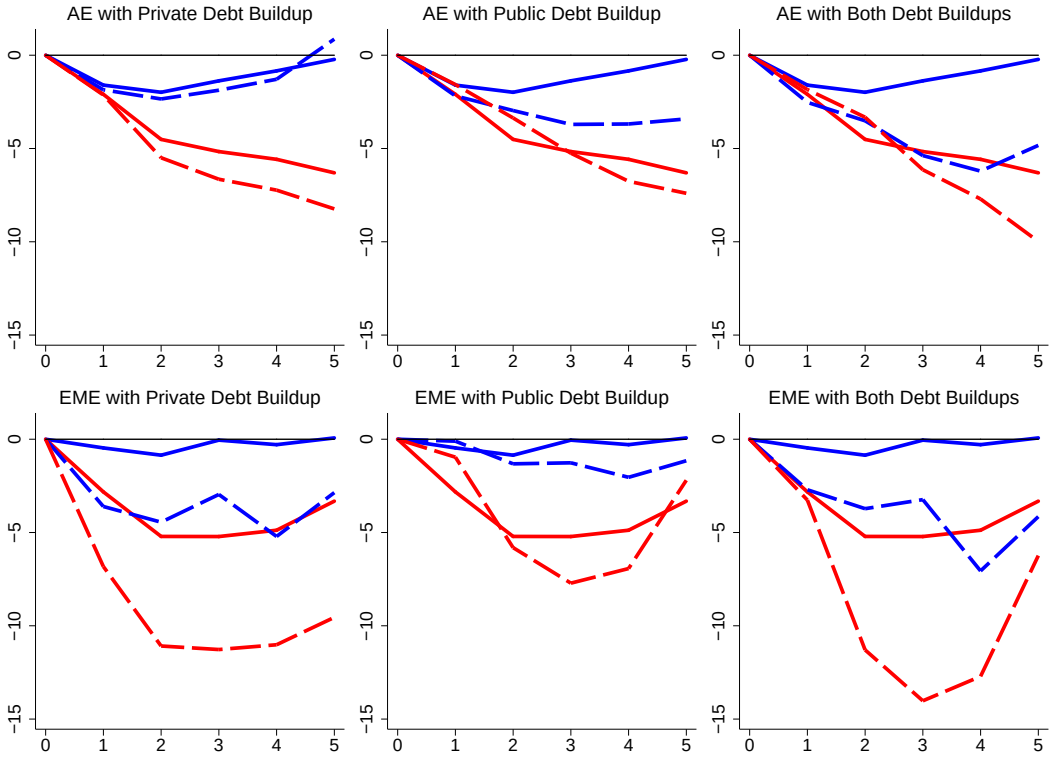
Figure 6. IMF Credit Dynamics



	Advanced Economies (AEs)					Emerging Market Economies (EMEs)				
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
θ_h^N	0.54	0.81	0.81	0.13	0.47	0.01	0.33	0.60	1.21	1.48
	(0.14)	(0.24)	(0.21)	(0.19)	(0.29)	(0.54)	(0.79)	(0.74)	(0.67)	(0.33)
θ_h^F	1.13	0.25	1.37	2.23	3.07	3.41	6.07	5.78	6.25	5.56
	(0.36)	(0.60)	(0.87)	(1.28)	(2.00)	(1.14)	(1.83)	(1.68)	(1.48)	(1.39)
β_h^{NPR}	-0.06	0.09	0.17	0.14	0.13	0.32	0.50	0.54	0.67	0.67
	(0.18)	(0.31)	(0.35)	(0.23)	(0.27)	(0.28)	(0.40)	(0.42)	(0.62)	(0.84)
β_h^{FPR}	0.19	0.31	0.53	1.09	1.01	1.86	3.42	3.49	3.56	2.72
	(0.17)	(0.28)	(0.41)	(0.40)	(0.66)	(1.07)	(1.55)	(1.42)	(1.16)	(0.53)
β_h^{NPU}	0.13	0.30	0.42	0.06	-0.05	0.06	0.06	0.10	0.26	0.24
	(0.19)	(0.33)	(0.33)	(0.32)	(0.36)	(0.06)	(0.10)	(0.11)	(0.20)	(0.26)
β_h^{FPU}	0.03	0.03	0.22	0.16	0.43	0.40	1.05	1.29	1.54	1.62
	(0.21)	(0.31)	(0.40)	(0.84)	(0.91)	(0.57)	(0.81)	(0.74)	(0.75)	(0.61)
β_h^{NPRPU}	-0.01	0.03	0.08	0.06	0.01	-0.01	-0.02	0.01	0.01	-0.00
	(0.05)	(0.08)	(0.07)	(0.06)	(0.08)	(0.02)	(0.02)	(0.03)	(0.04)	(0.07)
β_h^{FPRPU}	-0.09	-0.13	-0.07	-0.15	0.07	0.17	0.38	0.42	0.45	0.46
	(0.04)	(0.06)	(0.07)	(0.14)	(0.17)	(0.17)	(0.24)	(0.22)	(0.22)	(0.17)
R^2	0.78	0.70	0.71	0.84	0.72	0.71	0.74	0.73	0.69	0.66
Obs	125	125	125	124	110	152	152	152	148	133

Note. *Top panel.* Dynamics of real per-capita IMF credit in AEs and EMEs, starting from the year preceding non-financial (blue lines) and financial (red lines) recessions. The solid line shows the average path in recessions, while the dashed line shows how the path deviates when the recession is preceded by a rapid debt buildup. *Bottom panel.* Robust standard errors, clustered by country, are reported in parentheses.

Figure 7. Capital Formation Dynamics



	Advanced Economies (AEs)					Emerging Market Economies (EMEs)				
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
θ_h^N	-1.60	-1.99	-1.37	-0.84	-0.22	-0.46	-0.85	-0.05	-0.29	0.07
	(0.09)	(0.14)	(0.18)	(0.22)	(0.26)	(0.21)	(0.26)	(0.30)	(0.46)	(0.63)
θ_h^F	-2.10	-4.51	-5.16	-5.58	-6.30	-2.82	-5.21	-5.22	-4.88	-3.32
	(0.28)	(0.41)	(0.43)	(0.59)	(0.85)	(0.83)	(1.08)	(1.15)	(1.55)	(2.01)
β_h^{NPR}	-0.05	-0.07	-0.10	-0.09	0.22	-0.63	-0.72	-0.58	-0.98	-0.59
	(0.09)	(0.13)	(0.15)	(0.22)	(0.29)	(0.44)	(0.39)	(0.37)	(0.51)	(0.65)
β_h^{FPR}	-0.01	-0.20	-0.30	-0.33	-0.39	-0.80	-1.17	-1.21	-1.23	-1.25
	(0.06)	(0.07)	(0.11)	(0.15)	(0.15)	(0.36)	(0.50)	(0.52)	(0.62)	(0.77)
β_h^{NPU}	-0.12	-0.20	-0.47	-0.57	-0.64	0.07	-0.09	-0.24	-0.35	-0.25
	(0.08)	(0.12)	(0.13)	(0.21)	(0.31)	(0.10)	(0.11)	(0.15)	(0.25)	(0.31)
β_h^{FPU}	0.10	0.23	-0.02	-0.24	-0.22	0.37	-0.12	-0.50	-0.41	0.22
	(0.15)	(0.29)	(0.33)	(0.38)	(0.41)	(0.34)	(0.44)	(0.42)	(0.46)	(0.82)
β_h^{NPRPU}	-0.00	-0.01	-0.05	-0.08	-0.10	0.02	0.05	0.04	-0.00	-0.00
	(0.02)	(0.03)	(0.04)	(0.06)	(0.10)	(0.02)	(0.02)	(0.04)	(0.06)	(0.06)
β_h^{FPRPU}	-0.01	0.04	0.02	0.03	-0.03	0.07	0.02	-0.01	0.01	0.09
	(0.02)	(0.03)	(0.03)	(0.05)	(0.06)	(0.10)	(0.11)	(0.09)	(0.10)	(0.19)
R^2	0.83	0.83	0.78	0.70	0.68	0.69	0.64	0.59	0.49	0.41
Obs	124	124	124	123	108	134	130	129	118	110

Note. *Top panel.* Dynamics of real per-capita capital formation in AEs and EMEs, starting from the year preceding non-financial (blue lines) and financial (red lines) recessions. The solid line shows the average path in recessions, while the dashed line shows how the path deviates when the recession is preceded by a rapid debt buildup. *Bottom panel.* Robust standard errors, clustered by country, are reported in parentheses.