# Leaning against the global financial cycle

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**Abstract**

We study the role and the interaction of the quality of institutions and of countercyclical policies in leaning against the Global Financial Cycle (GFC) in Emerging Economies (EMEs). We show that differences in the institutional strength are a key determinant of the different effects that the GFC has on domestic financial conditions of EMEs. Institutional strength also shapes the response in terms of counter-cyclical policies to sudden changes in global financial conditions as well as the effectiveness of such policies. This poses an interesting policy dilemma. Countries may in fact decide to ex-ante undertake costly structural reforms that reduce the country's dependence on the GFC or ex-post react to the financial shock. We show that in a simple endowment model with a borrowing constraint structural and counter-cyclical policies are to a large extent substitutes; hence countries for which counter-cyclical policies are very effective have less of an incentive to strengthen their institutional framework.

**JEL classification**:F32, F38, E52, G28
**Keywords**: Global Financial Cycle, monetary policy, macroprudential policies, foreign-exchange intervention, capital controls, emerging markets, institutions.

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# Non-technical summary

The main focus of this paper is the role and the interaction of the quality of institutions and of countercyclical policies in leaning against the Global Financial Cycle (GFC) in Emerging Economies (EMEs).

We provide an extensive empirical analysis linking measures of the quality of institutions, economic and financial outcomes in EME (stock returns, sovereign spreads, the exchange rate against the U.S. dollar and GDP growth) following shocks in global financial conditions, and policy reactions including a menu of four possible counter-cyclical policies, namely (i) macro-prudential policy, (ii) capital controls, (iii) monetary policy (changes in the short term interest rate) and (iv) use of foreign exchange reserves. We run panel regressions on monthly data for 22 EMEs between 1995 and 2019, using the excess bond premium of Gilchrist and Zakrajsek (2012) as the baseline measure of global financial conditions.

Our main result is that differences in the institutional strength are a key determinant of the different effects that the GFC has on domestic financial conditions of EMEs. We find that institutional strength also shapes the response in terms of counter-cyclical policies to sudden changes in global financial conditions as well as the effectiveness of such policies. In turn, this poses an interesting policy dilemma. Countries may in fact decide to ex-ante undertake costly structural reforms that reduce the country's dependence on the GFC or ex-post transfer resources to (withdraw resources from) households when the GFC tightens (loosens). We show that in a simple stylised model of an endowment economy with borrowing constraints structural and counter-cyclical policies are to a large extent substitutes, so that countries for which counter-cyclical policies are very effective, have less of an incentive to strengthen their institutional framework.

# 1 Introduction

Emerging economies turn to global financial markets as a source of funding on a daily basis. The availability of external funding has risen over time, as financial globalization has favoured the international diversification of portfolios. As a result, the prices of risky assets have become increasingly correlated across markets, a phenomenon known as the global financial cycle (Rey, 2013). External funding, however, has occasionally ended up financing less productive sectors (like housing for instance) fuelling domestic bubbles and posing non-negligible financial stability risks. Policymakers wishing to pursue domestic and external stabilization objectives are therefore confronted with difficult trade-offs. On the one hand, they need to reap the benefits of capital mobility. On the other hand, they need to safeguard their economies from sudden swings in capital flows and in asset valuations that could be driven by a tightening of US monetary policy (a crucial determinant of the global financial cycle) or from a sudden change in risk aversion.

The menu of cyclical policies available to EMEs policy makers to lean against the global financial cycle is rich and includes monetary policy, foreign exchange (FX) intervention, macro-prudential policies and capital controls. Lines of defence can be built ex ante, in an attempt to reduce the vulnerability of the domestic economy, or can be deployed ex post, when outflow episodes pose a risk of disorderly depreciation and of asset prices collapse. The actual experience of small open emerging economies shows that FX intervention is typically used ex-post to support the domestic currency while macro-prudential measures are mostly deployed during inflow episodes, when funding is cheap and the risk of excessive credit growth needs to be managed. Monetary policy and capital flow management measures are found to be symmetrically used over the cycle (Fayad and Ward, 2020), although there is evidence that capital controls on *inflows* are used as an ex-ante macroprudential instrument (Ben Zeev, 2017) in periods of cheap funding and low volatility, while controls on *outflows* are employed in periods of financial stress and tighter financial conditions. How to combine these policies is a question that has spurred a wide debate as well as a rich research agenda, for which the IMF has coined the term Integrated Policy Framework (IPF).

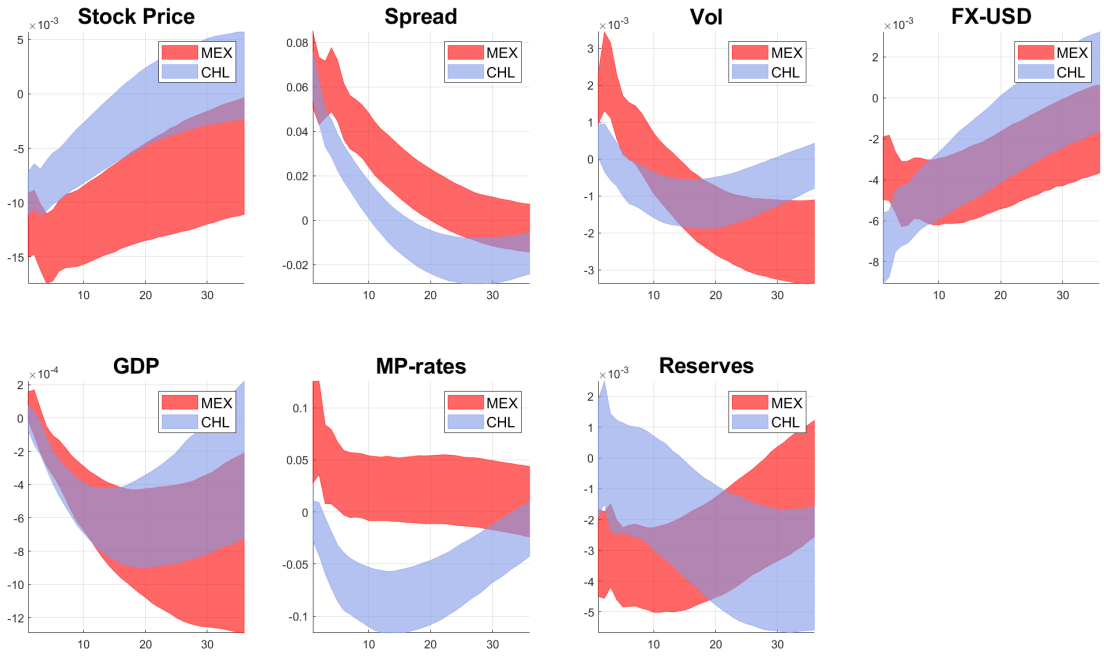
This paper contributes to this debate by putting the whole menu of counter-cyclical policies available to EMEs in the wider institutional context in which they are used. In particular, we show that differences in the institutional solidity of EMEs can, to a certain extent, explain the different effects of the global financial cycle on domestic financial conditions, the different menu of counter-cyclical policies that they actually use, as well as the effectiveness of such policies. This poses a further interesting policy dilemma. Countries may in fact decide to invest in ex-ante costly structural reforms that raise institutional strength and shield the domestic economy from shifts in global financial conditions, or may decide not to bear this cost and its associated benefit and to rely only on ex-post cyclical policies. Although the paper takes mainly a positive perspective, we provide a normative flavour by framing this dilemma in a theoretical model whose objective is to capture the essence of the complementarity (or trade-off) between country characteristics influencing the vulnerability to the global financial cycle (the quality of institutions) and cyclical stabilization policies. We find that in this model, structural and counter-cyclical policies are to a large extent substitutes, so that countries for which counter-cyclical policies are very effective, have less of an incentive to strengthen their institutional framework.

To provide an illustration of the key message from our analysis, in Figure 1 we show the response of domestic financial conditions, of economic activity and of two counter-cyclical policies (monetary policy and reserves) to a global financial shock in two different EMEs, Mexico and Chile.[1] In both countries stock prices fall, sovereign spreads rise, implied stock market volatility increases, the domestic currency depreciates against the U.S. dollar and GDP falls. However, the tightening of domestic financial conditions is more severe in Mexico, as stock prices fall more, sovereign spreads rise more, and also the fall in GDP is far more protracted. The response of policies might partly explain this result. Chile responds to the tightening in financial conditions with a monetary policy expansion, while at the same time not suffering a significant depletion of reserves. Mexico, on the other hand, raises interest rates and sheds reserves, plausibly in an attempt to support the exchange rate while suffering from significant capital outflows.

[1] An explanation of how these results are obtained can be found in Appendix A.

By looking at these results, two interrelated questions arise. The first is to what extent the

Figure 1: The effects of a global financial shock on Mexico and Chile




Impulse responses to a shock to the global financial conditions. The methodology used to obtain these responses is explained in Appendix A.

different macroeconomic outcomes of two countries like Chile and Mexico depend on the policy response, rather than on other country specific characteristics, and in particular the strength of their institutions, that make them different in the eyes of international investors. The second is to what extent these country specific characteristics can be influenced by long-term investment in structural policies and how these interact with the counter-cyclical policy space, i.e. whether or not strong institutions free the hand of counter-cyclical policies.

Our analysis reveals that strong institutions play a key role in shaping the impact of global financial shocks on EMEs and that they are closely related to counter-cyclical policies. We measure the strength of institutions through the Worldwide Governance Indicators (WGI) developed by the World Bank, which provide a score for five dimensions of governance: (i) rule of law, (ii) government effectiveness, (iii) control of corruption, (iv) regulatory quality and political stability and (v) absence of violence. In countries that enjoy a stronger rule of law, are more politically stable, are characterized by lower

corruption, lower levels of violence and higher regulatory standards, domestic financial conditions are more isolated from the global financial cycle. These countries are also more free to use monetary policy to ease financial conditions, and need to intervene less in the foreign exchange market. It therefore appears that the strength of institutions is a primary concern for international investors, who punish weaker countries that hike in the middle of a financial crisis with even more capital outflows. As for other policies, i.e. macroprudential policies and capital controls, we find little evidence of their use as a counter-cyclical tool. They appear to have been used as an ex-ante line of defence against volatile capital inflows, more than as stabilization policies. Our second result is that not only countries that have stronger institutions have more room for manoeuvre in terms of policy response, but also that in these countries stabilization policies are more effective in attenuating the effect of foreign financial shocks. Going back to our example in Figure 1, our findings (taken at face value) imply that the different economic performance conditional on a foreign financial shock is primarily due to the fact that (according to World Bank data) Chile has a much stronger institutional framework than Mexico.

In this paper we also introduce a simple two period model to illustrate the optimal choice for a policy maker dealing with global shocks leading to external borrowing constraints. The model builds on Cesa-Bianchi, Ferrero, and Rebucci (2018), with a key modification in the external collateral constraint that depends on domestic income and the exchange rate. In this model, the government can manipulate (i) the share of foreign currency (foreign law) debt that is more sensitive to global financial shocks, at a cost; and (ii) sell FX reserves in order to appreciate the exchange rate and loosen the collateral constraint in this way. The key message arising from the model analysis is therefore that structural reforms (ex ante policy) and use of FX reserves (ex post policy) are largely *substitutes*. This is in line with the empirical results which show that countries with stronger institutions need to use less FX intervention when faced with an adverse external financial shocks.

The paper is organised as follows. Section 2 discusses the literature and our contribution. Section 3 develops the empirical analysis. Section **??** discusses some normative

implications in the context of a theoretical model. Section 6 concludes

## 2 Contribution and Related Literature

The emergence of a Global Financial Cycle (Rey, 2013), following decades of growing financial integration, has revived the debate on the benefits and costs of capital flows. While in traditional macroeconomic models capital inflows are contractionary, due to an appreciation of the exchange rate, in richer models that include financial intermediation they can be expansionary, as they reduce the interest rate on loans (Blanchard, Ostry, Ghosh, and Chamon, 2017). Especially in EMEs, where domestic financial markets are relatively less developed, they loosen financial conditions also by raising the supply of credit from local banks, see for instance di Giovanni, Şebnem Kalemli-Özcan, Ulu, and Baskaya (2021) for an analysis centred on Turkey. Still, their unwanted consequences are well known, as they may lead to episodes of high financial and macroeconomic volatility (Forbes and Warnock, 2021), banking crises (Cesa-Bianchi, Eguren Martin, and Thwaites, 2019) and even affect the allocation of production between tradable and non-tradable products, eventually influencing long-term productivity growth, a phenomenon that Benigno and Fornaro (2014) term the "financial resource curse". They also limit policy options through a financial trilemma (Obstfeld, 2015), that is the incompatibility of financial stability, financial integration, and national financial policies, a constraint that may be particularly severe for EMEs.

Exchange rates flexibility does not seem sufficient to insulate an economy from the global financial cycle (Rey, 2013)[2] and an array of policies has been actively used by policy makers in EMEs to lean against the GFC.

The use of monetary policy and of official reserves has often been the first line of defence against global financial shocks. Bhattarai, Chatterjee, and Park (2020) for instance, find that an aggressive use of monetary policy helps Latin American central banks to limit the effects of global shocks on domestic financial conditions. In terms of exchange rate policy, Arce, Bengui, and Bianchi (2019) document that ex-ante reserves accumulation can

[2]On this issue the debate is still open as Obstfeld, Ostry, and Qureshi (2018) and Habib and Venditti (2019) find that the traditional trilemma (Geanakoplos, 1998) still stands.

alleviate external borrowing constraints in anticipation of future sudden stops. Reserves can also be used counter-cyclically, as exchange rate interventions attenuate the negative consequences of a depreciation after a negative exogenous capital flow shock (Blanchard, Adler, and de Carvalho Filho, 2015).

Recently, the policy debate has shifted towards other instruments, namely macroprudential policies and capital controls. Neanidis (2015), Bergant, Grigoli, Hansen, and Sandri (2020), and Coman and Lloyd (2022) find that a more stringent level of macroprudential regulation reduces the sensitivity of GDP growth to global financial shocks in EMEs. Risks, however, may migrate towards the non-banking sector, i.e. bond and equity flows. For instance, Chari, Dilts-Stedman, and Forbes (2021) find that a tighter *ex-ante* macroprudential stance amplifies the impact of global risk shocks on bond and equity flows, increasing outflows (inflows) significantly more during risk-off (risk-on) episodes. As for capital controls, those on inflows are effective in limiting credit booms and related risks (Ben Zeev, 2017). EMEs, however, shy away from imposing controls on outflows, fearing that this might indicate (exactly in times when foreign investors are more needed) readiness to adopt investor-unfriendly policies in the future (Rebucci and Ma, 2019).

The simultaneous use of these four instruments (monetary policy, reserves, macroprudential policies and capital controls) may affect their relative efficacy. For instance, ex-ante capital controls and reserve accumulation can help mitigate the typical dilemma faced by EMEs central banks (and exemplified by our example on Mexico and Chile in Figure 1) namely raising interest rates to defend the exchange rate or lowering them to stimulate the economy (Bianchi and Lorenzoni, 2021).

In the context of this literature, the contribution of our paper is fourfold. First, we introduce in the debate the notion of institutional quality, and provide evidence that institutions matter in shaping the domestic effects of global financial shocks and the related policy responses. Importantly institutional quality captures a layer of heterogeneity in leaning against the Global Financial Cycle that other variables, like per capita income or central bank independence and transparency, do not capture. Second, we show that countries with better institutions use monetary policy to lean against the global financial

cycle, while economies with weaker institutions refrain from cutting rates in the face of a global shock. Third, and related to the previous, we provide causal evidence that the effectiveness of policies is higher in countries where the quality of institutions is also higher. In particular, a monetary policy expansion in the face of a global shock yields to an increase, rather than a fall, in spreads for countries with weak institutions. Finally, we also introduce a simple two period model to illustrate the optimal choice for a policy maker dealing with global shocks leading to external borrowing constraints, building on Cesa-Bianchi, Ferrero, and Rebucci (2018).

In a paper closely related to ours, Batini and Durand (2021) look at the role of an array of policies in reducing the exposure of EMEs to the global financial cycle. They find that correlation between capital inflows to EMEs and a global capital flows cycle changes over time, and that it tends to fall in countries that implement capital controls and macroprudential policies. Their analysis also suggests that both policies are effective at reducing the sensitivity of domestic conditions to the global financial cycle, but only during episodes of large capital inflows. These results complement our analysis, as they confirm a dichotomy in terms of available policies, with macroprudential policies and capital controls being more effective as an *ex-ante* line of defense against foreign credit booms, and monetary policies and reserves management acting more as counter-cyclical tools. An additional novelty with respect to their paper is the role played by the quality of institutions in our analysis.

# 3 Empirical analysis

Our empirical analysis focuses on three interrelated questions. First, we analyze what are the effects of global financial shocks on EMEs domestic financial conditions. Second, we test whether EMEs that have institutions of higher quality are more sheltered from global financial shocks. Third we analyze to what extent, conditioning on a global financial shock, available stabilization policies are actually used and how effective they are, also depending on the quality of institutions.

**The data.** To introduce our dataset, we briefly sketch the logic of our empirical analysis. This clarifies the nature of the variables involved in the analysis and makes the data description easier. The analysis seeks to understand the relationship among the following economic variables. First, there is a global shock ($S_t$) that has an impact on economic outcomes ($Y_{i,t}$) in a given emerging economy $i$. We consider two types of economic outcomes $Y_{i,t}$, either financial conditions or economic activity. This economy is characterized by given institutional features on which the government has some control ($Z_{i,t-1}$) and that can shield the domestic economy from the financial shock. Notice that we consider the institutional variables at time $t-1$, i.e. before the foreign shock hits the economy. This ensures that these features are predetermined with respect to the shock. Policy makers also have a menu of counter-cyclical policies at their disposal to respond to the shock $S_t$. In our analysis, we look at a menu of four policies: monetary policies, macroprudential policies, capital controls and reserves management.[3] Besides policies and institutional features, there is a host of country specific fundamentals ($X_{i,t-1}$) that are somewhat more difficult to control (e.g. external position) and other features (e.g. capital account openness or a fixed exchange rate) that matter for the transmission of the shock. While some of these are not strictly speaking policy variables, they could matter for the transmission of the shock and could be indirectly influenced by policy choice. For instance, Habib and Stracca (2012) document that in the face of an unexpected fall in the appetite for risk in global financial markets, foreign investors tend to penalize the currencies of countries that have a worse net foreign asset position. While the level of net foreign assets is not directly controlled by a government, the change in private and public debt (due for instance to macroprudential or to fiscal policy) can indirectly affect the net international investment position of a country. This is all the more true in countries with shallow domestic financial systems like EMEs.

We use data for 22 EMEs between 1995 and 2021. The choice of which EMEs to include is dictated by the quality of the data at relatively high frequency, i.e. we include countries for which we have sufficient data at the monthly frequency.[4]

[3]Fiscal policy could also in principle be used, but bot its activation as well as its effects imply a considerable delay. Furthermore, the fiscal policy stance is also harder to measure on a comparable basis across a large number of EMEs. We therefore prefer to focus on policies that can be more promptly deployed and on which better data are available.

[4]The countries included are Turkey, South Africa, Argentina, Brazil, Chile, Colombia, Mexico, Peru,

A description of the variables used in the analysis, following the above taxonomy, is presented in Table 1. Our preferred variable to measure shocks to global financial conditions ($S_t$) is the Excess Bond Premium (EBP) proposed by Gilchrist and Zakrajsek (2012), a measure of default risk for the U.S. corporate sector.[5] The natural alternative to gauge global financial conditions is the VIX, a measure of implied volatility in the U.S. stock market, which has also been widely used in the literature to capture changes in sentiment in global financial markets. Both the EBP and the VIX are U.S. specific variables, and their use as proxies of global financial conditions is due to the centrality of the U.S. economy in the global economy as well as to the role played by U.S. based global banks in international credit intermediation. In our baseline specifications we prefer to use the EBP, as its effects on EMEs are well established (Ben Zeev, 2019, 2017). Robustness checks conducted using the VIX are presented in Appendix B.

Our target variables $Y_{i,t}$ are stock returns, sovereign spreads, the exchange rate against the U.S. dollar and GDP growth. We prefer to use individual asset prices rather than composite financial conditions indices (FCIs) since different methodologies can result in very different FCIs (Arrigoni, Bobasu, and Venditti, 2020).

Turning to the menu of policies $P_{i,t}$, we use the short term interest rate (3 months) as an indicator of the monetary policy stance. Exchange rates interventions are measured by the change of the level of reserves scaled by nominal GDP.[6] To assess the macroprudential policy stance we rely on the integrated Macroprudential Policy (iMaPP) database compiled by the IMF (Alam, Alter, Eiseman, Gelos, Kang, Narita, Nier, and Wang, 2019). For our purpose, this database presents a distinct advantage over alternative data sources as it is more comprehensive in terms of temporal as well as geographical coverage. While the database contains detailed information on 17 macroprudential policy instruments, we rely on a summary measure obtained by aggregating all policies into a single index. We

Israel, India, Indonesia, South Korea, Malaysia, Philippines, Thailand, Vietnam, Bulgaria, Russia, China, Czech Republic, Hungary and Poland.

[5]The EBP is constructed in three steps. First, a spread between corporate bond yields and the yields of safe assets (U.S. bonds) of comparable maturity is computed. Second, this spread is regressed (at the firm level) on observable firms characteristics that proxy for default risk. The residuals of this regression mostly reflect compensation demanded by investors (above and beyond expected losses) for being exposed to corporate credit risk. Third, the firm level residuals are aggregated to construct an economy wide credit spread.

[6]The use of log-change of reserves gives very similar results.

choose to work with this aggregate measures because for many of the countries that are included in the sample most of the macroprudential measures are empty. As common to other databases, the iMaPP categorizes policy actions through dummy-type indices (-1 for a tightening and 1 for a loosening).[7]

One of the main variable of interest for our analysis is the quality of institutions ($Z_{i,t}$). We rely on the Worldwide Governance Indicators (WGI) developed by the World Bank, which provide a score for five dimensions of governance: rule of law, government effectiveness, control of corruption, regulatory quality and political stability and absence of violence.[8] We base our baseline analysis on one of these indicators, namely the rule of law. In the definition provided by the World Bank this indicator *captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence*, and therefore seems to capture the core of institutional quality. Our main conclusions are not affected by this particular choice, as shown by our robustness checks obtained on the basis of other indicators. This is not surprising, since the scores are highly correlated with each other: countries that score high in terms of rule of law are also politically stable and are also characterized by low corruption, low levels of violence and high regulatory standards.

Finally, we control for a host of other country characteristics that can potentially affect the effect of global financial shocks on the domestic economy ($X_{i,t}$). First, we control for a potential policy trilemma, including capital account openness and the exchange rate regime. Second, we explore the role of several other country fundamentals that in the literature have been found to be potential amplifiers of such shocks, namely the current account balance, the ratio of foreign debt in U.S. dollars to GDP and net foreign assets (NFA) also scaled by nominal GDP. In our final specification we only include the country-specific fundamentals whose effect is consistently significant across specifications, namely openness as measured by the Chinn-Ito Index, a dummy variable that identifies countries with a flexible exchange rate, and the NFA to GDP ratio.

[7]The use of dummy type indicators fails to account for the intensity of policy changes, as large and small changes are both categorized with a minus or a plus 1. Alam, Alter, Eiseman, Gelos, Kang, Narita, Nier, and Wang (2019), however, show that these indices broadly capture the effects of macroprudential policies on credit conditions and economic activity.

[8]Data are available at `https://info.worldbank.org/governance/wgi/`.

### 3.1 Global Financial Conditions, Institutions and Economic Outcomes

Throughout the empirical analysis we use panel local projections with fixed effects, accounting for cross-sectional and temporal dependence of the residuals. The local projection methodology, originally developed by Jordà (2005), offers a relatively flexible environment in which to study the effect of structural shocks, and has gained substantial popularity in recent years. From our viewpoint, it offers the advantage of allowing for state-dependant impulse response functions, whereby the effects of a shock can be affected by other variables through an interaction term. Ramey and Zubairy (2018) and Tenreyro and Thwaites (2016), for instance, use this framework to study how business cycle conditions affect the transmission of, respectively, fiscal and monetary policy shocks on economic activity. Particular appealing for our purposes is the extension to a panel framework, where time-invariant country characteristics can be controlled for via fixed effects (Auerbach and Gorodnichenko, 2012; Jordà, Schularick, and Taylor, 2020).

In our first empirical model we examine the effects of shocks, institutions and policies, on financial conditions and economic activity. The exact specification of this model follows closely Ben Zeev (2019) and Ben Zeev (2017) and is described in equation 1:

$$\begin{aligned} y_{i,t+h} - y_{i,t-1} = & \alpha_{i,h} + \beta_h EBP_t + \delta_h Z_{i,t-1} + \phi_h' X_{t-1} + \gamma_h' \Delta P_{i,t} + \\ & EBP_t(\delta_{x,h} Z_{i,t-1} + \phi_{x,h}' X_{t-1} + \gamma_{x,h}' \Delta P_{i,t}) + OTHER + \epsilon_{i,t+h}. \end{aligned} \tag{1}$$

The left hand side variable $y_{i,t}$ is is either the log of the stock market index, sovereign bond spreads, the log exchange rate or GDP growth. The fundamental $Z_{t-1}$ is the World Bank rule of law indicator and the policies $P_t$ and macroeconomic controls $X_t$ are those described in Table 1. For the purpose of our research questions, the main parameters of interest in this equation are $\beta_h$ and $\delta_{x,h}$. The coefficient $\beta_h$ measures the average effect of shocks to global financial conditions on EMEs economic outcomes. This average effect may mask significant cross-sectional heterogeneity along a host of dimensions, the most interesting for our purpose being the quality of institutions. This is captured by the coefficient $\delta_{x,h}$, measuring how the effects of global financial shocks are effected by the quality of the institutions of a given country.

**Endogeneity issues.** Two sets of variables enter contemporaneously the model, i.e.

$EBP_t$ and the change in policies $\Delta P_t$, therefore posing an issue of endogeneity. First, we discuss possible endogeneity of the financial shock $EBP_t$. Here the issue is that news about the economy $\epsilon_{i,t+h}$ could have an effect on the the premium demanded by investors to hold risky assets. This would make estimates of the coefficient $\beta_h$ inconsistent. To remove any predictable component from EBP we include in the term OTHER lags of $EBP_t$, lags of $EBP_t$ interacted with $Z_{i,t-1}$, contemporaneous and lagged domestic macroeconomic controls (inflation and output), contemporaneous and lagged global IP growth and oil prices, as well as contemporaneous and lagged U.S. inflation and GDP growth. By controlling for lags of $EBP_t$, together with domestic and U.S. macroeconomic controls we can interpret the coefficients on $EBP_t$ (and on its interactions) as the effect of unanticipated shocks to the EBP. The identification assumption is that the EBP can react to macroeconomic shocks contemporaneously, but macroeconomic variables respond to financial shocks with a lag. In the parlance of structural identification in the context of vector autoregressions (VARs), this would amount to ordering the EBP last in a recursive identification scheme. The same identification assumption underpins the analyses in Ben Zeev (2019), Ben Zeev (2017) and Bhattarai, Chatterjee, and Park (2020).

The fact that policies enter the analysis contemporaneously also poses an endogeneity issue. As policies are activated counter-cyclically in response to shocks, the possibility that they are correlated with shocks about future economic conditions can not be neglected. We address this concern in two ways. First, we make the set $X_{i,t-1}$ and related interaction terms in the OTHER term in equation 1 rich enough to control for all time varying elements that affect policies and outcomes. By controlling in the regression also for the interaction between the financial shock and a large set of country characteristics, we aim at soaking up any cross-sectional heterogeneity in the policy functions and to make policy change as good as random. While this empirical strategy can in principle recover the *average* causal effect of policies on economic outcomes, it is not particularly informative on the efficacy of policies in responding to shocks to the global financial cycle. We address this point in Section 3.3.

**Results.** Table 2 shows the coefficient estimates obtained when taking equation 1 to the data. The table is organized row-wise in four panels, grouping from top to bottom the coefficients of the EBP, of its interaction with the rule of law, the interactions with

economic country-specific fundamentals, and finally with the policies. In the table we report the coefficients for local projections at horizons $h = 1, 6$, for financial conditions, and at horizons $h = 12, 18$, for GDP, accounting for the delayed transmission of financial conditions to economic activity.

Results in the top panel show that an increase in the EBP tightens significantly financial conditions in EMEs, leading to a fall in equity prices, a widening of sovereign spreads and a depreciation of the exchange rate. Whether the latter is expansionary or contractionary depends on whether the (contractionary) financial effects dominate the (expansionary) trade effects of the exchange rate depreciation. This, in turn, depends on a host of factors, ranging from the currency denomination of the debt exposure, to the current account position of a given country. The overall effect, however, is clearly contractionary, as GDP growth is significantly lower one year after the shock. This confirms that the changes in credit conditions in the U.S. are an effective proxy of the global financial cycle.

Coefficient estimates in the second panel indicate that, in countries that have better institutions, domestic financial conditions are relatively protected from the global financial shock. A higher rule of law score is associated with a less pronounced fall in equity prices and with a milder widening of spreads. The response of the exchange rate, instead, is not significantly affected by the rule of law. These effects on financial markets are economically sizeable, as they translate into a better macroeconomic performance: GDP falls less in countries with better institutions. These results play a central role in our analysis. On the one hand they indicate that countries that make a costly investment in improving the quality of their institutions could be less affected by the tightening of cross-border credit conditions generated by the financial shock. Yet, they could also suggest that better institutions grant policy makers in these countries more policy space to respond to adverse shocks. We will return to this point below, when we analyze the actual response of policies to the global financial shock.

In the third panel we report the coefficients relative to the policies $P_{i,t}$ and the respective interactions with the EBP. Keeping in mind possible endogeneity bias concerns, these latter set of coefficients indicates that interest rates and macro-prudential policies appear effective in attenuating the effects of financial shocks, as their coefficient is

generally negative and significant in the regressions for equity prices and, as regards macro-prudential measures, also GDP. An increase of reserves is positively correlated with equity prices, with the exchange rate and with GDP. This result, which can seem counter intuitive, is likely to signal and endogeneity of the policy reaction, i.e. countries that experience lower growth and tighter financial conditions tend to lose more reserves. We return to this point below, when we look at the policy reaction.

Table 3 shows the results of an exercise in which we replace the rule of law indicator with on of the other measures of institutional quality, namely government effectiveness, corruption control and regulation quality. The results are very similar to the ones obtained with the rule of law indicator. They confirm that the quality of institution is a multifaceted concept and that all of its aspects help countries affected by an exogenous shock in leaning against the global financial cycle. Finally, in the last four rows of the table we show results obtained by replacing measures of institutional quality with the measure of de jure central bank independence (CBI) computed by Garriga (2016) and with the index of central bank transparency developed by Dincer and Eichengreen (2014). Neither specification results in significant coefficients, suggesting that the measures of institutional quality capture distinct country specific characteristics.

## 3.2 Global Financial Conditions, Institutions and policies

In a second exercise, we put policies on the left hand side of the equation and ask (i) which policies are actually used by EMEs when facing a tightening of financial conditions and (ii) whether institutional features play a role in the activation of these counter-cyclical policies. The specification of the empirical model is the following:

$$\begin{aligned} P_{i,t+h} - P_{i,t-1} = \; & \alpha^P_{i,h} + \beta^P_h EBP_t + \delta^P_h Z_{i,t-1} + \phi^{P'}_h X_{t-1} + \\ & + EBP_t(\delta^P_{x,h} Z_{i,t-1} + \phi^{P'}_{x,h} X_{t-1}) + OTHER + \epsilon_{i,t+h}. \end{aligned} \tag{2}$$

The parameter $\beta^P_h$ measures directly the extent to which the average country in our sample responds to an increase in the EBP by activating the policy $P_{i,t}$. The role played by institutions and other economic fundamentals in affecting the policy response to shocks is captured, respectively, by the coefficient $\delta^P_{x,h}$ and by the coefficients vector $\phi^{P'}_{x,h}$.

Table 4 reports coefficient estimates for equation 2 for horizons 1 and 6 after the shock. Overall, there is no strong evidence of a broad based activation of counter-cyclical policies across the countries in our sample as, the coefficient relative to EBP is not significantly different from zero in most cases. When the EBP is interacted with our rule of law variable, however, two results emerges. First, six months after the tightening of financial conditions, there is a significant negative association between the rule of law score and the response of interest rates to financial conditions. Similarly, conditional on an exogenous tightening in financial conditions, there is a positive correlation between the change in reserves and institutional strength, that is either these countries lose less reserves or actually accumulate reserves, i.e. they benefit from a capital inflow. Finally, there is some weak evidence of a short-term response of macro-prudential policies, although this effect wanes very quickly.

To better understand the quantitative implication of this result, Figure 2 reports the estimated effects of a global financial shock on respectively, short term interest rates and foreign exchange reserves, for two hypothetical countries. The former has a rule of law score that coincides with the 10th percentile of the sample distribution (low rule of law, blue box), the latter with the 90th percentile (high rule of law, red box). Results for short term interest rates are very sharp. Countries with weak institutions cannot afford to loosen interest rates in the face of a financial shock, and actually tighten rates, in an attempt stem capital outflow and reserves depletion and reign in rising spreads. Countries with solid institutions, on the other hand, have room for actually loosening their monetary policy stance. It is useful recalling that our baseline results in Table 2 show that these countries, despite lowering short term rates, do not suffer from any additional exchange rate depreciation, while their stock markets suffer less and their sovereign spreads widen less. This seems to imply that international investors perceive these economies to be more credible, to the point that they do not flee from them despite lower short-term yields. This intuition is confirmed by the right hand side panel of Figure 2, which refers to reserves. Weaker countries experience a significant depletion of reserves, whereas for countries with stronger institutions the change in reserves is not significantly different from zero, indicating that an outflow of foreign investors is less of a concern for these economies. These results, obtained on the whole panel of 21

countries, confirm that those shown in our motivational example in Figure 1 for Chile and Mexico are indeed representative of a wider phenomenon, and that they are robust to controlling for other important country specific characteristics.

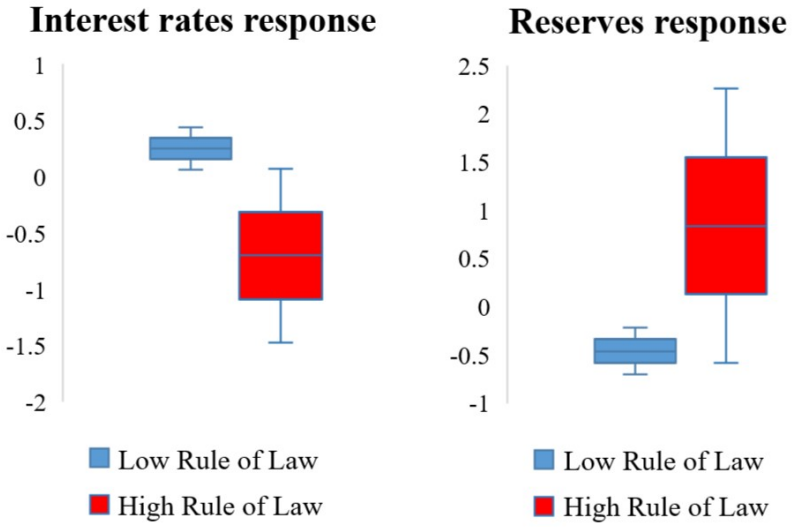



Figure 2: Policy Response to global financial conditions and the rule of law

One result that may seem surprising is the relative inactivity of macroprudential policies and of capital controls in response to financial shocks. In order to provide some further color to this result, we isolate some specific events of heightened global market stress and check how policies react to them. In particular we select 13 monthly episodes in which global financial conditions were unusually tight over our sample period. These episodes occur around well known events of market volatility, like the burst of the dot-com bubble, the global financial crisis, the euro area crisis and China's stock market turbulence in 2015-2016 and are discussed more in details in Appendix A. We then trace the cumulative response around a window of three months (one before the episodes and two afterwards) of short term interest rates, reserves, macroprudential policies and capital inflows. We only look at ten countries, 5 with very high quality of institutions and 5 with very low quality of institutions, to highlight differences across these categories.[9] Figures 3 to 6, where cumulative changes in policies are plotted against cumulative changes in the exchange rate, show the results of this analysis.

[9]To the first category belong, respectively, Russia, Mexico, Philippines, Peru and Argentina, to the second Malaysia, Czech Republic, Israel, Chile and South Korea.

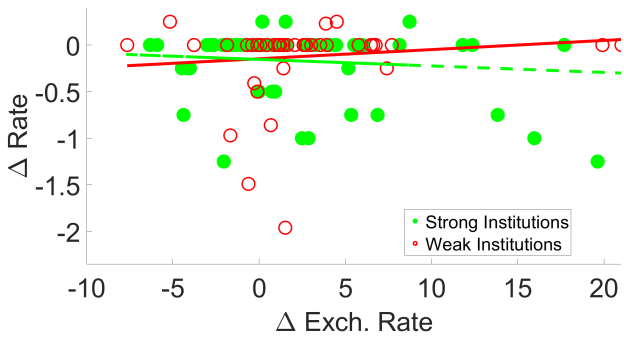



Figure 3: Δ rates and the exch. rate

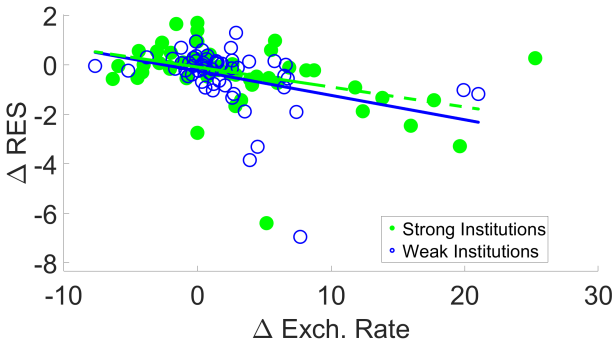



Figure 4: Δ reserves and the exch. rate

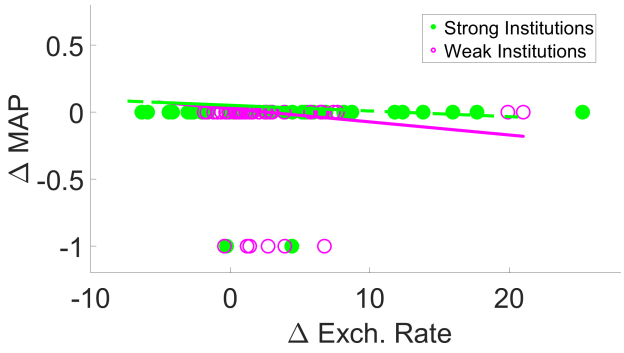



Figure 5: Δ macro-pru and the exch. rate

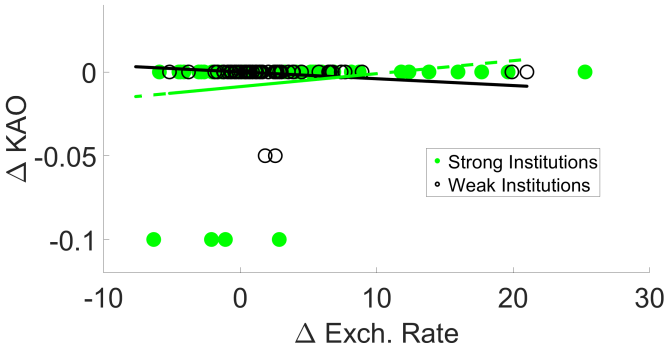



Figure 6: Δ K controls and the exch. rate

These plots confirm that most of the action comes from interest rates and reserves, whereas macroprudential policies and capital controls are activated only in a handful of cases and remain mostly inactive as counter-cyclical tools. In the case of macroprudential instruments, there are two concurrent explanations. First, they have been more widely adopted only after the Global Financial Crisis (Cerutti, Claessens, and Laeven, 2017). Second, some macroprudential policies need a transition time in which they are first tightened, so that they can be loosened in bad times. This is for instance the case for counter-cyclical capital buffers. Indeed, this seems to have happened in most of the countries under analysis, as the indices of macroprudential policies indicate a progressive tightening after the GFC, see Figure 7.[10]

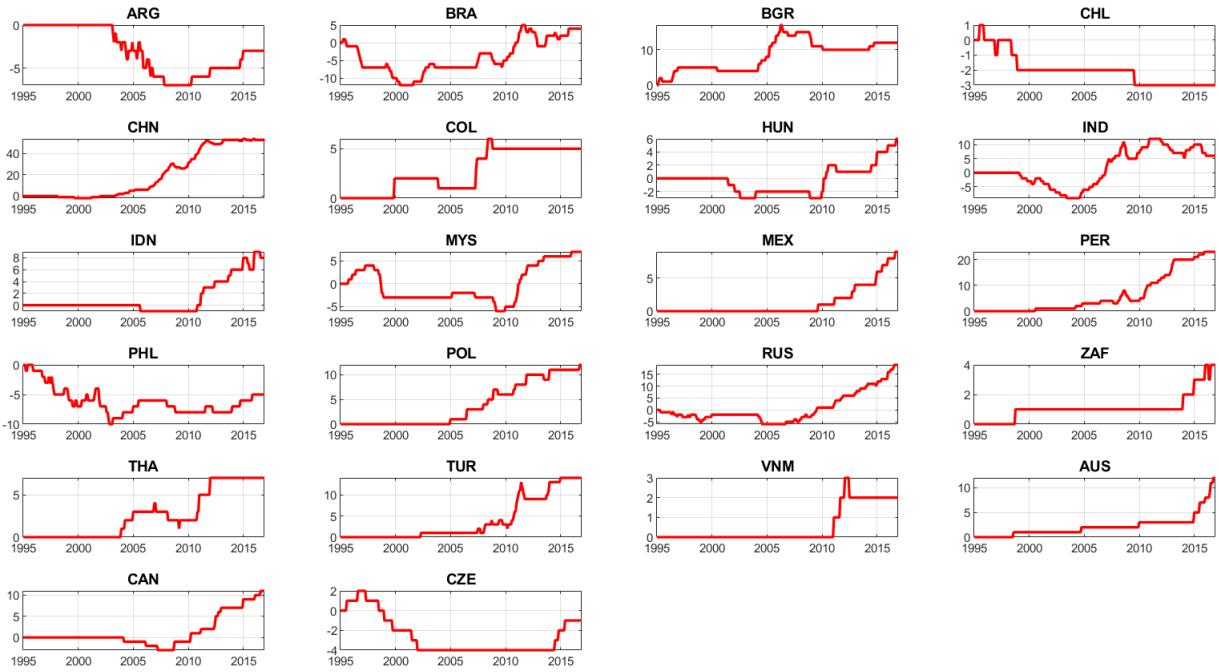



Figure 7: Indices of macroprudential stance

In the case of capital controls, EMEs tend not to use controls on outflows in periods of financial stress, fearing that this might exacerbate the perceived vulnerability of the country (Rebucci and Ma, 2019).

[10]Recent evidence by Martin, Joy, Maurini, Moro, Landi, Schiavone, and van Hombeeck (2020), is consistent with this view, as it shows that these instruments have been used more actively during the Covid crisis.

### 3.3 The causal effect of policies: Oaxaca-Blinder decomposition

So far, our empirical analysis has uncovered two interesting pieces of evidence. First, countries that have stronger institutions suffer less from an exogenous tightening of global financial conditions. Second, these countries can afford loosening monetary policy to support the economy, while at the same time suffering less in terms of foreign exchange reserves depletion. The last question that we face, the one that lies at the heart of the paper, is whether the use of these counter-cyclical policies is responsible, at least partially, for their better macroeconomic performance after a global financial shock. Answering this question poses some particular challenges. After all, we have seen that policy reacts endogenously to the shock, so that uncovering the *causal* effect of policies conditional on a given shock, requires further identifying assumption.

Cloyne, Jordà, and Taylor (2020) develop an econometric method that is suited to answer this type of question. The method consists of decomposing the impact of a treatment on an economic outcome into a direct and an indirect effect, where the latter is affected by the policy response to the shock itself.[11] In other words, imagine two countries that are hit by the same shock, but one has a monetary policy rule that prescribes a stronger reaction than the other. This decomposition allows to estimate to what extent the difference in economic outcomes depends on the policy response.

This method can be implemented in our framework in two steps. The first step consists of estimating *for each country* a policy reaction function:

$$\Delta_h P_{i,t+h} = \Theta^P_{i,h} EBP_t + Controls + \eta_{i,t} \tag{3}$$

where the term $Controls$ includes country specific fundamentals, lags of the $EBP_t$ and lags of the endogenous variable. The estimated term $\widehat{\Theta^P_{i,h}} EBP_t$ measures the policy response of country $i$, $h$ periods after the shock to global financial conditions. In a second step, this term is then added to the panel local projections:

$$\Delta_h y_{i,t+h} = \mu^h + \beta^h EBP_t + \widehat{\Theta^P_{i,h}} EBP_t \theta^{h,S} + Controls + Interactions + \gamma_i + \eta_{i,t}. \tag{4}$$

[11] The method is known as the Oaxaca-Blinder decomposition, as it translates to local projections a method developed in micro-econometrics in two separate papers by Alan Blinder and Ronald Oaxaca.

The coefficient $\theta^{h,S}$ provides an estimate of how the policy response affects the effects of changes in global financial conditions. Importantly for our purposes, it has a causal interpretation, i.e. it measures to what extent a change in the policy response to that particular shock determines a change in the effect of the shock on economic outcomes.[12]

We start by estimating a baseline version of this model, in which the strength of institutions does not play a specific role, and then extend it to allow for a different effects of policies in countries with a low or high rule of law. Given the results shown in the previous section we focus our analysis exclusively on monetary policy and reserves management. The baseline results are reported in the first six columns of Table 5, where we report the results for equity prices, sovereign spreads and exchange rates, one month after the change in $EBP_t$. Changes in official reserves have a significant impact in attenuating the effects of a global tightening of financial conditions on domestic asset prices: a reduction of reserves boosts equity prices and reduces spreads. The effects of monetary policy, on the other hand, appear to be ambiguous. A reduction of policy rates bolsters equity prices but induces a widening of spreads.

By allowing for a differential impact based on the strength of the rule of law, we shed some light on this issue. We interact the $\widehat{\Theta^{P}_{i,h}} EBP_t$ term with a dummy $D_t$ that equals 1 if the countries have a strong (above the mean) rule of law, and zero otherwise. This distinction reveals an interesting layer of heterogeneity. First, reserves are effective in mitigating global financial shocks only for countries with strong institutions. For those with a weak rule on law, a reduction of reserves tends to weaken equity prices (albeit the coefficient is not significantly different from zero) and to raise significantly spreads. For economies with a strong rule of law, instead, a reduction of reserves acts countercyclically, i.e. significantly raises stock prices and reduces spreads. This switch in the sign of the coefficients also emerges for monetary policy, although three out of four coefficients are estimated with large uncertainty. Still, it is worth noting that a monetary policy expansion in response to an external financial shock raises significantly (instead of reducing) spreads for EMEs with weak rule of law. All in all, despite uncertainty in some of the coefficient estimates, these results confirm that there is a strong interaction

[12]Both the regressors as well as the term $\widehat{\Theta^{P}_{i,h}} EBP_t$ in equation 4 are in deviation from the mean. Not to burden too much the notation, we have left this unspecified equation 4.

between the role of institutions and policies in EMEs. Stronger institutions not only grant countries more room for manoeuvre in terms of policies, but are also associated with relatively more effective stabilization policies. For countries with a weak rule of law, attempts to stabilize financial conditions in response to an external shock by either shedding reserves or reducing policy rates may actually be counterproductive, a result that chimes with the risk-perception argument in Kalemli-Ozcan (2019).

# 4 Robustness checks and the Covid crisis

Institutional quality, as captured by our rule of law indicators, is strongly correlated with other country-specific characteristics, and importantly with per capita income. This raises the question whether we are simply picking up differences between richer and poorer countries. To investigate this issue we re-estimate our baseline equation 1 with two modifications. First, we add per capita income and its interaction with the EBP. Second, we replace the rule of law and related interaction with per capita income. The results are shown in Table 6. Adding per capita income and its interaction with the EBP leaves the baseline results unaltered. We still find that equity prices fall less and spreads increase less in countries with a better rule of law, even when controlling for per capita income. Interestingly, the interaction of per capita income with the EBP elicits a negative and significant coefficient in the equation for the exchange rate, indicating a milder depreciation of the exchange rate in richer countries. Replacing altogether the rule of law indicator with per capita income confirms the role of this latter variable in shaping the exchange rate response as evident from the right hand side panel of Table 6. All in all, this analysis suggests that both per capita income and institutional quality matter for the response of local financial conditions to global shocks, but that they capture somewhat separate country characteristics.

A second set of robustness exercises consists of replacing the EBP in equation 1 with either the VIX or with an intervention dummy that takes a value of 1 in selected episodes of financial stress and 0 otherwise. The results, reported in Appendx B are broadly consistent with those obtained with the EBP. The EBP, however, gives sharper inference, and we take this as evidence that the risk premium that is priced in US corporate spreads

(the main driver of the EBP) is better correlated with the risk premium priced in global financial markets than the VIX is.

### 4.1 The Covid period: is it special?

Global financial conditions tightened noticeably at the onset of the pandemic crisis, placing significant strain on financial markets of both on Advanced and Emerging economies.

Figure 10 shows the behaviour of the EBP in 2020. Risk aversion spiked sharply in March, as a significant part of the global economy went to a complete shut down due to pandemic containment measures. The tightening of global financial conditions reverberated significantly on asset prices in EMEs. Equity prices fell across the board, spreads rose and exchange rates depreciated, see Figure 11. Differently from other episodes, most EMEs reacted by slashing aggressively policy rates, see Figure 12 buttressing domestic financial conditions and capital inflows. Only Turkey experienced a substantial loss of reserves. Econometric estimates, presented in Tables 7 and 8 confirm that the effect of the shock, as well as the policy response did not differ significantly across countries, also when judged through the lens of the quality of their institutions. The Covid shock stands in this respect in contrast to other episodes of global financial turmoil.

## 5 A simple model of leaning against the global financial cycle

We introduce a simple two period model to illustrate the policy choice for a policy maker dealing with global shocks leading to external borrowing constraints. The model builds on Cesa-Bianchi, Ferrero, and Rebucci (2018). The key modification is an external collateral constraint that depends on domestic income and the exchange rate.

## 5.1 Set up

The representative agent of a small open economy of relative size $n \in (0,1)$ consumes a bundle of domestic and foreign goods defined as

$$c = \frac{c_H^{\alpha} c_F^{1-\alpha}}{\alpha^{\alpha}(1-\alpha)^{1-\alpha}}$$

where $\alpha \in (0,1)$ is the steady state share of consumption expenditure on domestic goods. As in Sutherland (2005), we assume that the weight on imported goods in the domestic consumption basket is a function of the relative size of the foreign economy

$$\alpha \equiv 1 - (1-n)\lambda,$$

where $\lambda \in (0,1)$ measures the degree of openness. Expenditure minimization implies that the demand for domestic and foreign goods is

$$c_H = \alpha \left(\frac{P_H}{P}\right)^{-1} c \qquad \text{and} \qquad c_F = (1-\alpha)\left(\frac{P_F}{P}\right)^{-1} c,$$

where $P_H$ and $P_F$ are the prices in domestic currency of domestic and foreign goods, respectively, and $P$ is the domestic consumption price index

$$P = P_H^{\alpha} P_F^{1-\alpha}.$$

The consumption bundle in the foreign country takes the same form, except that the weight on domestic goods is $\alpha^* \equiv n\lambda$.

We denote the terms of trade with $\tau \equiv P_F/P_H$. Therefore, the relative price of domestic and foreign goods ($p_H \equiv P_H/P$ and $p_F \equiv P_F/P$) are a function of the terms of trade according to

$$p_H = \tau^{\alpha-1} \qquad \text{and} \qquad p_F = \tau^{\alpha}.$$

We assume that the law of one price holds so that

$$P_j = \mathcal{E} P_j^*,$$

for $j \in \{H, F\}$, where $\mathcal{E}$ is the nominal exchange rate. As a consequence, the (log of the) real exchange rate $s$ is proportional to the (log of the) terms of trade according to

$$s \equiv \frac{\mathcal{E} P^*}{P} = \tau^{\alpha - \alpha^*},$$

where $P^*$ is the foreign consumption price index.

In period $t = \{1, 2\}$, the representative household receives an endowment of domestic goods $y_t$ and maximizes the present discounted value of utility from consumption

$$\max U(c_1, c_2) = \ln c_1 + \beta \ln c_2,$$

where $\beta \in (0, 1)$ is the individual discount factor. The budget constraint for the first period is

$$c_1 - b - s_1 f = p_{H1} y_1 - R_0 b_0 - R_0^* s_1 f_0,$$

with $b_0$ and $f_0$ given, where $b$ is debt denominated in domestic currency and $f$ is debt denominated in foreign currency, which carry gross returns $R$ and $R^*$, respectively. Since the representative household cannot borrow in period 2, the budget constraint for the second period is

$$c_2 = p_{H2} y_2 - Rb - R^* s_2 f.$$

In addition, the representative household is subject to a collateral constraint on the total amount of borrowing that depends on the value of the endowment in the second period

$$b + s_1 f \leqslant \omega p_{H2} y_2, \tag{5}$$

where $\omega \in (0, 1)$ is the collateral constraint parameter.

The first order condition for the optimal choice of domestic debt is

$$1 - \mu = \beta R \frac{c_1}{c_2},$$

where $\mu$ is the multiplier on the collateral constraint. The first order condition for the optimal choice of foreign debt is

$$1 - \mu = \beta R^* \frac{c_1}{c_2} \frac{s_2}{s_1}.$$

Taking the difference between these first order conditions yields the uncovered (real) interest rate parity condition

$$R = R^* \frac{s_2}{s_1}.$$

In what follows, we assume that the size of the Home country is negligible relative to the rest of the world and take the limit $n \to 0$, which implies $\alpha = 1 - \lambda$ and $\alpha^* = 0$. With this assumption, relative prices become

$$p_H = \tau^{-\lambda} \qquad \text{and} \qquad p_F = \tau^{1-\lambda}.$$

Similarly, the relation between the real exchange rate and the terms of trade is

$$s = \tau^{1-\lambda}.$$

Below, for convenience, we express the equilibrium of the model in terms of the real exchange rate (so $p_H = s^{-\frac{\lambda}{1-\lambda}}$).

We do not seek to characterize the portfolio choice of the representative agent in the small open economy and instead take the ratio of foreign to domestic **currency** debt as given

$$\eta \equiv \frac{s_1 f}{b}.$$

If $\eta = 0$, all debt is denominated in domestic currency. As the fraction of debt denominated in foreign currency increase, so does $\eta$.[13] With this definition, we can rewrite the budget

[13]Most countries issue debt denominated both in domestic and in foreign currency. Emerging markets typically issue a larger share of debt denominated in foreign currency than advanced economies. See

constraints in the two periods as

$$c_1 - (1+\eta)b = s_1^{-\frac{\lambda}{1-\lambda}} y_1 - (1+\eta) R_0 b_0,$$

and

$$c_2 = s_2^{-\frac{\lambda}{1-\lambda}} y_2 - (1+\eta) R b,$$

where the right-hand side uses the relation between the relative price of domestic goods and real exchange rate, and we have also substituted the uncovered interest rate parity condition.[14]

The small open economy takes the world real interest rate as given, which we assume to be such that $\beta R^* = 1$. In addition, we also assume that $R = R^* e^{\epsilon}$, where $\epsilon = \{0, \bar{\epsilon}\}$ is a financial shock, with $\bar{\epsilon} > 0$. If $\epsilon = 0$, the economy is in "normal times." If $\epsilon = \bar{\epsilon}$, the economy experiences a "crisis."

## 5.2 Normal Times

We begin by characterizing the equilibrium in normal times. When $\epsilon = 0$, the interest rate on domestic and foreign debt is the same ($R = R^* = 1/\beta$). As a consequence, the real exchange rate is constant over time ($s_1 = s_2 = s$). We focus on the case in which the collateral constraint is not binding ($\mu = 0$). From the first order condition for debt, we can then see that consumption is also constant over time ($c_1 = c_2 = c$). Using this result in the budget constraints, we obtain

$$\left(1 + \frac{1}{\beta}\right)(1+\eta)b = s^{-\frac{\lambda}{1-\lambda}}(y_2 - y_1) + (1+\eta) R_0 b_0.$$

Cesa-Bianchi, Ferrero and Rebucci (2018) for details. If we interpret the share of debt issued in domestic currency as a measure of quality of institutions (e.g. protection of property rights), better institutions would correspond to lower $\eta$. In a country with low protection of property rights, foreign investors need to resort to foreign law contracts, whereas in a country with high protection also debt issued under domestic law is attractive.

[14] In principle, the share of foreign-currency debt could change over time as households adjust the currency composition of their portfolios in response to aggregate shocks. For simplicity, we abstract from this possibility. In the data, the share foreign-currency debt is rather stable for most countries, at least over the short to medium term.

From the last equation, we can solve for the total amount of debt undertaken at time 1 as a function of the real exchange rate and other parameters of the model

$$(1+\eta)b = \left(\frac{\beta}{1+\beta}\right)[s^{-\frac{\lambda}{1-\lambda}}(y_2 - y_1) + (1+\eta)R_0 b_0]. \tag{6}$$

Plugging the expression for debt back into the budget constraint at time 2, we obtain

$$c = s^{-\frac{\lambda}{1-\lambda}} y_2 - \frac{1}{1+\beta}[s^{-\frac{\lambda}{1-\lambda}}(y_2 - y_1) + (1+\eta)R_0 b_0],$$

which we can further simplify to obtain

$$c = \left(\frac{1}{1+\beta}\right)[s^{-\frac{\lambda}{1-\lambda}}(\beta y_2 + y_1) - (1+\eta)R_0 b_0]. \tag{7}$$

We can determine the real exchange rate using the domestic goods market clearing condition

$$y_t = c_{Ht} + \frac{1-n}{n} c^*_{Ht}.$$

Using the small open economy limit, we can rewrite the last equation as

$$y_t = (1-\lambda)p_{Ht}^{-1} c_t + \lambda (p^*_{Ht})^{-1} y^*_t,$$

where $y^*_t = c^*_t$ is the exogenous level of foreign demand. Using the law of one price and the link between the relative price of domestic goods and the real exchange rate, we can write the goods market clearing condition as

$$y_t = s_t^{\frac{\lambda}{1-\lambda}}[(1-\lambda)c_t + \lambda s_t y^*_t].$$

Replacing equation (7) in the last expression implicitly determines the real exchange rate. Plugging back the result into (6) and (7) gives a solution for debt and consumption, respectively, in normal times.

Finally, we need to check that the amount of debt satisfies the collateral constraint.

Substituting equation (6) into (5), we obtain

$$\left(\frac{\beta}{1+\beta}\right)\left[s^{-\frac{\lambda}{1-\lambda}}(y_2-y_1)+(1+\eta)R_0b_0\right]\leqslant \omega s^{-\frac{\lambda}{1-\lambda}}y_2.$$

This equation imposes an upper bound on the initial level of debt consistent with an equilibrium in which the collateral constraint does not bind.

## 5.3 The Crisis State

Next, we move on to characterize the equilibrium in a crisis. When $\epsilon = \bar{\epsilon}$, the size of the shock determines the depreciation of the real exchange rate in period 2 ($s_2 = s_1 e^{\bar{\epsilon}}$). The relation between real exchange rate, terms of trade and relative prices still holds in each period, but all those variables are no longer constant. In this case, we focus on equilibria in which the collateral constraint binds ($\mu > 0$) so the equilibrium level of debt is

$$(1+\eta)b = \omega s_1^{-\frac{\lambda}{1-\lambda}}y_2. \tag{8}$$

Substituting into the budget constraint at time 1, we obtain

$$c_1 = s_1^{-\frac{\lambda}{1-\lambda}}y_1 + \omega s_2^{-\frac{\lambda}{1-\lambda}}y_2 - (1+\eta)R_0b_0. \tag{9}$$

Similarly, for time 2, we have

$$c_2 = s_2^{-\frac{\lambda}{1-\lambda}}\left(1-\frac{e^{\bar{\epsilon}}}{\beta}\omega\right)y_2. \tag{10}$$

As in normal times, we can determine the real exchange rate in each period by substituting the expression for consumption into the domestic goods market clearing condition. Once we have the solution for the real exchange rate, we can substitute back into (8), (9) and (10) to determine debt and consumption in the two periods, respectively.

Fur illustration, in Appendix C we we consider the special case in which initial debt is zero ($b_0 = f_0 = 0$), which allows us to obtain a closed form solution for the model.

## 5.4 Numerical Analysis

If the initial level of debt is zero, for reasonable parameter values (e.g. $\beta = 0.96$, $\omega = 0.3$ and $\lambda = 0.4$, with $y_1 = 1$ and $y_2 = 1.1$) and $b_0 = 1$ we obtain an equilibrium such that the collateral constraint does not bind in normal times. A value of the shock $\bar{\epsilon} = 1.25$ is sufficient to make the real exchange rate depreciate so that first period debt is lower in a crisis than in normal times. Fixing all other parameter values, a larger value of the shock increases the depreciation and the gap between debt in normal times (which is unaffected) and in a crisis.

## 5.5 Optimal Policy: Leaning against the global financial cycle

Turning to policies to lean against the global financial cycle in this simple stylised setting, we consider two types of policy interventions and we refer to them, loosely speaking, as respectively the ex ante and ex post policies. The first is to influence the share of foreign law and hence foreign currency debt $\eta$ through structural reforms. The intuition here is that a country with a better quality of institutions and protection of property rights can lead to a lower share of foreign currency debt, which in turn reduces the stringency of the collateral constraint in the crisis state. In other words, this is a country that is able to rely on domestic debt to a large extent, protecting itself against the vagaries of the global financial cycle. As shown in Figure 8 for a straightforward numerical simulation of the model, a higher level of the $\eta$ parameter leads to a larger utility loss for the representative household in the crisis state compared with the unconstrained state with unlimited borrowing. Again loosely speaking, since $\eta$ can be thought of as a slow moving variable, this is an "ex ante" policy whose objective is to reduce the country's vulnerability to the shock, should it occur.

The second possible policy intervention entails selling foreign exchange reserves for one period with the objective to appreciate the real exchange rate in order to loosen the collateral constraint in the crisis state (the effect on the exchange rate is then reversed in the subsequent period).[15] Let us call this quantity a "wedge", because it implies a

[15] Another way this could be done is to increase the interest rate in the first period, using the Uncovered Interest Parity. This monetary policy intervention, however, has the effect of increasing the cost of domestic debt and is less effective than influencing the exchange rate directly.

deviation of the exchange rate s1 from its equilibrium value conditional on the external shock. Figure 9 shows the same utility loss in the crisis state against different values of this wedge. Note that the left panel refers to the baseline calibration of the share of foreign currency debt, $\eta = 0.5$, whereas the right hand panel refers to a calibration with a higher value ($\eta = 0.75$). Overall, we find that (i) higher value of the wedge reduce the utility loss in the crisis state and (ii) the effect of this intervention is larger, the larger the level of $\eta$.

All in all, the key message arising from this analysis is therefore that structural reforms (ex ante policy) and use of FX reserves (ex post policy) are largely *substitutes*. In line with the empirical results, countries with stronger institutions who rely less on foreign law and foreign currency debt also need to use less FX intervention. Which combination of policies is optimal in order to reduce the cost of the external shock and the existence of a binding collateral constraint in the steady state hinges therefore on the cost of implementing these policies, which is outside this simple model. In the case of structural reforms that influence the share of foreign currency debt, one can imagine that standing up to lobbies and interest groups as well as the electoral cycle are practical problems that a policy maker need to deal with. On the other hand, using FX reserves to stabilise the exchange rate in a crisis state is also associated with costs, for example the possible depletion of reserves, the cost of accumulating reserves and the risk that the policy is not effective. One counter-factual finding of our model simulation is that the ex post policy appears to be less, and not more effective in the presence of a lower share of foreign currency debt. Understanding the mechanism behind this type of complementarity that arises from some of our empirical results is left for future research.

# 6 Conclusions

This paper studies the role and the interaction of the quality of institutions and of countercyclical policies in leaning against the Global Financial Cycle (GFC) in Emerging Economies (EMEs). Our analysis shows that strong institutions play a key role in shaping the impact of global financial shocks on EMEs and that they are closely related to counter-cyclical policies. In countries that enjoy a stronger rule of law, domestic

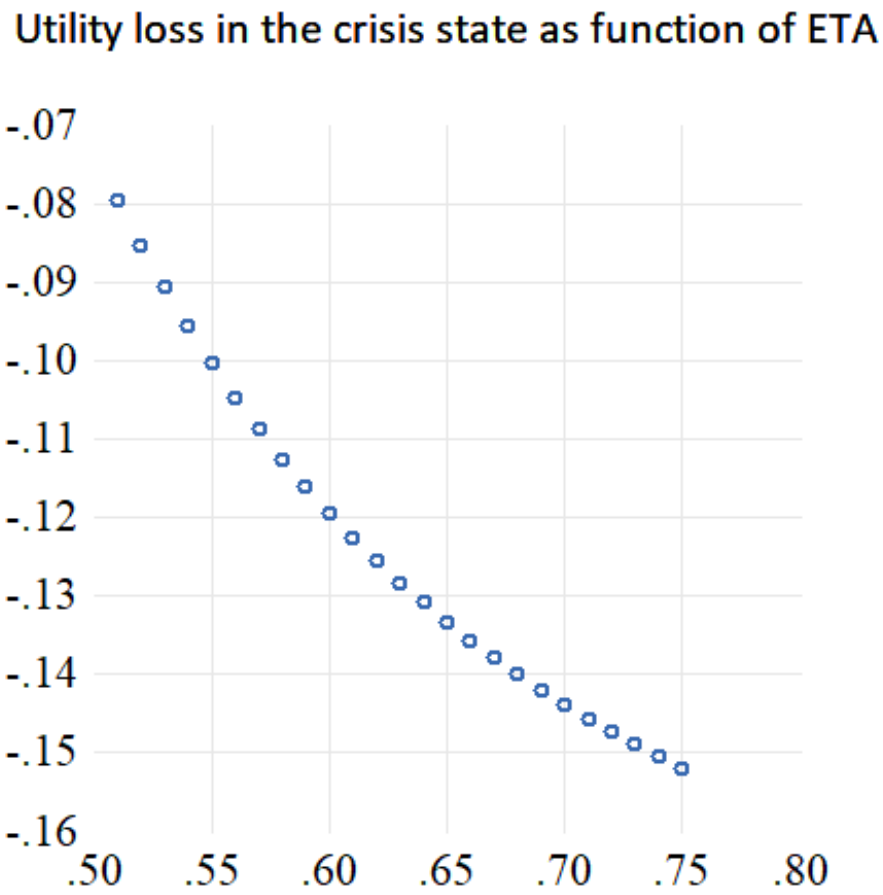



Figure 8: The x axis reports different values of the share of foreign currency debt η. The y axis reports the difference in utility between the normal and the crisis state (binding collateral constraint) conditional on the realization of a shock leading to a 25% nominal depreciation in the first period.

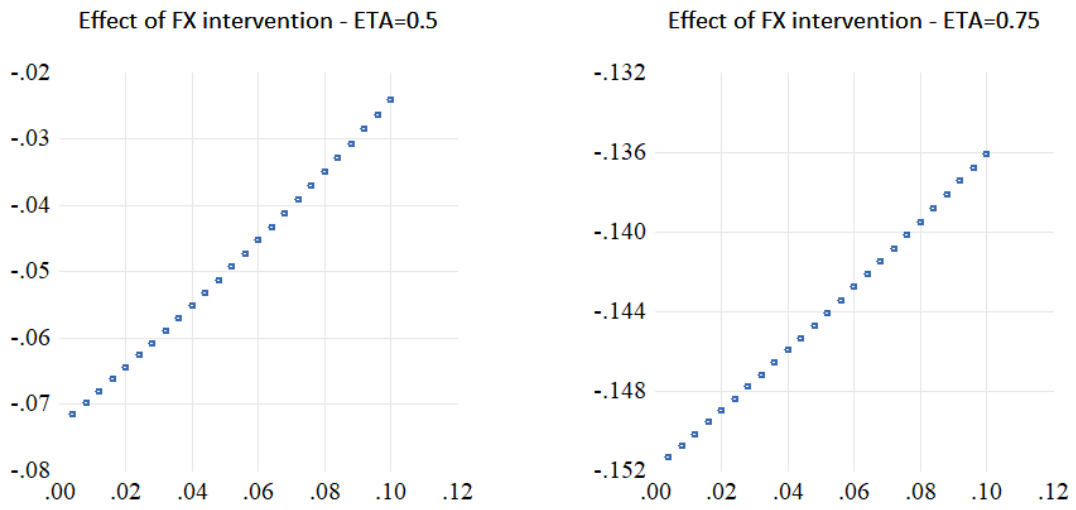



Figure 9: The x axis reports different values of the effect of selling FX reserves in period 1 on the exchange rate s1 (”wedge”). The left panel refers to the baseline case of the share of foreign currency debt $\eta = 0.5$, the right panel to a higher value of $\eta = 0.75$. The y axis reports the difference in utility between the normal and the crisis state (binding collateral constraint) conditional on the realization of a shock leading to a 25% nominal depreciation in the first period.

financial conditions are significantly more isolated from the global financial cycle. These countries are also more free to use monetary policy to ease financial conditions, and need to intervene less in the foreign exchange market. It seems then, that the strength of institutions is a primary concern for international investors, who punish weaker countries that hike in the middle of a financial crisis with even more capital outflows. Our second result is that in countries that have stronger institutions stabilization policies are more effective in attenuating the effect of foreign financial shocks.

This poses a further trade off for policy makers. Countries may in fact decide to ex-ante undertake costly structural reforms that reduce the country's dependence on the GFC or ex-post transfer resources to (withdraw resources from) households when the GFC tightens (loosens). We show that in a model of an endowment economy with borrowing constraints structural and counter-cyclical policies are to a large extent substitutes, so that countries for which counter-cyclical policies are very effective, have less of an incentive to strengthen their institutional framework.

Table 1: Description of the variables and data sources

| Variables | Source |
|---|---|
| $S_t$ | |
| Excess Bond Premium | Gilchrist and Zakrajsek (2012), updated |
| VIX | Haver |
| $Y_{it}$ | |
| Stock returns, sovereign spreads, exchange rates, GDP growth | IMF/Haver |
| $P_{it}$ | |
| Short term interest rate (%) | IMF and national sources/Haver |
| Foreign exchange reserves (% of GDP) | IMF/Haver |
| Macro-prudential stance (index) | MaPP (Alam et al. 2019) |
| Capital controls on inflows/outflows | Fernandez et al. (2019) |
| $Z_{it-1}$ | |
| Rule of Law | |
| Government effectiveness | |
| Corruption control | World Bank |
| Quality of Regulation | |
| Political Stability | |
| $X_{it-1}$ | |
| Capital account openness (index) | Chinn-Ito (2018) |
| Exchange rate regime (dummy) | Obstfeld et al. (2010), updated |
| Current account balance (% of GDP) | IMF/Haver |
| Foreign Debt in USD (% of GDP) | Benetrix et al. (2019) |
| Net foreign assets (% of GDP) | IMF/Haver |

Table 2: Global financial conditions, institutions and economic outcomes

| | Equity | | Spread | | Exch. rate | | GDP | |
|---|---|---|---|---|---|---|---|---|
| | t+1 | t+6 | t+1 | t+6 | t+1 | t+6 | t+12 | t+18 |
| EBP | -10.0*** | -14.5*** | 0.64*** | 0.58*** | -2.50*** | -3.51*** | -0.80*** | -1.05*** |
| | (1.20) | (2.35) | (0.078) | (0.13) | (0.54) | (1.06) | (0.19) | (0.26) |
| EBP*Rule of Law | 2.08*** | 1.90 | -0.18*** | -0.22*** | -0.34 | 0.14 | 0.23* | 0.24** |
| | (0.64) | (1.16) | (0.044) | (0.064) | (0.42) | (0.57) | (0.13) | (0.12) |
| Rule of Law | -1.40** | -9.72*** | 0.039 | 0.40 | -0.87* | -6.80*** | -0.99 | -1.59** |
| | (0.61) | (2.71) | (0.061) | (0.31) | (0.44) | (2.59) | (0.67) | (0.79) |
| EBP*ΔRates | -0.11 | -1.32*** | 0.0036 | 0.032 | -0.091 | -0.43 | 0.067 | -0.029 |
| | (0.26) | (0.50) | (0.029) | (0.050) | (0.080) | (0.40) | (0.092) | (0.075) |
| ΔRates | -0.066* | -0.42** | 0.0027 | 0.011 | -0.020 | -0.15 | -0.21*** | -0.20*** |
| | (0.040) | (0.21) | (0.0055) | (0.027) | (0.026) | (0.16) | (0.039) | (0.042) |
| EBP*ΔReserves | 0.56** | 0.37 | -0.028 | -0.020 | 0.32*** | 0.86*** | 0.10** | 0.058 |
| | (0.23) | (0.58) | (0.027) | (0.028) | (0.12) | (0.24) | (0.040) | (0.052) |
| ΔReserves | 0.0076 | -0.052 | 0.0014* | 0.0094* | 0.023*** | 0.14*** | 0.048** | 0.035* |
| | (0.014) | (0.097) | (0.00082) | (0.0048) | (0.0067) | (0.038) | (0.022) | (0.018) |
| EBP*ΔCTR-Outflows | -2.94 | -1.45 | 0.51*** | 1.00*** | 2.85*** | 6.53** | 1.53 | 1.10 |
| | (1.99) | (4.14) | (0.18) | (0.32) | (0.72) | (2.80) | (1.05) | (1.02) |
| ΔCTR-Outflows | 0.15 | 0.49 | -0.045 | -0.39 | -0.74* | -4.80* | 1.18* | 0.98 |
| | (0.63) | (3.28) | (0.075) | (0.36) | (0.40) | (2.55) | (0.67) | (0.78) |
| EBP*ΔMacroPru | 0.088 | -2.83** | 0.046* | 0.14*** | -0.021 | -0.50 | -0.21*** | -0.31*** |
| | (0.26) | (1.36) | (0.027) | (0.049) | (0.24) | (0.48) | (0.075) | (0.075) |
| ΔMacroPru | -0.083*** | -0.46*** | 0.0010 | 0.0040 | -0.015** | -0.098*** | -0.073*** | -0.068*** |
| | (0.019) | (0.15) | (0.00081) | (0.0039) | (0.0071) | (0.036) | (0.019) | (0.017) |
| Observations | 6003 | 5904 | 5301 | 5193 | 5108 | 5025 | 5467 | 5467 |
| Number of groups | 22 | 22 | 22 | 22 | 18 | 18 | 22 | 22 |
| Lags of Dep Var. | YES | YES | YES | YES | YES | YES | YES | YES |
| R2 Within | 0.20 | 0.23 | 0.15 | 0.14 | 0.075 | 0.11 | 0.34 | 0.24 |

**Notes:** The table shows coefficients of interest from model 1 estimated on monthly observations from 1990 to 2021 for 22 emerging economies. The model includes country-specific fixed effects. Robust standard errors (Driscoll-Kraay) are reported in parentheses. The asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

## Table 3: Robustness, other measures of institutional strength

| | Equity t+1 | Spread t+1 | Exch. rate t+1 | GDP t+12 | Equity t+1 | Spread t+1 | Exch. rate t+1 | GDP t+12 | Equity t+1 | Spread t+1 | Exch. rate t+1 | GDP t+12 | Equity t+1 | Spread t+1 | Exch. rate t+1 | GDP t+12 | Equity t+1 | Spread t+1 | Exch. rate t+1 | GDP t+12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| EBP | -10.9*** | 0.72*** | -2.48*** | -0.70*** | -9.88*** | 0.63*** | -2.59*** | -0.74*** | -10.6*** | 0.70*** | -2.32*** | -0.76*** | -9.43*** | 0.63*** | -2.56*** | -0.84* | -9.83*** | 0.67*** | -2.56*** | 0.086 |
| | (1.33) | (0.088) | (0.52) | (0.25) | (1.19) | (0.079) | (0.56) | (0.24) | (1.24) | (0.084) | (0.50) | (0.26) | (1.31) | (0.092) | (0.54) | (0.47) | (1.21) | (0.083) | (0.57) | (0.38) |
| EBP*Gov. Effectiv. | 2.89*** | -0.26*** | -0.12 | -0.14 | | | | | | | | | | | | | | | | |
| | (0.83) | (0.066) | (0.40) | (0.23) | | | | | | | | | | | | | | | | |
| Gov. Effectiv. | 0.0056 | 0.010 | 0.39 | -0.51 | | | | | | | | | | | | | | | | |
| | (0.59) | (0.049) | (0.35) | (1.19) | | | | | | | | | | | | | | | | |
| EBP*Corruption | | | | | 1.70** | -0.14*** | -0.88* | -0.012 | | | | | | | | | | | | |
| | | | | | (0.72) | (0.051) | (0.54) | (0.18) | | | | | | | | | | | | |
| Corruption | | | | | 0.50 | -0.021 | -0.099 | 1.86*** | | | | | | | | | | | | |
| | | | | | (0.59) | (0.048) | (0.36) | (0.66) | | | | | | | | | | | | |
| EBP*Regulation | | | | | | | | | 2.19*** | -0.19*** | -0.69 | 0.036 | | | | | | | | |
| | | | | | | | | | (0.70) | (0.038) | (0.45) | (0.20) | | | | | | | | |
| Regulation | | | | | | | | | -1.63** | 0.033 | -0.11 | -0.22 | | | | | | | | |
| | | | | | | | | | (0.64) | (0.066) | (0.45) | (0.67) | | | | | | | | |
| EBP*CB Transp. | | | | | | | | | | | | | -0.054 | 0.00 | -0.001 | 0.014 | | | | |
| | | | | | | | | | | | | | (0.066) | (0.0042) | (0.023) | (0.053) | | | | |
| CB Transparency | | | | | | | | | | | | | 0.20 | -0.014 | 0.067 | 0.069 | | | | |
| | | | | | | | | | | | | | (0.15) | (0.017) | (0.064) | (0.078) | | | | |
| EBP*CB Indep. | | | | | | | | | | | | | | | | | -0.24 | -0.037 | -0.039 | -1.45*** |
| | | | | | | | | | | | | | | | | | (0.58) | (0.047) | (0.34) | (0.37) |
| CB Independence | | | | | | | | | | | | | | | | | 1.21 | 0.39 | 0.77 | 6.75* |
| | | | | | | | | | | | | | | | | | (2.18) | (0.33) | (0.75) | (3.53) |
| Observations | 6003 | 5301 | 5108 | 5967 | 6003 | 5301 | 5108 | 5967 | 6003 | 5301 | 5108 | 5967 | 5739 | 5195 | 4857 | 5647 | 5759 | 5140 | 4829 | 5699 |
| Number of groups | 22 | 22 | 18 | 22 | 22 | 22 | 18 | 22 | 22 | 22 | 18 | 22 | 22 | 22 | 18 | 22 | 21 | 21 | 17 | 21 |
| Lags of Dep Var. | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| R2 Within | 0.20 | 0.15 | 0.074 | 0.21 | 0.19 | 0.15 | 0.075 | 0.21 | 0.20 | 0.15 | 0.074 | 0.21 | 0.20 | 0.15 | 0.088 | 0.22 | 0.19 | 0.14 | 0.072 | 0.22 |

**Notes:** The table shows coefficients of interest from model 1 estimated on monthly observations for 22 emerging economies over the different samples, for different indicators $Z_{t-1}$, as described in Section 3. The model includes country-specific fixed effects. Robust standard errors (Driscoll-Kraay) are reported in parentheses. The asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively. The last four rows of the table show results obtained by replacing measures of institutional quality with the measure of de jure central bank independence (CBI) computed by Garriga (2016) and with the index of central bank transparency developed by Dincer and Eichengreen (2014).

Table 4: Global financial conditions, institutions and policies

| | Interest Rates | | Reserves | | Capital Ctrl. | | Macropru | |
|---|---|---|---|---|---|---|---|---|
| | t+1 | t+6 | t+1 | t+6 | t+1 | t+6 | t+1 | t+6 |
| EBP | -0.016 | -0.30 | -0.14 | 0.14 | -0.0023 | -0.0084 | -0.076 | -0.17 |
| | (0.058) | (0.19) | (0.14) | (0.24) | (0.0030) | (0.0084) | (0.17) | (0.25) |
| EBP*Rule of Law | -0.0013 | -0.27** | 0.094 | 0.38* | -0.00044 | -0.0025 | 0.099* | 0.12 |
| | (0.057) | (0.11) | (0.077) | (0.22) | (0.0035) | (0.0081) | (0.053) | (0.10) |
| EBP*Rule of Law | -0.065 | -0.35 | 0.065 | 0.37 | -0.0047 | -0.013 | 0.033 | 0.037 |
| | (0.12) | (0.36) | (0.093) | (0.36) | (0.0041) | (0.013) | (0.059) | (0.19) |
| EBP*NFA/GDP | -0.24** | -0.87*** | 0.22 | 0.66 | 0.0052 | 0.015 | -0.020 | -0.049 |
| | (0.095) | (0.32) | (0.21) | (0.56) | (0.0061) | (0.014) | (0.11) | (0.23) |
| NFA/GDP | -0.13 | -0.22 | 0.028 | 0.29 | 0.00054 | 0.0020 | 0.23** | 0.81** |
| | (0.14) | (0.36) | (0.14) | (0.61) | (0.0041) | (0.014) | (0.11) | (0.38) |
| EBP*ChinnIndex | -0.087* | -0.20 | -0.045 | -0.064 | 0.0025 | 0.0091 | -0.028* | -0.090** |
| | (0.051) | (0.12) | (0.039) | (0.092) | (0.0027) | (0.0061) | (0.015) | (0.041) |
| ChinnIndex | 0.047 | 0.044 | 0.027 | 0.065 | 0.0040*** | 0.014*** | 0.022 | 0.086 |
| | (0.047) | (0.12) | (0.025) | (0.099) | (0.0014) | (0.0039) | (0.019) | (0.063) |
| EBP*FlexOpen | 0.024 | -0.0049 | 0.079 | 0.51* | 0.0054 | 0.018* | 0.033 | 0.16 |
| | (0.064) | (0.13) | (0.082) | (0.28) | (0.0038) | (0.0099) | (0.037) | (0.11) |
| FlexOpen | 0.072 | 0.18 | 0.0030 | 0.29* | -0.00064 | -0.0033 | 0.029 | 0.067 |
| | (0.047) | (0.11) | (0.041) | (0.15) | (0.0016) | (0.0049) | (0.022) | (0.077) |
| Observations | 6086 | 5966 | 6695 | 6592 | 6744 | 6644 | 6744 | 6644 |
| Number of groups | 22 | 22 | 22 | 22 | 22 | 22 | 22 | 22 |
| Lags of Dep Var. | YES | YES | YES | YES | YES | YES | YES | YES |
| R2 Within | 0.081 | 0.12 | 0.11 | 0.15 | 0.012 | 0.038 | 0.077 | 0.13 |

**Notes:** The table shows coefficients of interest from model 2 estimated on monthly observations from 1990 to 2021 for 22 emerging economies. The model includes country-specific fixed effects. Robust standard errors (Driscoll-Kraay) are reported in parentheses. The asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 5: The effectiveness of policy reaction to the financial shock

| | Equity t+1 | | Spread t+1 | | Exch. rate t+1 | |
|---|---|---|---|---|---|---|
| $\theta^{h,S}$, Reserves | -2.89* | | 0.19** | | 0.27 | |
| | (1.52) | | (0.082) | | (0.45) | |
| $\theta^{h,S}$, Mon. Pol. | -2.76** | | -0.42* | | 0.12 | |
| | (1.40) | | (0.24) | | (0.92) | |
| $\theta^{h,S}$, Reserves - Weak Inst. | | 2.44 | | -0.38** | | 2.56 |
| | | (2.71) | | (0.17) | | (1.70) |
| $\theta^{h,S}$, Reserves - Strong Inst. | | -3.99** | | 0.26*** | | -0.88 |
| | | (1.64) | | (0.073) | | (0.75) |
| $\theta^{h,S}$, Mon. Pol - Weak Inst. | | 0.37 | | -0.81** | | 0.87 |
| | | (1.78) | | (0.36) | | (1.18) |
| $\theta^{h,S}$, Mon. Pol - Strong Inst. | | -5.52 | | 0.13 | | 0.77 |
| | | (3.61) | | (0.33) | | (7.56) |
| Observations | 5993 | 5993 | 5285 | 5285 | 5100 | 5100 |
| Number of groups | 22 | 22 | 22 | 22 | 18 | 18 |
| Lags of Dep Var. | YES | YES | YES | YES | YES | YES |
| R2 Within | 0.11 | 0.11 | 0.085 | 0.089 | 0.060 | 0.061 |

**Notes:** The top panel of table shows coefficients of interest from model 4. The bottom panel of the table and from a version of 4 where the term $\widehat{\Theta^{P}_{i,h}}\,EBP_t$ is interacted with a dummy $D_t$ that equals 1 if the countries have a strong (above the mean) rule of law, and zero otherwise. The model is estimated on monthly observations from 1990 to 2021 for 22 emerging economies. The model includes country-specific fixed effects. Robust standard errors (Driscoll-Kraay) are reported in parentheses. The asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 6: Rule of law and per capita income

| | Equity | | Spread | | Exch. rate | | Equity | | Spread | | Exch. rate | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | t+1 | t+6 | t+1 | t+6 | t+1 | t+6 | t+1 | t+6 | t+1 | t+6 | t+1 | t+6 |
| EBP | -9.30*** | -17.4* | 0.42** | 0.19 | 0.096 | 6.91 | -16.3*** | -26.9*** | 1.01* | 0.37 | 3.80* | 10.5* |
| | (2.15) | (9.49) | (0.18) | (1.05) | (1.33) | (9.13) | (5.00) | (8.78) | (0.56) | (0.83) | (2.17) | (6.00) |
| EBP*Rule of Law | 2.14*** | 1.80 | -0.20*** | -0.24** | -0.12 | 1.01 | | | | | | |
| | (0.67) | (1.58) | (0.042) | (0.12) | (0.45) | (1.09) | | | | | | |
| Rule of Law | -1.49** | -12.2*** | 0.031 | 0.33 | -1.08** | -8.23*** | | | | | | |
| | (0.67) | (3.07) | (0.067) | (0.28) | (0.49) | (3.01) | | | | | | |
| EBP*Per Capita Income | -0.087 | 0.37 | 0.025 | 0.046 | -0.31** | -1.24 | 0.73 | 1.44 | -0.042 | 0.024 | -0.75*** | -1.67** |
| | (0.21) | (1.02) | (0.022) | (0.12) | (0.15) | (1.06) | (0.52) | (0.95) | (0.063) | (0.095) | (0.29) | (0.74) |
| Per Capita Income | 0.29 | 5.99* | 0.031 | 0.18 | 0.55* | 3.95** | 0.040 | 4.22 | 0.051 | 0.30 | 0.41 | 2.76* |
| | (0.57) | (3.07) | (0.048) | (0.23) | (0.31) | (1.77) | (0.53) | (2.94) | (0.044) | (0.25) | (0.27) | (1.54) |
| Observations | 5992 | 5893 | 5301 | 5193 | 5108 | 5025 | 5980 | 5881 | 5301 | 5193 | 5108 | 5025 |
| Number of groups | 22 | 22 | 22 | 22 | 18 | 18 | 22 | 22 | 22 | 22 | 18 | 18 |
| Lags of Dep Var. | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| R2 Within | 0.20 | 0.23 | 0.15 | 0.14 | 0.078 | 0.12 | 0.19 | 0.23 | 0.15 | 0.14 | 0.081 | 0.10 |

**Notes:** The table shows coefficients of interest from versions of model 1 where per capita income and its interaction with the EBP are either added to the baseline specification or replace the rule of law indicator. The model is estimated on monthly observations from 1990 to 2021 for 22 emerging economies. The model includes country-specific fixed effects. Robust standard errors (Driscoll-Kraay) are reported in parentheses. The asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Figure 10: EBP during the Covid crisis

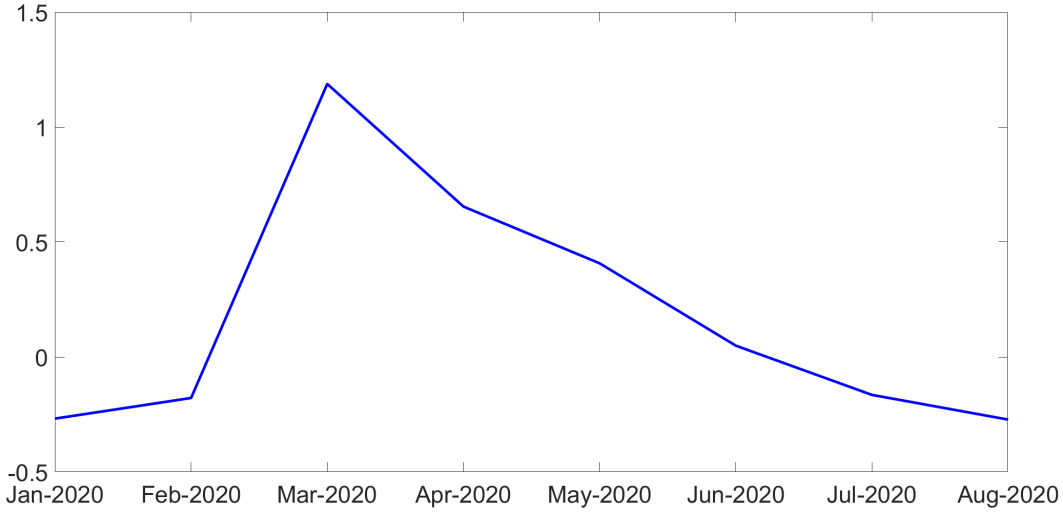
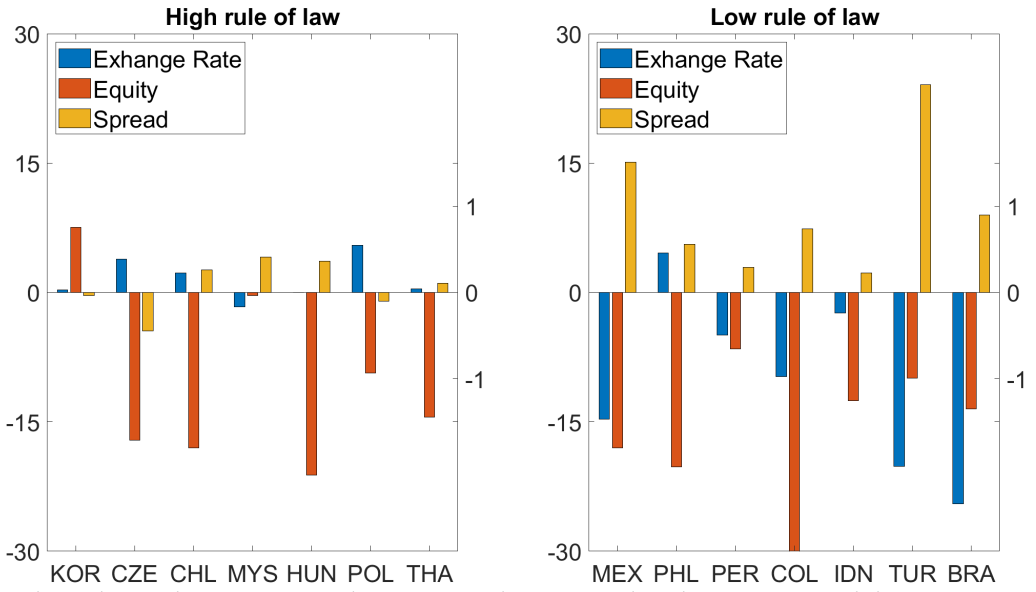
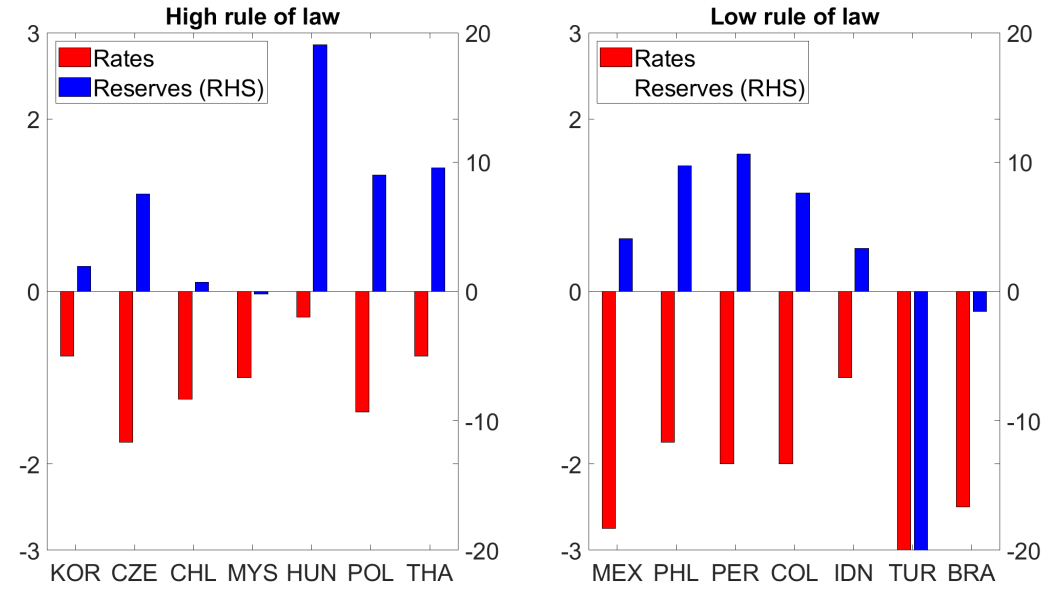


Figure 11: Yields, spreads and exchange rates during the Covid crisis in selected countries




**Notes:** The chart shows the percentage change in stock prices and exchange rates and the percentage points change in spreads (right hand axis) between January and August 2020 for a selected pool of countries with high and low rule of law.

Figure 12: Policy rates and FX reserves during the Covid crisis in selected countries




**Notes:** The chart shows the percentage points change in policy rates and the percentage change in foreign reserves (right hand axis) between January and August 2020 for a selected pool of countries with high and low rule of law.

Table 7: Economic outcomes during the pandemic

| | Equity | | | Spread | | | Exch. rate | | |
|---|---|---|---|---|---|---|---|---|---|
| EBP | -15.3*** | -15.4*** | -15.6*** | 0.72*** | 0.74*** | 0.75*** | -4.96*** | -5.01*** | -5.12*** |
| | (0.99) | (1.00) | (1.02) | (0.067) | (0.067) | (0.069) | (0.56) | (0.56) | (0.57) |
| EBP*Rule of Law | | 1.42 | 1.45 | | -0.26*** | -0.26*** | | 1.16 | 1.12 |
| | | (1.38) | (1.42) | | (0.096) | (0.100) | | (0.81) | (0.82) |
| Observations | 264 | 264 | 264 | 264 | 264 | 264 | 216 | 216 | 216 |
| R-squared | | | 0.558 | | | 0.366 | | | 0.341 |
| Countries | 22 | 22 | 22 | 22 | 22 | 22 | 18 | 18 | 18 |
| FE | NO | NO | YES | NO | NO | YES | NO | NO | YES |
| R2 Within | 0.56 | 0.56 | 0.56 | 0.35 | 0.37 | 0.37 | 0.33 | 0.34 | 0.34 |

**Notes:** The table shows coefficients of interest from model 1 estimated over the period January-August 2020. Given the short time span, estimates with both fixed and random effects are shown. The model is estimated on monthly observations for 22 emerging economies and includes country-specific fixed effects. Robust standard errors (Driscoll-Kraay) are reported in parentheses. The asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 8: Policies during the pandemic

| | Interest rates | | | Reserves | | |
|---|---|---|---|---|---|---|
| Shock | -0.34*** | -0.34*** | -0.35*** | -0.45*** | -0.44*** | -0.48*** |
| | (0.067) | (0.067) | (0.067) | (0.12) | (0.12) | (0.11) |
| Shock*Rule Of Law | | 0.048 | 0.053 | | -0.096 | -0.16 |
| | | (0.098) | (0.098) | | (0.18) | (0.17) |
| Observations | 262 | 262 | 262 | 264 | 264 | 264 |
| Countries | 22 | 22 | 22 | 22 | 22 | 22 |
| FE | NO | NO | YES | NO | NO | YES |
| R2 Within | 0.20 | 0.20 | 0.20 | 0.055 | 0.058 | 0.081 |

**Notes:** The table shows coefficients of interest from model 2 estimated over the period January-August 2020. Given the short time span, estimates with both fixed and random effects are shown. The model is estimated on monthly observations for 22 emerging economies and includes country-specific fixed effects. Robust standard errors (Driscoll-Kraay) are reported in parentheses. The asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

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# A The international effects of a shock to global financial conditions

To estimate the effects on the international macro-economy of an exogenous tightening of global financial conditions we follow a two step strategy. First, we estimate a small Vector Autoregression (VAR) model for the US and for key global variables (the price of oil and global industrial production) and use it to estimate shocks to the EBP. Then we use the estimated shocks as exogenous variables in a panel VAR framework to study the effects on individual emerging economies. This two step procedure has been widely used, see for instance Cesa-Bianchi, Ferrero, and Rebucci (2018) and Bhattarai, Chatterjee, and Park (2020), and rests on the assumptions that US and global shocks are exogenous with respect to developments in the small emerging economies.

The first VAR includes five endogenous variables (inflation and industrial production in the U.S., the price of crude oil, global industrial production and the EBP). We identify a shock to global financial conditions by ordering the EBP as the last variable in the model and using a recursive ordering of the shocks.[16]. In Figure (A1) we show the estimated shocks, highlighting with a green dot a number of episodes of extreme tightening of financial conditions. These align very reasonably with well known periods of turbulence in financial markets like the burst of the dot-com bubble, the months of extreme volatility following the collapse of Lehman Brothers and the euro area sovereign debt crisis (notice that the Covid period is excluded from our sample).

Figure A2 shows the reaction of the endogenous variables contained in the VAR to the estimated shock. In line with conventional wisdom, a tightening of financial conditions is followed by a fall of economic activity both in the US as well as at the global level. The fall in production also induces consumer prices as well as the price of crude oil to contract markedly.

[16]Under the assumption that the real economy responds only with a lag to financial shock, this identification strategy isolates successfully an exogenous tightening of the EBP. A very similar model is used by Bhattarai, Chatterjee, and Park (2020) to study the effects of US uncertainty shocks on EMEs. The only difference is that they use the VIX rather than the EBP and interpret the shock to the VIX as a U.S. uncertainty shock.

Figure A1: Shocks to the EBP

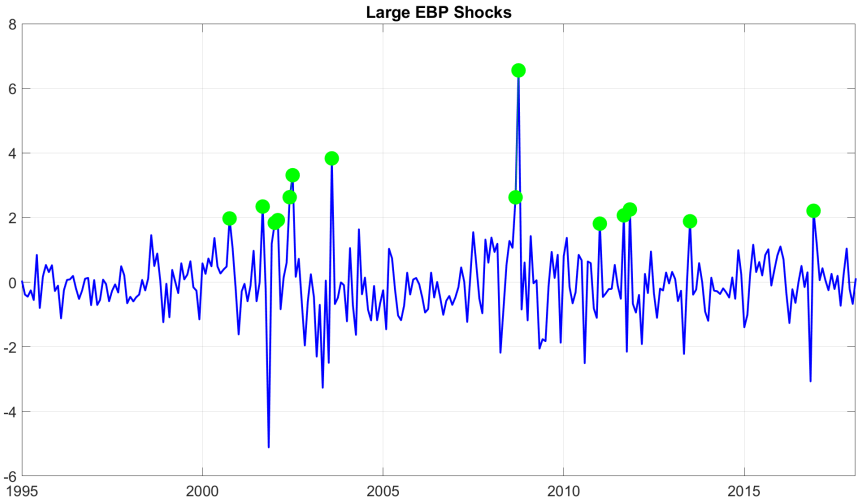
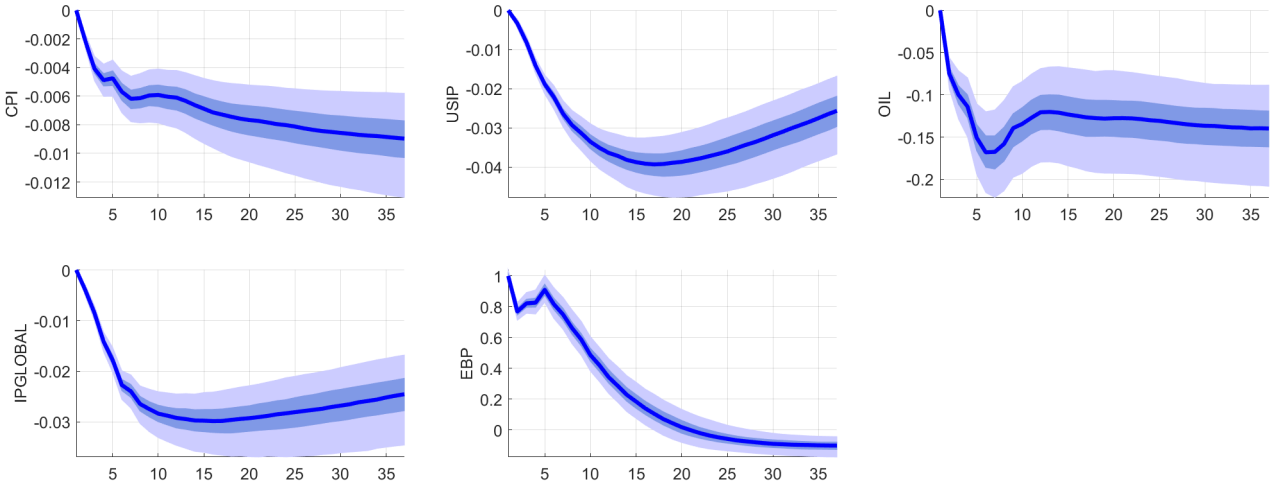



Figure A2: Reaction of US and global variables to EBP shocks



## A.1 Effects on EMEs

The effect of the global financial shock on individual countries is examined using the following model panel VAR-X model

$$Y_t^i = \sum_{j=1}^{p} B_j Y_{t-j}^i + \Gamma^i s_t + \varepsilon_t^i \tag{11}$$

where $Y_t^i$ is a vector of macro/financial variables for country $i$ and $s_t$ is the shock to financial conditions estimated in the first step. Both VARs are estimated with bayesian methods using standard Minnesota priors. This allows us to take into account all the sources of uncertainty when estimating the effects of the shocks on individual countries. In practice, conditioning on a draw of $s_t$ from the posterior of the US/global VAR we take a a draw from the country specific VARs and estimate the IRFs. The IRFs shown in Figure 1 on the effects of global financial conditions shocks on the economies of Mexico and Chile are obtained from this model.

# B Robustness checks

Table A1: Global financial conditions, institutions and economic outcomes - VIX

| | Equity | | Spread | | Exch. rate | | GDP | |
|---|---|---|---|---|---|---|---|---|
| | t+1 | t+6 | t+1 | t+6 | t+1 | t+6 | t+12 | t+18 |
| VIX | -0.73*** | -0.60*** | 0.044*** | 0.018** | -0.18*** | -0.15** | -0.059*** | -0.068*** |
| | (0.062) | (0.15) | (0.0060) | (0.0074) | (0.020) | (0.060) | (0.014) | (0.021) |
| VIX*Rule of Law | 0.068 | 0.016 | -0.014*** | -0.0073** | -0.0089 | 0.024 | 0.023** | 0.027*** |
| | (0.047) | (0.071) | (0.0035) | (0.0037) | (0.032) | (0.031) | (0.0097) | (0.0093) |
| Rule of Law | -1.93*** | -12.8*** | 0.037 | 0.34 | -0.99** | -8.34*** | -1.40* | -1.75* |
| | (0.68) | (3.68) | (0.069) | (0.38) | (0.47) | (2.62) | (0.79) | (1.03) |
| VIX*NFA/GDP | 0.33*** | 1.19*** | -0.016** | -0.000081 | 0.13** | 0.15 | 0.096*** | 0.14*** |
| | (0.073) | (0.33) | (0.0062) | (0.017) | (0.064) | (0.20) | (0.037) | (0.050) |
| NFA/GDP | -5.50*** | -9.20 | 0.30** | -0.44 | -2.54* | 0.55 | 0.93 | -0.100 |
| | (1.60) | (7.04) | (0.13) | (0.38) | (1.31) | (4.30) | (1.12) | (1.43) |
| VIX*ChinnIndex | 0.012 | 0.16 | -0.0021 | 0.00092 | 0.0036 | 0.11** | -0.0070 | -0.019 |
| | (0.017) | (0.100) | (0.0019) | (0.0050) | (0.011) | (0.047) | (0.010) | (0.013) |
| ChinnIndex | -0.22 | -2.87 | 0.043 | -0.0085 | 0.0033 | -1.24 | 0.14 | 0.29 |
| | (0.35) | (2.23) | (0.040) | (0.12) | (0.23) | (0.99) | (0.23) | (0.33) |
| VIX*FlexOpen | 0.0067 | 0.14 | 0.0024 | -0.014* | -0.022 | 0.12** | -0.030** | 0.0033 |
| | (0.030) | (0.11) | (0.0023) | (0.0080) | (0.019) | (0.058) | (0.015) | (0.021) |
| FlexOpen | -0.71 | -7.49*** | -0.030 | 0.46** | 0.23 | -4.65*** | -0.41 | -0.76 |
| | (0.57) | (2.81) | (0.047) | (0.20) | (0.38) | (1.31) | (0.33) | (0.56) |
| Observations | 6003 | 5904 | 5301 | 5193 | 5108 | 5025 | 5467 | 5467 |
| Number of groups | 22 | 22 | 22 | 22 | 18 | 18 | 22 | 22 |
| Lags of Dep Var. | YES | YES | YES | YES | YES | YES | YES | YES |
| R2 Within | 0.20 | 0.23 | 0.15 | 0.14 | 0.075 | 0.11 | 0.34 | 0.24 |

**Notes:** The table shows coefficients of interest from model 1 estimated on monthly observations from 1990 to 2021 for 22 emerging economies where the EBP is replaced by the VIX. The model includes country-specific fixed effects. Robust standard errors (Driscoll-Kraay) are reported in parentheses. The asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table A2: Robustness: events of financial tightening, institutions and economic outcomes

| | Equity | | Spread | | Exch. rate | | GDP | |
|---|---|---|---|---|---|---|---|---|
| | t+1 | t+6 | t+1 | t+6 | t+1 | t+6 | t+12 | t+18 |
| Event | -6.33*** | -5.52 | 0.47*** | 0.29 | -2.33*** | -2.04* | -0.61*** | -0.55 |
| | (1.55) | (3.45) | (0.11) | (0.19) | (0.73) | (1.12) | (0.20) | (0.34) |
| Event*Rule of Law | 3.21*** | 1.86 | -0.17*** | -0.14* | -0.099 | 0.075 | 0.20* | 0.15 |
| | (0.97) | (1.99) | (0.044) | (0.077) | (0.45) | (0.71) | (0.12) | (0.092) |
| Rule of Law | -1.58** | -10.5*** | 0.037 | 0.43 | -0.81* | -6.53*** | -1.15 | -1.77* |
| | (0.63) | (3.13) | (0.063) | (0.31) | (0.43) | (2.47) | (0.70) | (0.90) |
| Event*ΔRates | 0.58 | -2.54 | 0.082 | 0.27 | 0.14 | -1.56 | -0.28 | -0.085 |
| | (1.56) | (2.50) | (0.093) | (0.17) | (0.61) | (1.07) | (0.28) | (0.26) |
| ΔRates | -0.10** | -0.58*** | 0.0051 | 0.015 | -0.022 | -0.17 | -0.22*** | -0.21*** |
| | (0.040) | (0.20) | (0.0058) | (0.027) | (0.026) | (0.17) | (0.039) | (0.041) |
| Event*ΔReserves | 1.55 | 1.16 | -0.18** | -0.089 | 0.44 | 1.76** | 0.39** | 0.26 |
| | (1.25) | (2.40) | (0.084) | (0.10) | (0.41) | (0.74) | (0.15) | (0.23) |
| ΔReserves | 0.013 | -0.041 | 0.0011 | 0.0090* | 0.022*** | 0.15*** | 0.052** | 0.037** |
| | (0.015) | (0.098) | (0.00083) | (0.0046) | (0.0067) | (0.040) | (0.022) | (0.017) |
| Event*ΔCTR-Outflows | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | (0) | (0) | (0) | (0) | (0) | (0) | (0) | (0) |
| ΔCTR-Outflows | 0.013 | 0.64 | -0.011 | -0.33 | -0.71* | -4.80* | 1.19* | 0.95 |
| | (0.67) | (3.62) | (0.074) | (0.34) | (0.42) | (2.56) | (0.67) | (0.78) |
| Event*ΔMacroPru | 0.99* | 1.25 | -0.071 | -0.069 | -0.056 | 0.60 | -0.16 | -0.20 |
| | (0.55) | (0.86) | (0.048) | (0.087) | (0.47) | (0.64) | (0.29) | (0.31) |
| ΔMacroPru | -0.065*** | -0.46*** | 0.0015* | 0.0082** | -0.012 | -0.10*** | -0.069*** | -0.071*** |
| | (0.021) | (0.14) | (0.00087) | (0.0037) | (0.0077) | (0.032) | (0.018) | (0.014) |
| Observations | 6003 | 5904 | 5301 | 5193 | 5108 | 5025 | 5467 | 5467 |
| Number of groups | 22 | 22 | 22 | 22 | 18 | 18 | 22 | 22 |
| Lags of Dep Var. | YES | YES | YES | YES | YES | YES | YES | YES |
| R2 Within | 0.12 | 0.19 | 0.11 | 0.14 | 0.062 | 0.093 | 0.32 | 0.21 |

**Notes:** The table shows coefficients of interest from model 1 estimated on monthly observations from 1990 to 2021 for 22 emerging economies where the EBP is replaced by events dummy that takes value 1 for the episodes highlighted in Figure A1 and 0 otherwise. The model includes country-specific fixed effects. Robust standard errors (Driscoll-Kraay) are reported in parentheses. The asterisks ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

# C Special case of the theoretical model with closed form solutions

In this Appendix we consider the special case in which initial debt is zero ($b_0 = f_0 = 0$), which allows us to obtain a closed form solution for the model.

### C.0.1 Normal Times

With zero initial debt, the solution for consumption becomes

$$c = \left(\frac{1}{1+\beta}\right) s^{-\frac{\lambda}{1-\lambda}} (\beta y_2 + y_1).$$

Plugging into the goods market equilibrium at time 1, we obtain

$$y_1 = s^{\frac{\lambda}{1-\lambda}} \left[(1-\lambda)\left(\frac{1}{1+\beta}\right) s^{-\frac{\lambda}{1-\lambda}} (\beta y_2 + y_1) + \lambda s y_1^*\right].$$

The solution for the real exchange rate is

$$s = \left[\left(1 - \frac{\beta\gamma}{1+\beta}\frac{1-\lambda}{\lambda}\right)\frac{y}{y^*}\right]^{1-\lambda}.$$

Suppose we pick the endowments so that $s = 1$. Under this assumption, the solution for consumption is

$$c = \left(\frac{1}{1+\beta}\right)(\beta y_2 + y_1).$$

while debt is

$$(1+\eta)b = \frac{\beta}{1+\beta}(y_2 - y_1).$$

In addition, the solution needs to respect the goods market equilibrium also at time 2 with $c_2 = c$ and $s_2 = s = 1$, that is

$$y_2 = \left(\frac{1-\lambda}{1+\beta}\right)(\beta y_2 + y_1) + \lambda y_2^*.$$

Finally, debt must satisfy the collateral constraint

$$\frac{\beta}{1+\beta}(y_2 - y_1) \leqslant \omega y_2. \tag{12}$$

### C.0.2 Crisis

StartingStarting from consumption in period 2, we have

$$c_2 = \left(1 - \frac{e^{\bar{\epsilon}}\omega}{\beta}\right) s_2^{-\frac{\lambda}{1-\lambda}} y_2.$$

Plugging into the goods market equilibrium condition in the same period, we obtain

$$y_2 = s_2^{\frac{\lambda}{1-\lambda}} \left[(1-\lambda)\left(1 - \frac{e^{\bar{\epsilon}}\omega}{\beta}\right) s_2^{-\frac{\lambda}{1-\lambda}} y_2 + \lambda s_2 y_2^*\right],$$

which we can solve for the real exchange rate in period 2

$$s_2 = \left\{\left[\lambda + (1-\lambda)\frac{e^{\bar{\epsilon}}\omega}{\beta}\right]\frac{y_2}{\lambda y_2^*}\right\}^{1-\lambda}.$$

From this expression, we can see that the real exchange rate in the second period is depreciated compared to normal times if and only if

$$\left[\lambda + (1-\lambda)\frac{e^{\bar{\epsilon}}\omega}{\beta}\right] y_2 > \lambda y_2^*.$$

From the solution in normal times, we have

$$\lambda y_2^* = y_2 - \left(\frac{1-\lambda}{1+\beta}\right)(\beta y_2 + y_1).$$

Plugging into the condition above and simplifying yields

$$\frac{\beta(y_2 - y_1)}{1+\beta} < e^{\bar{\epsilon}}\omega y_2.$$

Since the last condition is weakly satisfied when $\bar{\epsilon} = 0$ for debt to respect the collateral constraint in normal times, any positive value of the shock will ensure that the real exchange rate in period 2 is depreciated compared to normal times.

Plugging the solution for the real exchange rate into the collateral constraint at equality yields an expression for debt

$$(1+\eta)b = \omega\left(1+\frac{1-\lambda}{\lambda}\frac{e^{\bar{\epsilon}}\omega}{\beta}\right)^{-\lambda}(y_2)^{1-\lambda}(y_2^*)^{\lambda}.$$

Debt in normal times is higher than in the crisis provided

$$\frac{\beta}{1+\beta}(y_2-y_1) > \omega s_2^{-\frac{\lambda}{1-\lambda}}y_2.$$

With some manipulations, we can recast the last condition in terms of a requirement on the size of the shock

$$\frac{e^{\bar{\epsilon}}\omega}{\beta} > \frac{\lambda}{1-\lambda}\left\{\left[\frac{(1+\beta)\omega(y_2)^{1-\lambda}(y_2^*)^{\lambda}}{\beta(y_2-y_1)}\right]^{\frac{1}{\lambda}}-1\right\}.$$