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Exchange Rate in Emerging Markets: Shock Absorber or Source of Shock?*

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Abstract

This paper examines the stabilization role of flexible exchange rates for emerging economies within the Latin America and Asia regions. Based on a structural VAR model, we utilize zero and sign restrictions as well as introduce novel exchange rate pass-through restrictions to identify structural macroeconomic shocks. Overall, we find that exogenous exchange rate shocks drive more than half of total exchange rate fluctuations in emerging economies. Despite this predominant role, we find that exchange rates do not act as a source of shocks to the real economy, but instead absorb and reduce output growth and inflation volatilities. We further find that this shock-insulation property is highly shock-dependent, where the benefits of flexible exchange rates are most evident for demand and global shocks, while exchange rate movements tend to amplify output growth volatilities in the face of global supply shocks. Also, based on counterfactual analyses, we find that the net benefits of flexible exchange rates as a shock absorber are in general larger for emerging economies in Latin America than in Asia, particularly during crises periods. Finally, while we find that the stabilization role of exchange rates hinges upon the nature of underlying structural shocks, there is also a positive association with structural determinants such as a country's degree of exchange rate flexibility and trade openness.

Keywords: flexible exchange rate, shock absorber, exchange rate pass-through, shock dependency, structural VAR

JEL Classifications: C32, E44, F31, F41.

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1 Introduction

A longstanding debate is whether flexible exchange rates are beneficial for macroeconomic stability. The benefits of fully flexible exchange rates rest upon the notion that exchange rates act as shock absorbers which help dampen the impact of real and external shocks. However, it has often been suggested that exchange rate movements may stem from shocks that originate in the foreign exchange (FX) market itself, such as those related to speculative capital flows (Buiter, 2000). Such deviations of exchange rates from fundamentals could, in turn, become a source of macroeconomic volatility. For emerging market economies, this debate has been more controversial, as emerging markets are more susceptible to volatile capital movements. Furthermore, the heterodox view suggests that exchange rates can even play a pro-cyclical role in emerging markets by amplifying certain shocks, due to their reliance on external debt and high degrees of foreign participation in domestic financial markets (Kohler and Stockhammer, 2023).

Despite the increased adoption of floating exchange rate regimes across countries over past decades, the empirical literature has yet to reach a consensus on the shock absorbing role of exchange rates (Clarida and Gali, 1994; Artis and Ehrmann, 2006; Farrant and Peersman, 2006). The focus of past studies has largely been on the experience of advanced economies, mostly due to their considerations to join a currency union. In the case of emerging market economies, however, empirical evidence is still scarce. Among them are Obstfeld et al. (2019) and Eichengreen et al. (2020), both of which suggest that flexible exchange rate regimes are better at insulating emerging countries from external shocks. Dabrowski and Wróblewska (2020) also explore the case of Central and Eastern European economies, and find that macroeconomic responses to real shocks are substantially stronger under less flexible exchange rate regimes.[1]

In light of this gap in the literature, we view that a deepened understanding on the stabilizing role of flexible exchange rates for emerging countries is critical, given that their currencies are particularly susceptible to large and volatile external shocks due to their high degrees of trade openness as well as liberalized capital accounts. Several events in the past, such as massive capital inflows to emerging countries due to the monetary expansion in advanced countries after the global financial crisis and capital flow reversals during the taper tantrum, are testament that exchange rate movements have key consequences for the economy, financial markets and policy decisions. The highly relevant role of exchange rates on the

[1] Early work done by Levy-Yeyati and Sturzenegger (2003) shows that for developing countries, less flexible exchange rate regimes are associated with slower growth and greater output volatility.

macroeconomy for emerging countries is undisputed as central banks evidently tend to actively intervene in FX markets. Furthermore, during recent periods, the role of exchange rates has again come under scrutiny, following widespread depreciations of emerging market currencies against the US dollar in response to the US hiking cycle and unprecendented oil price surges. In particular, questions have been raised over whether exchange rate fluctuations in emerging markets are driven by fundamental shocks and to what extent have they helped stabilize the macroeconomy (Hofmann et al., 2022; Gopinath and Gourinchas, 2022).

This paper explores the role of flexible exchange rates towards macroeconomic stabilization in ten emerging economies in the Latin America (LATAM) and Asia regions, which include Thailand, Indonesia, Philippines, Malaysia, Korea, Brazil, Peru, Chile, Mexico and Columbia. The key to determining whether floating exchange rates act as a shock absorber or a source of shocks depends on the extent to which exchange rates respond to underlying shocks, whether it be exogenous shocks in the FX market itself, monetary policy shocks, or real shocks such as demand and supply shocks of both domestic and global origins. To identify such shocks, we employ a two-country structural vector autoregression (SVAR) model with zero and sign restrictions, and also introduce a novel restriction on the magnitude of exchange rate pass-through (ERPT) to domestic inflation. Based on the ERPT restrictions, our findings support the argument put forth by An et al. (2021), where we find that the SVAR model with only zero and sign restrictions likely understates the variance share of exchange rate movements that are attributed to exogenous exchange rate shocks, as well as results in implausible ERPT estimates.

Our work is most closely related to the literature that examines the role of exchange rates as a shock absorber or a source of shocks based on SVAR models. Existing work typically offers mixed evidence for advanced economies. On the one hand, Farrant and Peersman (2006) report an important role for nominal shocks in explaining real exchange rate fluctuations, suggesting that exchange rates act as a source of shocks. De and Sun (2020) and An et al. (2021) reach a similar conclusion based on exchange rate shocks explaining a large fraction of the variation in exchange rates for the US and Japan, respectively. On the other hand, Clarida and Gali (1994), An and Kim (2010) and Juvenal (2011) find that demand shocks explain the majority of variance in real exchange rate fluctuations in the context of four industrialized countries, Japan and the US, respectively, suggesting a shock absorbing role for exchange rates. Alternatively, Artis and Ehrmann (2006) and Peersman (2011) argue that real shocks are symmetric in the US and Euro area, implying little need for exchange rates to act as a shock absorber at all.

Apart from aiming to offer a fresh perspective from the experience of emerging economies, our work differs from the bulk of the exisiting literature by analyzing the stabilization role of exchange rates beyond disentangling the underlying drivers of exchange rate fluctuations. We gain added insight by focusing on how well flexible exchange rates can help absorb the impact of different types of fundamental shocks, along the same line as Beckmann et al. (2024), who find that endogenous exchange rate movements in response to domestic aggregate demand shocks help stabilize economic activity for eight small and open advanced economies. By analyzing the insulation properties of the exchange rate conditional on the underlying shocks, our approach helps shed light on the shock-dependent nature of the insulation property of exchange rates.[2] Extending Beckmann et al. (2024), we also offer a new approach based on counterfactual analyses to quantify the net effects of allowing for flexible exchange rate movements on output growth and inflation volatility, by studying both the benefits within the context of the exchange rate acting as a shock absorber, weighed against the cost of it as being a potential source of macroeconomic fluctuations. Finally, based on a panel regression, we examine the extent to which the net benefits of flexible exchange rates may hinge upon the nature of underlying shocks as well as structural determinants such as trade openness and inflation variability that proxies for monetary policy regimes.

A preview of our main results are as follows. First, exogenous exchange rate shocks play a dominant role in explaining overall exchange rate movements. This is particularly the case in emerging Asia, as such shocks account for more than 60 percent of all exchange rate variations, pointing towards their potential role as a source of shocks for macroeconomic fluctuations. However, when examined further, exchange rate movements turn out to be far from a source of shocks, as they explain a negligible portion of output variance and only a slightly larger share of inflation variance. Instead, we find a shock-absorbing role for exchange rates for emerging countries in our sample. However, this property varies across fundamental shocks, because while exchange rate movements generally absorb demand and global monetary policy shocks, in many countries exchange rates amplify the impact of global supply shocks on output growth. Meanwhile, global supply shocks induce a trade-off for monetary policy, given the exchange rate's role in helping lower inflation volatility.

Overall, while exchange rate shocks drive most of the fluctuations in exchange rate movements, flexible exchange rates can help lower output and inflation vari-

[2] A few articles have explored whether exchange rates absorb the impact from specific shocks. For example, Edwards and Levy Yeyati (2005), using a large panel of 183 countries, find evidence suggesting that terms of trade shocks get amplified in countries that have more rigid exchange rate regimes. However, Corsetti et al. (2021) show that, in response to euro-area shocks, spillovers are not smaller in countries that float their currency, relative to those that peg to the Euro.

ability in emerging countries under consideration. Positive net effects are largest for output growth in Brazil, followed by Korea and Mexico, while net benefits for inflation turn out to be somewhat lower. In fact, for a few countries including Brazil and Indonesia, the costs from exogenous exchange rate shocks outweigh the shock-absorption benefits, and so exchange rate fluctuations become a source of shocks towards inflation volatility in these economies. Finally, apart from underlying shocks, the net benefits of flexible exchange rates towards macroeconomic stabilization also depend on structural determinants such as the degree of exchange rate flexibility and openness in trade.

The rest of the paper is organized as follows. The next section describes the data and the open-economy SVAR model with zero, sign and exchange rate pass-through restrictions that are utilized to identify structural shocks. Section 3 and 4 discuss the empirical findings from the SVAR model, while Section 5 attempts to disentangle the various factors that may influence the stabilization role of exchange rates. Section 6 concludes with key policy implications.

2 Data and Model Specification

2.1 Data and Exchange Rate Arrangements

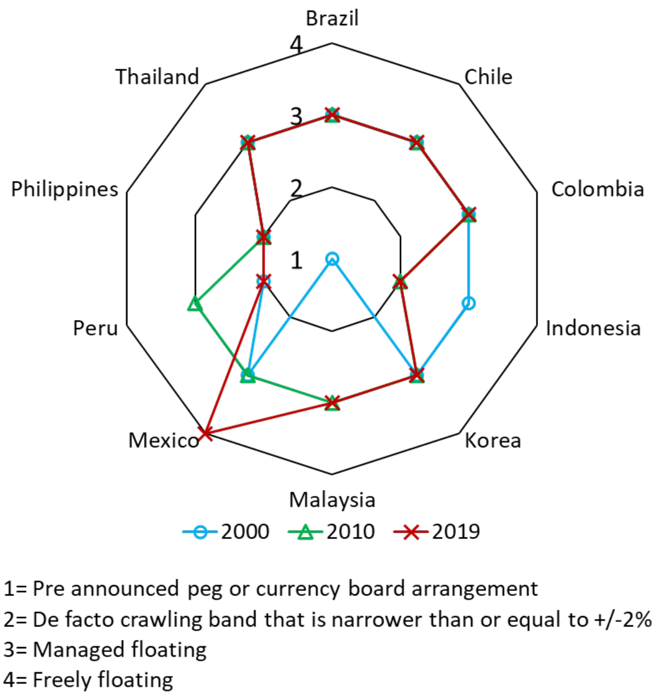
In our study, we focus on studying the shock absorbing role of exchange rates for ten small open emerging economies that have flexible exchange rates in the Latin America and Asia Pacific regions. Selected countries include Brazil, Chile, Colombia, Mexico, Peru, South Korea, Indonesia, Malaysia, the Philippines and Thailand.[3] Our dataset spans 2000Q1 to 2022Q3. This is with the exception of Malaysia, where the sample starts after the central bank abandoned the fixed exchange rate regime in 2005Q3.

As shown in Figure 1, most countries operate under a managed-float exchange rate regime over the entire sample period (Ilzetzki et al., 2019, 2022). Therefore, exchange rate movements for countries in our sample mostly move in accordance to market forces, although central banks do occasionally engage in FX market intervention to mitigate excessive exchange rate volatilities. Indeed, as shown in Table A1 in the Appendix, we observe that exchange rate volatilities differ to some extent, reflecting different foreign exchange market pressures and degrees of FX market intervention. Overall, we observe that countries in the LATAM region have higher exchange rate volatility, especially Brazil. Countries like Peru, the Philippines and

[3]Country abbreviations that will be used henceforth in Figures and Tables are BZ, CL, CO, MX, PR, KR, ID, MY, PP and TH, respectively.

Indonesia, on the other hand, have lower exchange rate volatility, making their de facto exchange rate arrangement better classified as having a crawling band.

Figure 1: Exchange Rate Regime Classification



Source: Ilzetzki et al. (2019, 2022)

2.2 SVAR Model Specification

For each country, we estimate a two-country structural vector autoregressive (SVAR) model to analyze how shocks to exchange rate movements pass-through to macroeconomic variables over time, which is critical towards understanding their role as a shock absorber or a source of shocks. To do so, we build upon the SVAR model of Forbes et al. (2020) that has been used to study exchange rate pass-through within an open economy framework for a diverse set of countries. In this empirical framework, sign restrictions in the SVAR are used to identify a rich set of shocks that influence exchange rate fluctuations.

Our SVAR model consists of eight endogenous variables, including three domestic, four global, and one exchange rate variable. The full list of macroeconomic variables alongside their respective sources are as described in Table A2. Domestic variables include the growth rate of real gross domestic product (GDP), consumer price inflation and the policy rate. Global variables consist of US real GDP growth, US consumer price inflation, the shadow federal funds rates, and world oil prices.

For the exchange rate, we use the bilateral exchange rate against the US dollar.

The choice of endogenous variables in our study largely follows Forbes et al. (2020), albeit with a few differences. First, we include world oil prices as an additional global variable. As explained in Ha et al. (2020), the inclusion of world oil prices help with the identification of oil-related global supply shocks, which could exert term-of-trade shocks on commodity-reliant economies and necessitate exchange rate adjustments. Second, due to the dominant role of the US dollar for global trade and financial transactions (Gopinath and Itskhoki, 2022; Gopinath et al., 2020), we view that utilizing bilateral exchange rates against the US dollar rather than effective exchange rates, may be the more relevant exchange rate towards studying the impact of exchange rates movements on growth and inflation rate volatilities. According to Boz et al. (2022), countries in our sample have over 80% of their exports and imports invoiced in the US dollar since the early 2000s. Then, given our exchange rate of choice, we use US macroeconomic variables to proxy for the global economy, as shocks to developments in the US economy should better explain US dollar exchange rate movements. This is unlike Forbes et al. (2020), which use trade-weighted macroeconomic variables to represent the global economy. However, we view that using the US to proxy for global variables is a standard approach in the literature, especially given the influential role that the US plays in transmitting foreign shocks to emerging economies.

To estimate the SVAR, we assume two lags for all endogenous variables. We follow Forbes et al. (2020) and employ Bayesian estimation with Minnesota-style priors to estimate coefficients, where the percentiles and confidence intervals are constructed from the final 500 repetitions in the Gibbs sampling procedure. Also, since our analysis focuses on small open economies, we adopt the standard approach in assuming that domestic variables of all small open economies do not impact global variables. This is achieved in the Bayesian estimation step by restricting the prior variance of these coefficients to be close to zero.

2.3 Shock Identification

In the SVAR model, we use a combination of zero and sign restrictions, as well as novel ERPT restrictions, to identify a total of seven structural shocks. Six of them are fundamental shocks which include a domestic supply shock, domestic demand shock, domestic monetary policy shock, global demand shock, global supply shock and a global monetary policy shock. The final shock is an exogenous exchange rate shock, which is intended to capture non-fundamental shocks that originate in FX markets. This mostly reflect shifts in risk sentiment of global investors or episodes of volatile capital movements, especially of speculative nature. In addition, it may capture active FX interventions by the central bank, as well as news regarding future economic fundamentals that do not yet have an impact on current economic conditions.[4]

2.3.1 Zero and Sign Restrictions

Towards our approach for structural shock identification, Table 1 describes the zero and sign restrictions imposed in the SVAR model. We build upon the restrictions of Forbes et al. (2018) and Forbes et al. (2020), as we attempt to identify a more complete set of structural shocks.[5] For zero restrictions, we impose both short and long run restrictions based on the following assumptions. First, we assume nominal shocks, which include both monetary policy and exchange rate shocks, to have a neutral impact on economic activity, as proxied by real GDP growth, over the long run. Second, although the existing literature typically assumes that output fluctuations over the long run are explained only by supply shocks and typically imposes zero long-run restrictions on the impact of other shocks on output, we choose to be agnostic about the longer term impact that stems from demand shocks. This is from the possibility an economy may exhibit hysteresis when encountered with large-scale demand shocks, such as those that occur during a crisis (Blanchard et al., 2015). Finally, we impose short-run zero restrictions to differentiate between domestic and global shocks. In particular, we assume that shocks which originate from emerging economies cannot have an impact on global variables.

Sign restrictions are also imposed on the contemporaneous response of variables in the SVAR model to identify shocks. First, we assume that domestic demand shocks induce a positive correlation between domestic economic growth and inflation, prompting a countercyclical monetary policy response. On the other hand, domestic supply shocks induce a negative correlation between these variables. Importantly, we do not impose any restrictions on the behavior of exchange rates in responses to these two shocks to be agnostic about their responses. In other words, we let the data speak on whether they will act to absorb or amplify shocks. Next,

[4]Note that we are left with an unidentified shock. As we did not place restrictions on this shock and it can influence both domestic and global macroeconomic variables, it is defined as a shock that is global in nature and is assumed to be among one of the fundamental drivers.

[5]Forbes et al. (2018) identify domestic demand, supply and monetary policy shocks, an exchange rate shock and persistent and transitory global shocks. Forbes et al. (2020) identify demand, supply and monetary policy shocks that are both domestic and global in nature, but do not identify an exogenous exchange rate shock. Following Forbes et al. (2020), we impose sign and ERPT restrictions using the algorithm suggested by Rubio-Ramírez et al. (2010) and extended by Binning (2013) for under-identified models. We benefit greatly from MATLAB codes provided by Forbes et al. (2020).

Table 1: Zero and Sign Restrictions for SVAR Shock Identification

	Domestic supply shock (S)	Domestic demand shock (D)	Domestic monetary policy shock (MP)	Exchange rate shock (ER)	Global supply shock (S^*)	Global demand shock (D^*)	Global monetary policy shock (MP^*)
	Short-run restrictions						
Domestic Real GDP Growth	+	+	-	-			
Domestic Inflation	-	+	-	-			
Domestic Interest Rate		+	+	-			
Exchange Rate			+	+			-
Global Real GDP Growth	0	0	0	0	+	+	-
Global Inflation	0	0	0	0	-	+	-
Global Interest Rate	0	0	0	0		+	+
Oil price	0	0	0	0	-	+	
	Long-run restrictions						
Domestic Real GDP Growth			0	0			
Domestic Inflation							
Domestic Interest Rate							
Exchange Rate							
Global Real GDP Growth							0
Global Inflation							
Global Interest Rate							
Oil price							

to identify exogenous exchange rate shocks, we assume that shocks which lead to a currency appreciation will cause domestic economic growth and inflation to decline, prompting the central bank to cut the policy rate. Meanwhile, domestic monetary policy tightening shocks are assumed to result in lower output growth and inflation, as well as lead to an appreciation of the exchange rate. Finally, turning to sign restrictions utilized to identify global shocks, we assume that positive global demand shocks raise all global variables simultaneously including world oil prices. On the other hand, global supply shocks, which are intended to capture supply variations in commodities including oil, cause US output growth and inflation to respond in different directions. Meanwhile, following a global monetary policy tightening shock, both US output and inflation are assumed to decline, while the US dollar appreciates.[6]

2.3.2 Exchange Rate Pass-through Restriction

Aside from standard zero and sign restrictions, we introduce a novel restriction approach on the degree of EPRT to domestic inflation. As suggested by An et al. (2021), SVAR models that rely on only zero and sign restrictions may produce impulse responses with large confidence bands and implausible ERPT estimates that are too large. As such, these models will tend to underestimate the contributions of exchange rate shocks towards explaining the variance of exchange rates. This

[6] Note that to identify both domestic and global monetary policy shocks, restrictions on exchange rate movements are necessary. Without these restrictions, exchange rates respond in a non-intuitive way. For example, a Thai baht appreciation in response to monetary policy easing by the Bank of Thailand and policy tightening by the Fed signals potential endogeneity issues. For this reason, in our empirical results, the direction of exchange-rate responses to monetary policy shocks in the short run are by construction, thus our focus should be on the magnitude of the responses instead.

bias appears to be particularly severe during periods that are associated with large exchange rate movements that are mostly driven by non-fundamental shocks, such as during the episode of Japanese Yen appreciation under the Plaza Accord. Furthermore, the findings of large ERPT are against those in the recent literature, such as Jašová et al. (2019), that tends to find low and declining ERPT estimates for emerging economies after the global financial crisis. To alleviate this issue, An et al. (2021) employ narrative sign restrictions in the spirit of Antolín-Díaz and Rubio-Ramírez (2018) to improve the identification of exogenous exchange rate shocks.

For our purposes, the narrative approach may not be entirely appropriate. Given that there are many countries in our study, it becomes rather inconvenient to pinpoint specific events where non-fundamental shocks may have led to large exchange rate movements for each of the ten countries in our sample. In fact, these episodes may even be difficult to identify, given that most emerging central banks would have already tried to offset these large exchange rate movements in the first place through FX intervention (Patel and Cavllino, 2019; Calvo and Reinhart, 2002). Therefore, instead of the narrative approach, we propose a novel method to improve the identification of exogenous exchange rate shocks based on restrictions placed on the degree of ERPT to domestic inflation.

The ERPT restriction approach is implemented as follows. First, we estimate the degree of ERPT for each country based on the following specification:

$$\begin{aligned}\Delta p_{i,t} = &\sum_{n=0}^{4} \beta^i_{1,n} \Delta s_{i,t-n} + \sum_{n=0}^{4} \beta^i_{2,n} \Delta wpx_{i,t-n} + \sum_{n=0}^{4} \beta^i_{3,n} \Delta oil_{t-n} \\ &+ \sum_{n=0}^{4} \beta^i_{4,n} GSCPI_{t-n} + \sum_{n=0}^{4} \beta^i_{5,n} \Delta GDP_{i,t-n} + \epsilon_{i,t},\end{aligned} \tag{1}$$

where $\Delta p_{i,t}$ is the consumer price inflation of country i in period t. $\Delta s_{i,t}$ represents the quarter-on-quarter log change in bilateral exchange rates against the US dollar of country i in period t, where increases in $s_{i,t}$ denote US dollar depreciations. $\Delta wpx_{i,t}$ is the quarter-on-quarter log change in the weighted-average export prices of country i's major exporting countries in period t; Δoil_t is the quarter-on-quarter log change in world oil prices in period t; $GSCPI_t$ is the level of the global supply chain pressure index in period t; and, $\Delta GDP_{i,t}$ is the real GDP growth of country i in period t. We include four lags of each regressor in the above specification to allow its dynamic effects to influence inflation. Note that the above ERPT specification above is quite standard, but we include world oil prices and the global supply chain pressure index as additional regressors as they could be relevant to marginal costs of a country's imports.

The ERPT estimates from an OLS estimation of Eq.1 are shown in Figure 2(a), where we calculate the degree of ERPT over a one-year horizon as $\sum_{n=0}^{4} \beta_{1,n}^{i}$. As shown, low ERPT to inflation can be observed for most countries in the sample, and are statistically insignificant for more than half of the sample. On average, we observe that the degree of ERPT is higher for countries in the LATAM region compared to those in Asia, which is consistent with findings in Carrière-Swallow et al. (2021) and Ito and Sato (2007)[7]. We also confirm the argument put forth by An et al. (2021) that estimating the SVAR model with only zero and sign restrictions leads to implausible ERPT estimates. This is as shown in Figure 2(b), which reports the 90-percent confidence interval of ERPT estimates from 500 accepted draws (grey area) with median ERPT estimates denoted by black dots.[8] Evidently, we find that a significant portion of accepted draws imply ERPT estimates that are larger than one in Indonesia, Malaysia, Thailand and Brazil - a counterintuitive result.

We view that ERPT restrictions are a crucial element of our study on the role of exchange rates as a shock absorber or a source of shocks. Due to implausible results produced from the SVAR model that employs only zero and sign restrictions, we include ERPT restrictions for each country in our SVAR model. In doing so, we specify that the degree of ERPT should be not exceed the OLS estimate for each country plus two standard errors. After imposing such restrictions, 90-percent confidence intervals of ERPT estimates become substantially smaller (orange area in Figure 2(b)), which in turn lowers the median estimate for all countries, as shown by red dots, including the four aforementioned countries that had ERPT estimates exceeding one. Furthermore, as shown in Figure A1, the contributions of exchange rate shocks toward driving exchange rate movements are notably higher in the SVAR model that includes ERPT restrictions, implying that without ERPT restrictions, we may risk understating the role of exchange rates as a source of shocks.

3 Empirical Results

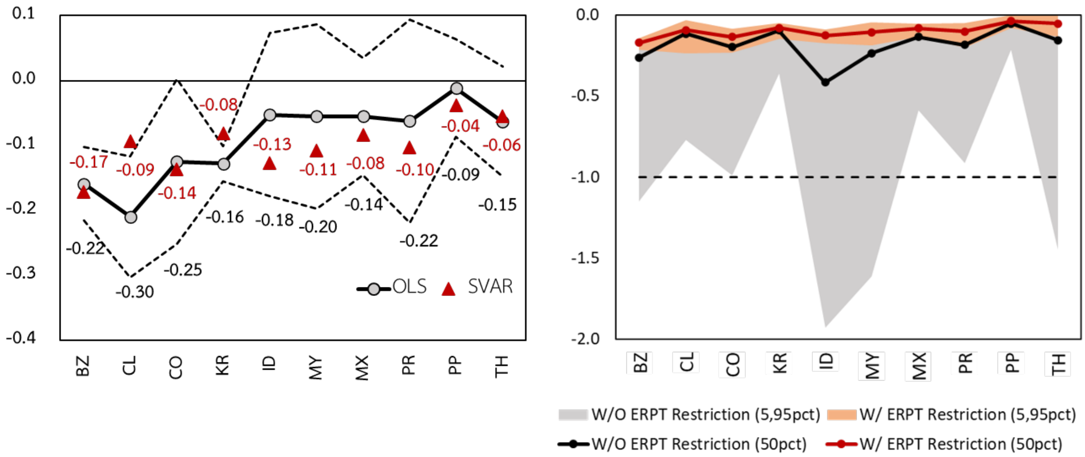
This section reports the estimation results based on the SVAR model with zero, sign and ERPT restrictions. To determine the role of exchange rates as a shock absorber or source of shocks, our investigation involves the following steps, in which we discuss the results in turn. First, for each country, we disentangle drivers of exchange rate movements into fundamental drivers or own exogenous shocks. We

[7]This result is also consistent with evidence in Kohlscheen (2010) that ERPT is higher for countries with greater nominal exchange rate volatilities and that trade more homogeneous goods.

[8]ERPT is calculated as the ratio of prices to exchange rates one year after an exogenous exchange rate shock.

Figure 2: Exchange Rate Pass-through Estimates

(a) OLS Regression (b) SVAR Model



Note: (a) ERPT estimates based on country-by-country regression of changes in consumer price index on contemporaneous and four lags of changes in bilateral exchange rates against the US dollar. Control variables include a country's real GDP growth, global supply chain pressure index, weighted-average export price growth of major exporting countries, and changes in world oil prices. We report the sum of coefficients on exchange rate changes (in grey circles) and use the Wald test to compute confidence intervals based on two standard errors (in dashed lines). We also report, in red triangles, median estimates from the SVAR model with ERPT restrictions. (b) EPRT estimates from the SVAR model, computed as ratios of prices to exchange rates after four quarters, in response to an exogenous exchange rate shock. Black dots are median estimates from 500 accepted draws of the model without an ERPT restriction, where the grey area represents 90-percent confidence intervals. Red dots are median estimates from the model with ERPT restrictions, while the orange area shows their corresponding 90-percent intervals.

then examine the extent by which exogenous exchange rate shocks affect growth and inflation volatilities to initially examine their role as a source of shocks for macroeconomic fluctuations. Next, we analyze the shock-insulating properties of exchange rate movements when being driven by fundamental shocks. Finally, based on counterfactual analyses, we compute the net benefits of allowing for flexible exchange rate movements in terms of macroeconomic stabilization.

3.1 Drivers of Exchange Rates

Based on the SVAR model, we explore underlying drivers of exchange rate fluctuations across emerging markets. In particular, we examine whether the source of exchange rate movements can be explained by fundamental shocks or their own exogenous exchange rate movements. We also differentiate between different types of fundamental shocks, to diffrentiate between drivers of exchange rate movements that are domestic versus global in nature, as well as whether they stem from supply or demand side factors.

Table 2 reports the eight-quarter forecast error variance decomposition of exchange rate changes for each country. As shown, it is evident that exogenous exchange rate shocks drive a sizable portion of overall fluctuations in exchange rates. On average, they account for 48 percent and 58 percent of the variations in exchange rate movements for emerging countries in LATAM and Asia, respectively. Also, while exchange rate shocks play the most muted role in Korea, it is still sizable at 40 percent. These findings thus suggest that exogenous exchange rate shocks play an important role towards explaining exchange rate fluctuations in emerging markets. Evidence on the prominent role of exchange rates shocks have also been suggested in the context of advanced economies by Farrant and Peersman (2006), Artis and Ehrmann (2006) and An et al. (2021).

Table 2: Forecast Error Variance Decomposition for Exchange Rate Changes

	S (1)	D (2)	MP (3)	ER (4)	S* (5)	D* (6)	MP* (7)	Other* (8)	Demand (2)+(6)+(7)	Supply (1)+(5)	Domestic (1)-(3)	Global (5)-(8)
Brazil	5%	8%	5%	50%	5%	15%	8%	6%	30%	10%	17%	33%
Chile	6%	9%	12%	46%	5%	9%	8%	5%	26%	11%	27%	27%
Colombia	3%	7%	9%	49%	4%	11%	9%	8%	26%	7%	18%	32%
Mexico	2%	5%	3%	46%	3%	25%	8%	9%	37%	5%	10%	44%
Peru	6%	9%	8%	48%	10%	4%	9%	6%	23%	16%	23%	29%
South Korea	5%	15%	4%	40%	7%	16%	8%	6%	38%	12%	24%	36%
Indonesia	2%	3%	9%	62%	6%	10%	4%	4%	17%	9%	14%	25%
Malaysia	4%	12%	3%	57%	3%	8%	7%	6%	27%	7%	19%	24%
Philippines	5%	4%	7%	69%	4%	4%	4%	3%	12%	9%	16%	15%
Thailand	4%	18%	5%	61%	3%	4%	2%	3%	24%	7%	26%	13%
EM LatAm	4%	7%	7%	48%	5%	13%	8%	7%	28%	10%	19%	33%
EM Asia	4%	10%	6%	58%	5%	8%	5%	5%	24%	9%	20%	22%
EM	4%	9%	6%	53%	5%	10%	7%	6%	26%	9%	20%	28%

Note: Reported are forecast error variance decomposition (FEVD) results of exchange rate changes, averaged over an eight-quarter horizon. Results are based on the median of 500 accepted draws, where the sum of shock contributions are rescaled to 100 percent for a given country. In the last four columns, we also report the sum of contributions from demand, supply, domestic, and global shocks for each country. In the last three rows, we report average shock contributions for each shock in Latin America and Asia regions, as well as for the entire sample.

Towards the role of fundamental shocks in driving exchange rate movements, we highlight several findings of interest. First, we find that demand rather than supply side shocks play a substantial role in explaining fluctuations in exchange rates. Overall, approximately 25 percent of all exchange rate variations come from demand shocks whereas only around 10 percent stem from supply shocks. This pattern is broadly consistent across countries except for some countries in Asia such as the Philippines and Indonesia that report a more muted role for demand shocks, as well as some countries in the LATAM region such as Peru that display a slightly larger role for supply shocks.

We also find a key role for global fundamental shocks in driving overall exchange rate fluctuations. This is consistent with earlier findings in the literature that emphasize the importance of global shocks for emerging countries (Akinci and Queralto, 2023; Carl and Mereb, 2023; Ahmed et al., 2021; Kohlscheen et al., 2017), while also being consistent with the large degree of trade openness of countries in our sample. In particular, global shocks explain on average about one-third of overall exchange rate movements, whereas domestic shocks account for only one-fifth. However, there are some variations across countries, and exchange rate fluctuations in the LATAM region as a whole are more susceptible to global shocks. Countries in Asia that have global shocks accounting for a smaller role towards driving exchange rates fluctuations include the Philippines and Thailand, where the role for global shocks in explaining overall exchange rate movements in these countries stands at only approximately one-half of the sample average.

3.2 Exchange Rates as a Source of Shock?

Based on results in the previous section where the majority of exchange rate fluctuations are driven by exogenous exchange rate shocks, the traditional view would be to suggest exchange rate shocks as a source of macroeconomic fluctuations. However, simply disentangling underlying drivers of exchange rate movements without investigating their effects on the overall macroeconomy would be a lacking way to examine their role as a source of shocks. In this section, we examine whether exchange rate shocks act as a source of shocks based on their role towards generating macroeconomic volatility.

First, we examine the role of exchange rates in explaining output growth volatility. According to Table 3, exchange rate shocks are far from being a source of shocks, as they explain only a negligible portion of output growth variance (2–4 percent). These results are consistent with the small impact that exchange rate shocks exert on output growth as shown in Figure 3(a). For most countries, we find that a one-percent exchange rate shock lowers real GDP growth by merely 0.02–0.06 percentage points, with the impact being largest in Peru at only 0.11 percentage points. Despite the impact of exchange rate shocks on output volatility being generally small, however, we do note some differences in the degree of shock persistence across countries. As shown, the impact of an exchange rate shock on output growth is notably more persistent in Asian countries, especially for Indonesia, Malaysia and Thailand. This finding is not surprising particularly for the latter two countries given their high degrees of openness in trade, with ratios of trade to GDP exceeding 100 percent.

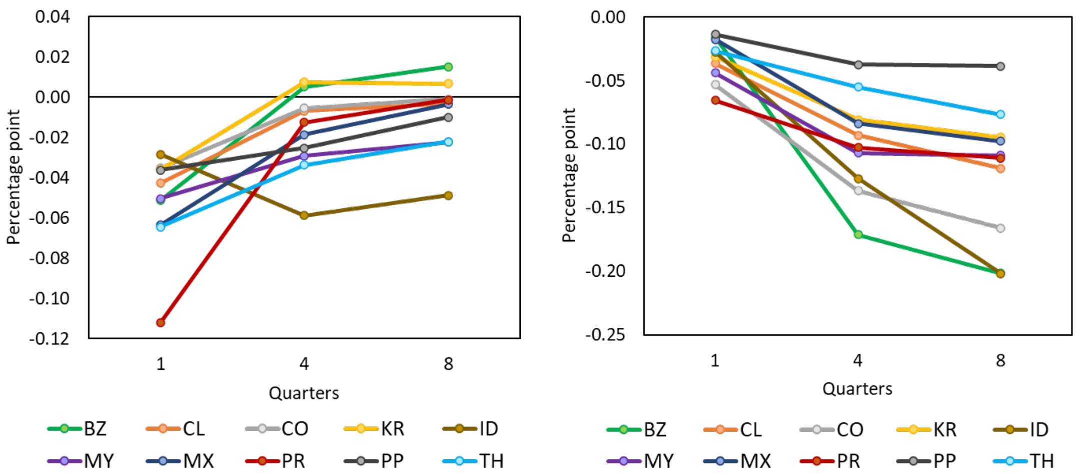
Table 3: Forecast Error Variance Decomposition for Output Growth

	S (1)	D (2)	MP (3)	ER (4)	S* (5)	D* (6)	MP* (7)	Other* (8)	Demand (2)+(6)+(7)	Supply (1)+(5)	Domestic (1)-(3)	Global (5)-(8)
Brazil	15%	9%	2%	4%	4%	47%	5%	12%	62%	20%	27%	69%
Chile	24%	10%	1%	2%	11%	38%	5%	11%	52%	34%	35%	64%
Colombia	16%	14%	0%	1%	8%	45%	5%	11%	64%	24%	31%	69%
Mexico	10%	7%	1%	1%	12%	51%	4%	14%	63%	22%	18%	81%
Peru	7%	13%	1%	1%	13%	49%	2%	15%	64%	20%	20%	79%
South Korea	22%	21%	8%	3%	3%	27%	9%	7%	57%	25%	50%	46%
Indonesia	17%	14%	0%	2%	5%	48%	3%	11%	65%	22%	31%	67%
Malaysia	7%	7%	4%	1%	7%	56%	5%	13%	68%	14%	17%	82%
Philippines	18%	6%	0%	1%	9%	52%	2%	12%	60%	27%	24%	75%
Thailand	29%	24%	1%	2%	5%	27%	4%	9%	55%	34%	54%	45%
EM LatAm	14%	11%	1%	2%	10%	46%	4%	13%	61%	24%	26%	72%
EM Asia	18%	14%	3%	2%	6%	42%	5%	11%	61%	24%	35%	63%
EM	16%	12%	2%	2%	8%	44%	4%	12%	61%	24%	31%	68%

Note: Reported are forecast error variance decomposition (FEVD) results of output growth, averaged over an eight-quarter horizon. Results are based on the median of 500 accepted draws, where the sum of shock contributions are rescaled to 100 percent for a given country. In the last four columns, we also report the sum of contributions from demand, supply, domestic and global shock for each country. In the last three rows, we report average shock contributions for each shock in Latin America and Asia regions, as well as for the entire sample.

Figure 3: Impulse Responses to an Exogenous Exchange Rate Shock

(a) Output Growth (b) Inflation



Note: Shown are cumulated impulse responses of output growth (panel a) and inflation (panel b) over eight quarters to an exogenous exchange rate appreciation shock from the SVAR model with a full set of zero, sign and ERPT restrictions. The impulse responses are scaled such that the median four-quarter cumulated responses of exchange rates equal to one percent in every country. Results are based on the median of 500 accepted draws.

The muted role of exogenous exchange rate shocks towards driving output growth volatility in turn implies a key role for fundamental shocks. By examining FEVD results for output growth as reported in Table 3, we find that among fundamental shocks, demand-side and global shocks again play a dominant role, and global shocks are more prominent for exchange rate fluctuations in LATAM compared to Asian countries. Contributions from global shocks are as high as 80 percent for output growth variance in Mexico, Peru and Malaysia. While the role of global shocks are smaller relative to domestic shocks for Thailand and Korea, they are nonetheless sizable at 45 and 46 percent, respectively.

Next, we turn to examine the source of shocks for inflation variations. According to Table 4, we find that average contributions of exogenous exchange rate shocks for inflation variance are slightly larger than those influencing output growth. Nonetheless, its role is still considered small at 8 percent for the entire sample, and 12 and 4 percent for LATAM and Asia countries, respectively. Nonetheless, in certain countries such as Brazil and Colombia, the share of inflation variance explained by exchange rate shocks are notably higher, standing at 25 and 15 percent, respectively. These results are more or less consistent with ERPT estimates, as we observe stronger and more persistent ERPT to domestic inflation for Brazil and Colombia in Figure 3(b), especially when compared to other countries.[9]

Despite our results pointing towards the potential role of exchange rates as a source of inflation volatilities for a few countries in our sample, overall they are far from being a source of shock as they merely explain a small portion of inflation variance in most countries. Again, these results highlight the importance of fundamental drivers in explaining inflation variability in emerging economies. According to Table 4, demand-side shocks dominate those from the supply-side in driving inflation variability, similar to the case of output growth. The main difference however, is that while output growth variability is heavily influenced by global shocks, we find that domestic shocks drive the majority of inflation variations in most countries in our sample. Global shocks are only more important relative to domestic shocks in a few Asian countries such as Thailand, Malaysia and Korea.

4 Exchange Rates as a Shock Absorber?

Given that exchange rates in emerging economies do not necessarily act as a source of shock for macroeconomic volatility, we examine their ability to absorb

[9]Indonesia is an exception as it features a large ERPT estimate but exchange rate shocks play only a minor role in driving inflation rate volatility, possibly due to a larger role for fundamental shocks in driving exchange rates.

Table 4: Forecast Error Variance Deomposition for Inflation

	S (1)	D (2)	MP (3)	ER (4)	S* (5)	D* (6)	MP* (7)	Other* (8)	Demand (2)+(6)+(7)	Supply (1)+(5)	Domestic (1)-(3)	Global (5)-(8)
Brazil	22%	17%	17%	25%	3%	6%	5%	5%	28%	25%	56%	20%
Chile	22%	8%	17%	6%	10%	16%	15%	6%	39%	32%	46%	48%
Colombia	30%	26%	11%	15%	5%	5%	3%	5%	35%	34%	67%	18%
Mexico	14%	17%	34%	6%	6%	9%	9%	6%	34%	21%	65%	30%
Peru	23%	42%	13%	8%	4%	3%	5%	3%	50%	26%	77%	15%
South Korea	11%	10%	18%	9%	10%	15%	20%	7%	44%	21%	39%	52%
Indonesia	24%	39%	21%	4%	2%	4%	3%	3%	46%	27%	84%	12%
Malaysia	9%	10%	15%	4%	7%	28%	18%	9%	56%	16%	34%	62%
Philippines	16%	19%	19%	2%	16%	13%	7%	8%	39%	33%	54%	44%
Thailand	6%	8%	20%	2%	8%	32%	14%	11%	54%	14%	33%	65%
EM LatAm	22%	22%	18%	12%	6%	8%	7%	5%	37%	28%	62%	26%
EM Asia	13%	17%	18%	4%	9%	18%	12%	8%	48%	22%	49%	47%
EM	18%	19%	18%	8%	7%	13%	10%	6%	42%	25%	55%	36%

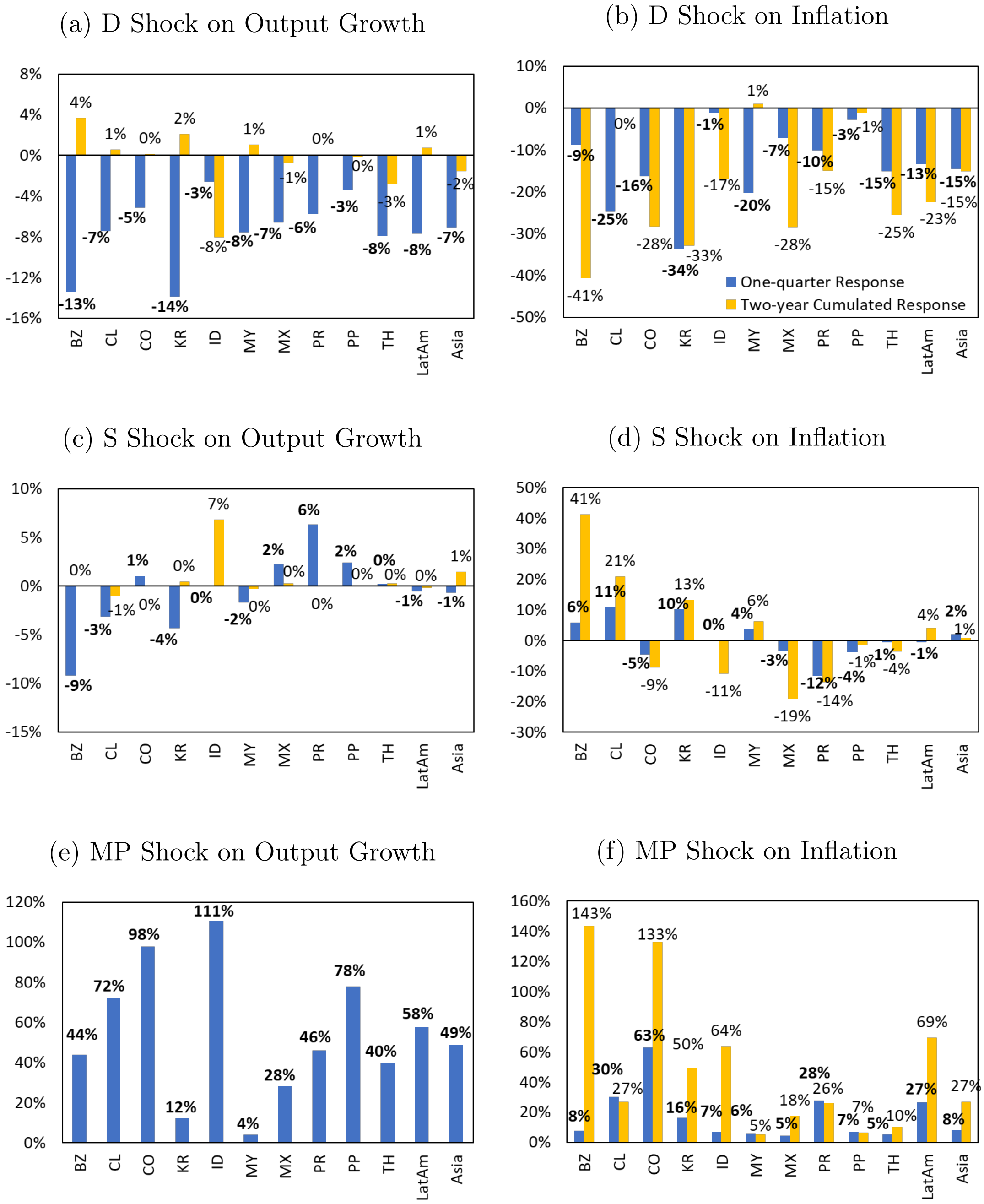
Note: Reported are forecast error variance decomposition (FEVD) of inflation, averaged over an eight-quarter horizon. Results are based on the median of 500 accepted draws, where the sum of shock contributions are rescale to 100 percent for a given country. In the last four columns, we also report the sum of contributions from demand, supply, domestic and global shock for each country. In the last three rows, we report average shock contributions for each shock in Latin America and Asia regions, as well as for the entire sample.

fundamental shocks. In particular, we examine the extent in which flexible exchange rates can help lower or even raise overall output and inflation volatility. In doing so, we compare the degree of macroeconomic volatility under the unconditional case in which exchange rates are allowed to respond endogenously to fundamental shocks, and the conditional case where we restrict the ability of exchange rates to respond to a particular fundamental shock. This is achieved by offsetting the endogenous response of exchange rates to fundamental shocks in the SVAR model by the exogenous exchange rate shock series.

Figure 4 reports the percentage difference between the median responses of the unconditional and conditional cases, where the blue and yellow bars illustrates the degrees of shock absorption upon impact and after two years respectively.[10] The percentage differences between median responses illustrate the degree in which exchange rates act as a shock absorber or amplifier of macroeconomic fluctuations. In particular, if the percentage difference is negative, it implies that the exchange rate acts as a shock absorber, as the fundamental shock induces a stronger response under the conditional case, where the exchange rate is held fixed, compared to the unconditional case.

[10]These results are computed from the cumulative conditional and unconditional impulse responses for output growth and inflation as shown in Figures A2 and A3 in the Appendix.

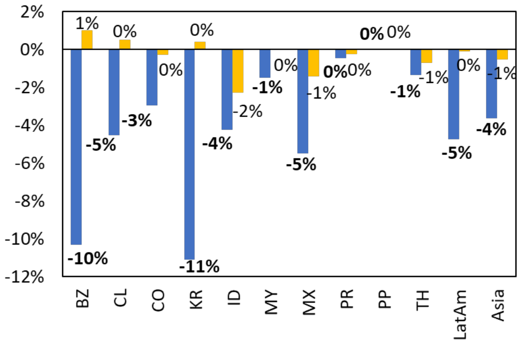
Figure 4: Degree of Shock Absorption for Fundamental Shocks



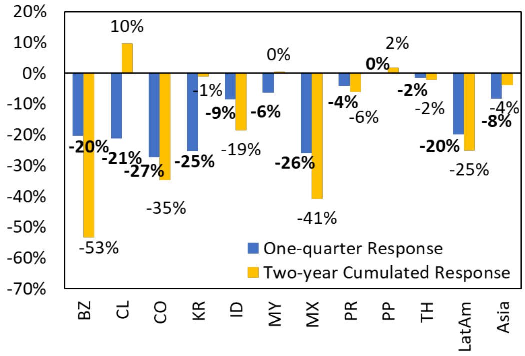
(a) D Shock on Output Growth
(b) D Shock on Inflation
(c) S Shock on Output Growth
(d) S Shock on Inflation
(e) MP Shock on Output Growth
(f) MP Shock on Inflation

Figure 4: Degree of Shock Absorption for Fundamental Shocks (continued)

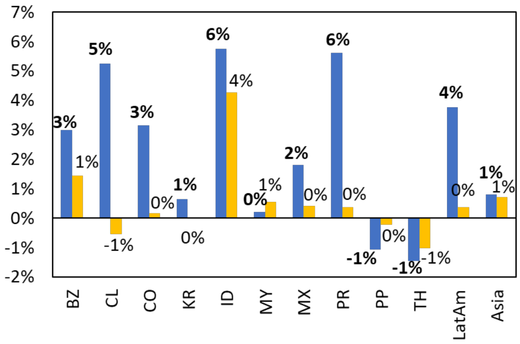
(g) D^* Shock on Output Growth



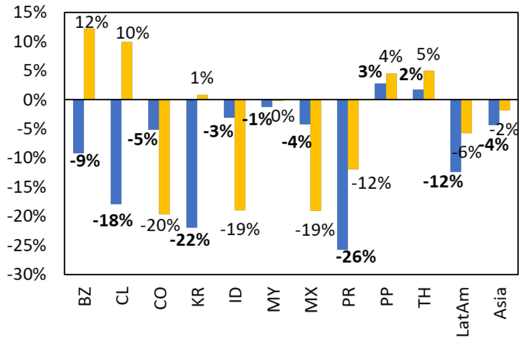
(h) D^* Shock on Inflation



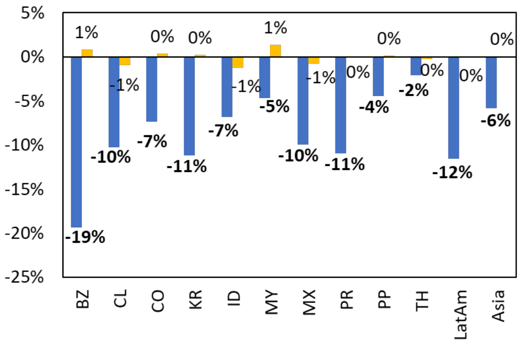
(i) S^* Shock on Output Growth



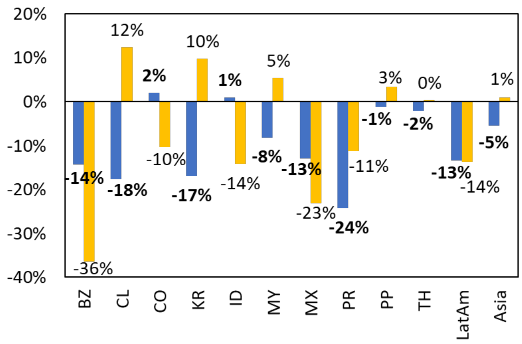
(j) S^* Shock on Inflation



(k) MP^* Shock on Output Growth



(l) MP^* Shock on Inflation



Note: Shown are the percentage differences of cumulated impulse responses of real GDP growth and inflation to each identified fundamental shock under the unconditional case based on the SVAR model with a full set of restrictions (Y), and under the conditional case (Y') where exchange rates are held fixed in response to shocks. This is calculated as $(\frac{Y-Y'}{Y'}) * 100$, where blue and yellow bars show results at the one-quarter and two-year horizons respectively. Under the conditional case case, we generate a series of exogenous exchange rate shocks to offset the responses of exchange rates to each identified shock. Results are based on the median of 500 accepted draws. The negative values indicate a smaller response under the unconditional model, i.e., exchange rates are acting as a shock absorber.

Our results strongly highlight the shock-dependent properties of exchange rates towards macroeconomic stabilization. We also find that the shock-absorbing role of exchange rates differs across time horizons. Focusing on the short run, our results show that exchange rates mainly help absorb the impact of both domestic and global demand shocks for output growth, (Figure 4(a) and (g)), as illustrated by the blue bars that are negative for all countries in the sample. This mechanism occurs through, for example, an exchange rate depreciation that helps stabilize real activity in the face of domestic demand shocks that tend to lead to economic slowdowns or recessions. In terms of magnitude, flexible exchange rates help absorb variations in output growth by 7–8 percent on average in the face of domestic demand shocks.[11] Flexible exchange rates also help absorb foreign demand shocks, but to a lesser degree at around 4–5 percent. Some cross-country differences that we find noteworthy are that the shock absorbing role of exchange rates is highest in Brazil and Korea for both domestic and global demand shocks, while the ability of exchange rates to absorb foreign demand shocks is mostly negligible in Peru, Thailand, Philippines and Malaysia.

Exchange rate flexibility also helps mitigate the impact of demand shocks on inflation. In fact, the shock absorbing role of exchange rates appears even more prominent when compared to the case of output growth. In the case of domestic demand shocks, the degree of shock absorption rises to 13–15 percent, whereas for global demand shocks, the shock-absorption benefits are larger as well (Figure 4(b) and (h)). Therefore, our overall results suggest that in the case of demand shocks, flexible exchange rate plays a significant shock-absorbing role for both output growth and inflation for emerging countries in our sample. However, there are some differences across countries. For example, in the case of inflation variability, the ability of exchange rates to absorb global demand shocks is particularly stark for LATAM countries, as exchange rates help absorb almost 20 percent of inflation variations, compared to 8 percent in Asia. We observe that in Thailand and the Philippines, absorption rates are particularly low, consistent with their lower ERPT estimates for inflation.

Turning to examine the shock absorbing role for other shocks in the short run, we also find that exchange rate flexibility helps mitigate the impact of global monetary policy shocks for output growth and inflation. According to Panels (k) and (l) in Figure 4, absorption rates are rather high for both output growth and inflation,

[11] To get a better sense of the magnitude, this means that if a shock causes a decline in output growth by 10 percent under the conditional case, economic activity will decline by 9.3 percent under the unconditional case where exchange rates are allowed to endogenously respond to fundamental shocks.

albeit being larger overall for LATAM countries when compared to Asia. As before, we find that in Brazil and Korea, exchange rates play a relatively larger shock-absorbing role. On the other hand, exchange rates play an amplifying role for both output growth and inflation in response to domestic monetary policy shocks (Figure 4(e) and (f)) due to exchange rates playing a part in the monetary policy transmission mechanism. These results are by construction as we restrict both the response of exchange rates to a monetary policy shock and the response of growth and inflation to an exogenous exchange rate shock. However, what we find noteworthy are the responses that are quite sizable for output growth over the short-term and inflation over the 8-quarter horizon.[12].

In the case of supply shocks, evidence on the role of exchange rates towards macroeconomic stabilization becomes rather mixed. We also observe that supply shocks can also generate trade-offs between output growth and inflation stabilization. First, on the impact of domestic supply shocks (Figure 4(c) and (d)), while exchange rates act as a shock absorber for output growth in Brazil, Korea and Chile, these countries face trade-offs as they experience higher inflation volatility. On the other hand, domestic supply shocks act as a shock amplifier for output growth in other countries, notably in Peru, but movements in exchange rates instead help mitigate inflation variability by 12 percent. That is, in Peru, exchange rates are found to appreciate in response to a negative supply shock that raises inflation and weakens economic activity.

In the case of foreign supply shocks, it is rather evident that exchange rates generally act as a shock amplifier for output growth fluctuations (Figure 4(i)), but help absorb inflation volatility (Figure 4(j)). Such benefits and costs of flexible exchange rates are notably more stark for countries in the LATAM region. The benefit towards mitigating inflation volatility is on average 12 percent in the short run for LATAM, reaching as high as 26 and 18 percent for Peru and Colombia, respectively, while being lower at 4 percent for emerging countries in Asia. They, however, amplify the responses on output growth by about 4 percent for LATAM countries.

The amplification role for exchange rates in response to global supply shocks may reflect both the central bank's reaction function and term-of-trade effects. To illustrate this, consider negative supply shocks that raise global inflation and oil prices. These shocks may translate to higher domestic inflation that prompts the central bank to react by raising the policy rate, which may in turn strengthen the

[12]We do not report the degree of shock absorption after two years for domestic monetary policy shocks, because they have an almost negligible impact on output growth over the long run due to the long-run zero restrictions in place.

exchange rate and worsen economic growth. Rising oil and commodity prices could also worsen the US terms of trade given the role of the US as an oil importer, while improving the terms of trade for commodity exporters.[13] This, in turn, weakens the US dollar against other currencies, which can alleviate domestic inflationary pressures but at the same time exacerbate economic activity. Note that our result contradicts with an earlier finding of Edwards and Levy Yeyati (2005), who show that flexible exchange rates lessens the growth impact from term-of-trade disturbances over the period 1974–2000.

Next, we examine the shock-absorbing properties of the exchange rate that differs over the medium-run. In the case of output growth, we barely observe a shock absorbing role for exchange rates in response to any types of fundamental shocks, suggesting that the output stabilization benefits of exchange rates mainly take place in the short run. Nevertheless, the shock-absorption benefits clearly extend to the medium run for inflation stabilization, particularly in countries such as Brazil and Mexico. These results are in line with Beckmann et al. (2024), who highlight the benefits of flexible exchange rates for stabilizing inflation over the longer run. However, our paper additionally highlights that such benefits also exist in the short run, with the exception for domestic supply shocks where movements in exchange rates amplify inflation variability in some countries.

Thus far, our results have illustrated the shock-dependent properties of exchange rates in their role as a shock absorber or amplifier of shocks. We confirm this point by examining conditional FEVDs for output growth and inflation, as shown in Tables 5 and 6, respectively. Towards output growth, we find consistent with our earlier findings that exchange rates act as a shock absorber in response to demand as well as global monetary policy shocks, as the variance shares attributed to these fundamental shocks under the conditional case increases from the unconditional case for every country. Such increases are as high as 6 percentage points for Korea and Thailand.

Towards inflation, it is evident that the shock-absorption roles for demand shocks becomes much more prominent, especially for emerging countries in the LATAM region and Korea. We find that the variance shares that are attributed to supply shocks decline rather than increase in many countries under the conditional case, again echoing our earlier results on the limited role of exchange rates in absorbing supply shocks. In Peru, however, we observe a larger share of inflation variance that is driven by supply shocks. This is consistent with the conditional impulse responses

[13]For most of the sample, the US is classified as an oil importer. However, during more recent periods, the US has become a net oil exporter and therefore these results may not hold (Hofmann et al., 2022).

Table 5: Forecast Error Variance Decompositions for Output Growth

	Based on FEVD				Based on Conditional FEVD			
	ER (1)	Demand (2)	Supply (3)	MP (4)	ER (5)	Demand (6)	Supply (7)	MP (8)
Brazil	4%	62%	20%	2%	0%	66%	21%	1%
Chile	2%	52%	34%	1%	0%	57%	32%	1%
Colombia	1%	64%	24%	0%	0%	67%	20%	0%
Mexico	1%	63%	22%	1%	0%	66%	19%	0%
Peru	1%	64%	20%	1%	0%	68%	16%	0%
South Korea	3%	57%	25%	8%	0%	63%	25%	5%
Indonesia	2%	65%	22%	0%	0%	68%	21%	0%
Malaysia	1%	68%	14%	4%	0%	70%	14%	3%
Philippines	1%	60%	27%	0%	0%	62%	26%	0%
Thailand	2%	55%	34%	1%	0%	61%	30%	1%
EM LatAm	2%	61%	24%	1%	0%	65%	22%	1%
EM Asia	2%	61%	24%	3%	0%	65%	23%	2%
EM	2%	61%	24%	2%	0%	65%	22%	1%

Note: Reported are the unconditional and conditional forecast error variance decompositions (FEVD) of output growth, averaged over an eight-quarter horizon. For conditional FEVDs, we generate a series of exogenous exchange rate shocks to offset the responses of exchange rates to each identified shock. Results are based on the median of 500 accepted draws, where shock contributions are rescaled to sum up to 100 percent for each country. Demand shocks are classified as domestic demand, global demand and global monetary policy shocks. Also in the last three rows, we show average shock contributions for each type of shock for Latin America, Asia and the whole sample.

shown earlier and indicates that exchange rates help absorb the impact of supply shocks on inflation volatility in this country, albeit at the expense of greater output growth volatility. Finally, when exchange rates are held fixed to monetary policy shocks, domestic monetary policy shocks play an almost negligible role towards macroeconomic stabilization, especially for inflation. This suggests that the effects of monetary policy on inflation mainly occurs through the exchange rate channel, despite low estimates of ERPT to inflation.

In conclusion, our empirical evidence suggests that exchange rates can well absorb the impact of demand and global monetary policy shocks on output growth and inflation, with benefits extending to the medium run for inflation. On the other hand, they are a shock amplifier towards output growth volatility when faced with a domestic monetary policy shock as well as global supply shocks, and in some cases for domestic supply shocks. Towards inflation, the shock absorbing role is evident in the case of global supply shocks. These results deepen the analyses provided by Beckmann et al. (2024), who only document shock-insulation properties for domestic demand shocks, but not global ones. They also help strengthen the analysis of Obstfeld et al. (2019) and Eichengreen et al. (2020), who show that

Table 6: Forecast Error Variance Decompositions for Inflation

	Based on FEVD				Based on Conditional FEVD			
	ER (1)	Demand (2)	Supply (3)	MP (4)	ER (5)	Demand (6)	Supply (7)	MP (8)
Brazil	25%	28%	25%	17%	0%	61%	18%	1%
Chile	6%	39%	32%	17%	0%	55%	28%	1%
Colombia	15%	35%	34%	11%	0%	53%	37%	0%
Mexico	6%	34%	21%	34%	0%	48%	21%	0%
Peru	8%	50%	26%	13%	0%	56%	34%	0%
South Korea	9%	44%	21%	18%	0%	62%	21%	5%
Indonesia	4%	46%	27%	21%	0%	53%	28%	0%
Malaysia	4%	56%	16%	15%	0%	63%	15%	3%
Philippines	2%	39%	33%	19%	0%	42%	35%	0%
Thailand	2%	54%	14%	20%	0%	59%	14%	1%
EM LatAm	12%	37%	28%	18%	0%	54%	28%	1%
EM Asia	4%	48%	22%	18%	0%	56%	22%	2%
EM	8%	42%	25%	18%	0%	55%	25%	1%

Note: Reported are the unconditional and conditional forecast error variance decompositions (FEVD) of inflation, averaged over an eight-quarter horizon. For conditional FEVDs, we generate a series of exogenous exchange rate shocks to offset the responses of exchange rates to each identified shock. Results are based on the median of 500 accepted draws, where shock contributions are rescaled to sum up to 100 percent for each country. Demand shocks are classified as domestic demand, global demand and global monetary policy shocks. Also in the last three rows, we show average shock contributions for each type of shock for Latin America, Asia and the whole sample.

flexible exchange rates can help insulate global shocks for emerging countries.[14]

4.1 Net Effects of Exchange Rate Volatility

In the previous section, we find that flexible exchange rate movements can generally help reduce growth and inflation volatility. However, exchange rate flexibility in itself could incur costs, if exogenous exchange rate movements serve as a source of macroeconomic volatility. At the same time, the benefits of flexible exchange rates for shock absorption could be rather small, or their movements could even amplify the impact of certain types of fundamental shocks such as supply shocks. Therefore, to truly gauge the benefits of flexible exchange rates as a shock absorber, it is important to measure the net effects of exchange rate movements on macroeconomic volatility by considering its shock absorbing abilities on the one hand, weighed against the cost of additional volatility that it may generate on the other.

Figure 5 reports the results where the blue bars illustrate the net benefits of

[14] In Figure A4, we check the robustness of our results by also computing the degrees of shock absorption by estimating the SVAR model without ERPT restrictions (in black) and comparing them against the baseline results with a full set of restrictions (in red). As shown, the results are qualitatively similar to our baseline findings. However, consistent with our earlier argument, we find that without placing ERPT restrictions, the benefits of allowing the exchange rate to move in response to shocks could be overstated, particularly in the face of demand shocks.

flexible exchange rates in each country. To compute net benefits, we perform counterfactual analyses on output growth and inflation series for each country, by keeping exchange rates fixed in response to shocks. Again, this is to prevent exchange rates from acting as a shock absorber or an amplifier, including being a source of shocks in themselves. In doing so, we offset exchange rate movements by a series of exogenous exchange rate shocks, and then compare the volatilities of output growth and inflation under this counterfactual scenario to the actual case where exchange rates can flexibly respond to shocks. As such, a positive value will signify that the benefits of reduced macroeconomic volatility outweigh the costs.

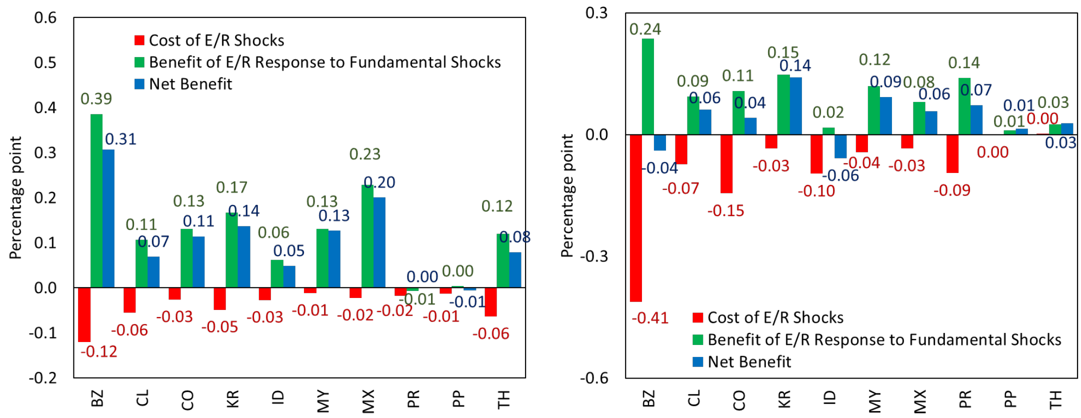
In Figure 5, we also show the benefits and costs of allowing the exchange rate to respond endogenously to fundamental shocks separately. In terms of the costs (red bars), we consider a counterfactual case where we purge exchange rate movements of exogenous exchange rate shocks. To compute benefits (green bars), we consider another counterfactual scenario, where exchange rates do not respond to any fundamental shocks including the unidentified global shock. As expected, we find that output growth and inflation volatilities are lowest for all countries under the first counterfactual case where we compute the cost of exchange rate movements by removing exogenous exchange rate shocks. Also, output growth and inflation volatility are highest under the second counterfactual, since exchange rate movements are purged of all its shock-insulation abilities.

As shown in Figure 5(a), most countries in our sample experience net gains from flexible exchange rates in terms of output stabilization. Peru and the Philippines are exceptions, where the estimated net gains are rather negligible. On the other hand, countries such as Brazil, while facing larger costs of exchange rate shocks in terms of output volatility, still experience net gains of about 0.3 percentage points. The gains for Mexico, Korea, Malaysia and Colombia are also sizable.

Turning to examine gains for inflation stabilization (Figure 5(b)), we observe that most countries also benefit from flexible exchange rates. Korea has the largest gains of 0.14 percentage point, partly due to the costs of exogenous exchange rate shocks being small. However, there are a few countries such as Brazil and Indonesia where net gains are negative, as the costs of inflation volatility coming from exchange rate shocks outweigh any shock-absorption benefits. Thailand and the Philippines also do not enjoy net gains from exchange rate flexibility towards inflation stabilization, but this is because both the costs and benefits from exchange rate fluctuations in these countries are extremely small. These findings may be related to the degree of ERPT to domestic inflation, as Brazil and Indonesia both feature relatively large ERPT compared to the lower ERPT estimates for Thailand and the Philippines.

Figure 5: Counterfactual Analyses: Net Benefits of Flexible Exchange Rates

(a) Output Growth Stabilization (b) Inflation Stabilization



Note: Shown are the differences between annualized standard deviations of actual real GDP growth (panel a) and actual inflation (panel b) against three counterfactual cases: (1) assume away exogenous exchange rate shocks (in red bars), (2) assume that exchange rates do not respond to fundamental shocks (in green bars), and (3) assume that exchange rates do not respond to any shocks (in blue bars). For (2) and (3), a series of exogenous exchange rate shocks are generated to offset exchange rate movements. Results are based on the median of 500 accepted draws. For a given country, red, green and blue bars measure costs from exogenous exchange rate shocks in terms of output growth and inflation volatility, benefits from exchange rates being a shock absorber, and the net benefits, respectively. The sample period is from 2000Q3 to 2022Q3.

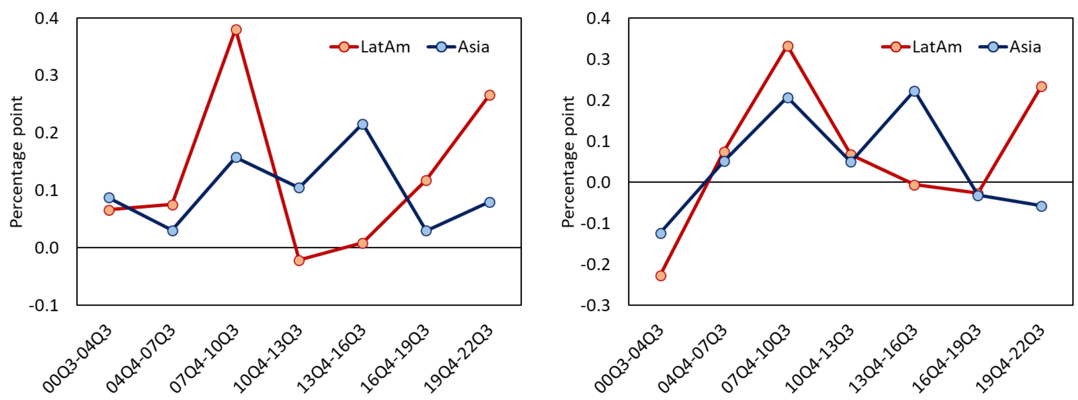
Next, we explore whether the above net benefits can be explained by exchange rate responses to certain types of fundamental shocks. First, we make a comparison between demand and supply shocks in Figure A5. To do so, we compute the difference between actual volatility against the counterfactual case where exchange rates are not allowed to respond to demand shocks (in blue bars) and to supply shocks (in yellow bars). As shown, the benefits for output and inflation stabilization can be mainly attributed to exchange rate responses to demand shocks. In fact, for most countries, the size of the benefits that stem from demand shocks is close to the estimated total benefits as shown in the green bars of Figure 5. An interesting case is Peru, where exchange rate movements clearly help absorb output variations attributed to demand shocks but amplify those due to supply shocks. This is in line with the strong shock-amplifying roles of exchange rates found earlier in case of supply shocks for Peru.

We are also interested in making a distinction between domestic versus global shocks towards explaining the net benefits of flexible exchange rates. As shown in Figure A6, exchange rates help absorb the impact of global shocks on output grwoth and inflation to a larger extent when compared to domestic shocks in most countries.[15] The ability to absorb global shocks is particularly prominent in Brazil, Mexico and Korea for output growth, whereas for inflation, Brazil, Chile and Korea stand out. However, there are some exceptions. For output growth, the net benefits for Thailand mainly derive from exchange rate responses to domestic shocks. This is consistent with the dominant role of domestic shocks in driving Thai economic growth fluctuations. Similarly, for inflation, the shock-absorption benefits of exchange rates stem from domestic rather than global shocks in Peru and Columbia.

Finally, we compute the net benefits of flexible exchange rates over time. The results are plotted by region in Figure 6. As shown, net benefits are positive across almost all time periods, with clear evidence of significant time variation for both LATAM and Asia regions. However, there is greater variation in the net benefits for LATAM in terms of output growth and inflation stabilization, with net benefits being particularly high during crisis periods, namely, the global financial crisis of 2008–2009 and the COVID-19 pandemic. This is rather intuitive, since the decline in economic activity necessitates exchange rate adjustments in a way that helps stabilize the macroeconomy.

Figure 6: Net Benefits of Flexible Exchange Rates across Time and Regions

(a) Output Growth Stabilization (b) Inflation Stabilization



Note: Shown are the time-varying differences between annualized standard deviations of actual real GDP growth (panel a) and actual inflation (panel b) against the counterfactual case where exchange rates do not respond to all shocks. In the latter case, we generate a series of exogenous exchange rate shocks to offset exchange rate movements. For each country, results are based on the median of 500 accepted draws. We report averages of these net benefits for Latin America and Asia using red and blue dots, respectively. The sample period is from 2000Q3 to 2022Q3.

[15] For output growth, this result may not be surprising given that global demand shocks are a prominent driver of output growth fluctuations.

5 Determinants of Shock Insulation Properties

Our results thus far have highlighted that the shock-absorbing role of exchange rates depends on a number of factors. It varies across shocks, countries, as well as time horizons. In this section, we explore whether the time and cross-country variation in the shock absorbing role of exchange rates hinges moreso on the types of shocks driving exchange rate variation, or whether they depend on other factors, particularly structural features of a country such as the degree of trade openness or FX market depth.

To explore the underlying determinants for the shock absorption properties of exchange rates, we estimate a panel regression of 10 emerging countries over 7 subperiods. Each subperiod covers a time period of three years. In the panel regression, we define the dependent variable as the net benefit of allowing the exchange rate to move in response to shocks, which is defined as the difference between the actual output growth volatility (or actual inflation volatility) and the volatility under the counterfactual case where exchange rates are held fixed in response to shocks.

For independent variables, we include two sets of factors in the panel regression. First, given that the results in the previous section emphasize the important role of shocks in determining the shock absorbing role of exchange rates, we include the importance of the various underlying shocks of exchange rate movements as explanatory variables in the panel specification. This is computed by performing a historical shock decomposition based on the SVAR model and calculating the percentage share of variations in exchange rates driven by each structural shock during each subperiod. More specifically, we compute the squared contributions from each shock in a given quarter, then express them as a percentage share of total shock contributions in that quarter, before finally computing the averages for each subperiod. We calculate such shares for exchange rate shocks, demand versus supply shocks, monetary policy shocks, and domestic versus global shocks.

The second set of variables attempt to capture structural features at the country level that may influence the ability of exchange rates to absorb shocks. There are a total of five variables that we consider. First is the degree of exchange rate flexibility, as measured by the volatility of exchange rate changes. The degree of exchange rate volatility could reflect both FX market pressures, which could arise from either productive factors of an economy or financial factors such as the interest rate differential and short-term financial flows, and the intensity of FX market intervention by the central bank. As the second variable, we consider inflation rate volatility to proxy for the monetary policy regime of a particular country. A country with low inflation volatility may signify a monetary policy regime where the central bank has a high degree of inflation aversion and acts aggressively to stabilize inflation. This may have an important bearing on the ability of exchange rates to absorb shocks, as according to Corsetti et al. (2021), countries that practice inflation targeting tend to implement policies to offset exchange rate movements and hence may not benefit as much from the insulating properties of exchange rates.

For the third variable, we include a country's degree of trade openness. A longstanding view is that in an open economy, the exchange rate that moves in response to real shocks will play a role in stabilizing macroeconomic fluctuations (Friedman, 1953; Fleming, 1962; Mundell, 1963). As such, countries that are more open to trade should be able to reap greater benefits of the exchange rate acting as a shock absorber. Next, we also consider FX market depth, proxied by the degree of FX market turnover. The depth of financial markets may matter for the ability of exchange rates to absorb shocks as a shallow market could make exchange rates more susceptible to episodes of capital flows volatility (Basu et al., 2023). Financial deepening also provides opportunities to diversify risks, manage volatility and insure against unexpected events, enhancing the ability of exchange rates to absorb shocks. Finally, we include the ratio of external debt to total debt as the final structural determinant, aimed to capture the financial channel of exchange rates. Recent work has cast doubt on the full benefits of fully flexible exchange rates as shock absorbers, as exchange rate depreciations may instead have perverse effects on the macroeconomy through this financial channel in economies with large external debt (Kohler and Stockhammer, 2023; Longaric, 2022; Avdjiev et al., 2019; Bank for International Settlements, 2019; Kearns and Patel, 2016; Towbin and Weber, 2013). Note that we treat all structural determinants in the panel regression as time-invariant.

The empirical results are reported in Tables 7 and 8. Based on the results, it is evident that the types of structural shocks that are the main drivers of exchange rate movements in each subperiod matter for the exchange rate's role toward macroeconomic stabilization. In column 1 of Table 7, we regress the net benefits of flexible exchange rates for output growth on the share of exchange rate movements as explained by exogenous exchange rate shocks. We find a negative association between exogenous exchange rate movements and the net benefits of flexible exchange rates. This confirms our earlier results that exchange rates that are driven less so by their own exogenous shocks provide a cushion against macroeconomic volatility. Instead, we find that the net benefits are enhanced when exchange rate fluctuations in each subperiod are dominated by fundamental shocks - namely global shocks (columns 2 and 3) and demand shocks (column 4), which is consistent with our earlier findings in Figures A5 and A6.

We next examine the role of structural determinants. As shown in columns 5–8, including structural determinants do not alter earlier results, where the share of exchange rate movements explained by exogenous exchange rate, global and demand shocks still have the same relation with the net benefits of flexible exchange rates. This finding thus confirms that the type of structural shocks that drive exchange rates in each subperiod matters for the shock insulation properties of exchange rates. However, structural determinants also matter, as we find that higher degrees of exchange rate flexibility can be associated with larger shock-insulation benefits. This is consistent with Obstfeld et al. (2019), Eichengreen et al. (2020), Dąbrowski and Wróblewska (2016) and Dabrowski and Wróblewska (2020) who show less pronounced economic responses to global or real shocks for countries with more flexible exchange rates.

We also notice that the degree of trade openness is also statistically significant, suggesting that flexible exchange rates help absorb real shocks particularly in the case of open economies. These findings thus highlight the role of both structural shocks as well as structural determinants, namely openness in trade and degrees of exchange rate flexibility, towards determining the shock absorbing role of exchange rates. However, note that the effects of both structural determinants appear only weakly significant, and even turns insignificant in column 8, where we differentiate exchange rate drivers into demand and supply-side shocks.

Last, we explore factors that determine the net benefits of flexible exchange rate toward stabilizing inflation in Table 8. As shown in columns 1–4, where we focus on the types of shocks driving exchange rate movements, the results turn out to be similar to the output growth case in Table 7. That is, when exchange rate movements are determined less so by exogenous exchange rate shocks and more so by global as well as demand shocks, inflation tends to become more stabilized relative to the case where exchange rates are fixed. On the other hand, we fail to find any role for supply shocks in driving such net benefits, although exchange rates are shown to absorb the impact of global supply shocks to a certain extent. Finally, as we add structural determinants, the results in columns 5–8 show that their role in explaining the net benefits of exchange rate flexibility towards inflation stabilization is not statistically significant.

Table 7: Determinants of the Net Benefits of Exchange Rates for Output Growth Stabilization

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exchange Rate Shocks	-0.004**				-0.004***			
	(0.002)				(0.002)			
Domestic Shocks		0.001				0.001		
		(0.002)				(0.002)		
Domestic Excl. Monetary Policy shocks			0.004				0.002	
			(0.003)				(0.003)	
Global Shocks		0.006***	0.005***			0.007***	0.007***	
		(0.002)	(0.002)			(0.002)	(0.002)	
Monetary Policy Shocks			-0.001				0.000	
			(0.003)				(0.004)	
Demand Shocks				0.005**				0.005***
				(0.002)				(0.002)
Supply Shocks				0.003				0.006
				(0.004)				(0.006)
Exchange Rate Volatility					0.022*	0.024**	0.022*	0.019
					(0.012)	(0.012)	(0.013)	(0.013)
Inflation Volatility					-0.054	-0.071	-0.055	-0.016
					(0.095)	(0.093)	(0.104)	(0.095)
Trade Openness					0.002*	0.003**	0.003*	0.002
					(0.001)	(0.001)	(0.001)	(0.001)
Foreign Currency Debt					0.000	0.000	0.000	0.000
					(0.001)	(0.001)	(0.001)	(0.001)
FX Market Depth					-0.032	-0.047	-0.043	-0.026
					(0.030)	(0.030)	(0.033)	(0.031)
Constant	0.306***	-0.047	-0.042	-0.066	0.161	-0.228	-0.229	-0.281
	(0.082)	(0.088)	(0.088)	(0.067)	(0.203)	(0.196)	(0.197)	(0.213)
Observations	69	69	69	69	69	69	69	69
R-squared	0.080	0.104	0.128	0.125	0.150	0.198	0.200	0.178

Note: Results from a panel regression of 10 countries and 7 sub-periods. The dependent variable is net benefits of flexible exchange rates in terms of reducing output growth volatility for a given country and sub-period. Explanatory variables include the percentage share of exchange rate variations attributed to a certain type of shocks (based on historical shock decomposition), and country characteristics. Domestic demand, global demand and global monetary policy shocks are classified as demand shocks. Details of each of the explanatory variables are in Table A2.

Table 8: Determinants of the Net Benefits of Exchange Rates for Inflation Stabilization

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Exchange Rate Shocks	-0.005*				-0.006**			
	(0.003)				(0.003)			
Domestic Shocks		0.002				0.002		
		(0.004)				(0.004)		
Domestic Excl. Monetary Policy Shocks			0.004				0.003	
			(0.005)				(0.005)	
Global Shocks		0.006*	0.006*			0.008**	0.008*	
		(0.003)	(0.003)			(0.004)	(0.004)	
Monetary Policy Shocks			-0.002				0.001	
			(0.005)				(0.007)	
Demand Shocks				0.006**				0.007***
				(0.003)				(0.004)
Supply Shocks				0.005				0.000
				(0.006)				(0.009)
Exchange Rate Volatility					0.009	0.011	0.009	0.000
					(0.020)	(0.020)	(0.021)	(0.021)
Inflation Volatility					-0.195	-0.211	-0.189	-0.163
					(0.157)	(0.157)	(0.175)	(0.158)
Trade Openness					0.002	0.003	0.002	0.001
					(0.002)	(0.002)	(0.002)	(0.002)
Foreign Currency Debt					-0.000	-0.000	0.000	0.001
					(0.002)	(0.002)	(0.002)	(0.002)
FX Market Depth					-0.049	-0.064	-0.059	-0.052
					(0.050)	(0.051)	(0.055)	(0.051)
Constant	0.291**	-0.122	-0.115	-0.154	0.587*	0.102	0.101	0.165
	(0.132)	(0.143)	(0.143)	(0.110)	(0.334)	(0.330)	(0.333)	(0.356)
Observations	69	69	69	69	69	69	69	69
R-squared	0.045	0.052	0.067	0.065	0.078	0.091	0.092	0.089

Note: Results from a panel regression of 10 countries and 7 sub-periods. The dependent variable is net benefits of flexible exchange rates in terms of reducing inflation volatility for a given country and sub-period. Explanatory variables include the percentage share of exchange rate variations attributed to a certain type of shocks (based on historical shock decomposition), and country characteristics. Domestic demand, global demand and global monetary policy shocks are classified as demand shocks. Details of each of the explanatory variables are in Table A2.

6 Conclusion

Despite the prominent role of exogenous exchange rate shocks in driving overall exchange rate movements in emerging markets, we find that exchange rates in general play a stabilizing role for the macroeconomy in LATAM and Asian emerging countries. We reach this conclusion by carefully examining the shock absorbing properties of exchange rates conditional on shocks, and via a thorough analysis on the net benefits of flexible exchange rates. One of our key findings is that the stabilizing properties of exchange rates is highly shock dependent. In particular, exchange rate flexibility mainly helps absorb demand as well as global monetary policy shocks, but instead amplifies global supply shocks for output growth despite helping mitigate inflation variability. Aside from the nature of underlying shocks, we also find that the net benefits of a flexible exchange rate also hinge upon structural characteristics of a country such as the degree of trade openness and exchange rate flexibility.

Our study lends important policy implications. First, we document that there exists gains to be had from a flexible exchange rate which helps insulate an economy from both domestic and global shocks. This stands in contrast to Rey (2015) and more recent work on the financial channel of exchange rates, which argue that exchange rate variability may not be able to provide the insulation property and even pose a dilemma towards monetary policy. Our results instead are in line with Obstfeld et al. (2019) and Eichengreen et al. (2020), who empirically support the shock-absorbing role of exchange rates among emerging economies, which in turn crucially support monetary policy autonomy in the context of liberalized capital accounts.

With that said, policymakers could also benefit from being able to better disentangle the underlying drivers of exchange rates. The task of identifying the underlying factors that move exchange rates has always been a challenge, as exchange rates are influenced by a large number of factors ranging from daily market volatility and news shocks, to more fundamental drivers which invite endogenous responses from exchange rates. Nevertheless, given that the insulation properties of exchange rates are highly shock-dependent, optimal FX market intervention and monetary policy could follow from tailored responses to shocks in order to reap the benefits under conditions where exchange rates help stabilize the macroeconomy, such as in the face of demand shocks. On the other hand, it could attempt to mitigate any destabilizing effects by smoothing exchange rate volatility in the face of supply shocks, especially if policymakers are more wary of risks to growth rather than to inflation.

Last, when tracing the implications of our results to the country level, additional factors must be taken into account to draw conclusions on the overall benefits of adopting fully flexible exchange rates. Based on our findings, whether a country should allow the exchange rate to be fully flexible or not depends on the nature of underlying shocks in any given time period, as well as more broadly the structural features of the economy. Nevertheless, it is critical to also consider other factors otherwise we may underevaluate the costs of exchange rate shocks or overestimate the benefits of fundamental exchange rate movements. These include nonlinearities that could take place under large exchange rate movements, the availability of hedging instruments, as well as the redistributive impact of exchange rates on firms that differ in size, exposure, profitability and shock-absorption capacity. Therefore, further research on how the shock absorbing capabilities of exchange rates interact with such factors is highly encouraged to further our understanding about the role of exchange rates towards macroeconomic stabilization more generally.

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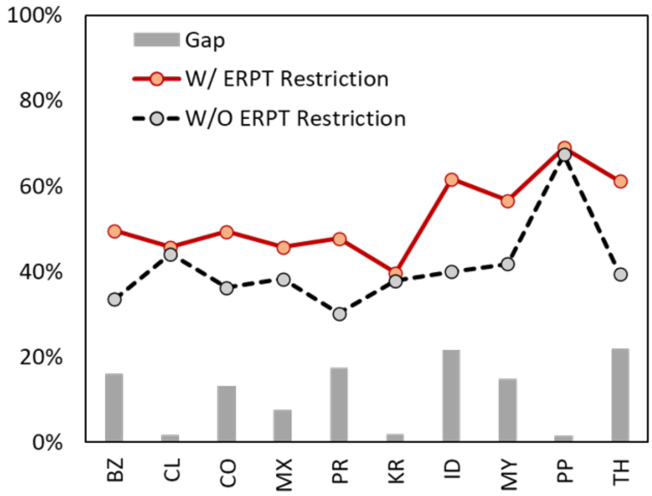
Appendix

Figure A1: Share of Variance of Exchange Rate Changes Explained by Exogenous Exchange Rate Shocks



Note: Shown are the forecast error variance decomposition (FEVD) of changes in exchange rates due to exogenous exchange rate shocks averaged over an eight-quarter horizon. Red dots are median estimates from the SVAR model with ERPT restrictions, whereas black dots come from the model without an ERPT restriction. Grey bars show the difference between the two cases.

Table A1: Summary Statistics

Variables	Statistic	Brazil	Chile	Colombia	Mexico	Peru	South Korea	Indonesia	Malaysia	Philippines	Thailand	Global
Real GDP growth	Mean	0.56	0.86	0.94	0.43	1.03	0.90	1.21	1.10	1.18	0.82	0.49
	S.D.	1.73	2.05	2.51	2.67	4.45	0.95	1.01	3.17	2.19	2.05	1.38
Inflation	Mean	1.54	0.91	1.21	1.14	0.72	0.61	1.49	0.56	0.98	0.52	0.62
	S.D.	0.86	0.79	0.88	0.48	0.71	0.48	1.20	0.87	0.68	0.82	0.63
Interest rate	Mean	12.30	3.68	5.96	6.92	3.99	2.81	6.96	2.86	5.12	2.02	1.08
	S.D.	5.20	1.90	2.71	3.35	2.47	1.39	3.16	0.55	2.31	1.06	2.33
Exchange rate change	Mean	-1.11	-0.59	-0.90	-0.83	-0.12	-0.14	-0.80	-0.24	-0.37	0.07	
	S.D.	7.52	4.96	5.36	4.64	2.29	4.23	4.41	3.10	2.71	2.73	
Export price growth	Mean	1.08	1.26	0.76	0.41	1.02	0.35	0.34	0.30	0.29	0.27	
	S.D.	1.68	2.42	1.28	1.27	1.65	1.43	1.41	1.36	1.35	1.40	
World oil price growth	Mean											1.50
	S.D.											16.44
Global supply chain	Mean											0.04
pressure index (GSCPI)	S.D.											1.00
Time-invariant variables												
Inflation volatility	Mean	1.73	1.59	1.76	0.92	1.44	0.95	2.43	1.76	1.32	1.66	
Exchange rate volatility	Mean	15.09	9.94	10.80	9.38	4.62	8.50	8.64	6.29	5.44	5.45	
Trade openness	Mean	27.30	65.96	37.78	63.30	46.93	79.87	49.34	143.75	70.54	125.36	
Foreign currency debt	Mean	59.11	115.12	61.60	82.64	92.39	44.45	61.17	104.23	103.58	42.50	
FX market depth	Mean	2.01	4.39	1.87	6.15	2.68	4.96	1.15	3.96	1.32	3.59	

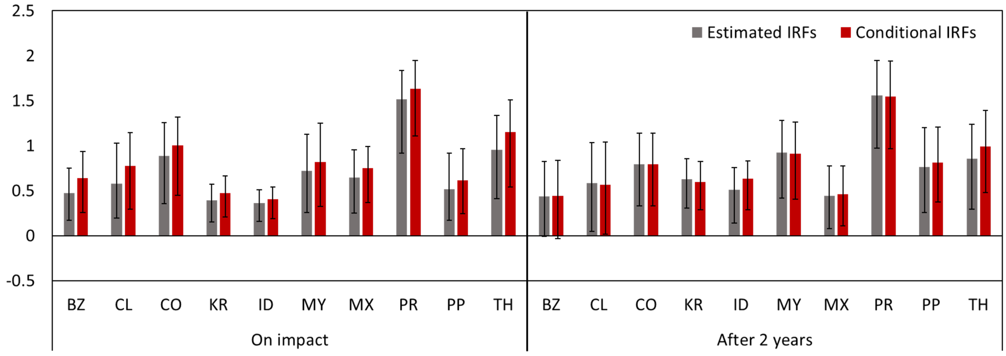
Table A2: Data Description and Sources

Name	Description	Source
Domestic real GDP growth	The quarterly log change in seasonally-adjusted real gross domestic product (GDP) (%)	Oxford Economics
Domestic inflation	The quarterly log change in seasonally-adjusted consumer price index (CPI) (%)	Oxford Economics
Domestic interest rate	The level of policy interest rates (%)	Oxford Economics
Exchange rate change	The quarterly log change in bilateral exchange rates against the US dollar (%)	Oxford Economics
Global real GDP growth	The quarterly log change in seasonally-adjusted US real GDP (%)	Oxford Economics
Global inflation	The quarterly log change in seasonally-adjusted US CPI (%)	Oxford Economics
Global interest rate	The level of US shadow federal funds rates (%)	Wu and Xia (2016)
World oil price growth	The quarterly log change in the simple average of WTI and Brent crude oil prices (US dollar per barrel)	CEIC
Export price growth	The quarterly log change in seasonally-adjusted export prices of 20 major exporting countries, weighted by their corresponding previous-year export-value share to total imports of each of the 10 sample countries (%)	Oxford Economics, Trade Map and authors' calculation
Global supply chain pressure index (GSCPI)	GSCPI is constructed based on cross-border transportation costs and the cost of air transportation of freight to and from the U.S., Asia and Europe	Federal Reserve Bank of New York
Exchange rate volatility	The annualized standard deviation of changes in exchange rates (%)	Oxford Economics
Inflation volatility	The annualized standard deviation of consumer price inflation (%)	Oxford Economics
Trade openness	The ratio of export and import of goods and services to nominal GDP (%)	Oxford Economics
Foreign currency debt	The ratio of foreign-currency debt issued by general government and non-financial corporate to nominal GDP.	BIS International Debt Statistics (IDS) and BIS Consolidated Banking Statistics (CBC)
FX market depth	The ratio of FX market turnover to nominal GDP	BIS Statistics and Oxford Economics

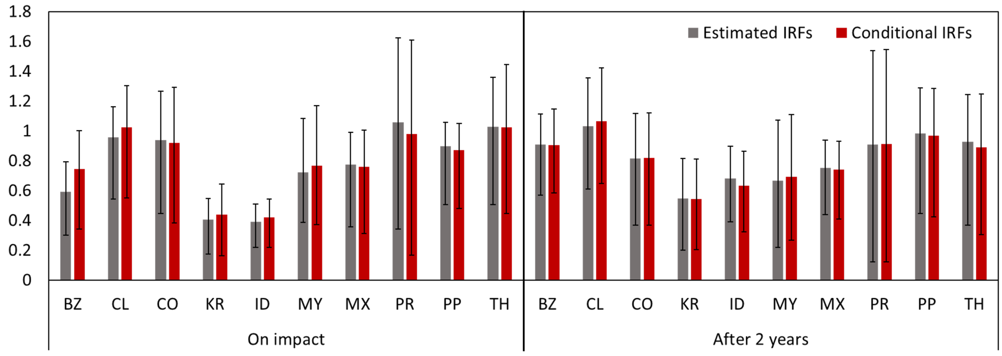
Note: Selected countries include ten emerging economies in the Latin America and Asia Pacific regions: Brazil, Chile, Colombia, Mexico, Peru, South Korea, Indonesia, Malaysia, the Philippines and Thailand. Sample period covers 2000Q1 - 2022Q3 with the exception of Malaysia which starts in 2005Q3 after the central bank adopted a flexible exchange rate regime in July 2005. Foreign currency debt is the sum of all foreign currency cross-border and local loans to, and international debt securities issued by general government and non-financial corporate sectors. We proxy foreign-currency loans by international claims by domestic banks for official and non-financial private sectors following Avdjiev et al. (2020). FX market turnover data is released every 3 years.

Figure A2: IRFs and conditional IRFs of Output Growth to Fundamental Shocks

(a) Positive D Shock on Output Growth



(b) Positive S Shock on Output Growth



(c) Expansionary MP Shock on Output Growth

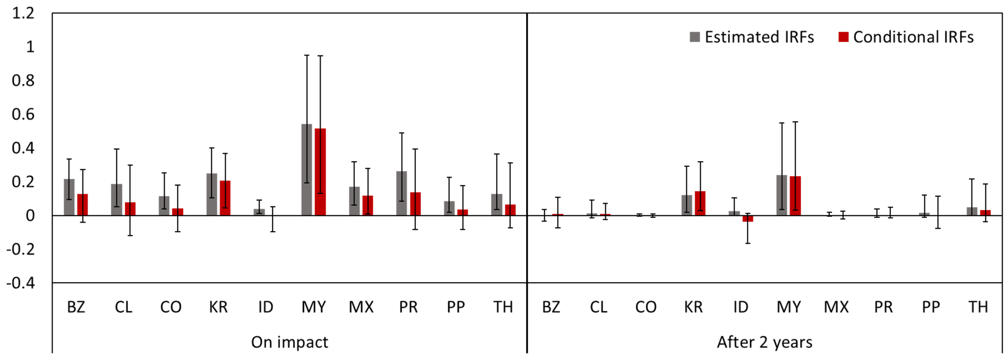
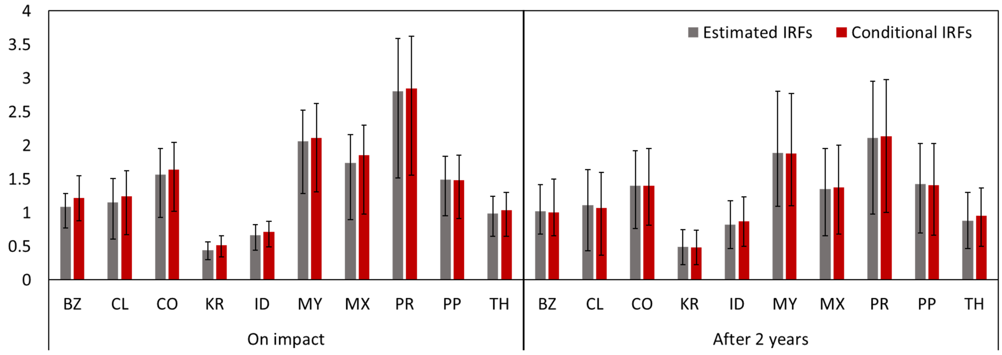
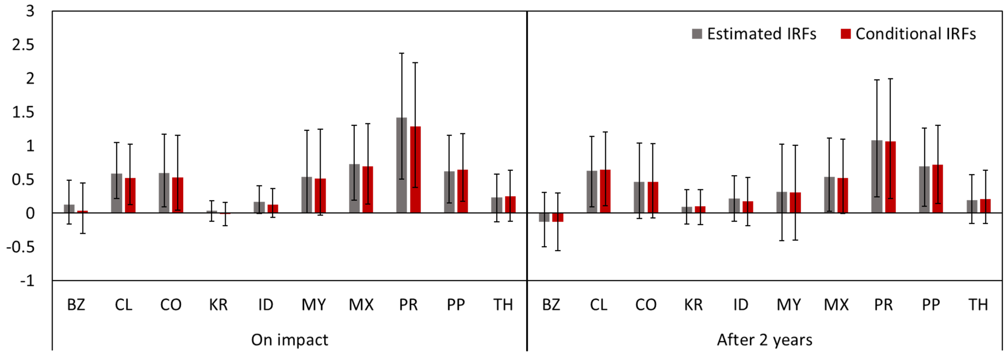


Figure A2: IRFs and conditional IRFs of Output Growth to Fundamental Shocks (continued)

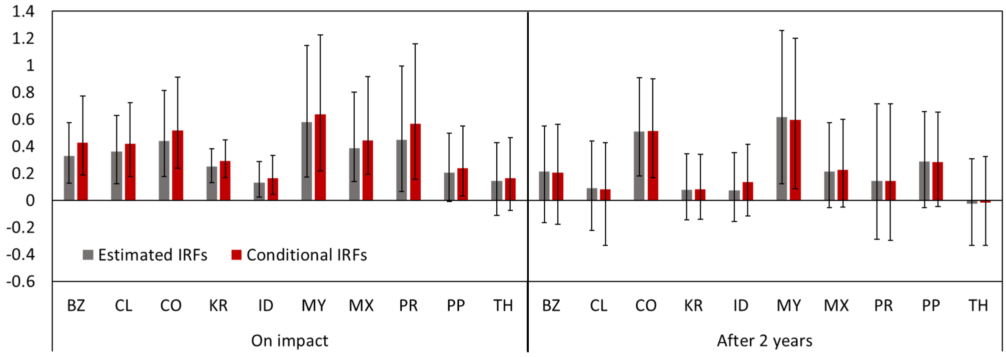
(d) Positive D^* Shock on Output Growth



(e) Positive S^* Shock on Output Growth



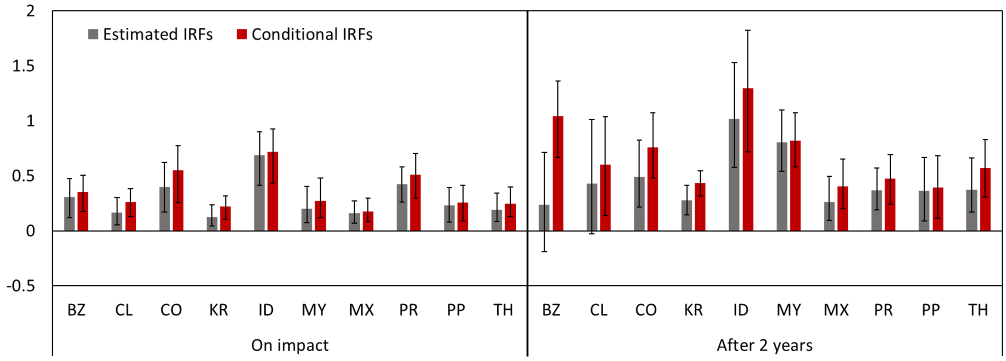
(f) Expansionary MP^* Shock on Output Growth



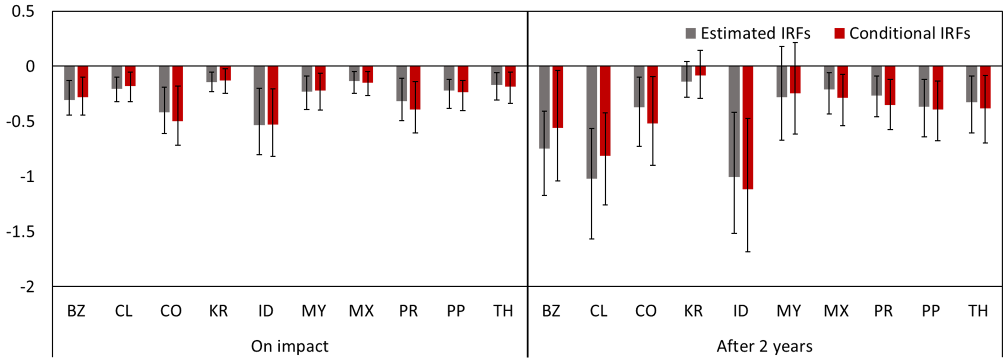
Note: Shown are one-quarter (on-impact) and two-year responses of real GDP to each identified fundamental shock of one standard deviation from the SVAR model with a full set of restrictions. The median responses from the unconditional case are reported using grey bars along with the responses at 16^{th} and 84^{th} percentiles, while the median responses under the conditional case where exchange rates are held fixed in response to shocks are in red. In the latter case, we generate a series of exogenous exchange rate shocks to offset the responses of exchange rates to each identified shock. Results are based on 500 accepted draws.

Figure A3: IRFs and conditional IRFs of Inflation to Fundamental Shocks

(a) Positive D Shock on Inflation



(b) Positive S Shock on Inflation



(c) Expansionary MP Shock on Inflation

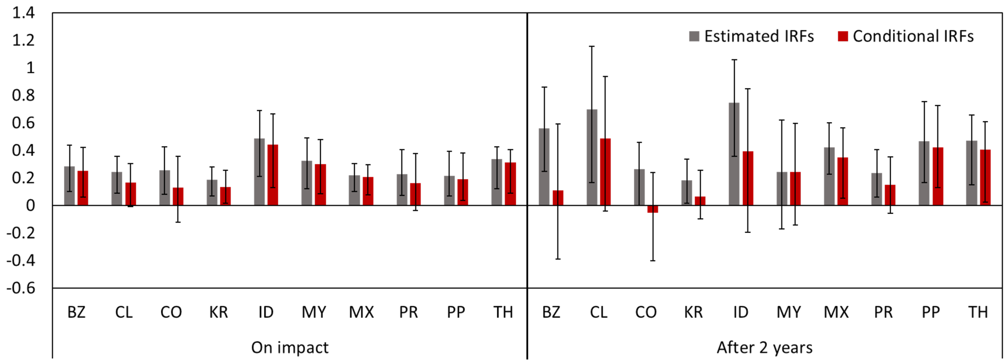
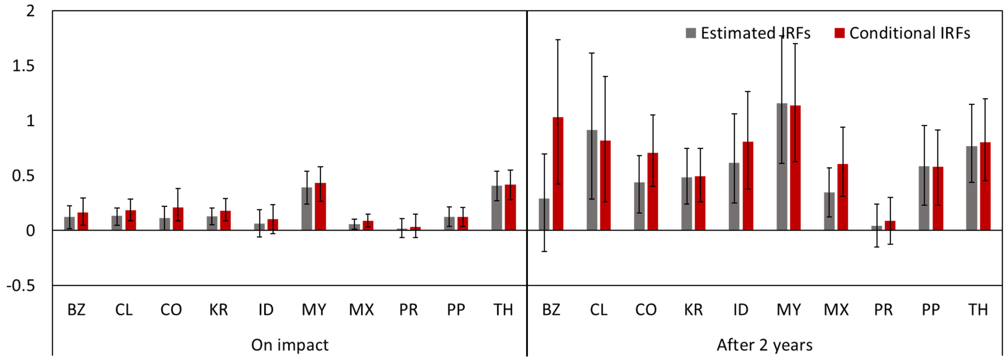
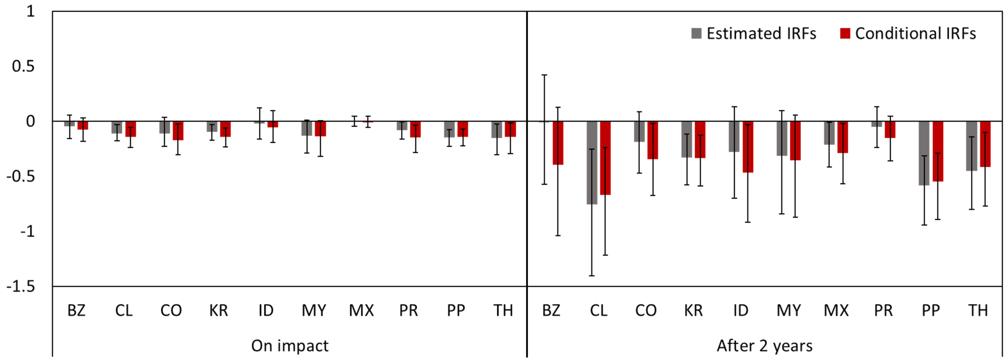


Figure A3: IRFs and conditional IRFs of Inflation to Fundamental Shocks (continued)

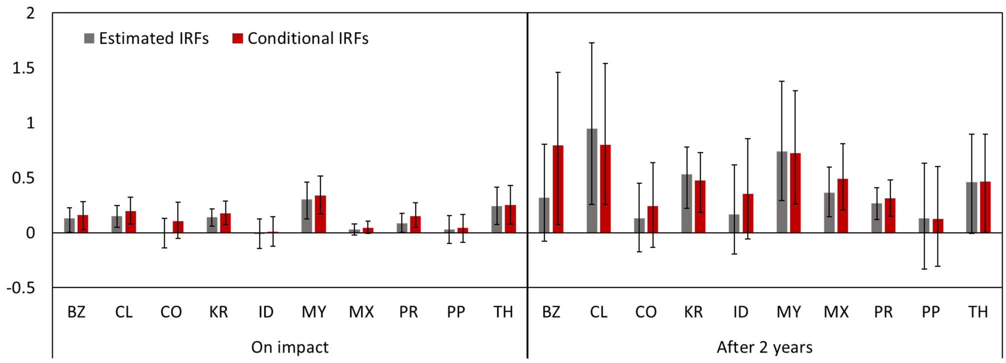
(d) Positive D^* Shock on Inflation



(e) Positive S^* Shock on Inflation



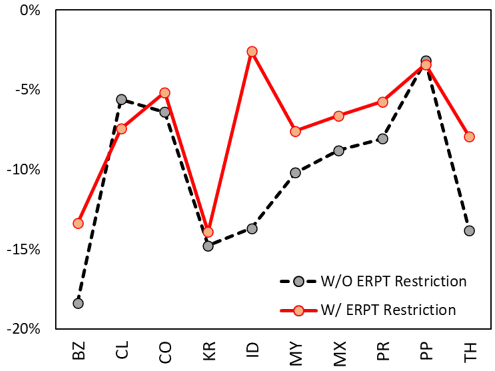
(f) Expansionary MP^* Shock on Inflation



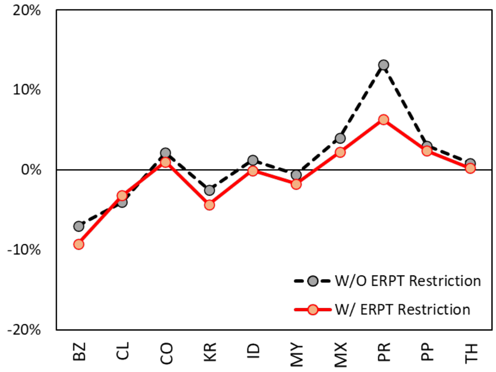
Note: Shown are one-quarter (on-impact) and two-year responses of inflation to each identified fundamental shock of one standard deviation from the SVAR model with a full set of restrictions. The median responses from the unconditional case are reported using grey bars along with the responses at 16^{th} and 84^{th} percentiles, while the median responses under the conditional case where exchange rates are held fixed in response to shocks are in red. In the latter case, we generate a series of exogenous exchange rate shocks to offset the responses of exchange rates to each identified shock. Results are based on 500 accepted draws.

Figure A4: Degree of Shock Absorption: Excluding ERPT Restrictions

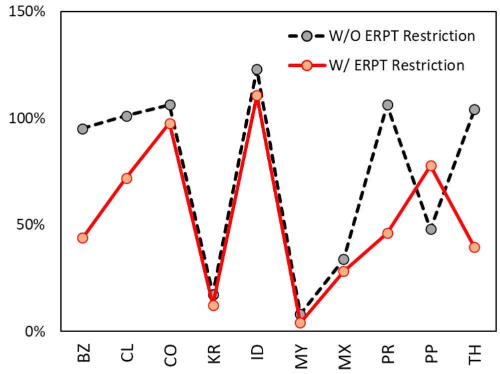
(a) Domestic Demand Shock



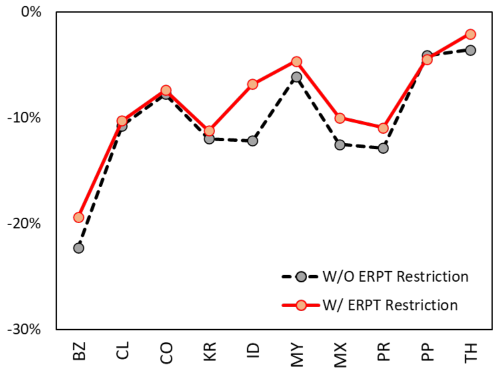
(b) Domestic Supply Shock



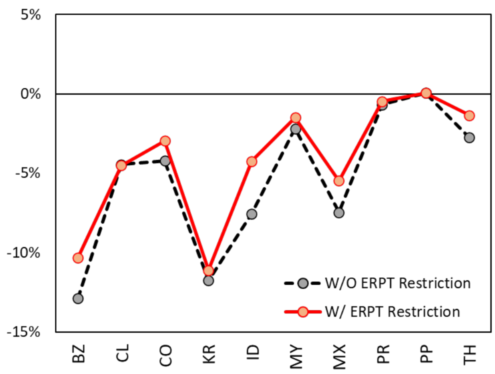
(c) Domestic Monetary Policy Shock



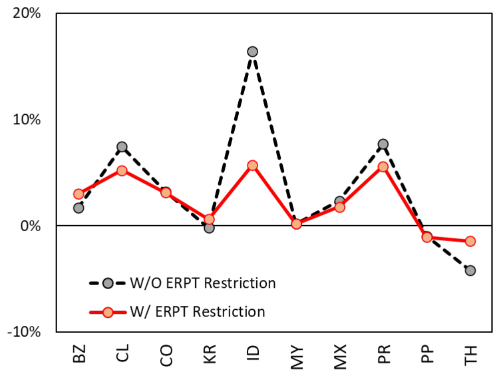
(d) Global Monetary Policy Shock



(e) Global Demand Shock



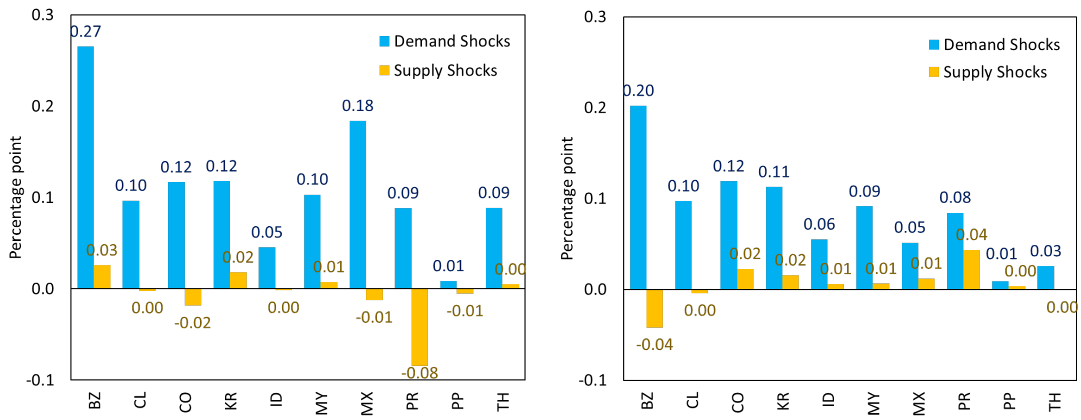
(f) Global Supply Shock



Note: Shown are the degree to which exchange rate changes help absorb variations of output growth in response to each identified fundamental shock. Such degree of shock absorption is calculated as a percentage difference between one-quarter unconditional responses of real GDP (Y) and the conditional responses (Y') under the case where exchange rates are held fixed, $(\frac{Y-Y'}{Y'})*100$. In the conditional case, we generate a series of exogenous exchange rate shocks to offset the responses of exchange rates to each identified shock. Red and black dots show results from the SVAR model with and without ERPT restrictions, respectively. Results are based on the median of 500 accepted draws. The negative values indicate a smaller response under the unconditional model, i.e., exchange rates are acting as a shock absorber.

Figure A5: Benefits of Flexible Exchange Rates against Demand versus Supply Shocks

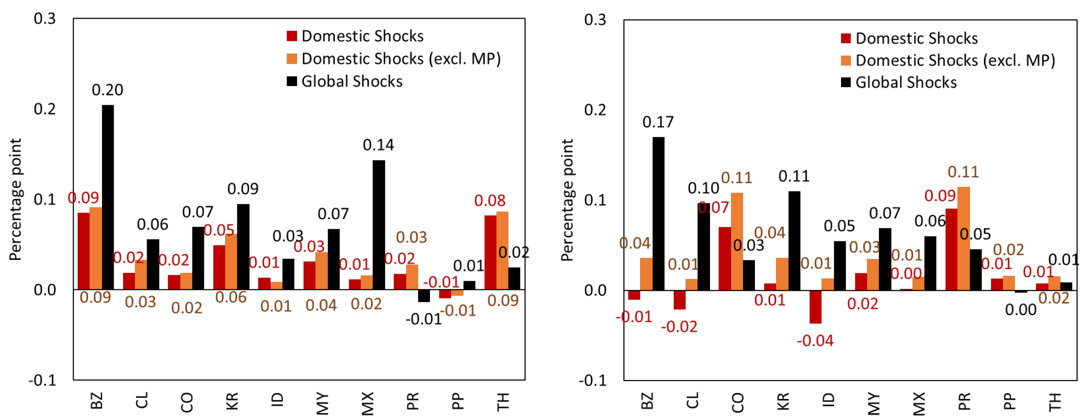
(a) Output Growth Stabilization (b) Inflation Stabilization



Note: Shown are the differences between annualized standard deviations of actual real GDP growth (panel a) and actual inflation (panel b) against two counterfactual cases, assuming that exchange rates do not respond to (1) demand shocks (in blue bars), and (2) supply shocks (in yellow bars). Domestic demand, global demand and global monetary policy shocks are classified as demand shocks. For both counterfactuals, a series of exogenous exchange rate shocks are generated to offset exchange rate movements. Results are based on the median of 500 accepted draws. The sample period is from 2000Q3 to 2022Q3.

Figure A6: Benefits of Flexible Exchange Rates against Domestic versus Global Shocks

(a) Output Growth Stabilization (b) Inflation Stabilization



Note: Shown are the differences between annualized standard deviations of actual real GDP growth (panel a) and actual inflation (panel b) against three counterfactual cases, assuming that exchange rates do not respond to (1) domestic shocks (in red bars), (2) domestic shocks but excluding monetary policy shocks (in orange bars), and (3) global shocks (in black bars). For all counterfactuals, a series of exogenous exchange rate shocks are generated to offset exchange rate movements. Results are based on the median of 500 accepted draws. The sample period is from 2000Q3 to 2022Q3.