The Anatomy of Emerging-Market Business Cycles:

Global Financial Shocks and Supply-Like Transmission*

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Abstract

The dominant driver of business-cycle fluctuations in emerging and developing economies is global-financial in origin but supply-like in domestic transmission. Expansionary shocks coincide with easier global risk conditions, generate broad increases in activity, raise total factor productivity strongly and persistently, and do not increase inflation. Supply-like fluctuations therefore need not reflect primitive technology or trend shocks: aggregate productivity can arise endogenously from global financial disturbances. We rationalize this pattern with a mechanism in which financial easing disproportionately lowers effective costs for more productive firms, reallocating production toward them and raising aggregate productivity. Firm-level evidence supports both the underlying financing-exposure pattern and the predicted reallocation of borrowing and activity. A quantitative extension of a workhorse small-open-economy model reproduces the aggregate responses and shows that the productivity response accounts for much of the persistence of the expansion.

JEL Codes: E32, F41, F44, E44.

Keywords: Emerging markets; business cycles; global financial cycle; financial frictions; misallocation.

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1 Introduction

What drives business cycles in emerging and developing economies (EMDEs)? Two influential explanations have emerged. The first attributes EMDE cycles to productivity forces, especially trend-productivity shocks, as in Aguiar and Gopinath (2007a). The second emphasizes external financial conditions, country spreads, and global risk premia, as in Uribe and Yue (2006), García-Cicco et al. (2010), and Akıncı (2013). These explanations are often treated as distinct: the productivity-based account is supply-side, whereas the financial account typically highlights borrowing-cost and demand channels.

This paper shows that these two views are more closely connected than this dichotomy suggests. The dominant driver of emerging-market business cycles is global-financial in origin, but its domestic transmission is supply-like. Expansionary shocks coincide with easier global risk conditions and movements in external prices, and they generate a broad domestic expansion. At the same time, they raise aggregate total factor productivity (TFP) and do not generate the inflationary response usually associated with a demand expansion. Thus, productivity-like EMDE business cycles need not be interpreted as primitive technology or trend shocks: global financial disturbances can generate endogenous movements in aggregate TFP as part of their domestic propagation.

We use the business-cycle anatomy approach of Angeletos et al. (2020) and identify, country by country, the innovation that explains the largest share of GDP fluctuations at business-cycle frequencies. The identification is deliberately agnostic: the main business-cycle (MBC) shock is assigned no economic interpretation ex ante. Its origin and transmission are inferred from its dynamic effects, variance contributions, time-series realizations, and relation to external variables.

We first focus on Mexico as our benchmark emerging-market small open economy, using Canada as an advanced-economy comparison with similar exposure to the United States and global markets. In both countries, the MBC shock generates a broad expansion: real activity rises, the trade balance deteriorates, and the exchange rate appreciates, while the shock is associated with easier global financial conditions and sizable movements in external prices. By contrast, the global risk-free rate moves little, and the recovered shock is distinct from high-frequency U.S. monetary-policy shocks. Despite being identified from domestic business-cycle fluctuations, the shock displays a clear connection with the global financial cycle (Rey, 2013; Miranda-Agrippino and Rey, 2022).

The broadly similar real expansions mask a sharp difference in domestic transmission. In Canada, the expansion is accompanied by higher inflation and only a modest TFP response; in Mexico, inflation falls and aggregate TFP rises strongly and persistently. This contrast is not an artifact of cyclical factor utilization:

after adjusting TFP for utilization, the Mexican response remains pronounced, whereas the already modest Canadian response becomes negligible. Quantitatively, the shock explains roughly two thirds of GDP fluctuations in both countries, but a much larger share of business-cycle TFP fluctuations in Mexico. Thus, a common global disturbance has a demand-like propagation in the advanced small open economy and a supply-like propagation in the emerging one, with procyclical TFP a defining feature of the latter.

This does not imply that productivity is the primitive source of Mexican business cycles. The MBC shock explains a large share of GDP and TFP fluctuations at business-cycle frequencies but a much smaller share of low-frequency GDP variation, while the shock that dominates low-frequency GDP explains little of the business-cycle variation in real activity. This is consistent with the broader message of García-Cicco et al. (2010) that nonstationary productivity shocks alone do not provide a satisfactory account of emerging-market business cycles. Instead, our evidence points to aggregate TFP as an endogenous propagation margin of cyclical disturbances tied to global financial conditions. This interpretation is robust to alternative identification targets and information sets.

The pattern we uncover is not specific to Mexico. We repeat the exercise for seven additional EMDEs. The country-level shocks display strong comovement and large swings around major global financial episodes, pointing to a common global driver. The average EMDE response closely resembles the Mexican one: expansions are associated with easier global financial conditions, movements in external prices, higher aggregate TFP, and no positive inflation response. Across EMDEs, the MBC shock is global in nature and supply-like in transmission.

To interpret these facts, we propose a simple mechanism based on the interaction between working-capital requirements and firm heterogeneity. Firms must finance part of their variable costs before revenues are realized, so global financial conditions affect effective production costs. Working-capital exposure increases with firms' efficient operating scale, consistent with models of financial frictions and development (e.g., Buera et al., 2011). Since efficient scale rises with productivity, a financial easing disproportionately lowers effective costs for higher-productivity firms. Activity and short-term borrowing therefore reallocate toward them, raising aggregate TFP endogenously and amplifying the expansion. This allocative margin is especially relevant for developing economies, where resource misallocation has been shown to be quantitatively important (Hsieh and Klenow, 2009).

In our setting, exposure to global financial conditions makes this margin cyclical, allowing it to rationalize the supply-like footprint documented above. Consistent with this mechanism, Mexican balance-sheet data show that more productive firms have greater working-capital exposure and rely more heavily on short-term finance, the reverse is true for Canadian firms. Following an instrumented global financial easing, higher-

productivity Mexican firms expand both short-term borrowing and revenue relative to less productive firms within the same sector, with the credit response exceeding the activity response as predicted by the model. Canada displays no comparable joint reallocation.

Finally, we assess the aggregate importance of this TFP response for the propagation of global financial shocks. We augment the workhorse small-open-economy model of Uribe and Yue (2006) by allowing TFP to respond to global risk and discipline this response using the dynamics of the other Mexican macroeconomic variables; the empirical TFP response itself is not targeted. Nevertheless, the model generates TFP dynamics that closely track those observed in the data. The decomposition shows that the conventional financial channel is front-loaded, while procyclical TFP accounts for most of the persistence in the propagation of the shock.

More generally, our results uncover a new channel in the domestic transmission of the global financial cycle in EMDEs. By reallocating production toward more productive firms, financial easing raises aggregate TFP and shifts effective supply, with procyclical TFP accounting for much of the persistence of the expansion. This blurs the conventional distinction between financial-demand and productivity-supply explanations of EMDE fluctuations: aggregate TFP need not be a primitive source of the cycle, but can instead arise endogenously as part of the transmission of global financial shocks.

Related Literature. The paper connects two prominent explanations of emerging-market business cycles. One interprets the productivity-like behavior of EMDE fluctuations as evidence that shocks to trend productivity play a central role (Aguiar and Gopinath, 2007a,b). The other emphasizes financial disturbances, either country-specific movements in spreads and risk premia or shifts in global financial conditions, as key drivers of small-open-economy fluctuations (Uribe and Yue, 2006; García-Cicco et al., 2010; Akıncı, 2013). A related literature emphasizes world prices and commodity-price shocks as important external forces for small open economies (Fernández et al., 2017, 2018; Drechsel and Tenreyro, 2018; Di Pace et al., 2025). Unlike work that typically starts from a particular candidate shock or transmission channel, our empirical analysis leaves both the identity of the dominant cyclical shock and its propagation unrestricted ex ante. This allows us to study the source and propagation of the dominant cyclical disturbance jointly and reveals that the distinction between productivity-based and financial accounts is less sharp than commonly assumed: the shock is global-financial in origin, while aggregate TFP responds endogenously as part of its domestic transmission.

Our results also speak to the global financial cycle literature. A long tradition emphasizes the role of global push factors in shaping capital flows to developing countries (Calvo et al., 1996). More recent work documents a global financial cycle in asset prices, capital flows, credit conditions, and risk appetite, and

emphasizes the role of global financial intermediaries in its transmission (Rey, 2013; Bruno and Shin, 2015a; Miranda-Agrippino and Rey, 2020; Akıncı et al., 2022). Micro evidence further shows that external financial conditions are transmitted to EMDE firms through domestic credit markets, internationally exposed banks, and foreign-currency borrowing (Schnabl, 2012; Bruno and Shin, 2017, 2023; Morais et al., 2019; di Giovanni et al., 2022). Related work highlights the exposure of EMDEs to global credit conditions and the dollar, with important effects on asset prices and real activity (Obstfeld and Zhou, 2022; Boyarchenko and Elias, 2026). We show that the global financial cycle emerges as the dominant driver of EMDE business cycles without being imposed ex ante: shocks recovered independently country by country display strong comovement, pointing to a common global driver. Currency markets are not the defining transmission margin: although the shock reprices exchange rates and UIP premia, it explains only a modest share of their fluctuations.[1] We also uncover a systematic link between the global financial cycle and aggregate productivity in EMDEs. Calvo et al. (2006) document large TFP losses during major financial crises and sudden-stop episodes.[2] Our evidence shows that this connection extends systematically to ordinary business-cycle frequencies: financial easing raises TFP as part of the domestic propagation of global-risk shocks, and this procyclical response is quantitatively important for aggregate transmission.

Methodologically, the paper builds on Angeletos et al. (2020) and Forni et al. (2025), who use frequency-domain restrictions to characterize the anatomy of U.S. business cycles. The agnostic nature of this approach is central to our results: the dominant cyclical disturbances recovered independently across countries share a strong global component, and procyclical TFP is a defining feature of EMDE business-cycle anatomy. This contrasts with the U.S. evidence, where TFP plays little role at business-cycle frequencies.

Finally, the mechanism we use to rationalize the evidence draws on work on misallocation and financial frictions. This literature shows that distortions across heterogeneous producers can have large effects on aggregate productivity (Hsieh and Klenow, 2009; Restuccia and Rogerson, 2008), including through markup-driven reallocation following monetary-policy shocks (Baqaee et al., 2024), and that financial frictions shape the allocation of resources across firms (Buera et al., 2011; Midrigan and Xu, 2014; Gopinath et al., 2017). We make this allocative margin cyclical and external: global financial conditions change relative financing costs across heterogeneous firms and thereby generate endogenous movements in aggregate TFP at ordinary business-cycle frequencies. This distinguishes our mechanism from financial channels that move firms' labor demand without affecting TFP (Jermann and Quadrini, 2012), and from episodes in which demand-side forces dominate the effects of credit expansions and financial crises (Mian et al., 2020; Benguria and Taylor,

[1] This connects our findings to the macro–FX disconnect emphasized by Itskhoki and Mukhin (2021, 2025b) and to the distinction between global and local risk in EM UIP premia documented by Kalemli-Özcan and Varela (2021).

[2] Analyses of specific EMDE crisis episodes link part of the associated TFP losses to worsening resource allocation (Pratap and Urrutia, 2012; Sandleris and Wright, 2014).

2020). In our setting, pronounced procyclical TFP is a defining feature of supply-like financial transmission in EMDEs and a quantitatively important amplification margin.

Structure. The rest of the paper is organized as follows. Section 2 describes the data and empirical framework. Section 3 presents the Mexico–Canada comparison and studies the relation between business-cycle and low-frequency shocks. Section 4 examines the global component of the Mexican MBC shock. Section 5 extends the analysis to the broader EMDEs sample. Section 6 develops the mechanism linking global financial shocks to supply-side transmission, examines its firm-level implications, and quantifies the role of the TFP channel in a workhorse small-open-economy model. Section 7 concludes.

2 Data and Empirical Framework

We assemble a country-by-country dataset covering the period from the mid-1990s to 2023, with country-specific starting dates dictated by data availability. Throughout the paper, Mexico and Canada serve as the main case study: Mexico as the benchmark emerging small open economy and Canada as the benchmark advanced small open economy. We then extend the analysis to a panel of seven emerging market and developing economies: Brazil, Chile, India, Indonesia, the Philippines, South Africa, and Türkiye. For each country, the information set combines domestic, external, and global variables. The domestic block includes real per-capita GDP, real per-capita investment, real per-capita consumption, the unemployment rate, TFP, the labor share, the short-term policy or money-market rate, and inflation. The external block includes the trade-balance-to-output ratio and the real effective exchange rate. The global block includes a global short-term real interest rate, the Baa corporate bond spread, and country-specific export and import price indices. Following evidence that export and import price movements have distinct business-cycle effects, we keep the two price margins separate rather than collapsing them into a single terms-of-trade measure (Fernández et al., 2017; Di Pace et al., 2025).

Real aggregates and the trade balance are taken from the IMF Quarterly National Accounts in constant prices, seasonally adjusted, and expressed in domestic currency. Inflation is computed from the headline consumer price index. The short-term interest rate is the policy or money-market rate of the relevant central bank, and the real effective exchange rate is the IMF broad real effective exchange rate. TFP and the labor share are taken from the Penn World Tables (Feenstra et al., 2015) and are available at annual frequency. The global short-term rate is measured as the yield on the one-year U.S. Treasury net of one-year expected inflation, while the Baa spread is Moody's seasoned Baa corporate bond yield relative to the ten-year

Treasury. Export and import price indices are the country-specific commodity price indices constructed by Juvenal and Petrella (2026). A complete list of the underlying series, source identifiers, transformations, and country-specific sample coverage is reported in Appendix A.

Let $\mathbf{y}_t$ denote the $N \times 1$ vector containing the variables in the country-specific information set. We assume that $\mathbf{y}_t$ admits the reduced-form representation

$$\mathbf{A}(L)\,\mathbf{y}_t \;=\; \mathbf{c} \;+\; \boldsymbol{\nu}_t, \qquad \mathbb{E}(\boldsymbol{\nu}_t\boldsymbol{\nu}_t') \;=\; \boldsymbol{\Sigma}, \tag{1}$$

where $\mathbf{A}(L) = \mathbf{I}_N - \mathbf{A}_1 L - \cdots - \mathbf{A}_p L^p$ is a matrix lag polynomial, $\mathbf{c}$ is a vector of intercepts, and $\boldsymbol{\nu}_t$ is the vector of reduced-form innovations with positive-definite covariance matrix $\boldsymbol{\Sigma}$. All variables enter the VAR in levels, consistent with the recommendation of Angeletos et al. (2020) that frequency-domain identification be carried out on level series rather than on growth rates. We set $p = 12$ lags, following De Graeve and Westermark (2025), who show that increasing the lag length of a VAR can reduce truncation bias in impulse-response estimates.

We estimate (1) by Bayesian methods. We adopt a Minnesota prior on the autoregressive coefficients, which shrinks each equation toward an independent AR(1) representation, and a standard inverse-Wishart prior on $\boldsymbol{\Sigma}$. The posterior is simulated via a Gibbs sampler. Because TFP and the labor share are observed at annual frequency only, we extend the standard Gibbs sampler with an additional block that draws the missing latent quarterly values jointly with the model parameters, using the precision-based mixed-frequency sampler of Chan et al. (2023). The annual observations are imposed as linear constraints on the latent quarterly state.[3]

We identify shocks following the frequency-domain max-share approach of Angeletos et al. (2020).[4] The procedure searches over orthogonal rotations of the VAR innovations and selects the innovation that maximizes the contribution to the variance of a target variable over a chosen frequency band. Equivalently, because the total variance of the target variable over the band is fixed, the selected innovation maximizes its share of that band-specific variance.

Inverting the autoregressive representation in (1) yields the Wold representation $\mathbf{y}_t = \mathbf{B}(L)\boldsymbol{\nu}_t$, where $\mathbf{B}(L) = \mathbf{A}(L)^{-1}$. Let $\tilde{\mathbf{S}}$ denote the lower-triangular Cholesky factor of $\boldsymbol{\Sigma}$, so that $\boldsymbol{\Sigma} = \tilde{\mathbf{S}}\tilde{\mathbf{S}}'$, and let $\mathbf{q}$ denote a

[3] To prevent the extreme observations of the early COVID-19 period from contaminating the estimated propagation mechanism, we treat the first three quarters of 2020 as missing for all domestic real aggregates. This treatment follows the logic of Lenza and Primiceri (2022), who show that the exceptional volatility of macroeconomic data after March 2020 can distort VAR estimates if handled as ordinary observations. Full details on prior hyperparameters and on the implementation of the Gibbs sampler are reported in Appendix A.6.

[4] This identification scheme extends the time-domain max-share approach of Faust (1998) and Uhlig (2004) to the frequency domain, making it possible to target the conventional business-cycle band—periodicities between 6 and 32 quarters—directly, without committing to a specific horizon in the time domain.

unit vector in the space of Cholesky-orthogonalized reduced-form innovations. The innovation associated with $\mathbf{q}$ is $\mathbf{q}'\tilde{\mathbf{S}}^{-1}\boldsymbol{\nu}_t$. For target variable k and frequency band $[\underline{\omega}, \overline{\omega}]$, the contribution of this innovation to the variance of variable k over the band can be written as $\mathbf{q}'\,\boldsymbol{\Theta}(k,\,\underline{\omega},\,\overline{\omega})\,\mathbf{q}$, where $\boldsymbol{\Theta}(k, \underline{\omega}, \overline{\omega})$ is a positive semidefinite matrix constructed from the reduced-form moving-average coefficients and the Cholesky factor $\tilde{\mathbf{S}}$.[5] The shock that targets variable k over the band $[\underline{\omega}, \overline{\omega}]$ is then

$$\mathbf{q}^*(k, \underline{\omega}, \overline{\omega}) = \arg\max_{\mathbf{q}'\mathbf{q}=1} \mathbf{q}'\,\boldsymbol{\Theta}(k, \underline{\omega}, \overline{\omega})\,\mathbf{q}. \tag{2}$$

The solution is the eigenvector associated with the largest eigenvalue of $\boldsymbol{\Theta}(k, \underline{\omega}, \overline{\omega})$ and is identified up to sign. We normalize the sign so that the response of the target variable is positive at its peak.

The identification is deliberately agnostic. The MBC shock is not restricted to be a financial, monetary, productivity, or global shock. It is the orthogonal innovation that accounts for the largest share of GDP fluctuations over the business-cycle band. Any economic interpretation is inferred ex post from the shock's impulse responses, variance contributions, time-series realizations, and relation with the variables in the information set. We focus on two frequency bands, expressed in periodicity units. The *business-cycle band* corresponds to periodicities between 6 and 32 quarters and follows a long-standing convention in empirical macroeconomics. The *long-run band* corresponds to periodicities longer than 80 quarters and isolates fluctuations close to the zero frequency. Our baseline analysis rests on these two bands, which capture the two ends of the spectrum of macroeconomic fluctuations and provide the sharpest contrast between cyclical and trend dynamics.

Unless otherwise stated, the MBC shock for each country is identified as the vector q^* that maximizes the contribution to the spectral density of GDP over the business-cycle band.[6] Below and in the appendix, we verify that the results are robust to alternative targets, including a joint real-activity target based on GDP, consumption, and investment.

[5] Let $\mathbf{C}(L) \equiv \mathbf{B}(L)\widetilde{\mathbf{S}} = \sum_{\ell=0}^{\infty} \mathbf{C}_\ell L^\ell$ denote the moving-average representation in terms of Cholesky-orthonormalized innovations, and let $\mathbf{C}(e^{-i\omega}) = \sum_{\ell=0}^{\infty} \mathbf{C}_\ell e^{-i\omega\ell}$ be its frequency-domain transfer function. If $\mathbf{e}_k$ is the k-th canonical basis vector, define $\mathbf{C}^{[k]}(e^{-i\omega}) \equiv \mathbf{e}_k'\mathbf{C}(e^{-i\omega})$, the $1 \times N$ row vector collecting the frequency responses of variable k to the N orthonormalized innovations. Then $\boldsymbol{\Theta}(k, \underline{\omega}, \overline{\omega}) \equiv \int_{\underline{\omega}}^{\overline{\omega}} \mathbf{C}^{[k]}(e^{-i\omega})^\star \mathbf{C}^{[k]}(e^{-i\omega})\, d\omega$, where $\star$ denotes complex conjugate transpose. Up to normalization constants, which do not affect the maximizing eigenvector, this matrix summarizes the band-specific contribution of the Cholesky-orthonormalized innovations to the variance of variable k.

[6] This differs from the baseline implementation in Angeletos et al. (2020), which targets unemployment, because unemployment is not always a reliable cyclical indicator across EMDEs and is less consistently measured across countries. GDP is available for all countries in the sample and provides a common target for the cross-country analysis.

3 The Main Business-Cycle Shock: Mexico vs. Canada

We begin by applying the empirical framework described in Section 2 to Mexico and Canada. This comparison is useful because both countries are highly exposed to the United States and to global markets, but they differ sharply in their stage of development. Figure 1 reports impulse responses to the MBC shock in each country.

The shock generates a broad-based expansion in both countries. Output, investment, and consumption rise, while unemployment falls. The output responses are remarkably similar across the two economies, while consumption rises somewhat more strongly in Mexico. The trade balance deteriorates in both countries, but more sharply in Mexico despite the similar output response.[7] The real exchange rate appreciates on impact, while the labor share falls in both economies. The expansion is also accompanied by an easing of global financial conditions, as measured by the decline in Baa spreads, and by sizable movements in export and import prices. By contrast, the global interest rate responds comparatively little, pointing to global risk premia and external prices, rather than the global risk-free rate, as the relevant external margins. The responses of the global variables are consistent with the broad comovement in risky asset prices, spreads, and risk appetite that defines the global financial cycle (Rey, 2013; Miranda-Agrippino and Rey, 2022), pointing to a key role for the latter in shaping business-cycle fluctuations in both Mexico and Canada.

Although the MBC shocks are identified separately in country-specific VARs and target domestic GDP fluctuations, the estimated shocks for Mexico and Canada have a correlation of about 0.70 (bottom-right panel of Figure 1). This is close to the comovement observed in GDP growth, but contrasts sharply with the weak comovement in aggregate TFP growth.[8] This comovement points to a common driver of business-cycle fluctuations in the two economies.

The sharpest difference between the two economies lies in the responses of inflation and TFP. In Canada, the expansion is accompanied by higher inflation and only a modest response of aggregate TFP. In Mexico, by contrast, inflation declines while aggregate TFP rises substantially and persistently. The fall in Mexican inflation is particularly striking given the increase in external prices, especially import prices, which would otherwise tend to put upward pressure on domestic inflation. These responses point to markedly different domestic propagation despite the broadly similar real expansions. The Canadian response is closer to a demand-like expansion, whereas the Mexican response has a distinctly supply-like footprint. The domestic

[7] These differences echo two classic EMDE facts: high consumption volatility relative to output and stronger trade-balance countercyclicality (Aguiar and Gopinath, 2007a; Boz et al., 2011).

[8] The correlation between Mexican and Canadian GDP growth is about 0.75, for both year-over-year growth and for two-year growth. The corresponding correlations for annual aggregate TFP growth are -0.03 and 0.10, respectively.

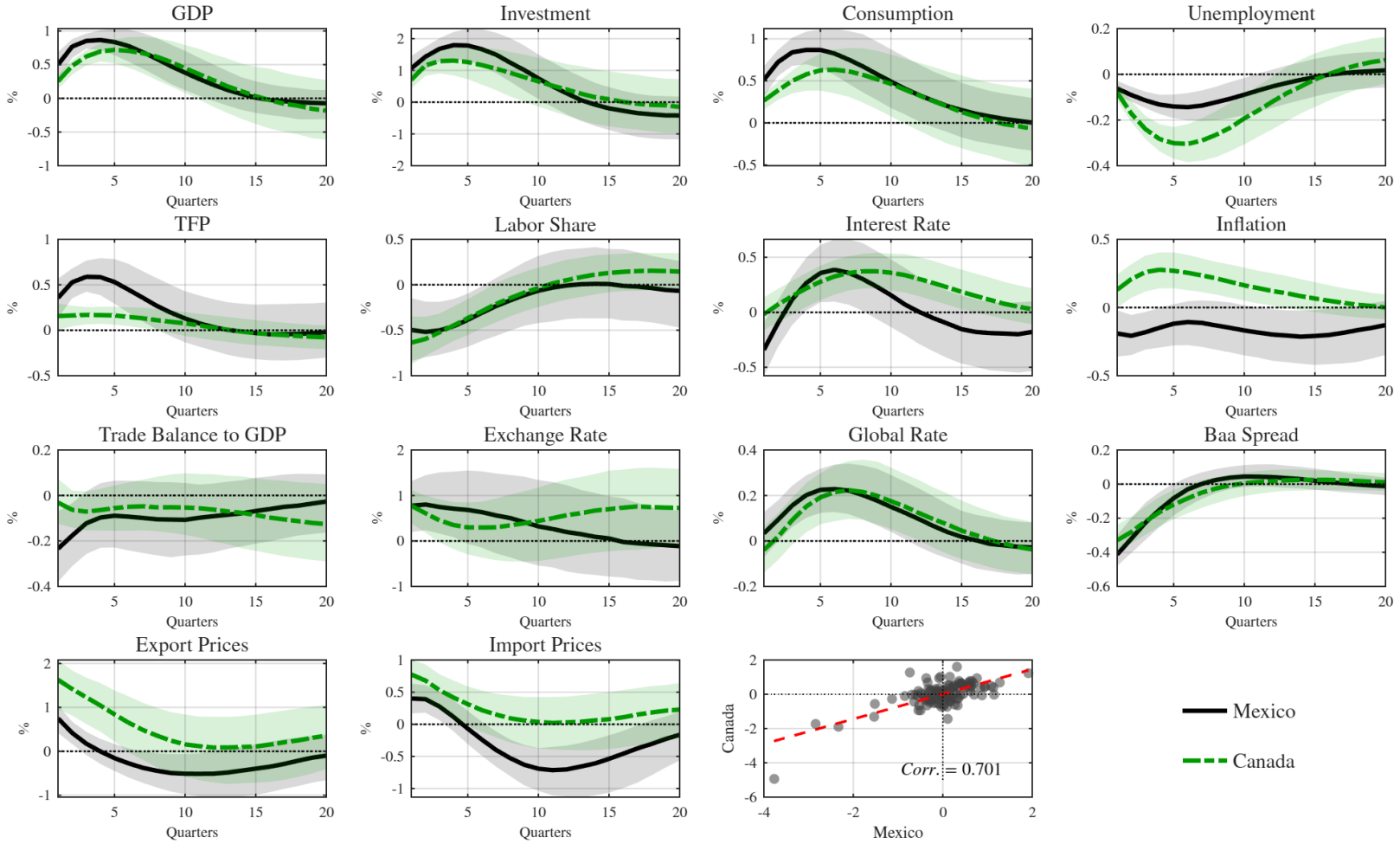


Figure 1: Impulse Responses to the Main Business-Cycle Shock: Mexico and Canada

Notes: The figure reports impulse responses to the main business-cycle shock for Mexico and Canada. The shock is identified as the innovation that explains the largest share of GDP fluctuations at business-cycle frequencies. Responses are shown to a one-standard-deviation shock. Solid black lines denote responses for Mexico; dashed green lines denote responses for Canada. Shaded areas report 68 percent posterior bands. The bottom-right panel displays a scatter plot of the identified shocks, along with the fitted linear regression line and the correlation between them.

Table 1: Variance Contributions of the Main Business-Cycle Shock: Mexico vs. Canada

	Business Cycle $(6–32q)$		Long Run $(80–\infty q)$	
Variable	Mexico	Canada	Mexico	Canada
GDP	68.97 [59.51, 77.21]	64.59 [55.38, 72.06]	21.23 [8.55, 42.38]	11.14 [3.77, 35.49]
Investment	51.56 [39.39, 63.06]	41.58 [28.79, 54.08]	13.33 [4.70, 30.77]	12.62 [3.97, 36.19]
Consumption	52.59 [39.51, 63.97]	49.55 [36.87, 61.71]	17.10 [6.30, 37.05]	10.36 [3.05, 35.02]
Unemployment Rate	35.13 [21.98, 51.15]	52.25 [38.85, 62.30]	11.79 [3.75, 30.59]	22.44 [9.79, 44.04]
TFP	35.96 [22.01, 49.50]	17.15 [8.52, 30.72]	8.27 [2.31, 22.87]	12.58 [4.29, 32.08]
Labor Share	23.00 [11.60, 36.66]	31.48 [16.45, 47.35]	9.46 [2.69, 25.46]	13.99 [4.97, 35.11]
Interest Rate	18.80 [8.79, 35.54]	30.22 [18.35, 44.01]	7.18 [2.02, 19.75]	17.22 [5.75, 39.77]
Inflation	9.33 [4.02, 19.15]	19.07 [7.74, 33.33]	11.48 [3.66, 30.33]	23.31 [8.48, 44.36]
Trade Balance to GDP	9.87 [4.07, 21.39]	8.93 [3.29, 20.39]	11.72 [3.08, 29.04]	12.37 [3.34, 35.18]
Exchange Rate	11.03 [4.20, 25.18]	11.48 [5.40, 22.81]	8.31 [2.11, 21.74]	14.02 [3.53, 35.44]
Global Rate	22.54 [11.11, 38.63]	23.32 [11.34, 36.72]	12.73 [4.11, 28.78]	11.73 [3.80, 32.47]
Baa Spread	56.65 [34.03, 73.12]	48.56 [28.87, 63.06]	14.74 [4.23, 35.10]	15.30 [5.36, 37.94]
Export Prices	25.10 [14.07, 39.94]	27.14 [15.26, 39.88]	7.96 [1.96, 22.76]	14.26 [3.91, 35.48]
Import Prices	32.24 [18.91, 48.26]	25.36 [14.31, 37.73]	10.98 [3.13, 27.52]	12.93 [3.45, 35.16]

Notes: The table reports the contribution of the main business-cycle shock to the variance of each variable over two frequency bands. The business-cycle band corresponds to periodicities between 6 and 32 quarters. The long-run band corresponds to periodicities between 80 quarters and infinity. The main business-cycle shock is identified separately for Mexico and Canada as the innovation that explains the largest share of GDP fluctuations at business-cycle frequencies. Entries are posterior medians, expressed in percent. Brackets report 68 percent posterior credible intervals.

interest-rate response reinforces this interpretation: combining nominal rates and inflation, the implied real rate rises in Mexico but falls in Canada. The Mexican expansion therefore combines higher TFP and lower inflation with a tighter domestic real rate, all features consistent with a supply-like transmission mechanism.

Table 1 reports the variance contributions of the MBC shock. At business-cycle frequencies, the shock explains 69 percent of GDP fluctuations in Mexico and 65 percent in Canada, and roughly one half of the variation in investment and consumption in both economies. It is also tightly connected to global financial conditions, accounting for 57 percent of Baa-spread fluctuations in Mexico and 49 percent in Canada, compared with about 23 percent of the variation in the global risk-free rate in both countries. This reinforces the evidence from Figure 1 that global risk premia, rather than the global risk-free rate, are the relevant external financial margin (Akıncı, 2013). The shock also explains a sizable share of export and import price

fluctuations, with contributions between 25 and 32 percent across the two countries.[9]

The remaining columns show that the shock has a much smaller footprint at low frequencies.[10] Its share of long-run GDP variation falls to 21 percent in Mexico and 11 percent in Canada, while its contributions to long-run movements in investment, consumption, TFP, and external prices are generally modest. The MBC shock is therefore not the main source of long-run movements in output or productivity. Its limited contribution to trade-balance fluctuations—about 10 percent at business-cycle frequencies in both countries—is also consistent with this interpretation, given the role of trade-balance dynamics in distinguishing nonstationary productivity shocks (García-Cicco et al., 2010). One notable cross-country difference is aggregate TFP: at business-cycle frequencies, the shock explains 36 percent of TFP fluctuations in Mexico, compared with 17 percent in Canada. This reinforces the message from the impulse responses: the shock is quantitatively important in both economies and similarly associated with global financial conditions, but is much more tightly connected to TFP fluctuations in Mexico.

Joint targeting of GDP, consumption, and investment. As a check on the choice of target variable, we also identify the shock that maximizes the joint business-cycle variation of output, consumption, and investment, in line with Forni et al. (2025). The resulting impulse responses are nearly identical to those obtained under the baseline GDP target (see Appendix Figure C.1 and Table C.1). In particular, the shock continues to display the same global signature, with large movements in Baa spreads and external prices, and the contrasting demand-like propagation in Canada and supply-like propagation in Mexico, including the stronger procyclical response of aggregate TFP.

3.1 Is the Cycle the Trend?

The limited low-frequency footprint of the MBC shock is particularly informative for Mexico. Despite its strong effect on aggregate TFP, the dominant cyclical shock is not the dominant source of long-run GDP fluctuations. Thus, the productivity-like response documented above does not imply that the shock is a trend disturbance, speaking directly to the "cycle is the trend" view of Aguiar and Gopinath (2007a).

To investigate the connection between cycle and trend more directly, we repeat the anatomy exercise at low frequencies. Specifically, we identify the shock that explains the largest share of GDP variation in the long-run frequency band and then compute its contribution to the variance of the main real aggregates

[9] This is consistent with evidence that world prices are an important propagation channel for global shocks to small open economies (see, e.g., Fernández et al., 2017), and that commodity prices and global financial conditions jointly shape their transmission (Juvenal and Petrella, 2024).

[10] Given the length of the quarterly sample, low-frequency variance decompositions should be interpreted as diagnostic rather than as precise estimates. They are useful for assessing whether the MBC shock has a substantial low-frequency footprint, but the exact shares are necessarily more sensitive to sample length and model specification than the business-cycle-band decompositions.

Table 2: Variance Contributions of the Main Low-Frequency GDP Shock

	Business Cycle $(6\text{–}32q)$		Long Run $(80\text{–}\infty q)$	
Variable	Mexico	Canada	Mexico	Canada
GDP	17.72	15.04	78.60	87.38
	[5.63, 38.25]	[6.17, 32.69]	[65.62, 89.76]	[74.06, 93.96]
Investment	14.53	10.56	45.57	71.09
	[4.94, 34.22]	[3.90, 24.24]	[17.28, 75.47]	[48.25, 87.07]
Consumption	13.78	15.46	67.85	83.57
	[4.90, 30.80]	[5.98, 42.08]	[45.70, 85.37]	[68.19, 92.43]

Notes: The table reports the contribution of the main low-frequency GDP shock to the variance of selected real aggregates. The shock is identified as the innovation that explains the largest share of GDP fluctuations over the long-run frequency band. The business-cycle band corresponds to periodicities between 6 and 32 quarters. The long-run band corresponds to periodicities between 80 quarters and infinity. Entries are posterior medians, expressed in percent. Brackets report 68 percent posterior credible intervals.

at business-cycle frequencies. Table 2 reports the results for GDP, investment, and consumption. By construction, this shock accounts for most of the long-run variation in GDP in both countries and also explains a large share of long-run movements in consumption and investment. Yet its contribution to business-cycle fluctuations is small. The pattern is remarkably similar in Mexico and Canada: the shock that drives GDP at low frequencies explains little of the business-cycle variation in real activity in either economy.

Taken together, Tables 1 and 2 show a symmetric separation between cycle and trend: the MBC shock has a limited long-run footprint, while the main low-frequency GDP shock contributes little to the business cycle. This is consistent with the broader message of García-Cicco et al. (2010) that nonstationary productivity shocks alone cannot satisfactorily account for emerging-market business cycles. Our contribution is to reach this conclusion through an agnostic frequency-domain decomposition and to show that the dominant cyclical disturbance has a global origin while generating a pronounced procyclical response of aggregate TFP in Mexico. Large productivity movements therefore emerge as a distinctive feature of the domestic transmission of the global shock, rather than as evidence that cycle and trend share the same primitive source.

Aguiar and Gopinath (2007b) emphasize that domestic productivity shocks can endogenously move country borrowing rates through default risk, implying a financial transmission channel for productivity disturbances. For the MBC shock, our evidence points to the opposite causal ordering. The shock explains a substantial share of fluctuations in global financial conditions and external prices, while the shocks independently recovered for Mexico and Canada are strongly correlated. Together, these findings point to a common global origin of domestic business-cycle fluctuations, with TFP and domestic interest rates responding as part of country-specific propagation. Our evidence therefore reveals a productivity channel in the domestic transmission of a global financial shock in Mexico.

3.2 TFP Measurement and Robustness

The most striking result of the Mexico–Canada comparison is the large and persistent procyclical response of aggregate TFP in Mexico, in sharp contrast with Canada. We therefore examine the robustness of this finding to alternative TFP measures and adjustments for factor utilization, before turning to the VAR lag specification.

Alternative measures of TFP. Because TFP is a residual, however, it may absorb changes in factor utilization, labor quality, capital services, informality, and measurement error, concerns that are especially relevant in cross-country and emerging-market data (see, e.g., Feenstra et al., 2015). Our baseline specification uses TFP from the Penn World Table. We therefore repeat the exercise using three alternative measures for Mexico, from the Conference Board Total Economy Database, the World Bank Global Productivity database, and the National Institute of Statistics and Geography of Mexico. The left panel of Figure 2 report the response of alternative measures of TFP.[11] Across all four measures, the impulse responses are broadly similar: the MBC shock generates a broad domestic expansion, no increase in inflation, and a persistent rise in aggregate TFP. Its variance contributions are likewise stable at both business-cycle and long-run frequencies.

Utilization-adjusted TFP. A more fundamental concern is that measured TFP may reflect cyclical changes in factor utilization rather than changes in underlying productivity. Constructing utilization-adjusted TFP is challenging, particularly for EMDEs, because important margins of factor utilization are unobserved and suitable industry-level data are limited. We follow Huo et al. (2023) (HLP), who extend the approach of Basu et al. (2006) to a cross-country setting, using changes in hours per worker to proxy for unobserved labor effort and capital utilization. A central empirical challenge is estimating the coefficients that map changes in hours per worker into the utilization component of measured TFP. For Mexico, we consider two alternatives. First, we use the utilization coefficients estimated by HLP on G7 data.[12] Second, we estimate these coefficients directly using Mexican industry data and their instrumental-variable strategy. The Mexican estimates are weakly identified and are therefore used as a sensitivity check. For Canada, we construct utilization-adjusted TFP using Canadian industry data and HLP's coefficients. Appendix A.4 provides construction details. In each specification, we replace TFP in the mixed-frequency VAR and re-identify the MBC shock. The middle and right panels of Figure 2 show that utilization-adjusted TFP remains strongly procyclical in Mexico, with a response at least as large as in the baseline, whereas the already modest response in Canada becomes

[11] Figure B.1 reports the for IRFs results and Table B.1 the FEVD for each of the specification considered.

[12] HLP also apply their G7-based coefficients to non-G7 countries in their sample, as estimation on the full country sample yields noisier coefficients and weaker first stages.

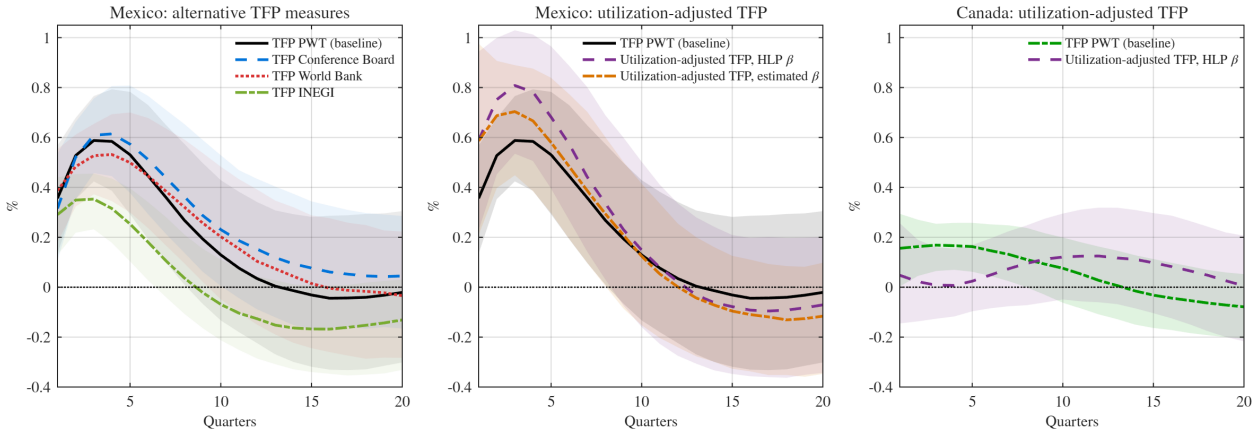


Figure 2: Response of TFP to the MBC Shock: Alternative and Utilization-Adjusted TFP Measures

Notes: The figure reports TFP responses to the main business-cycle (MBC) shock under alternative productivity measures. The left panel compares four measures for Mexico: Penn World Table (PWT, baseline; solid black), Conference Board (dashed blue), World Bank (dotted red), and INEGI (dash-dotted green). The middle panel compares the Mexican baseline (solid black) with utilization-adjusted TFP constructed following Huo et al. (2023), using either their utilization coefficients (dashed purple) or coefficients estimated on Mexican data with the same identification strategy (dash-dotted orange). The right panel compares the Canadian baseline (dash-dotted green) with utilization-adjusted TFP based on their coefficients (dashed purple). Lines show posterior medians and shaded areas 68% credible intervals.

negligible after adjustment. Moreover, the MBC shock continues to explain well over 30% of business-cycle fluctuations in Mexican utilization-adjusted TFP.[13]

Lag specification in the VAR. Motivated by recent evidence on the importance of lag length for VAR-based impulse responses (Antolín-Díaz and Surico, 2025; De Graeve and Westermark, 2025), we re-estimate the baseline specification with 16 and 20 lags. The 20-lag specification matches the projection horizon, bringing the VAR impulse responses close to their local-projection counterparts as in Plagborg-Møller and Wolf (2021). Across both specifications, the impulse responses, variance decompositions, and recovered shock series remain essentially unchanged (Table B.3 and Figure B.3).

4 The Global Component of the Main Business-Cycle Shock

We next establish that the Mexican MBC shock is a global financial shock.[14] We proceed in five steps. First, we show that the recovered shock is closely related to shifts in global risk appetite, a central feature of the global financial cycle (Rey, 2013; Chari et al., 2020; Akıncı et al., 2022). Second, we directly target global financial conditions and compare the resulting shock with the Mexican MBC shock. Third, we ask whether a closely

[13] Figure B.2 reports the full set of Mexican impulse responses under utilization-adjusted TFP with HLP coefficients, and Table B.2 the corresponding variance decompositions for both sets of coefficients.

[14] Throughout this section, we use the term global financial conditions broadly, to capture movements in global risk premia, risk appetite, credit conditions, and capital-flow pressures. This encompasses shifts often described as risk-on/risk-off episodes, as well as related notions of global financial and credit cycles; see, among others, Forbes and Warnock (2012), Miranda-Agrippino and Rey (2020), and Boyarchenko and Elias (2026).

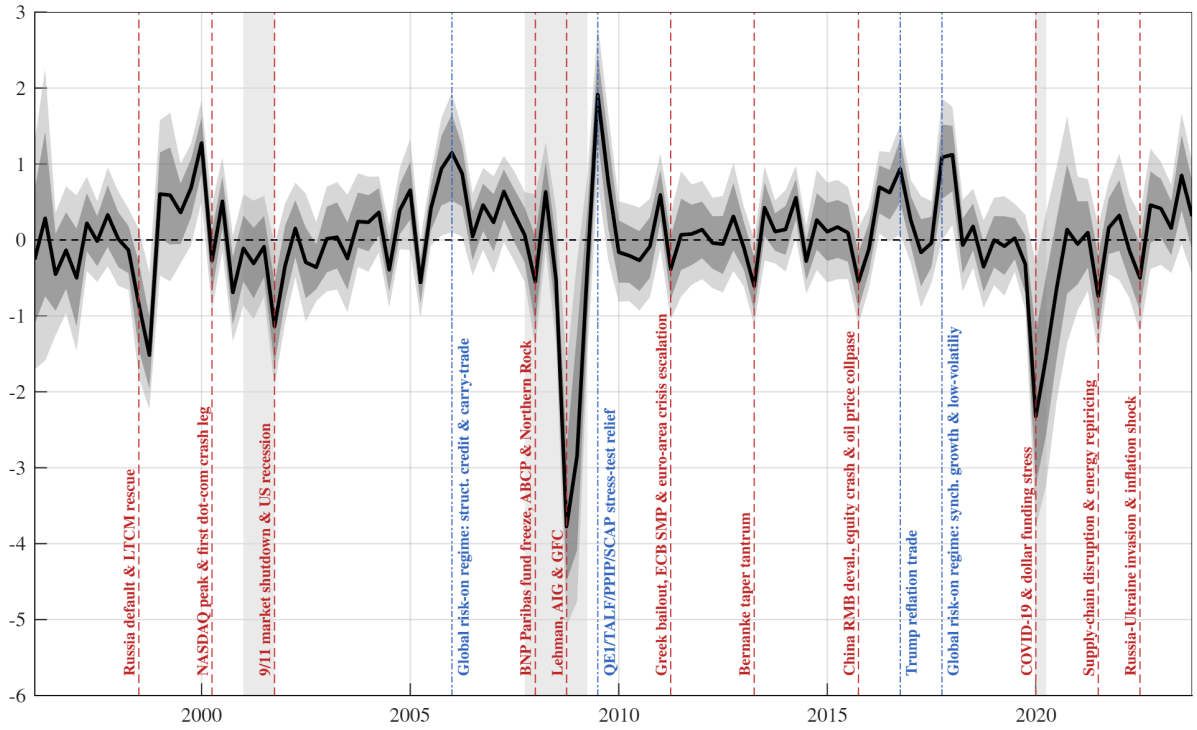


Figure 3: Mexico: Main Business-Cycle Shock and Global Financial Events

Notes: The figure plots the estimated main business-cycle (MBC) shock for Mexico over the period 1996Q1–2023Q4. The shock is identified as the innovation that explains the largest share of GDP fluctuations at business-cycle frequencies (6–32 quarters). The solid black line reports the posterior median; dark and light shaded areas report the 68 and 90 percent posterior credible bands, respectively. The shock is normalized so that positive realizations correspond to an expansion in GDP; negative realizations therefore correspond to contractionary disturbances. Vertical red dashed lines mark major global contractionary episodes; vertical blue dash-dotted lines mark global expansionary regimes. A full description of each episode is provided in Table C.2 in the Appendix. Shaded grey bands mark NBER U.S. recessions.

related shock can be recovered from a domestic-only VAR and what information is lost by excluding global variables. Fourth, we examine sovereign and currency risk, the dollar, and exchange rates as additional transmission margins. Finally, we extend the sample backward to assess the stability of the recovered shock and its relationship with earlier global financial episodes. Along the way, we also show that the recovered shock is distinct from high-frequency U.S. monetary-policy shocks and from a dollar shock.

4.1 Global Financial Events, Risk Appetite, and the Recovered Shock

Figure 3 plots the estimated Mexican MBC shock, normalized so that positive realizations correspond to an expansion in GDP. The timing of the recovered shock is highly informative. Its largest contractionary realizations coincide with major global financial stress episodes, including the Russian/LTCM crises, the global financial crisis, and the COVID-19 shock. The series also turns negative around later episodes of global stress, including the post-pandemic supply-chain disruptions, energy repricing, and the inflation shock associated with the Russia–Ukraine war. Conversely, positive realizations occur during periods

Table 3: MBC Shocks and External Proxies for Global Risk and U.S. Monetary Policy

	Mexico MBC shock		EMDE MBC PC1	
	Corr.	Sample	Corr.	Sample
Risk aversion index (BEX)	-0.637^{***}	1996–2023	-0.508^{***}	1996–2023
Risk-on/risk-off index (CSL)	-0.598^{***}	2003–2023	-0.745^{***}	2003–2023
Global risk shock (GMS)	-0.499^{***}	1996–2023	-0.464^{***}	1996–2023
U.S. monetary-policy shock (AD)	0.022	1996–2008	-0.153	1996–2008
U.S. monetary-policy shock (MAR)	0.026	1996–2019	0.001	1996–2019

Notes: The table reports Pearson correlations between the Mexican MBC shock, the first principal component of EMDE MBC shocks, and external proxies for global risk and U.S. monetary-policy shocks. The MBC shocks are normalized so that positive realizations are expansionary. For the risk proxies, higher values correspond to tighter global risk conditions; negative correlations therefore indicate that EMDE expansions coincide with easier global financial conditions. The risk-aversion index is from Bekaert et al. (2022); the risk-on/risk-off index is from Chari et al. (2020); and the GMS global risk shock is from Georgiadis et al. (2023, 2024). AD denotes the shock of Aruoba and Drechsel (2025) and MAR denotes the U.S. monetary-policy shock of Miranda-Agrippino and Ricco (2021). The sample columns report the overlapping window used for each correlation. Significance levels are denoted by $^{***}p < 0.01$, $^{**}p < 0.05$, and $^{*}p < 0.10$.

of easier global financial conditions and risk-on sentiment, such as the mid-2000s credit-and-carry-trade expansion, the rebound after the global financial crisis, and the low-volatility global expansion of the late 2010s. This alignment with global financial events is important: it shows that the shock recovered from Mexican macroeconomic fluctuations behaves like the domestic counterpart of a global financial disturbance, contracting when global risk appetite deteriorates and expanding when risk premia compress.

We next compare the recovered Mexican shock with external proxies for global risk and U.S. monetary-policy shocks. Table 3 reports the correlations. The pattern is clear. The Mexican MBC shock is strongly negatively correlated with all three global-risk proxies: the risk-aversion index of Bekaert et al. (2022), the risk-on/risk-off index of Chari et al. (2020), and the global risk shock of Georgiadis et al. (2024).[15] By contrast, the correlations with high-frequency U.S. monetary-policy surprises, using the information-robust proxy of Miranda-Agrippino and Ricco (2021) and the shocks of Aruoba and Drechsel (2025), are small and statistically insignificant. These patterns indicate that the recovered Mexican MBC shock is more tightly linked to shifts in global risk appetite than to high-frequency U.S. monetary-policy surprises. This does not imply that U.S. monetary policy is irrelevant for global financial conditions, which may themselves be shaped by monetary policy in the center country (see, e.g., Kalemli-Özcan, 2019; Miranda-Agrippino and Rey, 2020). Rather, it shows that the shock recovered from Mexican business-cycle fluctuations loads primarily on the global-risk component of financial conditions.

[15] Positive MBC shocks are expansionary, while higher values of the global-risk proxies denote tighter risk conditions; negative correlations therefore correspond to expansions under easier global financial conditions. The EMDE common component of the country-level MBC shocks, introduced in Section 5, displays the same pattern: strong negative correlations with global-risk proxies and weak correlations with U.S. monetary-policy surprises.

Alternative measures of global financial conditions. The results are not specific to using Baa spreads as the measure of global financial conditions. We re-estimate the baseline specification by replacing Baa spreads with (a) the VIX, (b) the global financial cycle factor of Miranda-Agrippino and Rey (2020), and (c) the global credit cycle factor of Boyarchenko and Elias (2026) (Tables C.3–C.5 and Figures C.2–C.4). Across all three specifications, the impulse responses are virtually unchanged and the recovered shocks have correlations above 90% with the baseline MBC shock. Thus, Baa spreads are not uniquely driving the results; they proxy for a broader global financial component also captured by volatility, risky-asset-price, and global-credit indicators.

4.2 Targeting Global Financial Conditions

Figure 3 suggests a close connection between the Mexican MBC shock and global financial conditions. We examine this more directly by changing the identification target. Instead of targeting Mexican GDP, we target Baa spread fluctuations over the same frequency band. The exercise asks whether targeting global risk premia, rather than Mexican GDP, recovers the same propagation mechanism.

Figure 4 compares the impulse responses from the Baa-targeted shock with those from the baseline GDP-targeted shock. The two sets of responses are very similar. The Baa-targeted shock generates the same broad domestic expansion: output, investment, and consumption rise, while unemployment falls. It also produces nearly the same global responses: Baa spreads decline, the global rate rises temporarily, and export and import prices display the same hump-shaped dynamics. Crucially, the features that distinguish Mexico's transmission from Canada's are preserved: inflation declines, and aggregate TFP rises strongly and persistently. The recovered shock series are also similar: the Baa-targeted and Mexican-GDP-targeted shocks have a correlation of almost 80% over the full sample.[16]

The variance decompositions reinforce this result. The Baa-targeted shock accounts for similar shares of business-cycle variation across domestic aggregates, global financial variables, and external prices as the baseline shock (see Appendix Table C.6). Therefore, the two identification schemes recover essentially the same empirical footprint: the shock driving Mexican GDP at business-cycle frequencies is closely aligned with the shock driving global risk premia. Importantly, this interpretation does not require taking a stand on the precise source of the global disturbance—risk appetite, credit conditions, intermediary balance sheets, or other components of global financial conditions. It shows that the dominant Mexican business-cycle shock behaves like a global-financial shock identified from Baa spreads.

[16]The correlation remains roughly similar when we exclude the global financial crisis and the COVID-19 episode, indicating that the result is not driven only by the largest global stress events.

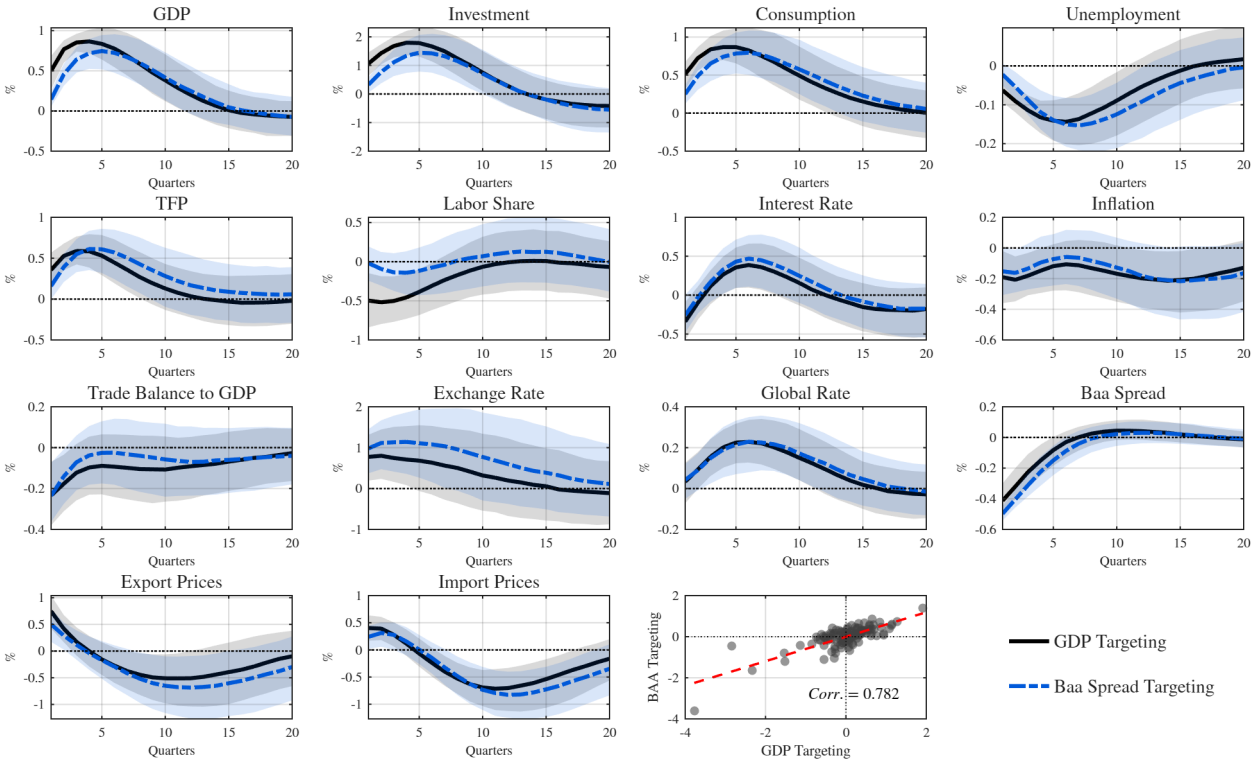


Figure 4: Mexico: Output-Targeted and Baa-Targeted Shocks

Notes: The figure compares impulse responses for Mexico under two identification schemes. The solid black line reports responses to the baseline main business-cycle shock, identified as the shock that explains the largest share of GDP fluctuations at business-cycle frequencies. The dashed blue line reports responses to the shock that explains the largest share of Baa spread fluctuations over the same frequency band. Shaded areas report 68 percent posterior bands. Both shocks are normalized so that they generate an expansion in GDP. Responses are shown for the variables included in the baseline VAR. The bottom-right panel displays a scatter plot of the identified shocks, along with the fitted linear regression line and the correlation between them.

Targeting global financial conditions and external prices. We next broaden the target to include external prices. Specifically, we identify a shock that maximizes the joint business-cycle variation of Baa spreads, export prices, and import prices. This captures global financial conditions together with the commodity-price variation embedded in Mexico's external prices. The impulse responses, reported in Appendix Figure C.5, are very close to those generated by the baseline MBC shock. Thus, the connection between the Mexican MBC shock and the global block is not limited to Baa spreads: it extends to a broader combination of global financial conditions and external prices, two dimensions closely intertwined in the global financial cycle (Miranda-Agrippino and Rey, 2022).

4.3 Excluding Global Variables

One concern with the previous evidence is that the connection with global financial conditions may be mechanical, since the baseline VAR includes global variables. To address this, we re-estimate the system using

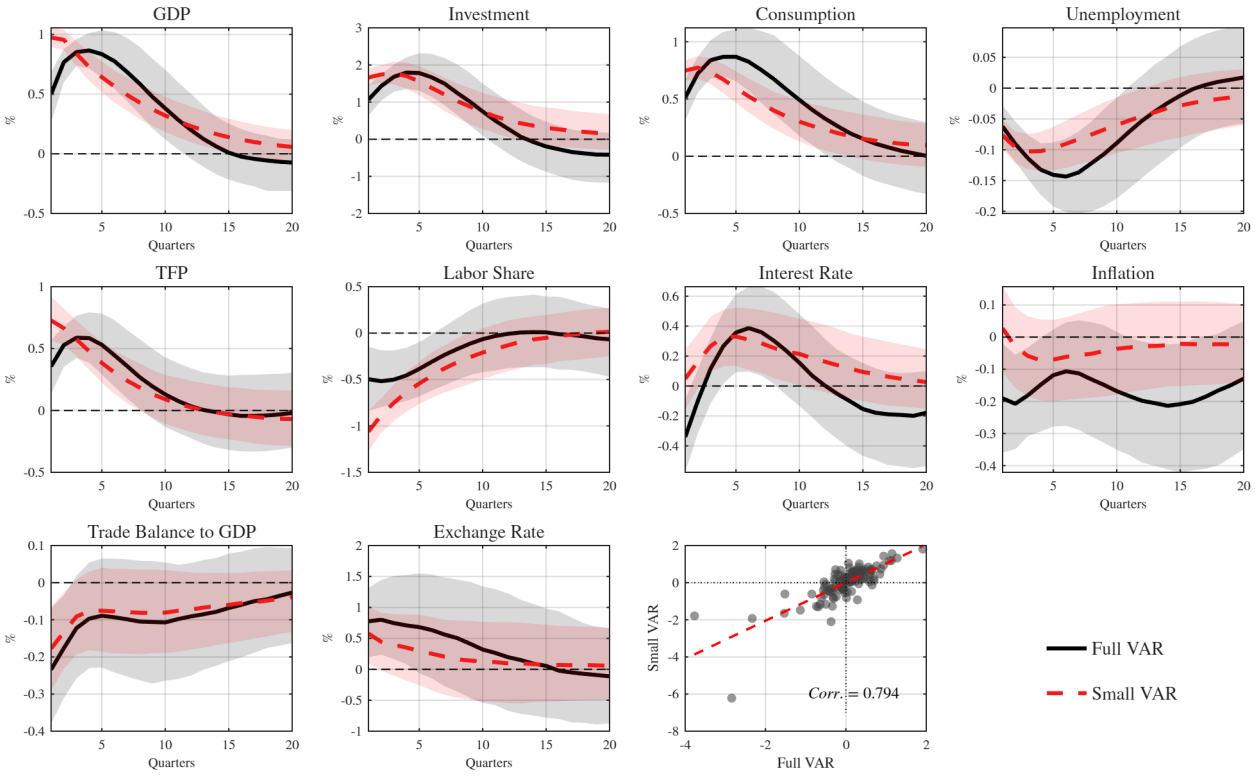


Figure 5: Mexico: Baseline VAR and Domestic-Only VAR

Notes: The figure compares impulse responses to the main business-cycle shock in Mexico under two information sets. The solid black line reports responses from the baseline medium-scale VAR, which includes domestic variables, global financial variables, and external prices. The dashed red line reports responses from a smaller VAR that includes only domestic variables. In both specifications, the shock is identified as the innovation that explains the largest share of GDP fluctuations at business-cycle frequencies and is normalized to generate an expansion in GDP. Shaded areas report 68 percent posterior bands. The figure reports responses for the variables common to the two VAR specifications. The bottom-right panel displays a scatter plot of the identified shocks, along with the fitted linear regression line and the correlation between them.

only domestic Mexican variables and identify the shock that explains the largest share of GDP fluctuations at business-cycle frequencies. This exercise addresses two questions: whether domestic data alone recover an MBC shock with the same global-financial footprint as in the baseline specification, and whether a domestic-only system is sufficient to estimate its propagation.

The answer to the first question is yes. The shock series recovered from the two systems are strongly correlated, with a correlation of about 80%, and their large realizations align with the same global financial episodes highlighted in Figure 3. The domestic-only shock is nevertheless smoother and attenuates some of the sharpest peaks in the baseline series. Therefore, the global financial disturbance leaves a clear footprint in Mexican macroeconomic dynamics even when global variables are excluded, although their omission somewhat alters the timing and amplitude with which the shock is recovered.

Figure 5 compares the impulse responses for the variables common to the two specifications. The broad anatomy is preserved: output, investment, and consumption rise, unemployment falls, and aggregate TFP is

procyclical. In particular, the TFP response is not mechanically induced by including Baa spreads or external prices in the VAR. Relative to the baseline, the domestic-only VAR produces less pronounced hump-shaped dynamics in the real aggregates and a weaker, less precisely estimated inflation response. These differences do not overturn the interpretation of the shock, but omitting global variables affects the shape and precision of its estimated propagation.

We next test whether the shock recovered from the domestic-only VAR is predictable from lagged global variables (Forni and Gambetti, 2014).[17] We regress the domestic-only MBC shock on four lags of the Baa spread or the full global block and test for joint predictability. The predictive power is substantial: the Baa spread alone explains about 37 percent of the variation in the domestic-only shock, while the full global block explains about 44 percent; in both cases, the p-value is well below 1 percent. Thus, although domestic data recover a shock closely related to the baseline MBC shock, the domestic-only VAR is not informationally sufficient: global financial and external-price variables contain significant information about the shock.

The predictability results also help explain the differences in Figure 5. If agents respond to global financial information omitted from the econometrician's information set, the moving-average representation of the smaller system need not recover the dynamic effects of the underlying disturbance. This informational deficiency is closely related to the non-fundamentalness problem studied by Lippi and Reichlin (1994) and Leeper et al. (2013). While the richer information set is not needed to uncover the global-financial nature of the MBC shock or its procyclical TFP response, it yields a sharper characterization of its propagation, with more pronounced hump-shaped real responses and a clearer disinflationary effect.

4.4 Sovereign Risk, the Dollar, and Currency Markets

We now augment the Mexican VAR with Mexico's EMBI spread, the market–policy rate wedge, the broad U.S. dollar, the UIP premium, and the nominal exchange rate. These extensions characterize the financial and exchange-rate footprint of the MBC shock and provide a check on the information set underlying the baseline specification. Across all augmentations, the recovered MBC shock and impulse responses are virtually unchanged, supporting the informational sufficiency of the baseline VAR.[18] Figure 6 summarizes the additional responses: the MBC shock materially reprices both sovereign and local-currency risk and compresses the market–policy rate wedge, while accounting for only a limited share of currency-market fluctuations.

[17] If the VAR information set is sufficient, the estimated innovation should not be predictable from variables outside the system; predictability therefore signals informational deficiency.

[18] Formal tests following Forni and Gambetti (2014) confirm that lags of the additional variables do not predict the MBC shock recovered from the baseline VAR. Full impulse responses and variance decompositions are reported in Appendix Table C.7–C.12 and Figures C.6–C.11.

The EMBI spread is the spread on Mexico's U.S.-dollar sovereign bonds over comparable U.S. Treasuries. Following an expansionary MBC shock, the spread declines markedly, with most of the decline unwinding within the first year. The shock accounts for about one third of its business-cycle variation and is therefore an important source of Mexican sovereign-risk fluctuations, consistent with evidence of a substantial global component in sovereign spreads (Gilchrist et al., 2022). The market–policy rate wedge, the difference between the three-month Mexican Treasury rate and the domestic policy rate, also falls by a similar amount on impact, although the wedge response is estimated less precisely. This joint response is the expansionary counterpart of the intermediation channel documented by De Leo et al. (2022), who show that higher external funding premia widen the wedge by raising domestic short-term market rates relative to policy through intermediaries reliant on foreign funding. The joint decline in EMBI and the market–policy rate wedge therefore suggests that the effects of global financial easing are amplified by the response of domestic financial markets, as emphasized by Juvenal and Petrella (2024).[19]

A large literature emphasizes the dollar as a conduit for global financial conditions through risk taking, intermediary balance sheets, dollar credit, and trade finance (Bruno and Shin, 2015a,b, 2023; Georgiadis et al., 2023). The broad dollar initially depreciates after an expansionary MBC shock. Together with the strong investment response, this is consistent with the financial channel of exchange rates documented by Avdjiev et al. (2019), whereby a weaker dollar eases credit conditions and supports investment in EMDEs through borrowers' balance sheets and lenders' risk-taking capacity. The evidence, however, does not support interpreting the MBC shock as a dollar shock as in Obstfeld and Zhou (2022). The dollar response partly reverses at medium horizons, and the shock explains only about one fifth of its business-cycle variation—considerably less than for Baa spreads. More importantly, the broad dollar is not an interchangeable proxy for the global financial conditions relevant to the MBC shock over our sample.[20] The dollar therefore appears to be an important transmission margin of the broader global-financial disturbance rather than its defining feature.

We next examine whether the MBC shock also reprices local-currency risk. We measure it with a survey-based UIP premium: $\lambda_t = (i_t^{mx} - i_t^{us}) - [E_t(s_{t+1}) - s_t]$, where s_t is the log MXN/U.S.-dollar exchange rate, so that an increase denotes a peso depreciation. We construct $E_t(s_{t+1})$ from Banco de México one-quarter-

[19]The rest of the anatomy remains essentially unchanged in both augmentations. The MBC shock accounts for about 51 percent of TFP fluctuations in the EMBI specification and 46 percent in the market–policy rate wedge specification, compared with 36 percent in the baseline.

[20]When we replace the Baa spread with the broad dollar index, rather than adding the dollar to the baseline VAR, the recovered shock remains highly correlated with the baseline MBC shock and still explains only a modest share of dollar fluctuations. However, the resulting specification fails the informational-sufficiency test of Forni and Gambetti (2014): four lags of the Baa spread jointly explain about 32% of the variation in the recovered shock, with an F-test p-value well below 0.001. Thus, the dollar does not span the global-financial information contained in the Baa spread. This evidence, however, does not rule out a stronger role for the dollar in more recent periods (see, e.g., Erik et al., 2020).

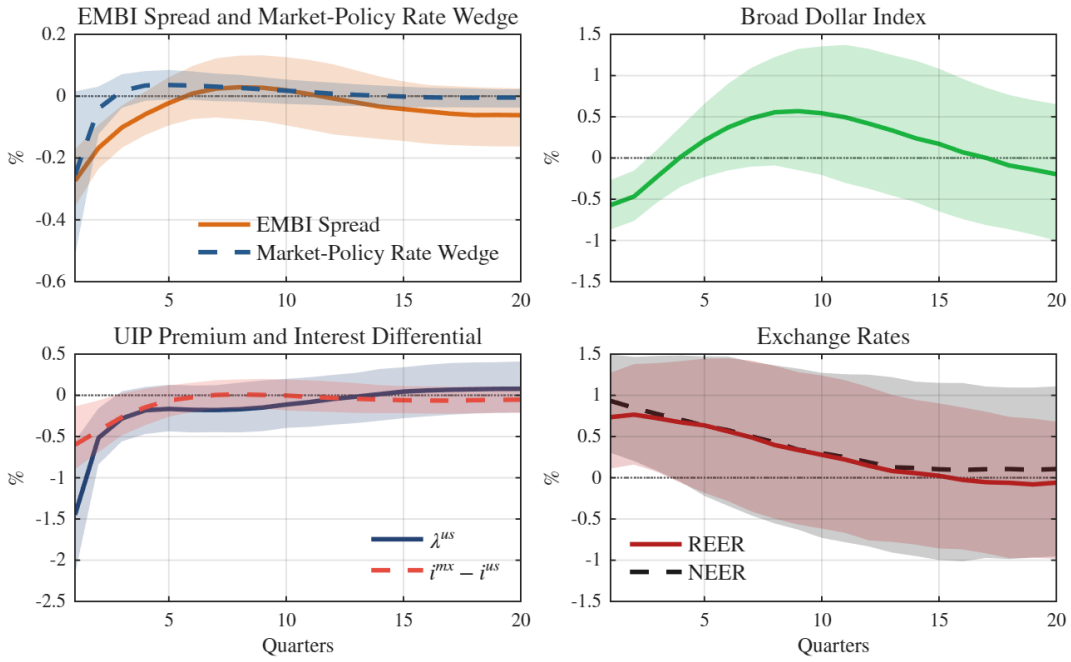


Figure 6: Financial and Exchange-Rate Responses to the Mexican MBC Shock

Notes: The figure reports selected financial and exchange-rate responses to the Mexican MBC shock. Each response is obtained from an augmentation of the baseline VAR with the corresponding financial variable(s), and the MBC shock is re-identified in each specification as the innovation that explains the largest share of GDP fluctuations at business-cycle frequencies. In the top-left panel, the EMBI and market–policy rate wedge responses are obtained from separate augmented specifications estimated over their common sample. The top-right panel reports the broad U.S. dollar index; the bottom-left panel reports the Mexico–U.S. uncovered interest parity premium, λ_t, together with the interest-rate differential, $i_t^{mx} - i_t^{us}$, obtained from a single specification that includes the two variables jointly, so that the two responses are driven by the same identified shock; and the bottom-right panel reports the nominal effective exchange rate alongside the real effective exchange rate. Responses are shown to a one-standard-deviation shock, normalized so that positive realizations correspond to a GDP expansion. Solid and dashed lines report posterior medians, and shaded areas report 68 percent posterior credible bands.

ahead MXN/U.S.-dollar survey forecasts and maturity-matched Mexican and U.S. short-term interest rates.[21] The UIP premium falls sharply on impact. As with sovereign risk, the repricing is front-loaded, with most of the response dissipating within a few quarters. Thus, the MBC shock compresses both hard-currency sovereign risk and the premium on Mexican local-currency assets. This combination of narrower credit spreads, a weaker dollar, and a lower UIP premium is the expansionary counterpart of the global-risk tightening in Akıncı et al. (2022), where tighter intermediary constraints widen credit spreads, appreciate the dollar, and raise currency risk premia.

The UIP decomposition clarifies the source of this repricing. The Mexico–U.S. interest-rate differential also falls, but by substantially less than λ_t, implying that expected peso depreciation rises. The two components therefore move in opposite directions, a central implication of financial disturbances in the Itskhoki and Mukhin (2021) framework, as emphasized by Emeksiz et al. (2026): exchange-rate jumps followed by

[21]The survey and financial series are monthly, we construct the three-month-ahead UIP premium at that frequency and then aggregate to quarterly frequency. Table A.4 in the Appendix reports the details of the construction.

expected reversal induce the two components of the UIP premium to move in opposite directions. Both movements therefore contribute to the decline in the UIP premium. This pattern differs from the U.S. monetary-policy shocks studied by Cristi et al. (2024), for which EM interest differentials and expected depreciation move in the same direction, reinforcing the weak relation between our MBC shock and high-frequency U.S. monetary-policy surprises documented above. At the same time, it mirrors the response to global risk documented by Kalemli-Özcan and Varela (2021), where global risk operates through both the interest differential and exchange-rate expectations, unlike local risk, which acts predominantly through the interest differential. More broadly, financial-market responses are concentrated at short horizons, while domestic activity and productivity respond considerably more persistently.

Expansionary MBC shocks generate nearly identical appreciations of the Mexican peso in nominal and real effective terms. The real appreciation is therefore driven overwhelmingly by nominal exchange-rate adjustment, with little contribution from CPI-based relative prices. This pattern echoes the close empirical comovement between nominal and real exchange rates emphasized in the exchange-rate-disconnect literature (Mussa, 1986; Itskhoki and Mukhin, 2025a). This does not imply that relative prices are unimportant for broader transmission: export and import prices respond substantially in the baseline. Rather, domestic-versus-foreign consumer prices contribute little to the conditional real exchange-rate response.

The variance decompositions sharpen the distinction between transmission and origin: the MBC shock accounts for roughly one third of EMBI fluctuations, but only about 8 percent of the market–policy rate wedge's business-cycle variation, around 12 percent of nominal and real effective exchange-rate fluctuations, and roughly 15 percent of the UIP premium and the Mexico–U.S. interest-rate differential. Thus, the MBC shock is an important source of sovereign-risk fluctuations, while it is not the dominant source of variation in the market–policy rate wedge or currency markets. These results complement Kalemli-Özcan and Varela (2021), who find that EM UIP premia are predominantly driven by local rather than global risk, and distinguish the MBC shock from the FX-specific risk-sharing disturbances emphasized by Itskhoki and Mukhin (2021, 2025b) and targeted empirically by Emeksiz et al. (2026).[22] The MBC shock has the opposite quantitative footprint: it dominates Mexican business-cycle fluctuations but accounts for only a modest share of currency-market variation.

[22]These disturbances explain a large share of exchange-rate and UIP-premium fluctuations but have relatively small macroeconomic effects. Emeksiz et al. (2026) further show that their identified FX shock is distinct from the global financial cycle.

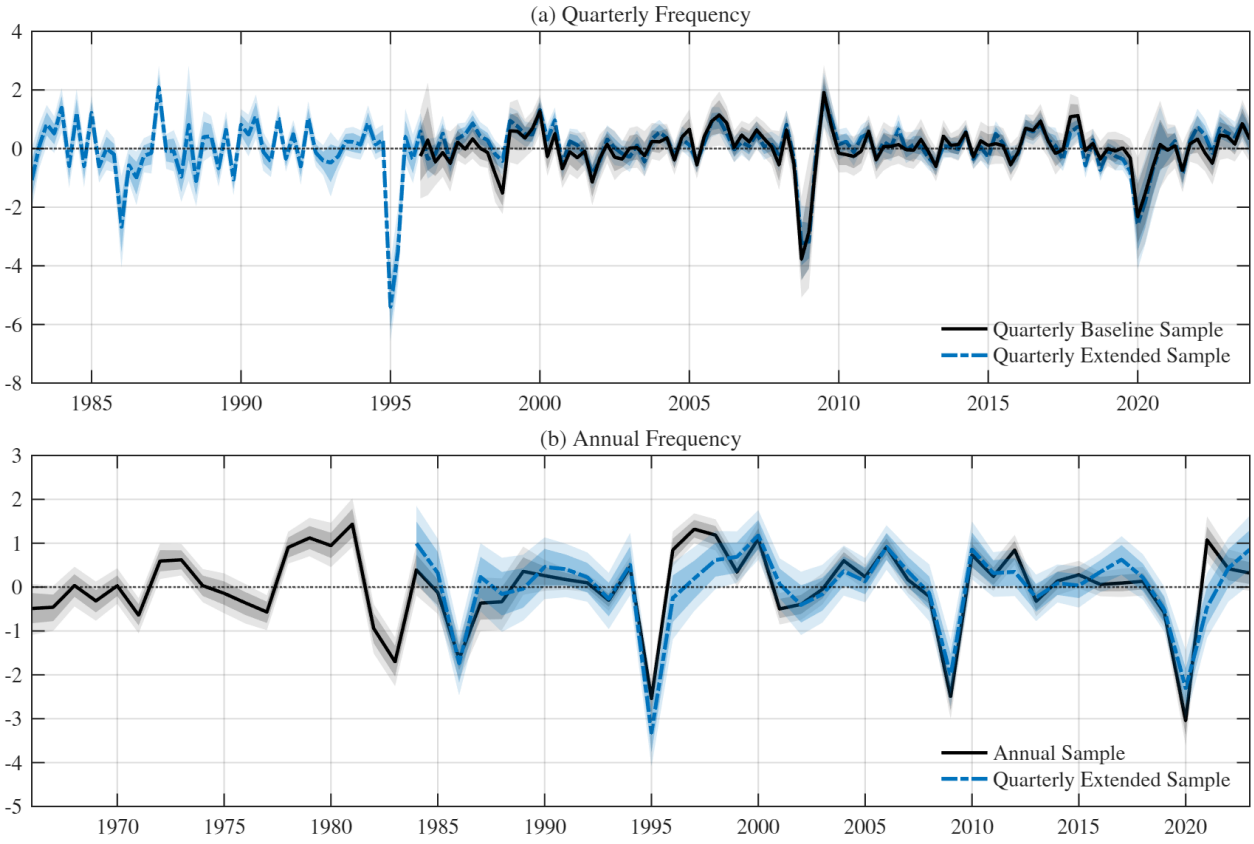


Figure 7: The Main Business-Cycle Shock in Mexico: Baseline and Extended Samples

Notes: The figure reports the estimated MBC shock for Mexico, normalized so that positive realizations correspond to a GDP expansion. Panel (a) compares the baseline shock with the shock recovered from the extended quarterly sample, 1980Q1–2023Q4. Panel (b) compares the shock estimated directly at annual frequency over 1963–2023 with the extended quarterly shock aggregated to annual frequency. All shocks are expressed in units of the standard deviation of the baseline quarterly shock. Lines report posterior medians; shaded areas report 68 and 90 percent posterior credible intervals.

4.5 Extended Samples

We retain the mid-1990s onward sample as our baseline because it draws on a relatively consistent set of official macroeconomic series; extending the sample back to 1980Q1 requires combining alternative sources, reconstructing some early observations, and using lower-frequency data for some variables. At annual frequency, we can extend the dataset back to 1963.[23] We use these extended samples to assess whether the baseline results are sensitive to sample coverage and to examine earlier global financial episodes.

Figure 7 compares the shocks recovered from the baseline and extended samples. The quarterly comparison in panel (a) shows that, over the common quarterly sample, the shock identified from the 1980Q1–2023Q4 dataset is nearly indistinguishable from the baseline shock. Thus, including earlier observations leaves the baseline-period chronology essentially unchanged. Panel (b) also reveals substantial agreement between

[23] Appendix A.5 provides details on the exact construction of the extended samples.

the shock identified directly at annual frequency and the extended quarterly shock aggregated to annual frequency, particularly around major contractionary episodes.

The shock is weak or negative around the breakdown of Bretton Woods and the first oil shock, turns positive during the mid-1970s petrodollar-recycling phase, rises around the late-1970s global monetary-financial turning point associated with the second oil shock and the Volcker disinflation, and falls sharply during the 1982 Mexican and broader Latin American debt crises. The series then improves around the late-1980s Brady Plan recovery before contracting again during the 1994–95 peso crisis. This historical alignment provides additional support for the global-financial interpretation of the recovered innovation. Despite the lower frequency, the annual impulse responses also preserve the qualitative domestic propagation: expansionary realizations raise real activity and aggregate TFP, while inflation falls on impact.[24]

5 The Main Business-Cycle Shock in EMDEs

We now ask whether the anatomy documented for Mexico is representative of a broader set of emerging and developing economies. We repeat the baseline exercise for Chile, Brazil, India, South Africa, Türkiye, Indonesia, and the Philippines.[25] For each country, we estimate the same medium-scale VAR and identify the shock that explains the largest share of GDP fluctuations at business-cycle frequencies. We then aggregate the country-level responses using inverse-variance weights, so that more precisely estimated responses receive greater weight (see, e.g., Canova and Pappa, 2007).[26] Mexico is reported alongside the EMDE aggregate to assess whether the benchmark case studied above is representative of the broader sample.

Figure 8 reports the inverse-variance-weighted EMDE response together with the Mexican response. The aggregate EMDEs anatomy is close to the Mexican one. The shock generates a broad-based expansion: output, investment, and consumption rise, while unemployment falls. It is also associated with an easing of global financial conditions, captured by a decline in Baa spreads, and with sizable movements in external prices. Most importantly, the supply-side features documented for Mexico are present in the broader sample. Aggregate TFP rises after the shock, while inflation does not display the positive response typical of a demand-driven expansion. Thus, the Mexican response is not an isolated case; it provides a useful benchmark for the average EMDEs transmission of the MBC shock.[27]

[24] See Figure C.12. At annual frequency, the identification naturally places greater weight on lower-frequency movements and major global-financial episodes that survive aggregation, as reflected in Figure 7.

[25] For India and South Africa, the sign normalization is extended to four consecutive quarters, so that the shock generates a persistent positive response of GDP.

[26] Appendix Figure C.13 shows that the results are similar when responses are aggregated using unweighted averages or medians.

[27] Appendix Figure C.14 reports the same exercise for the Latin American subsample. The responses are, if anything, even closer to the Mexican benchmark. Appendix Table C.13 shows a similar pattern for the variance decompositions.

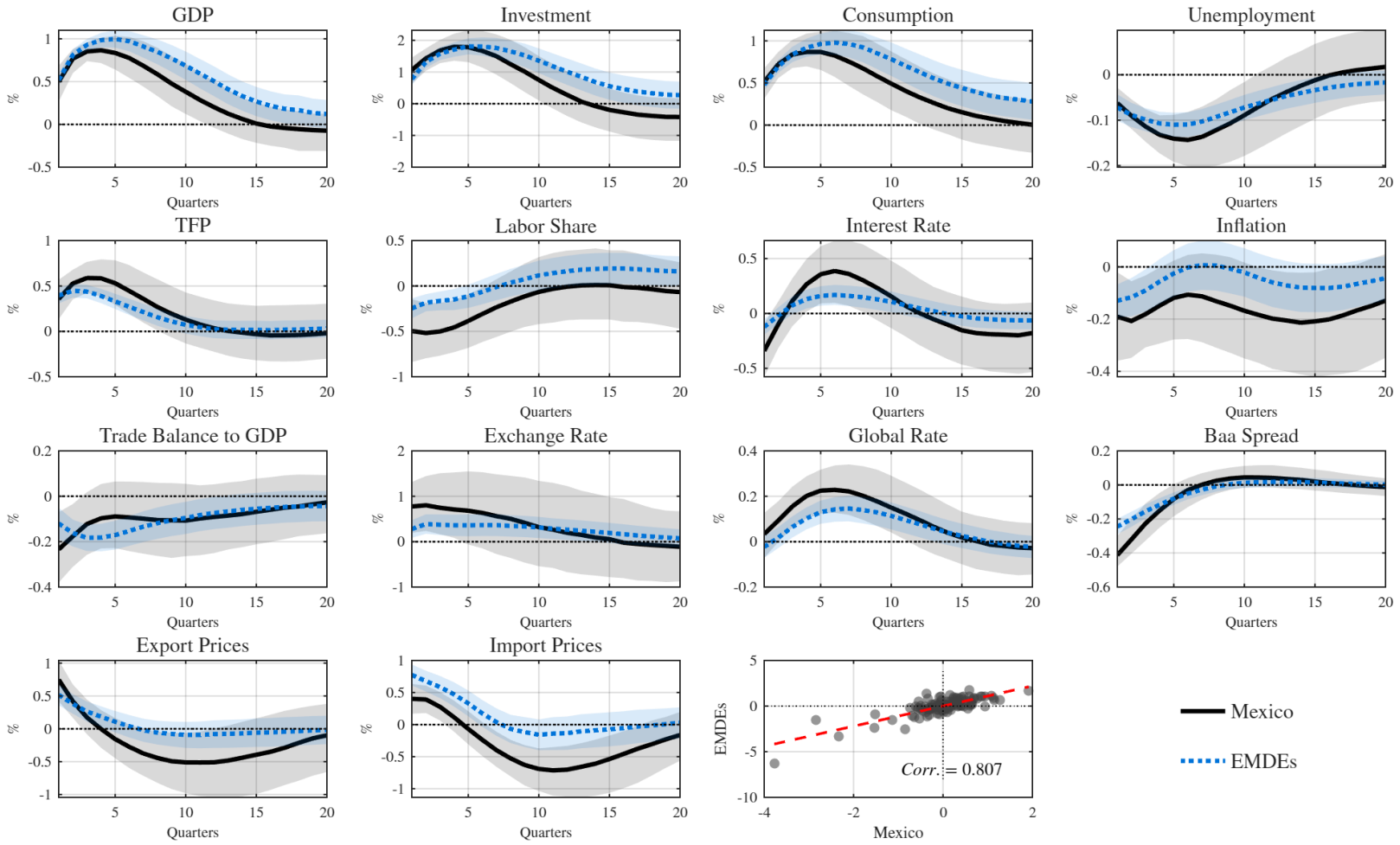


Figure 8: Impulse Responses to the Main Business-Cycle Shock: Mexico and EMDEs Aggregate

Notes: The figure compares impulse responses to the main business-cycle shock in Mexico and in the EMDEs aggregate. For each country, the shock is identified as the innovation that explains the largest share of GDP fluctuations at business-cycle frequencies. The solid black line reports the Mexican response. The dotted blue line reports the inverse-variance-weighted average response across the EMDEs sample. Shaded areas report 68 percent posterior bands. Responses are normalized so that the shock generates an expansion in GDP. The bottom-right panel displays a scatter plot of the MBC shock for Mexico and the first principal component of the MBC shocks of the EMDEs sample, along with the fitted linear regression line and the correlation between them. The EMDEs sample includes Mexico, Chile, Brazil, India, South Africa, Türkiye, Indonesia, and Philippines.

Table 4: EMDEs: Variance Contributions of the Main Business-Cycle Shock

Variable	Business Cycle (6–$32q$)	Long Run (80–∞q)
GDP	67.17	24.97
	[63.52, 70.82]	[12.50, 37.43]
Investment	39.16	21.04
	[31.30, 47.01]	[10.12, 31.95]
Consumption	47.73	22.69
	[37.08, 58.37]	[10.05, 35.33]
Unemployment Rate	20.44	18.80
	[4.12, 36.75]	[7.88, 29.73]
TFP	24.59	14.96
	[11.82, 37.35]	[5.95, 23.97]
Labor Share	14.86	14.11
	[4.90, 24.82]	[10.04, 18.17]
Interest Rate	15.56	12.49
	[10.66, 20.45]	[7.41, 17.57]
Inflation	10.62	13.73
	[4.62, 16.62]	[9.77, 17.69]
Trade Balance to GDP	14.30	17.19
	[9.45, 19.16]	[12.45, 21.92]
Exchange Rate	10.89	13.66
	[6.50, 15.28]	[5.46, 21.87]
Global Rate	13.37	13.85
	[8.95, 17.78]	[8.29, 19.41]
Baa Spread	20.91	14.81
	[6.53, 35.28]	[10.86, 18.77]
Export Prices	17.23	13.79
	[7.94, 26.52]	[9.20, 18.37]
Import Prices	19.99	16.02
	[9.14, 30.84]	[12.48, 19.56]

Notes: The table reports the variance contribution of the main business-cycle shock for the EMDEs aggregate. For each country, the shock is identified as the innovation that explains the largest share of GDP fluctuations at business-cycle frequencies. Country-level variance contributions are aggregated using inverse-variance weights. The business-cycle band corresponds to periodicities between 6 and 32 quarters. The long-run band corresponds to periodicities between 80 quarters and infinity. Entries are posterior medians, expressed in percent. The EMDEs sample includes Mexico, Chile, Brazil, India, South Africa, Türkiye, Indonesia, and Philippines.

Table 4 confirms the quantitative importance of the EMDE MBC shock. The shock explains about two thirds of GDP fluctuations at business-cycle frequencies. Its contribution is also sizable for consumption and investment, and it explains a meaningful share of aggregate TFP fluctuations. The shock is again more closely associated with global risk premia than with the global risk-free rate: it accounts for a larger share of Baa spread variation than of the global rate. It also explains nontrivial variation in export and import prices. At low frequencies, the same shock has a more limited footprint, including for GDP. The EMDEs evidence therefore mirrors the Mexico results: the main cyclical shock is quantitatively important, connected to global financial conditions and external prices, and distinct from the main low-frequency driver of the data.

The commonality is also visible in the shock realizations. The shocks comove strongly across countries, with pairwise correlations above 80%, and the first component captures the major episodes common to the sample.[28] Large contractionary realizations occur around the same global financial episodes highlighted for Mexico (see Figure 3). This evidence shows that the similarity across EMDEs is not limited to average impulse responses. The estimated shocks themselves contain a strong common component, consistent with

[28] Figure C.15 plots the country-level MBC shocks together with their first principal component.

a global driver of EMDE business cycles.

The EMDEs evidence reinforces the message from Mexico. The MBC shock is quantitatively important, has a strong common component across countries, and is associated with global financial conditions and external prices. At the same time, its transmission is supply-like: aggregate TFP rises and inflation fails to increase. The next section develops a model designed to account for this combination of a global financial signature and supply-side domestic propagation.

6 Global Financial Shocks and Supply-Side Transmission

The empirical evidence imposes sharp restrictions on the transmission mechanism. The dominant cyclical disturbance is global in origin, but its domestic effects are supply-like: expansions raise real activity and measured aggregate TFP without increasing inflation. Thus, the relevant channel cannot be only a demand channel, and the TFP response cannot be a primitive technology or trend shock. The evidence does not uniquely identify a particular microeconomic mechanism, but it points to mechanisms in which global financial conditions affect effective supply conditions at business-cycle frequencies—for example by changing the financing cost of variable inputs, inventories, imported inputs, or production at scale. We focus on one parsimonious implementation: working-capital finance with heterogeneous firms.

Firms must finance part of their wage bill before revenues are realized, as in canonical models of financial frictions in EMDE business cycles (Neumeyer and Perri, 2005; Uribe and Yue, 2006), so global financial conditions affect their effective production costs. Our additional ingredient is scale-dependent exposure: larger and more productive firms have greater effective working-capital needs. A financial easing therefore changes not only aggregate production costs but also their distribution across firms, creating scope for reallocation and movements in aggregate TFP.

The proposed channel makes misallocation cyclical and external. Buera et al. (2011) show that financial frictions can have large effects on aggregate productivity and output across countries by distorting resource allocation, with these effects particularly important for activities requiring larger operating scale. In our setting, this allocative margin becomes a business-cycle propagation mechanism: domestic financing conditions move with global financial conditions, so external shocks change relative production costs across firms and thereby affect aggregate productivity through reallocation. Micro evidence supports the global transmission margin underlying this mechanism: external financial conditions are transmitted to EMDE firms through internationally exposed banks and domestic credit markets, with real effects on firm outcomes (see Schnabl, 2012; Morais et al., 2019; di Giovanni et al., 2022; Bruno and Shin, 2023).

6.1 A Model of Working Capital and Scale-Dependent Exposure

We present a deliberately simple environment designed to isolate the cross-sectional supply channel through which global financial conditions affect aggregate productivity. Time is discrete and indexed by $t = 0, 1, 2, \ldots$. In each period, households choose labor supply and firms choose employment, taking the working-capital rate as given.[29] A representative household has Greenwood–Hercowitz–Huffman preferences (Greenwood et al., 1988, hereafter GHH),

$$\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t u\left(C_t - G(N_t)\right), \qquad G(N_t) = \frac{\chi}{1+\varphi} N_t^{1+\varphi}, \tag{3}$$

with $0 < \beta < 1$, $\chi > 0$, and $\varphi > 0$. The function $u(\cdot)$ is strictly increasing and strictly concave, with $u'(X) > 0$ and $u''(X) < 0$. GHH preferences eliminate wealth effects from labor supply, keeping employment tied directly to the wage induced by firms' labor demand rather than to income effects through consumption.

The household owns firms and receives labor income, firm profits, and lump-sum transfers. Its budget constraint is

$$C_t = w_t N_t + \Pi_t + T_t, \tag{4}$$

where w_t is the wage, Π_t denotes aggregate firm profits, and T_t denotes transfers of intermediary profits. The household takes w_t, Π_t, and T_t as given when choosing C_t and N_t. The resulting intratemporal optimality condition takes the simple form $w_t = \chi N_t^{\varphi}$.

There is a continuum of firms indexed by $i \in [0, 1]$. Firm i produces

$$y_{it} = a_i n_{it}^{\alpha}, \qquad 0 < \alpha < 1, \tag{5}$$

where a_i is time-invariant idiosyncratic productivity. The cross-sectional distribution of a_i is fixed. The production process is subject to a working-capital constraint that requires firms to hold non-interest-bearing assets to finance a fraction $q_i \in [0, 1]$ of the wage bill each period:

$$m_{it} \geq q_i w_t n_{it}, \tag{6}$$

where m_{it} denotes the amount of working capital held by firm i in period t. We restrict attention to equilibria with a positive interest rate, so the working-capital constraint binds: financing more than required would be

[29] The stripped-down environment abstracts from additional intertemporal margins and from other channels of the global financial and credit cycle, including movements in export and import prices and the real exchange rate. These margins may affect domestic activity directly and may also reinforce reallocation by changing relative profitability, cash flows, and financing needs across firms.

costly. Let R_t denote the gross domestic cost of working-capital finance.[30] In a small emerging economy, this cost is tightly linked to global financial conditions through movements in global risk premia, external borrowing costs, and country spreads (Uribe and Yue, 2006; Akıncı, 2013). Easier global financial conditions therefore lower R_t, while an increase in R_t corresponds to a financial tightening.

We assume that firms differ in the extent to which they must finance variable production costs before revenues are realized, parameterizing exposure as

$$q_i = q_0 + q_1 \kappa(\bar{n}_i), \qquad \kappa'(\bar{n}_i) > 0, \tag{7}$$

with $q_0 \geq 0$, $q_1 \geq 0$. The term q_0 captures common working-capital exposure, while $q_1 \kappa(\bar{n}_i)$ captures scale-dependent exposure. Here, $\bar{n}_i$ is the employment level firm i would choose in the frictionless deterministic benchmark: $\bar{n}_i = \left(\frac{\alpha a_i}{\bar{w}}\right)^{1/(1-\alpha)}$, where $\bar{w}$ is the corresponding frictionless steady-state wage. Because $\bar{n}_i$ is strictly increasing in a_i, more productive firms have greater working-capital exposure when $q_1 > 0$. The interpretation is that firms operating at larger scale have larger payrolls, larger input purchases, longer cash-conversion cycles, and greater short-term financing needs.[31] The parameter q_1 indexes the strength of this scale-exposure channel.[32]

Given q_i, the firm-specific working-capital wedge is

$$\omega_i(R_t) = 1 + q_i(R_t - 1). \tag{8}$$

A decline in R_t lowers the effective wage more for firms with larger q_i, and hence, under scale-dependent exposure, disproportionately reduces the marginal cost of larger, more productive firms.

Firm i chooses labor to solve

$$\max_{n_{it} \geq 0} \left\{ a_i n_{it}^{\alpha} - w_t \omega_i(R_t) n_{it} \right\}. \tag{9}$$

The firm's labor demand is $n_{it} = \left(\alpha a_i / w_t \omega_i(R_t)\right)^{\frac{1}{1-\alpha}}$.

[30] We do not model the intermediary sector explicitly. The term T_t in the household budget should be interpreted as the lump-sum rebate of any net income generated by the reduced-form working-capital arrangement. Since T_t is taken as given by the household and preferences are GHH, it plays no role in the labor-supply condition or in the allocative mechanism emphasized below.

[31] One possible microfoundation operates through dollar borrowing and trade finance. More productive firms may select into foreign-currency borrowing (Salomão and Varela, 2022), while EM firms' dollar borrowing responds to global dollar-credit conditions (Bruno and Shin, 2017). If larger, more productive firms are also exporters, dollar movements can affect their effective working-capital costs disproportionately, as in Bruno et al. (2018) and Bruno and Shin (2023). We abstract from currency denomination and exporter status and capture these margins through the reduced-form exposure q_i.

[32] Our mechanism operates through the intensive margin of variable production costs rather than through firm selection. This differs from crisis-selection mechanisms, such as Ates and Saffie (2021), in which financial contractions can raise measured productivity by selecting more productive firms.

6.2 Aggregation, Misallocation, and Aggregate TFP

Aggregating labor demand and supply, equilibrium aggregate labor is

$$N_t = \left[\frac{\alpha}{\chi}\left(\int_0^1 a_i^{\frac{1}{1-\alpha}}\omega_i(R_t)^{-\frac{1}{1-\alpha}}\,di\right)^{1-\alpha}\right]^{\frac{1}{1-\alpha+\varphi}}. \tag{10}$$

Aggregate output is $Y_t = \int_0^1 a_i n_{it}^{\alpha}\,di$. Therefore, the economy admits the aggregate representation $Y_t = A(R_t)N_t^{\alpha}$, where aggregate TFP is

$$A(R_t) = \frac{\int_0^1 a_i^{\frac{1}{1-\alpha}}\omega_i(R_t)^{-\frac{\alpha}{1-\alpha}}\,di}{\left[\int_0^1 a_i^{\frac{1}{1-\alpha}}\omega_i(R_t)^{-\frac{1}{1-\alpha}}\,di\right]^{\alpha}}. \tag{11}$$

Aggregate TFP is therefore endogenous. It depends on the allocation of labor across heterogeneous firms, not only on primitive productivities. If q_i is common across firms, a change in R_t changes the aggregate cost of labor but not relative labor costs. In that case, aggregate TFP is independent of R_t: $A = \left(\int_0^1 a_i^{\frac{1}{1-\alpha}}\,di\right)^{1-\alpha}$. A global financial easing then raises output through aggregate employment without changing aggregate TFP. When exposure instead increases with frictionless operating scale, the easing also changes relative labor costs, disproportionately benefiting high-productivity firms and reallocating labor toward them.

The following proposition formalizes the two channels: a common working-capital wedge moves employment and output, while scale-dependent exposure also raises aggregate TFP.

Proposition 1. *Suppose $R_t > 1$ and $q_i = q_0 + q_1\kappa(\bar{n}_i)$, with $\kappa'(\bar{n}_i) > 0$. Since frictionless operating scale $\bar{n}_i$ is increasing in productivity a_i, more productive firms have larger working-capital exposure whenever $q_1 > 0$. Then:*

(i) A global financial tightening lowers aggregate labor and GDP:

$$\frac{\partial N_t}{\partial R_t} < 0, \qquad \frac{\partial Y_t}{\partial R_t} < 0. \tag{12}$$

Equivalently, a global financial easing raises both employment and GDP.

(ii) A global financial tightening lowers aggregate TFP:

$$\frac{\partial A(R_t)}{\partial R_t} \leq 0. \tag{13}$$

The inequality is strict whenever $q_1 > 0$. If $q_1 = 0$, working-capital exposure is common across firms and $\frac{\partial A(R_t)}{\partial R_t} = 0$.

Proof: see Appendix D.

Thus, scale-dependent exposure adds an allocative margin to the common working-capital channel: financial easing shifts resources toward more productive firms, raising aggregate TFP and amplifying output without any change in primitive technology. The strength of this margin depends on both scale-dependent exposure and firm heterogeneity. Greater productivity dispersion creates larger differences in frictionless operating scale and hence, when $q_1 > 0$, in working-capital exposure. Appendix D.1 illustrates that this interaction can generate economically sizable output amplification for empirically plausible degrees of productivity dispersion.

In a standard sticky-price extension, the productivity gain generated by reallocation lowers real marginal cost relative to the demand pressure associated with the expansion. Inflation therefore need not rise, and may fall, even as output expands, paralleling the aggregate implications of the monetary-policy reallocation mechanism in Baqaee et al. (2024). The reallocation channel can thus generate the supply-like aggregate footprint documented above.

Cross-firm reallocation. The mechanism is particularly transparent in a two-type version of the model. Suppose that a measure λ of firms has high productivity a_H, while a measure $1-\lambda$ has low productivity a_L, with $a_H > a_L$. Since high-productivity firms are larger in the deterministic benchmark, scale-dependent working-capital exposure implies $q_H > q_L$. The corresponding wedges are $\omega_i(R_t) = 1 + q_i(R_t - 1)$ for $i = \{L, H\}$. Relative employment is

$$\frac{n_{Ht}}{n_{Lt}} = \left[\frac{a_H}{a_L}\frac{\omega_L(R_t)}{\omega_H(R_t)}\right]^{\frac{1}{1-\alpha}}. \tag{14}$$

Because $q_H > q_L$, a financial easing lowers the effective labor cost of high-productivity firms proportionately more, increasing their employment relative to low-productivity firms. The same reallocation appears in output and working-capital finance. Given the production technology in (5), changes induced by financial conditions satisfy $\Delta \log(y_H/y_L) = \alpha\, \Delta \log(n_H/n_L)$. Because the working-capital constraint binds and q_H/q_L is fixed, $\Delta \log(m_H/m_L) = \Delta \log(n_H/n_L)$. Hence, the proportional reallocation in working-capital finance is $1/\alpha$ times that in output. The magnitude of this joint reallocation depends on the exposure gap, $q_H - q_L = q_1[\kappa(\bar{n}_H) - \kappa(\bar{n}_L)]$: stronger scale dependence increases the differential response across firms, and greater separation in productivity widens the exposure differential. If $q_1 = 0$, exposure is common and the relative responses to R_t vanish.

6.3 Firm-Level Reallocation Evidence

The two-type model delivers a sharp cross-sectional prediction: financial easing should jointly reallocate activity and short-term finance toward more productive firms, with the proportional reallocation in finance exceeding that in output. We test this prediction using Orbis financial statements for firms in Mexico and Canada, cleaned following Kalemli-Özcan et al. (2024). Mexico is our main firm-level test; Canada is reported as an advanced-economy benchmark. Firms are sorted within 3-digit NACE sectors according to predetermined productivity, computed as a trailing three-year mean using information available as of $t-1$.[33] For each sector s, year t, and horizon h, we define $\varrho_{s,t+h} \equiv \log\left(\frac{Z^H_{s,t+h}}{Z^L_{s,t+h}}\right)$, where Z is either (deflated) total revenue or short-term loans, and H and L denote high- and low-productivity firms within the sector. Given data availability, the Mexican revenue contrast uses the top and bottom quartiles of the productivity distribution, while the Mexican short-term-loan contrast uses a median split. For Canada, both contrasts use the top and bottom quartiles. We estimate panel local projections (see, e.g., Jordà and Taylor, 2025):

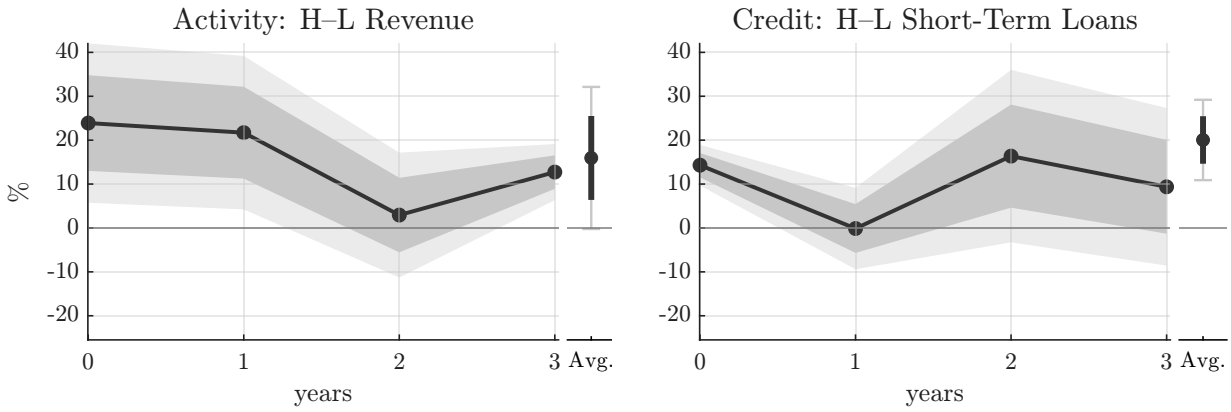
$$\varrho_{s,t+h} - \varrho_{s,t-1} = \alpha_{s,h} + \beta_h \Delta \mathrm{Baa}_t + \boldsymbol{x}'_{s,t}\boldsymbol{\gamma}_h + u_{s,t+h}, \qquad h = 0, \ldots, H, \tag{15}$$

where $\Delta \mathrm{Baa}_t$ is the change in the Baa spread with its sign reversed, so that positive values denote an easing, and is instrumented with the annual realization of the average EMDE MBC shock.[34] The control vector $\boldsymbol{x}_{s,t}$ includes one lag of the $h = 0$ outcome change and one lag of the Baa-spread change. Standard errors are computed following Bai et al. (2024). Thus, β_h measures whether an expansionary global-financial shock reallocates activity or short-term credit toward high-productivity firms within sectors; in Figure 9, we scale the estimates by the average first-year Baa easing induced by a one-standard-deviation average EMDE MBC shock and report the responses in percent.

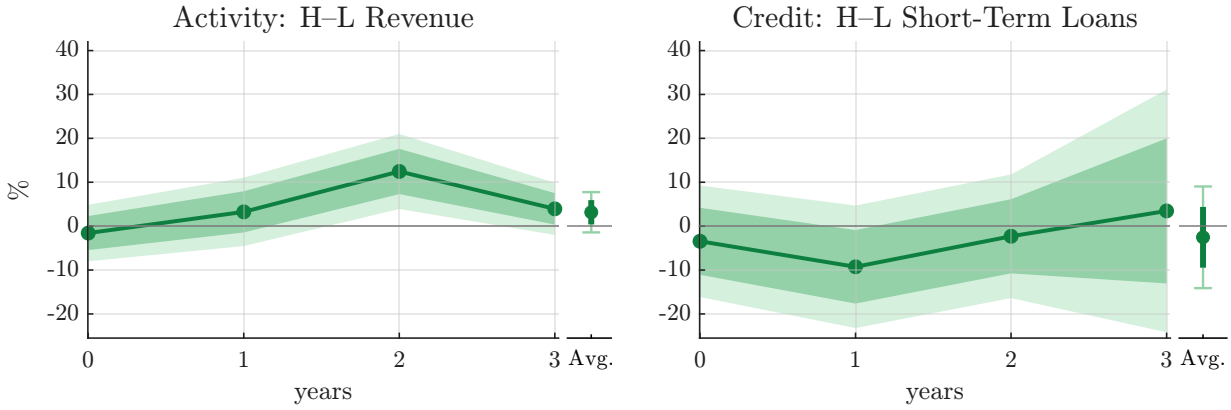
The exercise is not intended to identify the mechanism structurally, but to test its cross-sectional predictions in firm-level data. Figure 9 shows that, in Mexico, both margins move in the predicted direction. Following an instrumented global-financial easing, short-term borrowing by high-productivity firms rises relative to that of low-productivity firms on impact; relative revenue also rises, and the average response is positive. The average relative response of short-term borrowing is also larger than that of revenue, consistent with the ordering implied by the model. Together, these responses provide a firm-level counterpart to the

[33] For Mexico, productivity is measured as average revenue labor productivity. For Canada, where employment is sparsely reported in Orbis, firms are ranked by revenue per unit of wage bill. This proxy is appropriate for cross-sectional comparisons within narrowly defined sector-year cells if average wages are approximately homogeneous within those cells. Appendix E provides details.

[34] We instrument Baa-spread easing with the common EMDE MBC shock, which isolates the global-financial component of the recovered disturbances and reduces country-specific estimation noise. In the first stage used by the IV estimator, the $h = 0$ excluded-instrument F-statistics are 26.7 for Mexican revenue, 92.3 for Mexican short-term loans, 24.4 for Canadian revenue, and 24.2 for Canadian short-term loans. Appendix E repeats the exercise using country-specific MBC shocks.



(a) Mexico



(b) Canada

Figure 9: Firm-Level Reallocation After a Global Financial Easing

Notes: The figure reports the response of $100(\varrho^Z_{s,t+h} - \varrho^Z_{s,t-1})$, where ϱ^Z is the sector-level log ratio of high-productivity to low-productivity firms, separately for revenue and short-term loans. The top row reports estimates for Mexico; the bottom row reports estimates for Canada. Firms are ranked within 3-digit NACE sectors using predetermined productivity measures based on information available as of $t-1$. The IRFs are scaled so as to correspond to the typical Baa spread fall after a 1-std MBC shock. The estimate reported at the right edge of each panel is a separate local projection for the average response over horizons h, i.e. the dependent variable is $100\sum_{h=0}^{3}(\varrho^Z_{s,t+h} - \varrho^Z_{s,t-1})/4$ (see Jordà and Taylor, 2025). Shaded areas report 68 and 90 percent confidence bands based on Bai et al. (2024) standard errors.

aggregate supply-like evidence: global financial easing reallocates both financing and activity toward more productive firms.[35]

If the reallocation channel is particularly important in EMDEs, the same joint credit-and-activity response should be weaker in an advanced economy. As a benchmark, the bottom row of Figure 9 reports the same exercise for Canada. On the same scale as Mexico, Canada displays at most a modest relative revenue response and no corresponding increase in short-term loans. Thus, the advanced-economy benchmark does not reproduce the joint activity-and-credit reallocation documented for Mexico. This contrast is consistent

[35]The median split used for short-term loans is dictated by data coverage and is conservative. Appendix E shows that the Mexican revenue response attenuates as the productivity groups become less separated, from quartiles to tertiles to the median, consistent with the model. The relative short-term-loan response is about 30 percent larger than the revenue response, broadly consistent with the model-implied ratio $1/\alpha \simeq 1.54$ for $\alpha = 0.65$, despite the more compressed median split used for loans.

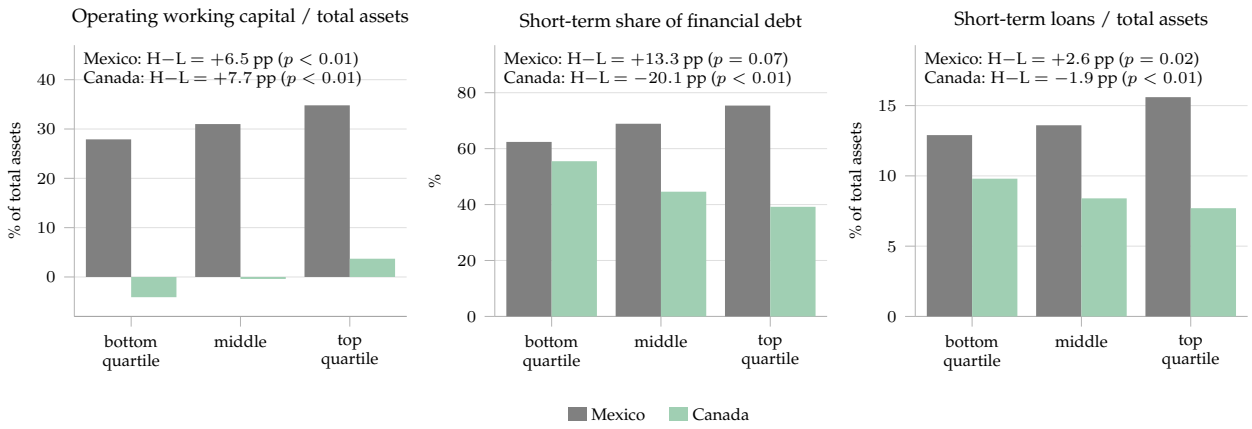


Figure 10: Working-Capital Exposure Across the Productivity Distribution

Notes: Group means for the ranked sample using productivity measured through $t-1$ and balance sheets at t. Firms are grouped into bottom quartile, middle half, and top quartile within sector-years. Left: inventories plus receivables minus payables over total assets. Middle: short-term loans over total financial debt, among firms with short-term loans (unreported long-term debt set to zero). Right: short-term loans over total assets, among the same firms. H–L denotes within-sector-year top-minus-bottom differences, in percentage points. Reported p-values are based on standard errors two-way clustered by 3-digit sector and year.

with the aggregate evidence that the supply-like transmission of global financial shocks is particularly pronounced in EMDEs.

Working-capital exposure. A central assumption of the model is that working-capital exposure increases with firm productivity. Figure 10 examines this assumption using the same predetermined productivity ranking as in the local projections. In Mexico, operating working capital rises from about 28 to 35 percent of total assets between the bottom and top productivity quartiles, a statistically significant difference.[36] More productive firms also rely more heavily on short-term financing: their short-term share of financial debt is higher, although the association is estimated less precisely, and their short-term loans are larger relative to total assets, 16 percent in the top quartile against 13 in the bottom.[37] In Canada, working capital is much lower, although it increases with productivity. Yet both measures of reliance on short-term debt decline significantly with productivity: the short-term share of financial debt falls from 56 to 39 percent and short-term loans from 10 to 8 percent of total assets between the bottom and the top quartile. Taken together, these balance-sheet patterns support the model's premise that more productive Mexican firms are more exposed to changes in working-capital financing costs.

[36] Operating working capital is defined as inventories plus receivables minus payables. In Mexico, payables remain around 21–22% of assets across productivity groups, while receivables rise from 25 to 30% and inventories from 23 to 27%, both with statistically significant differences between the top and bottom productivity quartiles. Appendix E provides additional details.

[37] The maturity contrast also holds at the extensive margin: among firms with short-term loans, the share that reports no long-term debt at all is 36, 40 and 56 percent across the Mexican productivity quartiles ($p = 0.03$ for the top-minus-bottom difference) and 34, 23 and 14 percent across the Canadian ones ($p < 0.01$).

6.4 Quantifying the TFP Amplification Channel

The reallocation mechanism above provides one microfoundation for the procyclical TFP response. To assess the aggregate importance of this response without tying the quantification to a particular microfoundation, we take the standard small-open-economy model of Uribe and Yue (2006), a canonical framework for the transmission of external financial conditions through domestic borrowing costs, and add two reduced-form margins. First, export and import prices affect the trade balance, providing a parsimonious external-price channel in the spirit of Drechsel and Tenreyro (2018). Second, aggregate TFP is allowed to respond to the same global financial shock. Consistent with the evidence above, this process permits a persistent response of TFP at business-cycle horizons but imposes a zero long-run effect. The framework therefore lets the data determine how much TFP amplification is required to account for the domestic transmission of global financial shocks. Appendix F provides the full model, calibration, and estimation details.

We estimate the model by minimum distance, jointly matching impulse responses as in Christiano et al. (2005). The targeted responses are those of the Baa spread, export and import prices, GDP, consumption, investment, the trade-balance-to-output ratio, and the domestic risky real rate, the latter constructed from the nominal interest rate, inflation, and the EMBI spread using the augmented specification of Section 4.4. Importantly, the TFP response is *not* included among the targeted moments. The coefficients governing the response of TFP to global risk are therefore chosen solely to help account for the dynamics of the other macroeconomic variables, and the estimation is free to assign no role to this channel. We estimate the parameters governing the external processes and TFP transmission, the investment adjustment cost, the strength of the external-price channel, and the domestic risky real-rate equation, specified along the lines of the original model, while deliberately retaining the calibration of Uribe and Yue (2006) for the remaining structural parameters.

Figure 11 shows that the model reproduces the targeted macroeconomic responses closely. In particular, it captures both the magnitude and persistence of the responses of GDP, consumption, and investment, while also reproducing the broad dynamics of the domestic risky real rate. More importantly, although TFP is not targeted in the estimation, the model generates a persistent increase in TFP whose dynamics closely track the empirical response and remain within its posterior uncertainty throughout. Thus, the macroeconomic responses themselves call for a sizable procyclical TFP component.

The model can then be used to decompose the aggregate response across transmission channels. To isolate the procyclical TFP channel, we shut down the mapping from global risk to TFP, leaving the rest of the fitted model unchanged. On impact, the conventional financial channel accounts for about 30 percent of the

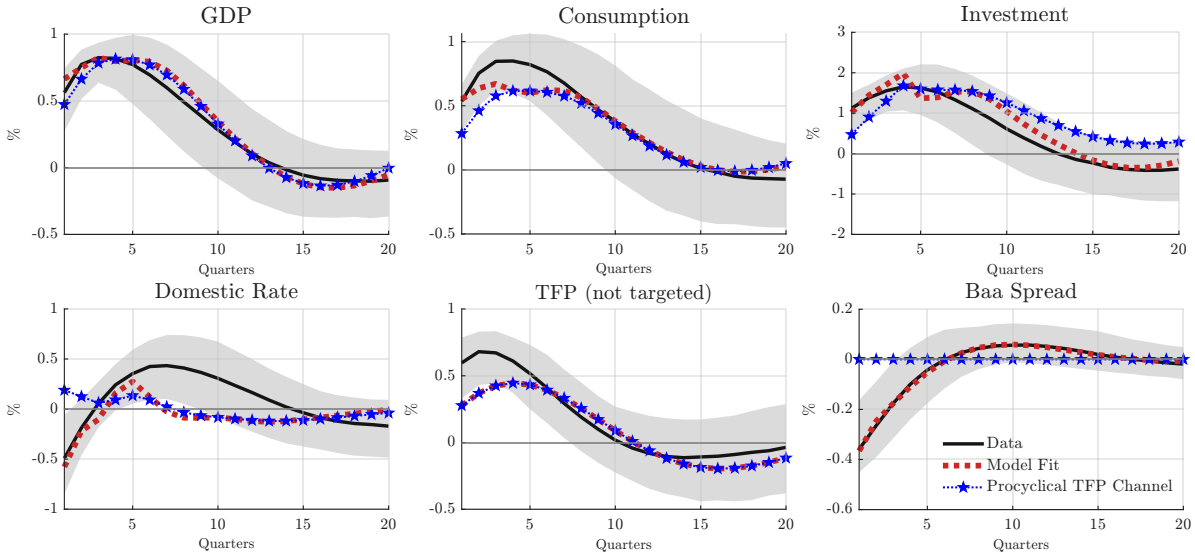


Figure 11: Global Financial Shock Transmission: The Role of the Procyclical TFP Channel

Notes: Solid black lines report the empirical impulse responses to a one-standard-deviation expansionary MBC shock, with shaded areas denoting 68 percent posterior credible bands. Red dotted lines report the responses of the fitted model. Blue dotted lines with stars report the contribution of the procyclical TFP channel, obtained by shutting down the mapping from global risk to TFP while leaving the rest of the fitted model unchanged. The Baa spread and export and import price responses are targeted in the estimation, whereas the TFP response is not; the model-implied TFP response is therefore an untargeted implication of the estimated transmission mechanism. GDP, consumption, investment, and TFP are expressed in percent deviations; the domestic risky real rate and the Baa spread are expressed in annualized percentage points.

GDP response and roughly 50 percent of the consumption and investment responses. Over time, however, the procyclical TFP channel becomes increasingly important and accounts for most of the persistence in aggregate activity.[38] Interestingly, the rate decomposition mirrors the reduced-form evidence: the procyclical TFP component pushes the risky real rate upward, consistent with the positive response of the domestic real rate in the baseline VAR, whereas the financial component is concentrated at short horizons, in line with the sharp but transitory compression in the EMBI spread. Thus, the procyclical TFP dynamics called for by the macroeconomic responses constitute an important amplification mechanism for the transmission of global financial shocks.

The workhorse small-open-economy model with financial frictions, augmented to allow for procyclical TFP dynamics, can therefore account well for the domestic propagation of global financial shocks. Taken together, the mechanism, firm-level evidence, and quantitative exercise indicate that the procyclical TFP response is not merely a feature of the empirical footprint of global financial risk, but a quantitatively important component of its transmission to EMDEs.

[38]The external-price channel plays a quantitatively limited role. The responses of export and import prices are matched essentially exactly, but the two prices respond broadly in parallel to the shock and, given Mexico's similar export and import shares, their income effects largely offset. The impulse response and decomposition for the trade-balance-to-output ratio are reported and discussed in Appendix F.

7 Concluding Remarks

We find that the dominant cyclical disturbance in emerging and developing economies is global-financial in origin but supply-like in domestic transmission. Using the business-cycle anatomy approach, we recover country-specific shocks that account for most GDP fluctuations at business-cycle frequencies and are closely associated with global risk conditions and external prices, rather than the global risk-free rate. Their domestic footprint is distinctive: expansionary realizations raise aggregate TFP without raising inflation. Yet these shocks have only a limited low-frequency footprint. The productivity-like behavior of EMDE business cycles therefore need not reflect primitive technology or trend shocks; aggregate TFP can instead move endogenously as part of the propagation of a global financial disturbance.

We rationalize this pattern through a simple mechanism linking global financial conditions to cross-firm reallocation. When firms must finance variable production costs in advance, a decline in financing costs lowers effective marginal costs. If larger and more productive firms have greater working-capital exposure, the easing benefits them disproportionately. Activity shifts toward these firms, raising aggregate TFP and amplifying output, thereby giving the shock a supply-like domestic footprint. Mexican firm-level data show that higher-productivity firms expand both activity and short-term borrowing relative to less productive firms following a global financial easing. A quantitative extension of a workhorse small-open-economy model further shows that the associated TFP response is quantitatively important: the model reproduces the macroeconomic responses and, even without targeting TFP, generates dynamics close to those observed in the data, with procyclical TFP accounting for most of the persistence of the response.

The results connect productivity-based and financial accounts of emerging-market fluctuations. We find that the dominant cyclical disturbance has a common global financial source, while its domestic propagation generates endogenous movements in aggregate productivity. In EMDEs, these TFP movements are an important amplification margin of global financial transmission rather than the primitive source of the cycle. For stabilization policy, exposure to global financial conditions is therefore not only a demand-side problem. By affecting the allocation of resources across firms, external financial shocks can also move effective aggregate supply.

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Online Appendix

The Anatomy of Emerging-Market Business Cycles: Global Financial Shocks and Supply-Like Transmission

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This appendix contains data sources and estimation details, additional empirical results, robustness exercises, model derivations, and additional details on the firm-level evidence.

A Data and Estimation Details

B Additional Results

C Robustness

D Derivations and Proofs for Section 6

E Firm-Level Evidence: Additional Details

F Quantitative Model of Global Financial Shock Transmission

A Data and Estimation Details

A.1 Sample coverage

Table A.1 reports the country-by-country sample period at quarterly frequency.

Table A.1: Sample coverage by country

Country	Sample (quarterly)	Annual variables
Mexico	1993Q1 – 2023Q4	TFP, labor share
Canada	1986Q1 – 2023Q4	TFP, labor share
Brazil	1996Q1 – 2023Q4	TFP, labor share, unemployment (1996-2012)
Chile	1996Q1 – 2023Q4	TFP
India	1997Q1 – 2023Q4	TFP, labor share, unemployment
Indonesia	2000Q1 – 2023Q4	TFP, unemployment
Philippines	2000Q1 – 2023Q4	TFP, labor share
South Africa	1993Q1 – 2023Q4	TFP, labor share, unemployment (1993-2007)
Türkiye	1998Q1 – 2023Q4	TFP, labor share, unemployment (1998-2004)

A.2 Variable transformations

Table A.2 reports the transformations applied to all the variables used in the paper.

Table A.2: Variable transformations

Variable	Transformation
GDP	$100 \cdot \log(\cdot)$
Investment	$100 \cdot \log(\cdot)$
Consumption	$100 \cdot \log(\cdot)$
Unemployment Rate	-
TFP	$100 \cdot \log(\cdot)$
Labor Share	$100 \cdot \log(\cdot)$
Interest Rate	-
Inflation	-
Trade Balance to GDP	$\cdot \times 100$
Exchange Rate	$100 \cdot \log(\cdot)$
Global Rate	DGS1 $-$ EXPINF1YR
Baa spread	-
Export Prices	$100 \cdot \log(\cdot)$
Import Prices	$100 \cdot \log(\cdot)$
VIX Index	-
GFCy	-
Global Credit Factor	-
EMBI Spread	$\cdot/100$
Dollar Index	$100 \cdot \log(\cdot)$
NEER	$100 \cdot \log(\cdot)$
UIP Premium	-
Interest Rate Differential	-
Market–Policy Rate Wedge	-

A.3 Data sources

Table A.3 and Table A.4 report the series identifiers and sources for the global variables and the transmission mechanism variables included in the paper. Table A.5 reports the country-specific sources for all domestic and open-economy variables. IMF series are accessed through the IMF Data portal; FRED series through the Federal Reserve Bank of St. Louis. Penn World Tables (PWT) series (Feenstra et al., 2015) follow the FRED naming convention `RTFPNA*A632NRUG` for TFP and `LABSHP*A156NRUG` for the labor share, where $*$ denotes the ISO country code. Country-specific export and import price indices are constructed by Juvenal and Petrella (2026).

Table A.3: Global Variables: Definitions and Sources

Variable	Source	Series identifier / notes
Global Rate	FRED	`DGS1` − `EXPINF1YR`: 1-year Treasury yield minus 1-year expected inflation.
Baa Spread	FRED	`BAA10Y`: Moody's Seasoned Baa Corporate Bond Yield − 10-Year Treasury Constant Maturity.
Export Prices	Juvenal and Petrella (2026)	Country-specific commodity price indices.
Import Prices	Juvenal and Petrella (2026)	Country-specific commodity price indices.
VIX Index	FRED	`VIXCLS`.
Global Financial Cycle Factor	Miranda-Agrippino and Rey (2020)	
Global Credit Cycle Factor	Boyarchenko and Elias (2026)	

Notes: FRED series are retrieved from the Federal Reserve Bank of St. Louis. The Global Rate is measured as the yield on the one-year U.S. Treasury net of one-year expected inflation. The Baa Spread is Moody's seasoned Baa corporate bond yield relative to the ten-year Treasury constant maturity. Export and import price indices are country-specific commodity price indices constructed by Juvenal and Petrella (2026). The VIX, the Global Financial Cycle Factor, and the Global Credit Cycle Factor are used only in robustness exercises reported in Appendix Section 4.1 and Appendix B.

Table A.4: Additional Variables used in Section 4: Definitions and Sources

Variable	Source	Series identifier / notes
EMBI Spread	Banco Central de Reserva del Perù	Series for Mexico – (1998Q1-2023Q4)
US Dollar Index	IMF EER	US NEER
NEER	IMF EER	Mexican NEER
MXN/USD (s_t^{us})	IMF ER	Domestic Currency per US Dollar
3-month Mexican Rate	Banco de México	Public Securities (`CF114`) – Monthly average in annual percent – i_t^{mx}
3-month US Rate	FRED	`DGS3MO` – i^{us}
3-month Expected MXN/USD	Banco de México	Expectativas Mensuales del Tipo de Cambio (`CR172`) – (1999Q1-2023Q4) – s_{t+3}
Mex–U.S. Interest Rate Differential		$i_t^{mx} - i_t^{us}$
Mexico–U.S. UIP Premium		$\lambda_t = (i_t^{mx} - i_t^{us}) - 400\big[\log(s_{t+3}) - \log(s_t)\big]$
Policy/Operating Rate	Banco de México	Overnight bank-funding rate before 2008 and one-day interbank target rate thereafter
Market–Policy Rate Wedge	Banco de México; BIS	$i_t^{mkt} - i_t^{pol}$, where i_t^{mkt} is the 91-day CETES rate (`CF114`) and i_t^{pol} is the domestic policy/operating rate from BIS

Notes: Monthly series are converted to quarterly frequency by within-quarter averaging. The term s_{t+3} is the three-month-ahead expectation from the Banco de México survey of private forecasters, and the factor 400 expresses the implied depreciation at an annual rate, comparable with the interest rates. The market–policy rate wedge follows the concept in De Leo et al. (2022). The 91-day CETES rate and the policy/operating rate are first converted to monthly averages; the wedge is constructed at monthly frequency and then averaged within quarters.

Table A.5: Domestic Variables: Definitions and Sources

Country	GDP	Investment	Consumption	Unemployment	TFP
Mexico	IMF NEA	IMF NEA	IMF NEA	FRED LRUNTTTTMXQ156S	PWT RTFPNAMXA632NRUG
Canada	IMF NEA	IMF NEA	IMF NEA	FRED LRUNTTTTCAM156S	PWT RTFPNACAA632NRUG
Brazil	IMF NEA	IMF NEA	IMF NEA	IMF Labor Stat. (Q from 2013Q1); IMF WEO (A, 1996–2012)	PWT RTFPNABRA632NRUG
Chile	IMF NEA	IMF NEA	IMF NEA	IMF Labor Statistics	PWT RTFPNACLA632NRUG
India	IMF NEA	IMF NEA	IMF NEA	World Bank, annual	PWT RTFPNAINA632NRUG
Indonesia	IMF NEA	IMF NEA	IMF NEA	IMF WEO (A)	PWT RTFPNAIDA632NRUG
Philippines	IMF NEA	IMF NEA	IMF NEA	IMF Labor Force Survey (2002Q4 lin. interp.)	PWT RTFPNAPHA632NRUG
South Africa	IMF NEA	IMF NEA	IMF NEA	IMF Labor Stat. (Q from 2008Q1); IMF WEO (A, 1993–2007)	PWT RTFPNAZAA632NRUG
Türkiye	IMF NEA	IMF NEA	IMF NEA	IMF Labor Stat. (Q from 2005Q1); IMF WEO (A, 1998–2004)	PWT RTFPNATRA632NRUG

Country	Labor Share	Interest Rate	Inflation	Trade Bal./GDP	Exchange Rate
Mexico	PWT LABSHPMXA156NRUG	IMF MFS, money market rate	IMF CPI, yoy change	IMF NEA	IMF EER, broad REER
Canada	PWT LABSHPCAA156NRUG	FRED IRSTCB01CAM156N, central bank rate	IMF CPI, yoy change	IMF NEA	IMF EER, broad REER
Brazil	PWT LABSHPBRA156NRUG	IMF MFS, money market rate	IMF CPI, yoy change	IMF NEA	IMF EER, broad REER
Chile	Absent	IMF MFS, monetary policy rate	IMF CPI, yoy change	IMF NEA	IMF EER, broad REER
India	PWT LABSHPINA156NRUG	FRED IRSTCB01INQ156N, central bank rate	FRED, yoy change, INDCPIALLMINMEI	IMF NEA	FRED RBINBIS, broad REER
Indonesia	Absent	FRED IRSTCB01IDM156N, central bank rate	IMF CPI, yoy change	IMF NEA	FRED RBIDBIS, broad REER
Philippines	PWT LABSHPPHA156NRUG	IMF MFS, money market rate	IMF CPI, yoy change	IMF NEA	FRED RBPHBIS, broad REER
South Africa	PWT LABSHPZAA156NRUG	IMF MFS, money market rate	IMF CPI, yoy change	IMF NEA	IMF EER, broad REER
Türkiye	PWT LABSHPTRA156NRUG	IMF MFS, monetary policy rate	FRED, yoy change, TURCPIALLMINMEI	IMF NEA	FRED RBTRBIS, broad REER

Notes: "IMF NEA" refers to the IMF National Economic Accounts. The specific series used are: *Gross domestic product (GDP)* for GDP; *Final consumption expenditure, Private sector* for Consumption; and *Gross fixed capital formation* for Investment. All three series are in constant prices, seasonally adjusted, and expressed in domestic currency. The Trade Balance is constructed as *External balance of goods and services*, also from IMF QNA. "IMF MFS" refers to the IMF Monetary and Financial Statistics database; "IMF EER" to the IMF Effective Exchange Rate dataset; "IMF CPI" to the IMF Consumer Price Index dataset, yoy stands for year-on-year change; "PWT" to the Penn World Tables (Feenstra et al., 2015). In the Unemployment column, "Q" and "A" denote quarterly and annual frequency, respectively. TFP and Labor Share are available at annual frequency only. Labor Share is omitted from the VAR specification for Chile and Indonesia, since available series are not reliable.

A.4 Utilization-Adjusted TFP

We construct utilization-adjusted measures of aggregate TFP for Mexico and Canada following Huo et al. (2023), who extend the methodology of Basu et al. (2006) and Fernald (2014) to a cross-country setting. The approach exploits the fact that observed hours per worker provide a proxy for unobserved margins of factor utilization, including labor effort and capital utilization. For industry i, belonging to industry group g, the estimating equation is

$$\Delta y_{it} = \gamma_g \Delta x_{it} + \beta_g \Delta h_{it} + \alpha_i + \Delta z_{it}, \tag{A.1}$$

where Δy_{it} denotes real gross-output growth, Δx_{it} is cost-share-weighted growth in observed inputs, Δh_{it} is the growth of hours per worker, and α_i is an industry fixed effect. The coefficient γ_g captures returns to scale, while β_g measures the contribution of unobserved factor utilization to measured productivity growth.

We impose constant returns to scale ($\gamma_g = 1$), consistently with the construction of the national KLEMS productivity accounts. Denoting measured industry TFP growth by $\Delta tfp_{it} = \Delta y_{it} - \Delta x_{it}$, utilization-adjusted TFP growth is constructed as

$$\Delta z_{it} = \Delta tfp_{it} - \beta_g \Delta \widetilde{h}_{it}, \tag{A.2}$$

where $\Delta \widetilde{h}_{it}$ is the growth of hours per job, calculated as $100\Delta \ln(H_{it}/N_{it})$ and demeaned by industry over the available sample. Here H_{it} denotes total hours worked and N_{it} the number of jobs. We use the unfiltered series, as in Huo et al. (2023). Industries are classified into three groups: durable manufacturing, non-durable manufacturing, and the rest of the economy. Our preferred adjustment uses their G7-based utilization coefficients, estimated by instrumental variables: $\beta_g = 0.435$, 1.480, and 1.128, respectively.[1]

We aggregate industry-level productivity growth using lagged Domar weights:

$$\Delta Z_t = \sum_i D_{i,t-1} \Delta z_{it}, \qquad D_{i,t-1} = \frac{P_{i,t-1} Y_{i,t-1}}{VA_{t-1}}, \tag{A.3}$$

where $P_{i,t-1}Y_{i,t-1}$ is nominal industry gross output and VA_{t-1} is total nominal value added of the covered economy. Annual growth rates are cumulated into an index normalized to 100 in 2018.

For Mexico, we use the annual KLEMS accounts published by INEGI (2018 base), covering 76 industries and providing industry-level TFP growth, nominal gross output, value added, hours worked, and employment. The resulting measure covers the entire economy. For Canada, we use the industry KLEMS accounts of Statistics Canada, covering 39 business-sector industries. Industry-level productivity and Domar weights are available through 2021; for 2022–2023, we extend measured productivity using the aggregate business-sector multifactor-productivity series and construct the utilization adjustment using the 2021 Domar weights.

[1] Huo et al. (2023) also apply their G7-based utilization coefficients to all non-G7 countries in their sample, as the instruments are weak when estimated on the broader set of countries.

Hours per job are obtained from the corresponding industry-level labor statistics.

As an additional exercise for Mexico, we estimate the utilization coefficients directly from the Mexican industry panel using two-stage least squares with industry fixed effects and imposing constant returns to scale. Following Huo et al. (2023), we construct instruments combining oil-price and military-spending shocks with industries' direct, upstream, and downstream exposures from the World Input-Output Database. The corresponding first-stage F-statistics are only 3.46, 2.31, and 1.79, indicating weak identification. We therefore retain the coefficients estimated by Huo et al. (2023) as our preferred adjustment and use the Mexican estimates only as a sensitivity check.

Finally, the utilization-adjusted series enter the mixed-frequency VAR as annual observations, expressed as 100 times the logarithm of the corresponding index. All other variables, the lag specification, priors, and identification procedure remain unchanged. In each specification, we re-identify the MBC shock as the innovation explaining the largest share of GDP fluctuations at business-cycle frequencies.

A.5 Extended-Sample Data Construction

Section 4.5 extends the Mexican analysis beyond the baseline period to assess the stability of the recovered MBC shock and its historical alignment with earlier global-financial episodes. We construct two complementary extended datasets. The first preserves the quarterly frequency and covers 1980Q1–2023Q4. The second is observed at annual frequency and extends the sample back to 1963. Unless otherwise noted below, variable definitions and transformations follow those used in the baseline specification and reported in Tables A.2–A.5.

Extended quarterly sample. The official quarterly series underlying the baseline specification begin only in the early 1990s. To extend the information set back to 1980Q1, we combine the baseline series with alternative historical sources. Real GDP, private consumption, investment, exports, and imports are extended backward using quarterly OECD volume indices.

Each OECD volume index is linked backward to the corresponding baseline series by anchoring it to the level of the baseline series in the first quarter in which the two are jointly observed. Letting τ denote this splice date, V_τ the level of the baseline series at τ, and I_t the OECD volume index, the extended series is defined as $V_t = V_\tau \times (I_t / I_\tau)$ for $t < \tau$, with $\tau = 1993$Q1. Equivalently, pre-τ observations are obtained by cumulating the quarterly growth rates of the volume index backward from the level of the baseline series at the splice date.

The trade-balance-to-output ratio is reconstructed from the extended export and import series so that its definition is consistent throughout the sample. Exports, imports, and GDP are retropolated using the same splice date τ, so that the reconstructed ratio coincides with its official counterpart from τ onward.

The short-term interest-rate series contains a gap at the beginning of the extended sample. In particular,

the series used in the VAR is unavailable for 1980Q1–1981Q1. We fill these observations with fitted values from an auxiliary OLS regression in which the IMF monetary-policy rate is the dependent variable and the corresponding FRED/OECD interest-rate series is the regressor, estimated over the period for which the two series overlap. The regression yields an R^2 of 0.987, indicating an almost one-to-one correspondence between the two measures, and its fitted values are used only for these initial missing observations.

One-year-ahead inflation expectations begin in 1982Q1. For the preceding eight quarters (1980Q1–1981Q4), we obtain fitted values from an auxiliary regression of expected inflation on contemporaneous inflation, estimated over the period in which both variables are observed. The fit of this auxiliary regression is considerably weaker ($R^2 = 0.388$). These fitted values are used only to complete the initial part of the expected-inflation series required to construct the global real interest rate.

Several domestic variables are available at lower frequency over part or all of the extended sample. The unemployment rate is available annually before 1987 and quarterly thereafter, while aggregate TFP and the labor share are observed annually throughout. We retain these observations at their original frequencies and incorporate them through the mixed-frequency VAR rather than interpolating them prior to estimation. As in the baseline specification, missing quarterly observations are treated as latent variables and sampled jointly with the VAR parameters using the precision-based mixed-frequency approach of Chan et al. (2023). Annual observations enter as linear aggregation constraints on the within-year average of the latent quarterly series.

Aggregate TFP and the labor share are taken from the Penn World Tables (Feenstra et al., 2015). As described in Appendix A.3, the corresponding PWT series are the country-level measures used throughout the baseline analysis.

The remaining external and global variables required for the Mexican VAR are available quarterly over the full 1980Q1–2023Q4 period and require no additional processing. The real effective exchange rate is the IMF broad real effective exchange-rate index. The global real interest rate is constructed as the one-year U.S. Treasury yield net of one-year-ahead expected U.S. inflation. The Baa spread is Moody's seasoned Baa corporate bond yield relative to the ten-year U.S. Treasury yield. Export and import prices are the country-specific commodity-price indices of Juvenal and Petrella (2026).

Table A.6 summarizes the additional sources and treatments used to construct the extended quarterly sample.

Annual sample. To extend the historical coverage further, we also construct an annual dataset for 1963–2023. The macroeconomic variables are taken from the Global Macro Database of Müller et al. (2025), which provides harmonized long-run macroeconomic series across countries. Aggregate TFP is taken from the Penn World Tables (Feenstra et al., 2015).

The annual information set mirrors the baseline Mexican VAR as closely as data availability permits. It contains real GDP, investment, consumption, TFP, the short-term interest rate, inflation, the trade-balance-to-output ratio, the real exchange rate, the global real interest rate, the Baa spread, and export and import

Table A.6: Mexico: Construction of the Extended Samples

Variable	Source	Treatment
Quarterly sample: 1980Q1–2023Q4		
GDP	OECD	Retropolated to 1980Q1
Consumption	OECD	Retropolated to 1980Q1
Investment	OECD	Retropolated to 1980Q1
Exports	OECD	Retropolated to 1980Q1
Imports	OECD	Retropolated to 1980Q1
Trade Balance to GDP	OECD-based series	(Exports - Imports)/GDP
Unemployment	OECD	Annual before 1987 – mixed-frequency
TFP	PWT	Annual – mixed-frequency
Labor Share	PWT	Annual – mixed-frequency
Interest Rate	IMF; FRED; OECD	1980Q1–1981Q1 filled from auxiliary regression
1-Year Expected Inflation	FRED	1980Q1–1981Q4 filled from auxiliary regression
Exchange Rate	IMF	–
Global Real Rate	FRED	DGS1 − EXPINF1YR
Baa Spread	FRED	–
Export Prices	Juvenal and Petrella (2026)	–
Import Prices	Juvenal and Petrella (2026)	–
Annual sample: 1963–2023		
Macroeconomic variables	Global Macro Database	–
TFP	PWT	–

Notes: The table summarizes the additional data sources used for the extended-sample exercises in Section 4.5. Baseline definitions and transformations are reported in Tables A.2–A.5. Retropolation applies the rule $V_t = V_\tau \times (I_t/I_\tau)$ for $t < \tau$, where $\tau = 1993Q1$ is the first quarter in which the baseline level series and the OECD volume index are jointly observed. The Global Macro Database is from Müller et al. (2025); PWT stands for Penn World Table measures, from Feenstra et al. (2015). Variables observed annually in the quarterly specification are incorporated in the VAR using the mixed-frequency approach (see, Chan et al., 2023).

prices. The transformations follow those used in the quarterly specification where applicable.

Because the annual frequency changes the mapping between periodicity and calendar time, we adjust the frequency-domain identification accordingly. The annual MBC shock is identified as the innovation that explains the largest share of GDP fluctuations over periodicities between two and ten years, the annual-frequency analogue of the business-cycle band used in the quarterly analysis. The annual VAR is estimated with three lags. Figure C.12 reports the resulting impulse responses.[2]

The quarterly and annual extensions serve different purposes. The 1980Q1–2023Q4 dataset preserves the quarterly frequency and allows a direct comparison with the baseline estimates over their common sample, but it requires combining data sources and treating several variables at mixed frequencies. The 1963–2023 annual dataset requires less reconstruction and provides substantially longer historical coverage, but necessarily places more weight on lower-frequency movements. Together, the two datasets allow us to assess both the stability of the post-1990 results and the historical alignment of the recovered MBC shock with earlier global-financial episodes.

[2]At annual frequency, aggregation naturally places greater weight on relatively persistent movements and on major global-financial episodes that survive temporal aggregation. The annual results should therefore be interpreted as complementary historical evidence rather than as a substitute for the quarterly baseline.

A.6 Prior specification and Gibbs sampler

Let $\boldsymbol{\beta}$ denote the vectorized matrix of autoregressive coefficients and intercepts in (1). We adopt a standard Minnesota prior (Litterman, 1986; Kadiyala and Karlsson, 1997), $\boldsymbol{\beta} \sim \mathcal{N}(\boldsymbol{\beta}_0, \mathbf{V})$, where the prior mean $\boldsymbol{\beta}_0$ is centered around an AR(1), with series-specific persistence parameter ρ_i, and all remaining coefficients shrunk toward zero. We set $\rho_i = 1$ for variables that exhibit a unit root in the data—real aggregates, the real effective exchange rate, the price indices, TFP—and $\rho_i = 0.9$ for the remaining variables. The prior covariance $\mathbf{V}$ is diagonal and follows the standard Minnesota parameterization, with overall tightness $\lambda_1 = 0.2$, cross-equation tightness $\lambda_2 = 0.5$, lag decay $\lambda_3 = 2$, and a diffuse prior on the constants ($\lambda_4 = 10^5$). The own-lag prior variance for variable i at lag ℓ is $\left(\frac{\lambda_1}{\ell^{\lambda_3}}\right)^2$, and the cross-lag prior variance from variable j to variable i at lag ℓ is $\left(\frac{\sigma_i}{\sigma_j}\frac{\lambda_1 \lambda_2}{\ell^{\lambda_3}}\right)^2$, where the residual standard deviations σ_i are estimated from univariate AR(4) regressions on the observed quarterly series.

The residual covariance matrix $\boldsymbol{\Sigma}$ is given an inverse-Wishart prior with scale matrix equal to the identity matrix $\mathbf{I}_N$ and $N+1$ degrees of freedom. Posterior inference proceeds via a Gibbs sampler that cycles through three blocks. The conditional posterior of $\boldsymbol{\beta}$ given $\boldsymbol{\Sigma}$ and the latent quarterly observations is multivariate Gaussian; the conditional posterior of $\boldsymbol{\Sigma}$ given $\boldsymbol{\beta}$ and the latent observations is inverse-Wishart, with scale matrix updated using the demeaned residuals, as in Angeletos et al. (2020); and the conditional posterior of the missing latent quarterly values, given $\boldsymbol{\beta}$, $\boldsymbol{\Sigma}$, and the observed annual data, is jointly Gaussian with a banded precision matrix and is sampled in a single step using the precision-based sampler of Chan et al. (2023). At each iteration, candidate draws of $\boldsymbol{\beta}$ that violate the stationarity of the VAR companion matrix are rejected and a new draw is taken from its conditional posterior.

A practical implementation detail concerns the treatment of the early COVID-19 period. The observations for 2020Q1–Q3 of the domestic real aggregates are set to missing prior to estimation and treated as additional latent quarterly values to be sampled within the precision-based block. Because the pandemic shock hit different economies with different intensity and at different points in time, treating these observations as latent prevents the sharp 2020 swings from anchoring the estimated dynamics around a single, idiosyncratic episode while still allowing the model to use the information contained in the surrounding observations.

The Gibbs sampler is run for $5{,}000$ iterations, discarding the first $4{,}000$ as burn-in and retaining the remaining $1{,}000$ draws for posterior inference.

B Robustness

Table B.1: Variance Contributions of the MBC Shock for Mexico: Robustness to the TFP Measure

	Business Cycle (6–32q)				Long Run (80–∞q)			
	PWT	TCB	World Bank	INEGI	PWT	TCB	World Bank	INEGI
GDP	68.97 [59.51, 77.21]	69.74 [60.52, 77.45]	68.90 [59.54, 76.95]	68.60 [59.49, 76.52]	21.23 [8.55, 42.38]	18.82 [7.35, 42.19]	21.96 [7.90, 46.58]	26.57 [10.49, 52.70]
Investment	51.56 [39.39, 63.06]	50.57 [38.19, 61.60]	51.20 [38.47, 62.80]	51.05 [38.08, 63.02]	13.33 [4.70, 30.77]	12.49 [4.22, 28.69]	12.93 [4.34, 31.50]	16.64 [5.27, 39.23]
Consumption	52.59 [39.51, 63.97]	53.43 [41.27, 64.71]	53.10 [40.91, 64.05]	52.72 [41.36, 63.49]	17.10 [6.30, 37.05]	15.87 [6.28, 34.28]	17.87 [6.21, 42.66]	20.89 [8.34, 46.23]
Unemployment	35.13 [21.98, 51.15]	35.76 [21.87, 50.74]	35.94 [22.84, 51.40]	38.53 [25.22, 52.11]	11.79 [3.75, 30.59]	11.24 [3.40, 27.77]	11.34 [3.48, 29.83]	11.88 [3.78, 29.57]
TFP	35.96 [22.01, 49.50]	37.28 [24.32, 51.31]	35.84 [23.67, 49.57]	42.23 [28.72, 53.98]	8.27 [2.31, 22.87]	12.63 [4.12, 29.58]	9.19 [3.07, 25.36]	9.13 [2.19, 27.89]
Labor Share	23.00 [11.60, 36.66]	20.94 [9.12, 33.51]	21.64 [11.41, 35.27]	21.05 [9.78, 34.56]	9.46 [2.69, 25.46]	8.17 [2.40, 23.24]	8.74 [2.30, 24.15]	10.42 [3.06, 26.37]
Interest Rate	18.80 [8.79, 35.54]	18.45 [8.62, 35.15]	19.99 [9.39, 35.90]	19.99 [8.93, 35.37]	7.18 [2.02, 19.75]	6.59 [1.58, 18.86]	7.09 [1.87, 21.15]	7.06 [1.90, 22.49]
Inflation	9.33 [4.02, 19.15]	9.11 [4.02, 19.78]	9.15 [4.49, 18.93]	9.31 [4.53, 19.83]	11.48 [3.66, 30.33]	11.18 [3.66, 27.56]	12.60 [3.86, 30.84]	14.06 [3.60, 33.44]
Trade Balance to GDP	9.87 [4.07, 21.39]	10.10 [4.05, 22.34]	9.88 [4.38, 21.37]	11.05 [4.33, 22.78]	11.72 [3.08, 29.04]	10.49 [2.95, 26.70]	11.95 [3.32, 29.80]	13.27 [3.66, 31.40]
Exchange Rate	11.03 [4.20, 25.18]	11.62 [4.49, 28.55]	11.82 [4.33, 26.88]	12.35 [5.02, 27.85]	8.31 [2.11, 21.74]	8.18 [2.25, 21.79]	8.81 [2.38, 23.59]	10.10 [2.68, 25.11]
Global Rate	22.54 [11.11, 38.63]	24.01 [12.25, 38.82]	23.40 [11.73, 38.98]	24.48 [12.53, 40.58]	12.73 [4.11, 28.78]	11.52 [3.47, 28.95]	12.63 [3.84, 28.33]	12.51 [3.91, 29.00]
Baa Spread	56.65 [34.03, 73.12]	56.76 [35.93, 71.51]	57.73 [37.12, 72.79]	55.37 [33.49, 72.02]	14.74 [4.23, 35.10]	13.28 [4.13, 32.71]	14.00 [4.28, 33.60]	15.10 [4.27, 35.48]
Export Prices	25.10 [14.07, 39.94]	24.52 [13.27, 39.92]	26.18 [14.63, 41.45]	24.81 [13.52, 40.29]	7.96 [1.96, 22.76]	7.18 [1.93, 20.08]	7.47 [1.81, 22.00]	7.56 [1.70, 21.13]
Import Prices	32.24 [18.91, 48.26]	30.79 [16.75, 47.15]	33.71 [20.55, 50.39]	32.22 [18.79, 49.58]	10.98 [3.13, 27.52]	9.75 [2.76, 26.92]	10.28 [2.88, 26.29]	9.87 [2.77, 25.23]

Notes: The table reports the contribution of the main business-cycle shock to the forecast error variance of each variable over two frequency bands, business cycle (6–32 quarters) and long run (80–∞ quarters), estimated under alternative measures of total factor productivity: the Penn World Table (PWT, baseline), the Conference Board Total Economy Database (TCB), the World Bank Global Productivity database, and INEGI. In each specification the shock is identified as the innovation explaining the largest share of GDP fluctuations at business-cycle frequencies. The baseline PWT columns are shaded in gray. Entries are posterior medians, expressed in percent; brackets report 68 % posterior credible intervals.

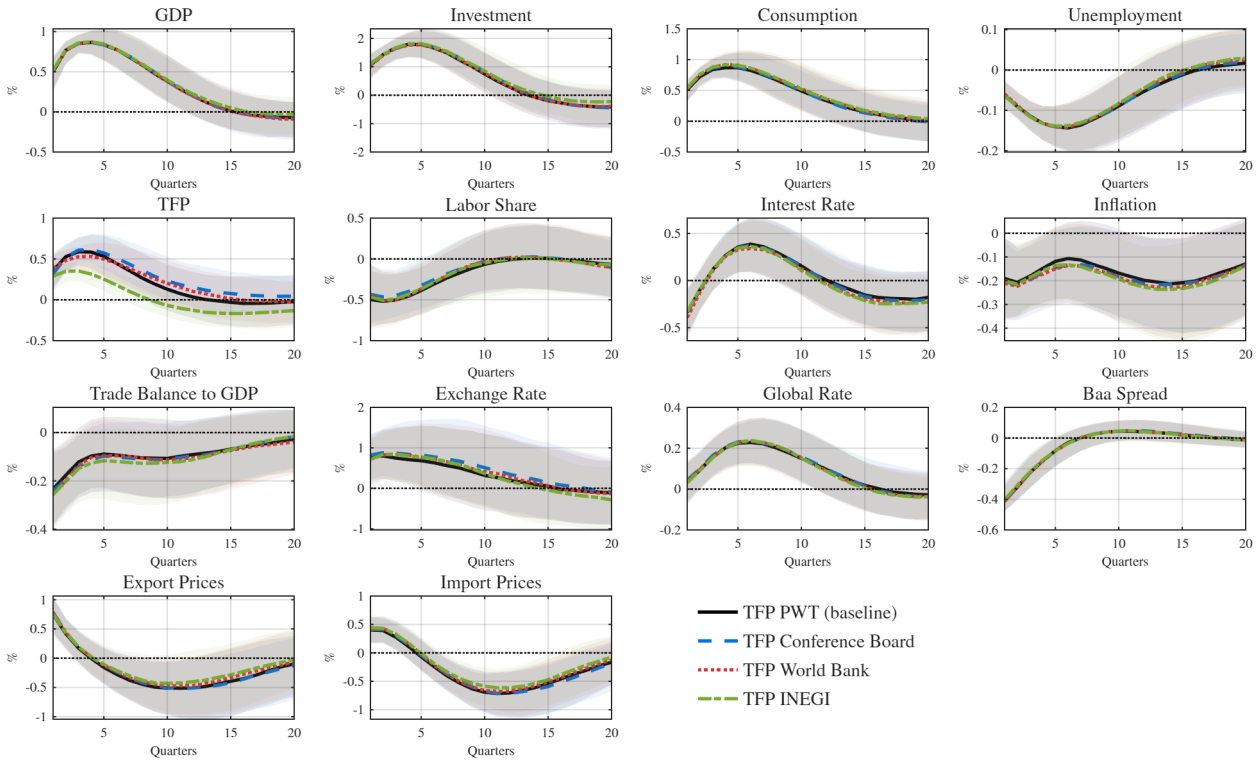


Figure B.1: Impulse Responses to the MBC Shock for Mexico: Robustness to the TFP Measure

Notes: The figure reports the impulse responses to the main business-cycle shock estimated under alternative measures of total factor productivity: the Penn World Table (baseline, solid black), the Conference Board Total Economy Database (dashed blue), the World Bank Global Productivity database (dotted red), and INEGI (dash-dotted green). In each specification the shock is identified as the innovation explaining the largest share of GDP fluctuations at business-cycle frequencies, and is normalized so that positive realizations correspond to a GDP expansion. Lines report posterior medians and shaded areas the corresponding 68 % posterior credible intervals. The horizon is expressed in quarters and responses are in percent.

Table B.2: Variance Contributions of the MBC Shock for Mexico: Utilization-Adjusted TFP

	Business Cycle (6–32q)			Long Run (80–∞q)		
	Baseline (PWT)	HLP β	Estimated β	Baseline (PWT)	HLP β	Estimated β
GDP	68.97 [59.51, 77.21]	67.63 [57.26, 76.02]	68.30 [57.90, 76.33]	21.23 [8.55, 42.38]	20.68 [7.63, 46.76]	21.31 [7.16, 43.58]
Investment	51.56 [39.39, 63.06]	50.01 [37.68, 61.59]	50.05 [37.59, 61.49]	13.33 [4.70, 30.77]	13.93 [4.29, 35.53]	15.21 [4.95, 34.77]
Consumption	52.59 [39.51, 63.97]	51.18 [39.02, 61.72]	53.94 [41.08, 64.13]	17.10 [6.30, 37.05]	17.34 [6.28, 44.17]	17.87 [6.07, 39.78]
Unemployment	35.13 [21.98, 51.15]	35.36 [22.73, 49.98]	33.13 [20.22, 49.54]	11.79 [3.75, 30.59]	11.16 [3.35, 31.33]	11.73 [3.59, 31.38]
TFP	35.96 [22.01, 49.50]	36.63 [23.02, 50.75]	38.39 [24.45, 52.19]	8.27 [2.31, 22.87]	11.73 [3.81, 28.95]	15.30 [5.36, 32.87]
Labor Share	23.00 [11.60, 36.66]	21.16 [9.00, 36.19]	21.46 [10.62, 35.52]	9.46 [2.69, 25.46]	10.37 [2.56, 27.94]	10.35 [2.47, 28.88]
Interest Rate	18.80 [8.79, 35.54]	18.28 [8.22, 34.49]	18.76 [7.86, 33.56]	7.18 [2.02, 19.75]	7.11 [1.77, 23.15]	6.94 [1.88, 21.75]
Inflation	9.33 [4.02, 19.15]	8.83 [4.02, 18.72]	9.55 [3.94, 21.46]	11.48 [3.66, 30.33]	12.97 [3.82, 34.46]	12.54 [3.40, 32.24]
Trade Balance to GDP	9.87 [4.07, 21.39]	10.88 [4.37, 22.79]	11.36 [4.91, 25.53]	11.72 [3.08, 29.04]	11.96 [3.12, 31.39]	12.27 [3.61, 29.35]
Exchange Rate	11.03 [4.20, 25.18]	12.79 [4.73, 30.51]	11.31 [4.31, 26.07]	8.31 [2.11, 21.74]	9.16 [2.38, 25.31]	8.55 [2.39, 22.04]
Global Rate	22.54 [11.11, 38.63]	24.38 [12.21, 39.76]	23.85 [11.41, 39.79]	12.73 [4.11, 28.78]	12.45 [3.51, 29.50]	12.03 [3.93, 30.40]
Baa Spread	56.65 [34.03, 73.12]	56.33 [32.78, 72.90]	54.51 [32.19, 71.89]	14.74 [4.23, 35.10]	14.79 [4.18, 38.34]	13.05 [3.65, 35.56]
Export Prices	25.10 [14.07, 39.94]	24.36 [12.85, 39.08]	24.51 [12.22, 41.12]	7.96 [1.96, 22.76]	7.78 [1.70, 24.95]	7.74 [2.08, 23.98]
Import Prices	32.24 [18.91, 48.26]	30.92 [17.15, 47.41]	31.44 [17.22, 48.15]	10.98 [3.13, 27.52]	10.19 [2.75, 27.89]	9.53 [2.67, 26.69]

Notes: The table reports the contribution of the main business-cycle shock to the forecast error variance of each variable over two frequency bands, business cycle (6–32 quarters) and long run (80–∞ quarters), for Mexico under three measures of total factor productivity: the Penn World Table (baseline), and two utilization-adjusted TFP series constructed following **?**. The first uses their estimated utilization coefficients (HLP β), the second uses coefficients we estimate on Mexican data with their identification strategy (Estimated β). Each TFP series enters the VAR in place of the baseline TFP. In each specification the shock is identified as the innovation explaining the largest share of GDP fluctuations at business-cycle frequencies. The baseline columns are shaded in gray. Entries are posterior medians, expressed in percent; brackets report 68 % posterior credible intervals.

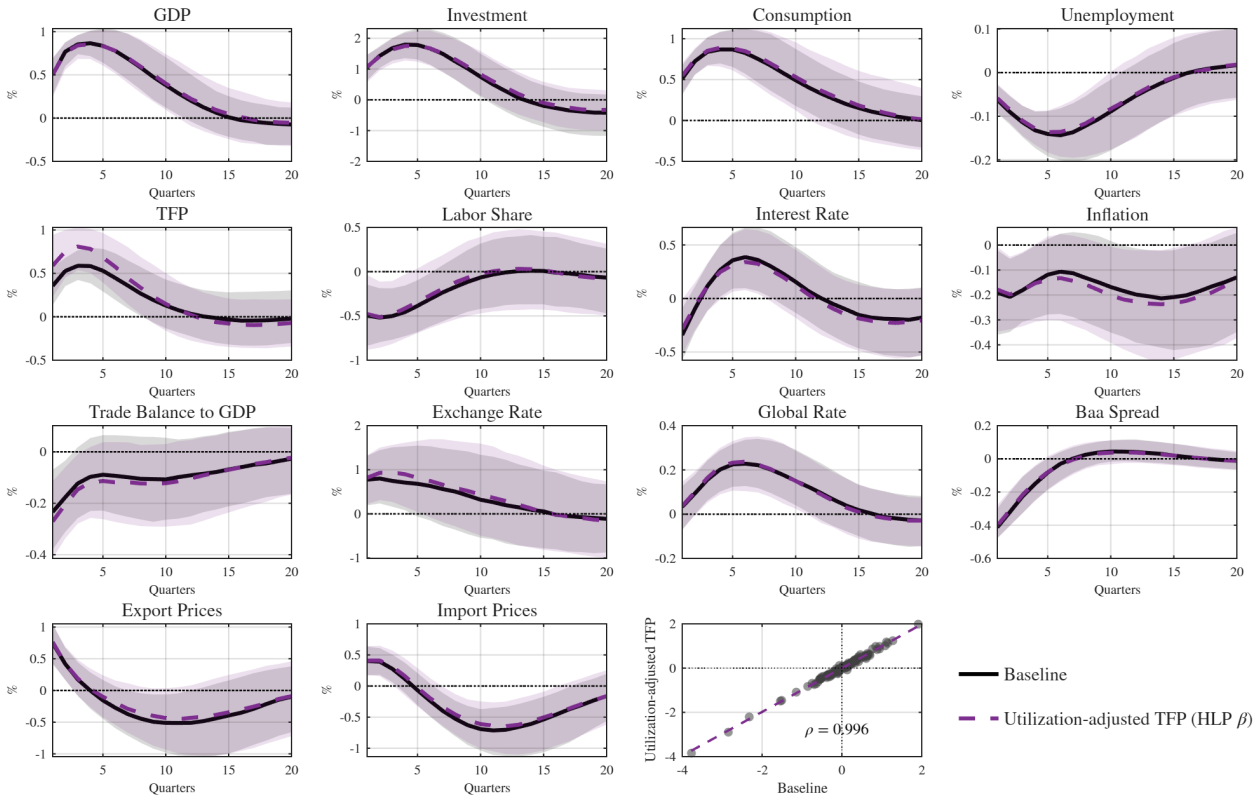


Figure B.2: Impulse Responses of the MBC Shock for Mexico: Robustness to Utilization-Adjusted TFP

Notes: The figure plots the impulse responses of the main business-cycle shock for Mexico estimated under two measures of total factor productivity: the baseline TFP from the Penn World Table, and utilization-adjusted TFP constructed following **?** with their estimated utilization coefficients. Apart from the TFP series, the two specifications are identical. For each specification, the shock is identified as the innovation that explains the largest share of GDP fluctuations at business-cycle frequencies. The solid black line reports the posterior median under the baseline specification; the dashed purple line reports the posterior median under the specification with utilization-adjusted TFP. Shaded areas report the corresponding 68% posterior credible intervals. The panel next to the legend plots the shock recovered from the specification with utilization-adjusted TFP against its baseline counterpart (posterior medians), with the dashed line reporting the fitted regression line and ρ the correlation between the two series. The shock is normalized so that positive realizations correspond to an expansion in GDP. Interest rates and the Baa spread are expressed in annualized percentage points.

Table B.3: Variance Contributions of the MBC Shock for Mexico: Robustness to the Number of Lags

	Business Cycle (6–32q)			Long Run (80–∞q)		
	12 Lags	16 Lags	20 Lags	12 Lags	16 Lags	20 Lags
GDP	68.97 [59.51, 77.21]	71.11 [61.40, 79.07]	69.26 [59.53, 77.46]	21.23 [8.55, 42.38]	22.09 [8.32, 46.26]	21.58 [8.24, 43.77]
Investment	51.56 [39.39, 63.06]	50.89 [38.83, 61.21]	48.34 [33.68, 59.45]	13.33 [4.70, 30.77]	13.46 [4.40, 30.74]	12.59 [4.04, 29.41]
Consumption	52.59 [39.51, 63.97]	56.06 [45.25, 65.80]	60.08 [48.52, 69.58]	17.10 [6.30, 37.05]	15.35 [5.67, 33.45]	15.72 [5.88, 34.34]
Unemployment	35.13 [21.98, 51.15]	34.40 [21.22, 47.52]	39.81 [27.10, 53.51]	11.79 [3.75, 30.59]	9.27 [3.04, 26.57]	9.97 [2.88, 28.29]
TFP	35.96 [22.01, 49.50]	36.25 [23.58, 49.07]	45.51 [31.78, 58.52]	8.27 [2.31, 22.87]	7.92 [2.08, 21.80]	7.70 [1.77, 24.30]
Labor Share	23.00 [11.60, 36.66]	25.69 [13.92, 38.30]	23.32 [12.65, 38.62]	9.46 [2.69, 25.46]	11.70 [2.95, 28.62]	14.56 [4.45, 33.10]
Interest Rate	18.80 [8.79, 35.54]	17.33 [8.30, 31.79]	17.30 [8.11, 32.58]	7.18 [2.02, 19.75]	6.64 [1.82, 18.11]	7.56 [2.19, 21.03]
Inflation	9.33 [4.02, 19.15]	10.61 [5.02, 21.25]	13.25 [5.92, 28.28]	11.48 [3.66, 30.33]	8.88 [2.76, 22.33]	10.18 [3.04, 24.39]
Trade Balance to GDP	9.87 [4.07, 21.39]	9.84 [3.87, 20.95]	10.34 [4.31, 23.13]	11.72 [3.08, 29.04]	8.14 [2.36, 22.60]	9.39 [2.93, 23.85]
Exchange Rate	11.03 [4.20, 25.18]	11.66 [4.51, 23.70]	13.24 [4.96, 27.56]	8.31 [2.11, 21.74]	6.89 [1.99, 20.10]	8.60 [2.38, 22.47]
Global Rate	22.54 [11.11, 38.63]	19.72 [9.48, 34.20]	23.18 [11.12, 38.06]	12.73 [4.11, 28.78]	10.78 [3.14, 25.54]	11.87 [3.20, 28.61]
Baa Spread	56.65 [34.03, 73.12]	49.18 [31.57, 66.43]	49.16 [31.25, 65.47]	14.74 [4.23, 35.10]	12.08 [3.69, 30.13]	12.44 [3.43, 32.49]
Export Prices	25.10 [14.07, 39.94]	22.92 [12.43, 38.26]	23.20 [12.77, 38.26]	7.96 [1.96, 22.76]	6.10 [1.62, 19.39]	7.62 [1.79, 23.03]
Import Prices	32.24 [18.91, 48.26]	31.35 [19.28, 46.42]	33.30 [21.25, 48.49]	10.98 [3.13, 27.52]	8.49 [2.51, 22.42]	8.84 [2.36, 24.68]

Notes: The table reports the contribution of the main business-cycle shock to the variance of each variable over two frequency bands, estimated with 12, 16, and 20 lags respectively. The baseline specification uses 12 lags, highlighted in gray. Entries are posterior medians, expressed in percent. Brackets report 68 percent posterior credible intervals.

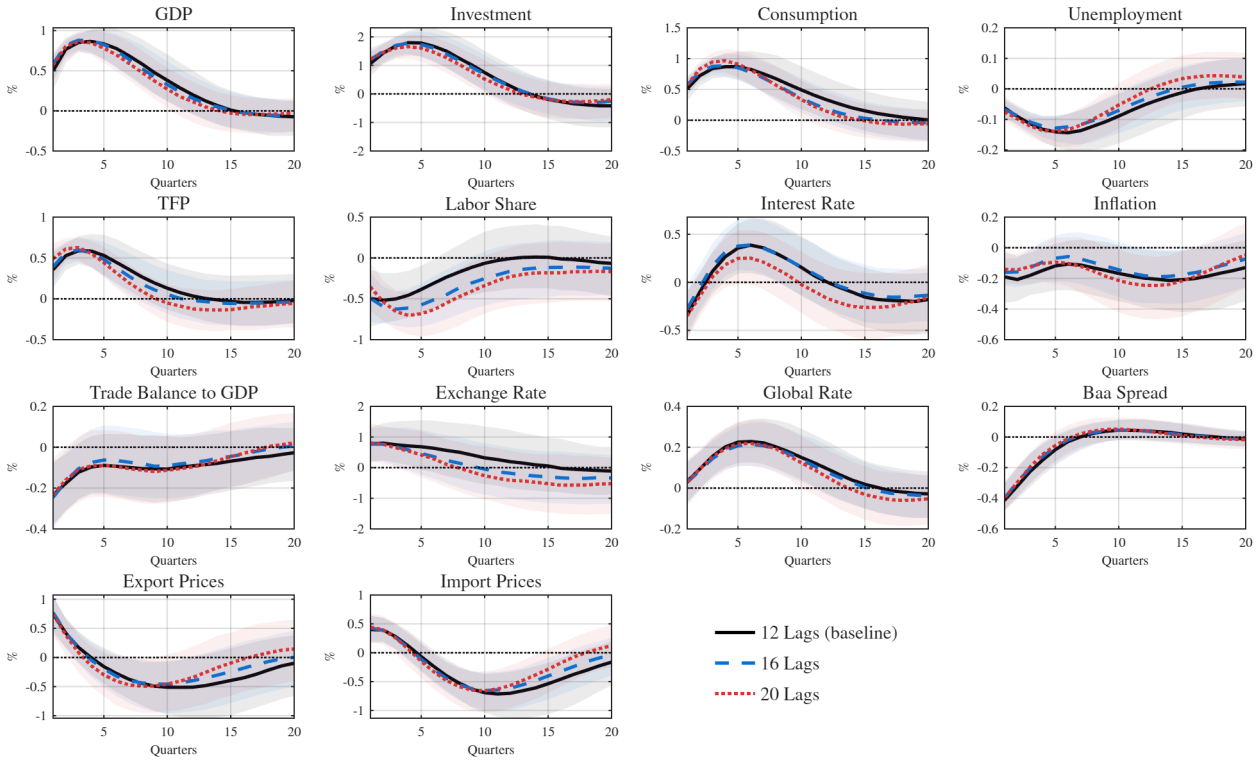


Figure B.3: Impulse Responses of the MBC Shock for Mexico: Robustness to the Number of Lags

Notes: The figure plots the impulse responses of the main business-cycle shock estimated under alternative lag specifications: 12, 16, and 20 lags. The baseline specification uses 12 lags. For each specification, the shock is identified as the innovation that explains the largest share of GDP fluctuations at business-cycle frequencies. The solid black line reports the posterior median under the baseline specification. Shaded areas and alternative lines report posterior medians under the remaining lag specifications. The shock is normalized so that positive realizations correspond to an expansion in GDP.

C Additional Results

Table C.1: Variance Contributions of the MBC Shock for Mexico: GDP, Investment and Consumption Targeting

	Business Cycle $(6\text{–}32q)$	Long Run $(80\text{–}\infty q)$
GDP	64.14	19.71
	[54.32, 72.76]	[7.39, 39.91]
Investment	61.22	17.41
	[50.94, 70.29]	[6.27, 37.76]
Consumption	60.49	16.87
	[48.69, 70.31]	[6.50, 36.52]
Unemployment	33.26	10.01
	[20.91, 49.64]	[3.25, 26.69]
TFP	38.34	8.94
	[23.84, 51.11]	[2.50, 23.89]
Labor Share	21.71	11.09
	[10.41, 35.75]	[2.91, 28.53]
Interest Rate	17.98	7.65
	[8.34, 34.32]	[2.30, 22.28]
Inflation	9.87	13.44
	[4.23, 20.46]	[4.38, 32.88]
Trade Balance	17.38	15.32
	[8.59, 29.90]	[4.61, 33.82]
Exchange Rate	17.66	9.16
	[8.24, 33.66]	[2.57, 24.19]
Global Rate	24.14	10.48
	[11.87, 39.75]	[3.28, 26.05]
BAA	53.08	11.64
	[31.50, 70.25]	[3.34, 30.68]
Export Prices	24.68	7.51
	[13.76, 40.47]	[1.71, 23.46]
Import Prices	35.61	9.28
	[22.49, 50.85]	[2.74, 26.61]

Notes: The table reports the contribution of the main business-cycle shock to the variance of each variable over two frequency bands. The business-cycle band corresponds to periodicities between 6 and 32 quarters. The long-run band corresponds to periodicities between 80 quarters and infinity. The shock is identified as the innovation that jointly explains the largest share of GDP, Investment, and Consumption fluctuations at business-cycle frequencies. Entries are posterior medians, expressed in percent. Brackets report 68 percent posterior credible intervals.

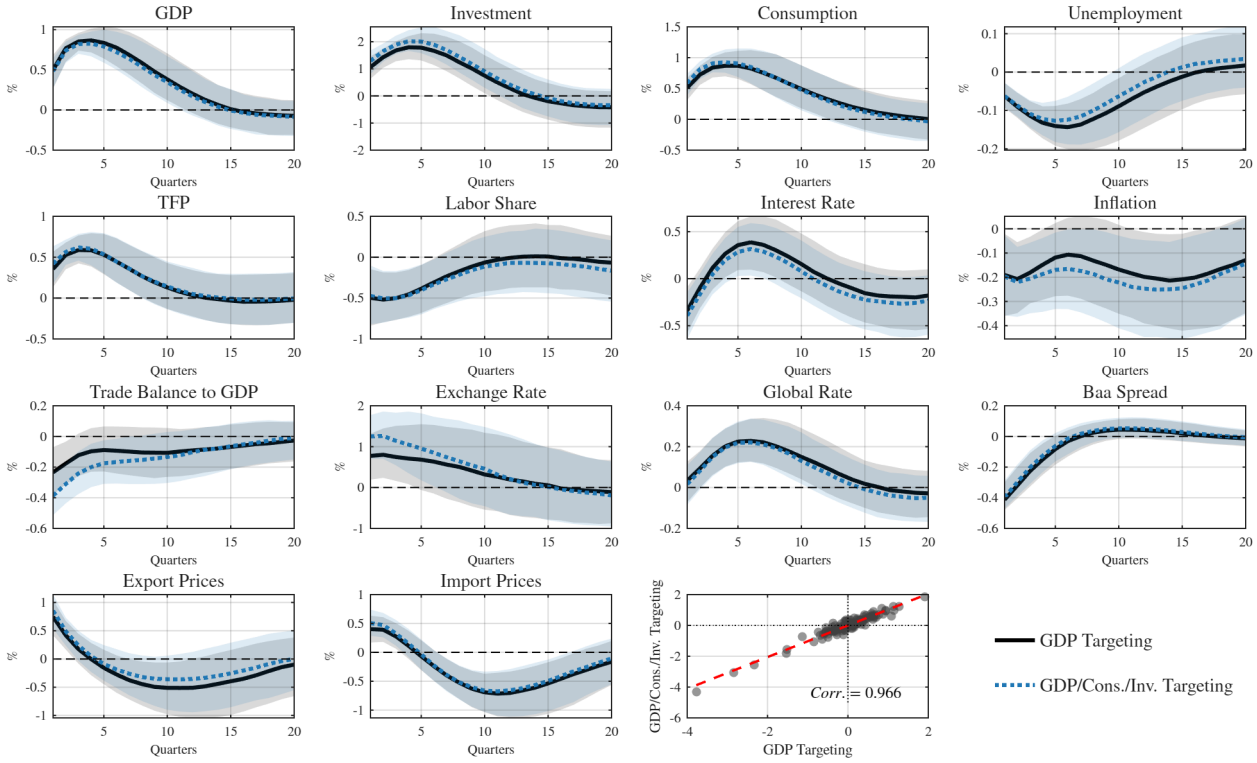


Figure C.1: Impulse Responses to the MBC Shock for Mexico: Alternative Targets

Notes: The figure reports impulse responses to the main business-cycle shock for Mexico. The shock is identified as the innovation that explains the largest share of GDP fluctuations or, alternatively, the joint variation in GDP, consumption, and investment, at business-cycle frequencies. Responses are shown to a one-standard-deviation shock. The bottom-right panel displays a scatter plot of the identified shocks, along with the fitted linear regression line and the correlation between them.

Table C.2: Largest Spikes in Mexico's MBC Shock and Associated Global Financial Events

Approx. Date	Value (med.)	Event	Explanation
1998Q3–Q4	−1.517	Russia default and LTCM rescue	Russia's August 1998 devaluation/default triggered a global liquidity shock and repricing of emerging-market and leveraged positions. LTCM's September near-failure amplified the unwind of relative-value and arbitrage trades.
2000Q1–Q2	−0.274	NASDAQ peak and first dot-com crash leg	The NASDAQ peaked in March 2000 and then fell sharply in March–April, producing the first major dot-com risk-off move and a broad repricing of technology and growth equities.[a]
2001Q3–Q4	−1.414	9/11 market shutdown and US recession shock	The September 11 attacks produced a discrete uncertainty and liquidity shock: US equity markets closed temporarily, airline and insurance exposures were repriced, and the shock hit during the US recession.
2006Q1–2007Q2	+1.148	Global risk-on regime: structured-credit and carry-trade boom	A well-defined risk-on regime: low implied volatility, compressed credit spreads, rapid structured-credit issuance, leveraged loans, carry trades, and expanding global-bank balance sheets before the subprime shock.[b]
2007Q3	−0.552	BNP Paribas fund freeze, ABCP shock, and Northern Rock	Subprime losses spilled into money markets: BNP Paribas froze three funds in August, ABCP markets came under pressure, interbank spreads widened, and Northern Rock required Bank of England liquidity support in September.
2008Q3–Q4	−3.774	Lehman, AIG, and Reserve Primary Fund	The September 2008 sequence—Lehman bankruptcy, AIG rescue, Reserve Primary Fund breaking the buck, dollar funding seizure, and emergency liquidity/swap-line support—marks the largest risk-off event.
2009Q2–Q3	+1.916	QE1/TALF/PPIP/SCAP stress-test relief rally	The rebound is linked to named backstops: the Fed's QE1 expansion, TALF, PPIP, and US SCAP bank stress-test results, which reduced tail risk and restored confidence in bank and credit markets.[c]
2010Q2–2011Q3	−0.386	Greek bailout, ECB SMP, and euro-area crisis escalation	Greece lost market access and received its first EU/IMF program, the ECB launched the SMP, and by 2011 stress had spread to Italy and Spain, widening sovereign and bank spreads.
2013Q2–Q3	−0.609	Bernanke taper tantrum	May–June 2013 Fed taper communication triggered a sharp rise in US Treasury yields, losses in duration assets, emerging-market outflows, currency depreciation, and wider spreads.
2015Q3–2016Q1	−0.551	China RMB devaluation, equity crash, and oil-price collapse	The August 2015 RMB devaluation and Chinese equity stress raised hard-landing fears. The late-2015/early-2016 oil collapse added pressure on commodity exporters, EM assets, and credit spreads.
2016Q4	+0.939	Trump reflation trade	Post-election markets repriced US tax cuts, deregulation, and fiscal expansion: equities, banks, and cyclicals rallied; Treasury yields rose; and yield curves steepened.[d]
2017Q2–Q4	+1.086	Global risk-on regime: synchronized growth and low-volatility carry compression	Global growth, investment, manufacturing, and trade improved together; markets were buoyant, volatility unusually low, credit spreads tight, and search-for-yield behavior compressed risk compensation.[e]
2020Q1	−2.326	COVID-19 dash-for-cash and dollar funding stress	March 2020 saw global liquidation: risky assets sold off, investors rushed into cash and dollars, Treasury-market liquidity deteriorated, dollar funding stress rose, and the Fed expanded swap lines and emergency facilities.
2021Q3–Q4	−0.744	Supply-chain disruption and energy/inflation repricing	Semiconductor shortages, shipping bottlenecks, Delta disruptions, European gas-price stress, and commodity-price pressures led investors to reprice inflation, rates, and margins.[f]
2022Q1–Q3	−0.501	Russia-Ukraine invasion, inflation shock, and Fed tightening repricing	Russia's invasion generated food and energy shocks, sanctions uncertainty, and stagflation fears, while persistent inflation forced a sharp repricing of the Fed tightening path.

[a] Sources: BIS, *71st Annual Report*, June 2001; Federal Reserve Board, *Monetary Policy Report to Congress*, February 2001.
[b] Sources: IMF, *Global Financial Stability Report*, April 2007; BIS, *77th Annual Report*, June 2007.
[c] Sources: Federal Reserve Board, *Monetary Policy Report to Congress*, July 2009; IMF, *Global Financial Stability Report*, October 2009.
[d] Source: BIS, *Quarterly Review*, December 2016, press release.
[e] Sources: IMF, *World Economic Outlook*, April 2017; IMF, *Global Financial Stability Report*, October 2017.
[f] Sources: IMF, *World Economic Outlook*, October 2021; BIS Bulletin No. 48, November 2021.

Table C.3: Variance Contributions of the MBC Shock for Mexico: VIX Index Specification

	Business Cycle $(6\text{–}32q)$	Long Run $(80\text{–}\infty q)$
GDP	76.25	19.24
	[67.59, 83.19]	[7.80, 36.27]
Investment	49.43	13.09
	[38.81, 59.68]	[4.90, 29.67]
Consumption	55.10	14.30
	[44.25, 65.07]	[5.39, 30.19]
Unemployment Rate	31.86	8.65
	[20.26, 43.76]	[3.05, 22.08]
TFP	32.85	7.71
	[20.77, 45.01]	[1.96, 18.95]
Labor Share	17.66	9.93
	[8.78, 29.19]	[2.30, 25.37]
Interest Rate	9.74	5.78
	[4.62, 17.88]	[1.62, 15.27]
Inflation	5.94	10.70
	[2.58, 11.49]	[3.15, 27.50]
Trade Balance to GDP	10.46	10.88
	[3.68, 20.64]	[3.30, 28.25]
Exchange Rate	12.09	7.31
	[5.01, 23.45]	[1.96, 19.35]
Global Rate	17.01	9.63
	[8.64, 28.26]	[2.93, 22.43]
VIX Index	32.73	11.59
	[21.41, 44.17]	[3.43, 26.42]
Export Prices	23.76	5.25
	[14.39, 34.22]	[1.40, 14.97]
Import Prices	28.98	7.89
	[18.82, 41.32]	[2.25, 19.73]

Notes: The table reports the contribution of the main business-cycle shock to the variance of each variable over two frequency bands. The business-cycle band corresponds to periodicities between 6 and 32 quarters. The long-run band corresponds to periodicities between 80 quarters and infinity. In this specification, we replace Baa spread with the VIX index as a proxy for global financial conditions. Entries are posterior medians, expressed in percent. Brackets report 68 percent posterior credible intervals.

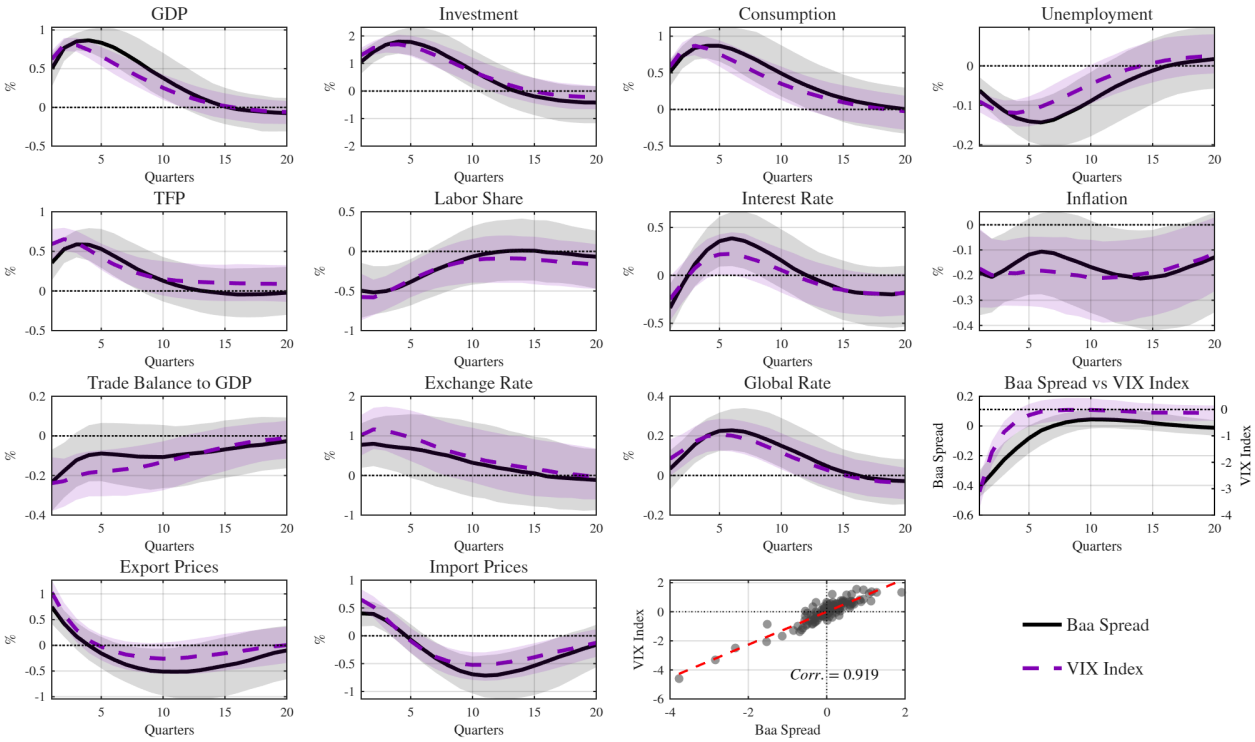


Figure C.2: Impulse Responses to the MBC Shock for Mexico: Baa Spread and VIX Index Specification

Notes: The figure reports impulse responses to the main business-cycle shock for Mexico for two different VAR specifications. The first specification is the baseline, while in the second specification, we substitute Baa spread with the VIX index. The shock is identified as the innovation that explains the largest share of GDP fluctuations. Responses are shown to a one-standard-deviation shock.

Table C.4: Variance Contributions of the MBC Shock for Mexico: GFCy Specification

	Business Cycle $(6\text{–}32q)$	Long Run $(80\text{–}\infty q)$
GDP	73.23	17.81
	[63.46, 81.41]	[6.86, 37.24]
Investment	48.61	13.30
	[38.84, 57.65]	[4.61, 31.60]
Consumption	55.65	13.18
	[45.83, 65.34]	[4.90, 29.19]
Unemployment Rate	29.98	7.76
	[19.25, 42.78]	[2.52, 19.71]
TFP	31.70	6.37
	[19.65, 43.69]	[1.58, 17.56]
Labor Share	23.93	11.12
	[14.13, 35.53]	[3.24, 27.67]
Interest Rate	9.23	5.95
	[3.60, 18.10]	[1.63, 16.77]
Inflation	6.01	9.01
	[2.70, 12.85]	[3.01, 23.51]
Trade Balance to GDP	9.27	10.50
	[3.35, 20.05]	[3.03, 26.66]
Exchange Rate	9.26	6.37
	[3.60, 19.99]	[2.05, 17.16]
Global Rate	16.20	8.07
	[7.56, 27.35]	[2.54, 21.07]
GFCy	28.10	8.32
	[17.33, 42.32]	[2.51, 21.67]
Export Prices	16.42	5.87
	[8.86, 27.76]	[1.47, 17.16]
Import Prices	23.62	7.44
	[13.94, 36.37]	[2.14, 18.95]

Notes: The table reports the contribution of the main business-cycle shock to the variance of each variable over two frequency bands. The business-cycle band corresponds to periodicities between 6 and 32 quarters. The long-run band corresponds to periodicities between 80 quarters and infinity. In this specification, we substitute Baa spread with the global financial cycle factor of Miranda-Agrippino and Rey (2020). Entries are posterior medians, expressed in percent. Brackets report 68 percent posterior credible intervals.

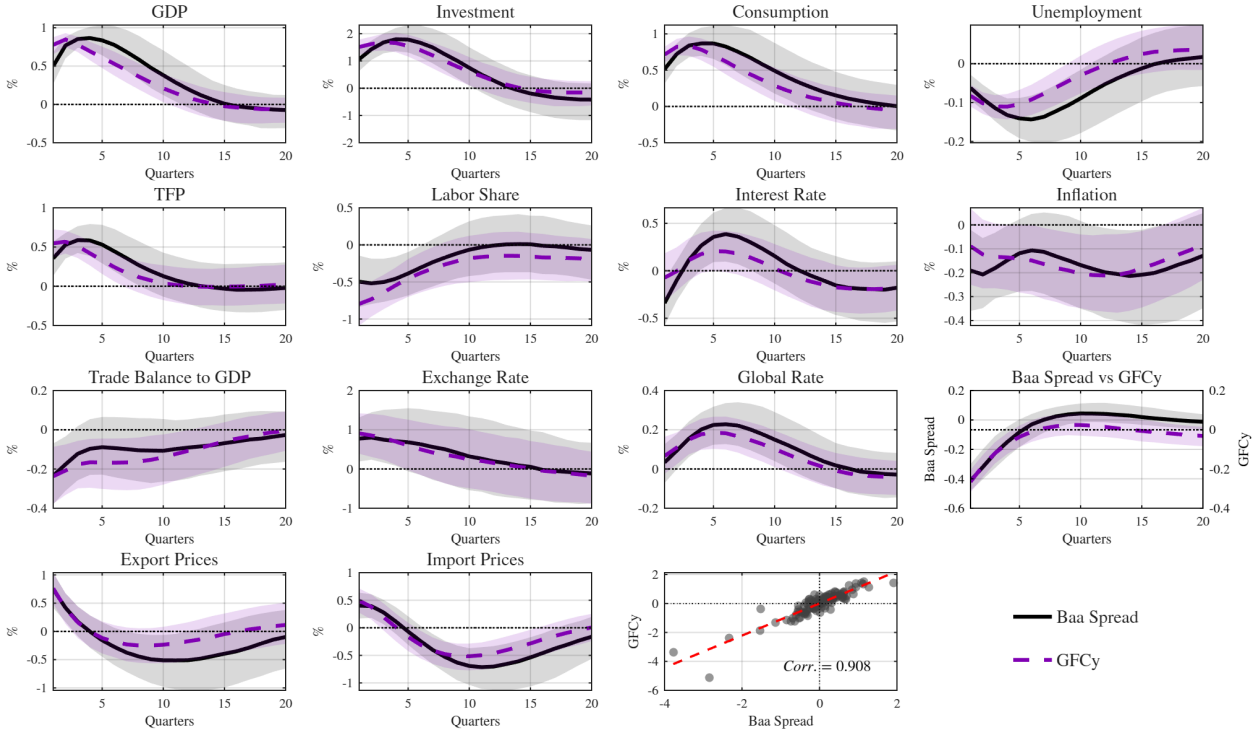


Figure C.3: Impulse Responses to the MBC Shock for Mexico: Baa Spread and GFCy Factor Specification

Notes: The figure reports impulse responses to the main business-cycle shock for Mexico for two different VAR specifications. The first specification is the baseline, while in the second specification, we substitute Baa spread with the global financial cycle (GFCy) factor of Miranda-Agrippino and Rey (2020). The shock is identified as the innovation that explains the largest share of GDP fluctuations. Responses are shown to a one-standard-deviation shock.

Table C.5: Variance Contributions of the MBC Shock for Mexico: GCC Specification

	Business Cycle $(6\text{–}32q)$	Long Run $(80\text{–}\infty q)$
GDP	77.96	16.65
	[69.10, 84.25]	[6.78, 35.47]
Investment	53.71	15.16
	[41.74, 62.91]	[5.46, 32.36]
Consumption	57.70	12.50
	[46.85, 67.44]	[5.23, 26.88]
Unemployment	31.98	7.28
	[21.03, 44.02]	[2.31, 17.59]
TFP	31.58	7.28
	[19.52, 45.12]	[2.18, 17.42]
Labor Share	20.72	10.44
	[11.14, 31.43]	[2.84, 25.32]
Interest Rate	10.39	5.42
	[4.32, 18.53]	[1.44, 15.08]
Inflation	5.93	9.98
	[2.69, 12.08]	[2.86, 22.16]
Trade Balance to GDP	11.37	11.63
	[5.00, 22.81]	[3.49, 26.26]
Exchange Rate	10.85	6.66
	[4.68, 21.76]	[1.84, 17.51]
Global Rate	19.36	8.70
	[10.76, 30.04]	[2.90, 20.78]
Global Credit Factor	44.68	7.16
	[33.31, 55.64]	[2.39, 18.56]
Export Prices	23.94	5.42
	[14.35, 34.65]	[1.32, 15.41]
Import Prices	28.11	6.16
	[18.85, 40.12]	[1.61, 16.35]

Notes: The table reports the contribution of the main business-cycle shock to the variance of each variable over two frequency bands. The business-cycle band corresponds to periodicities between 6 and 32 quarters. The long-run band corresponds to periodicities between 80 quarters and infinity. In this specification, we substitute Baa spread with the global credit cycle (GCC) factor of Boyarchenko and Elias (2026). Entries are posterior medians, expressed in percent. Brackets report 68 percent posterior credible intervals.

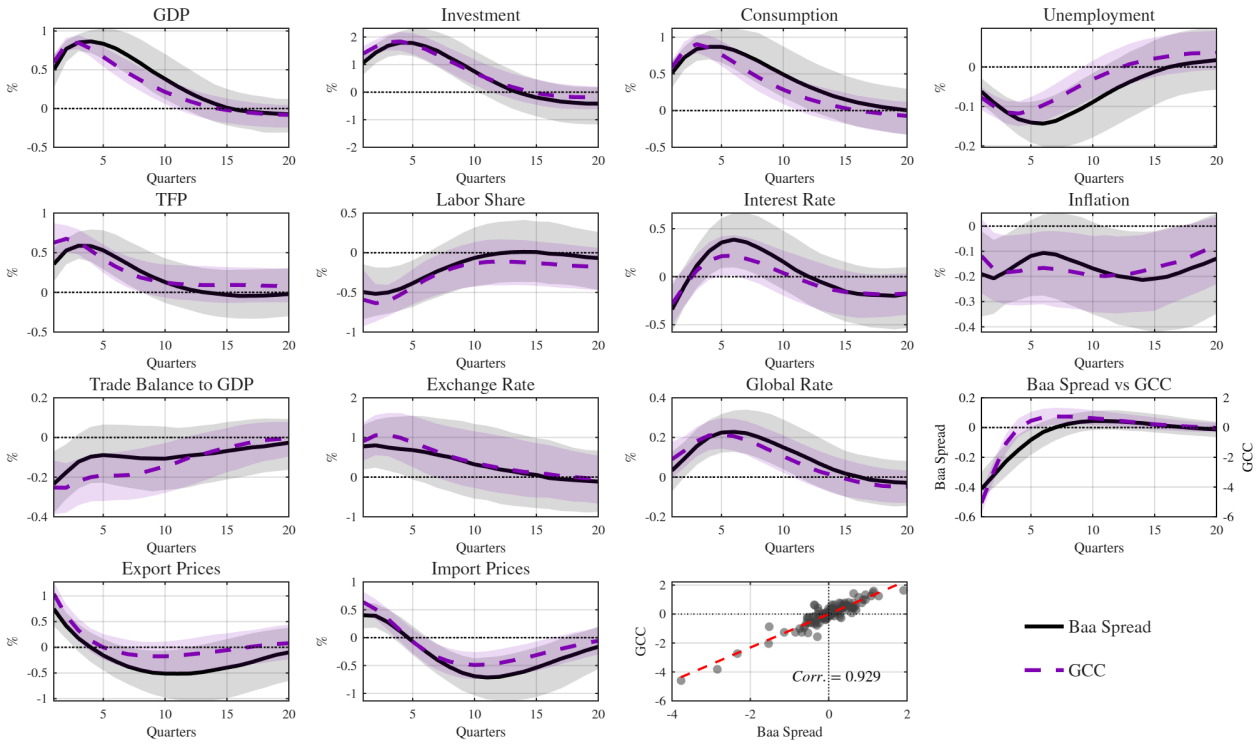


Figure C.4: Impulse Responses to the MBC Shock for Mexico: Baa Spread and GCC Factor Specification

Notes: The figure reports impulse responses to the main business-cycle shock for Mexico for two different VAR specifications. The first specification is the baseline, while in the second specification, we substitute Baa spread with the global credit cycle (GCC) factor of Boyarchenko and Elias (2026). The shock is identified as the innovation that explains the largest share of GDP fluctuations. Responses are shown to a one-standard-deviation shock.

Table C.6: Variance Contributions of the Baa-Targeted Shock for Mexico

	Business Cycle $(6\text{–}32q)$	Long Run $(80\text{–}\infty q)$
GDP	50.04	18.81
	[36.78, 61.57]	[7.91, 36.99]
Investment	38.27	11.62
	[22.35, 53.53]	[3.95, 26.99]
Consumption	38.66	18.39
	[22.79, 53.88]	[7.95, 37.30]
Unemployment Rate	33.85	15.67
	[18.94, 50.76]	[5.37, 35.34]
TFP	34.29	12.04
	[19.05, 48.92]	[3.15, 31.65]
Labor Share	11.02	9.20
	[4.32, 24.68]	[2.58, 25.08]
Interest Rate	23.34	8.68
	[11.39, 39.68]	[2.48, 24.17]
Inflation	9.93	13.02
	[4.44, 21.08]	[3.68, 31.89]
Trade Balance to GDP	10.62	11.61
	[4.81, 21.33]	[3.59, 28.69]
Exchange Rate	16.82	12.75
	[7.23, 31.83]	[3.94, 30.85]
Global Rate	22.55	16.51
	[9.78, 38.70]	[5.51, 35.65]
Baa Spread	83.32	26.60
	[75.12, 89.84]	[10.25, 50.99]
Export Prices	24.28	11.46
	[12.61, 38.83]	[3.06, 29.13]
Import Prices	33.39	16.25
	[19.47, 48.42]	[5.06, 37.36]

Notes: The table reports the contribution of the innovation that explains the largest share of Baa spread fluctuations at business-cycle frequencies. The business-cycle band corresponds to periodicities between 6 and 32 quarters. The long-run band corresponds to periodicities between 80 quarters and infinity. Entries are posterior medians, expressed in percent. Brackets report 68 percent posterior credible intervals.

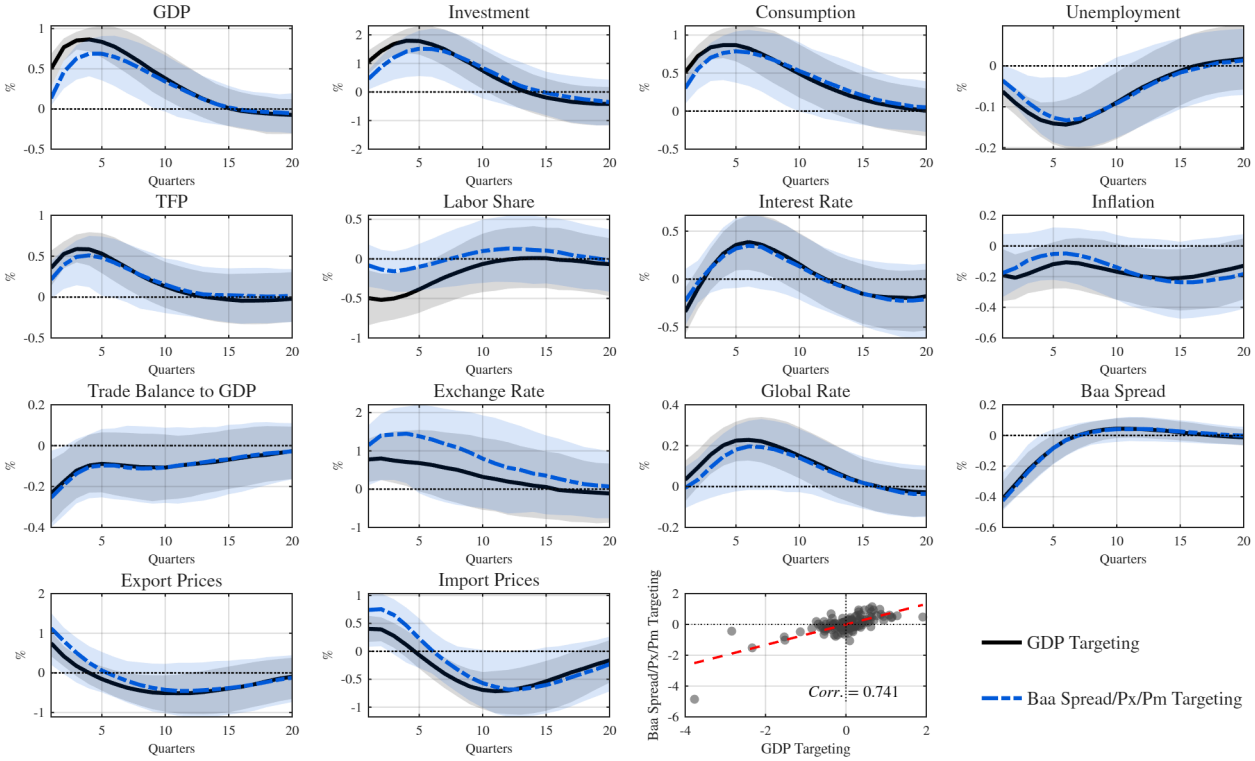


Figure C.5: Mexico Output-Targeted and Baa Spread/Px/Pm-Targeted Shocks

Notes: The figure compares impulse responses for Mexico under two identification schemes. The solid black line reports responses to the baseline main business-cycle shock, identified as the shock that explains the largest share of GDP fluctuations at business-cycle frequencies. The dashed blue line reports responses to the shock that jointly explains the largest share of fluctuations in the Baa spread, export prices, and import prices over the same frequency band. Shaded areas report 68 percent posterior bands. Both shocks are normalized so that they generate an expansion in GDP. Responses are shown for the variables included in the baseline VAR. The bottom-right panel displays a scatter plot of the identified shocks, along with the fitted linear regression line and the correlation between them.

Table C.7: Variance Contributions of the MBC Shock for Mexico: Adding the EMBI Spread

	Business Cycle $(6\text{–}32q)$	Long Run $(80\text{–}\infty q)$
GDP	65.57	20.68
	[55.68, 74.90]	[7.66, 42.42]
Investment	46.87	12.95
	[35.37, 59.75]	[4.18, 31.23]
Consumption	53.26	15.95
	[41.57, 62.94]	[5.40, 38.81]
Unemployment	38.01	11.22
	[25.59, 51.99]	[3.22, 31.76]
TFP	50.99	9.17
	[37.73, 61.70]	[2.20, 29.44]
Labor Share	22.38	11.74
	[11.04, 37.67]	[3.34, 31.79]
Interest Rate	18.13	7.45
	[7.64, 39.28]	[2.06, 23.58]
Inflation	10.29	12.41
	[4.31, 20.79]	[3.38, 30.52]
Trade Balance to GDP	11.21	11.11
	[4.73, 24.77]	[3.27, 29.14]
Exchange Rate	13.58	9.44
	[4.93, 29.54]	[2.43, 25.45]
EMBI Spread	30.71	9.49
	[16.46, 47.48]	[2.43, 26.53]
Global Rate	23.71	12.06
	[11.05, 40.49]	[3.43, 30.89]
Baa Spread	46.90	12.64
	[24.49, 69.05]	[3.59, 35.51]
Export Prices	24.30	8.23
	[12.62, 40.52]	[1.99, 25.71]
Import Prices	31.70	11.07
	[18.46, 49.62]	[2.83, 29.67]

Notes: The table reports the contribution of the main business-cycle shock to the variance of each variable over two frequency bands. The business-cycle band corresponds to periodicities between 6 and 32 quarters. The long-run band corresponds to periodicities between 80 quarters and infinity. The VAR includes the EMBI sovereign spread in addition to the baseline specification. Entries are posterior medians, expressed in percent. Brackets report 68 percent posterior credible intervals.

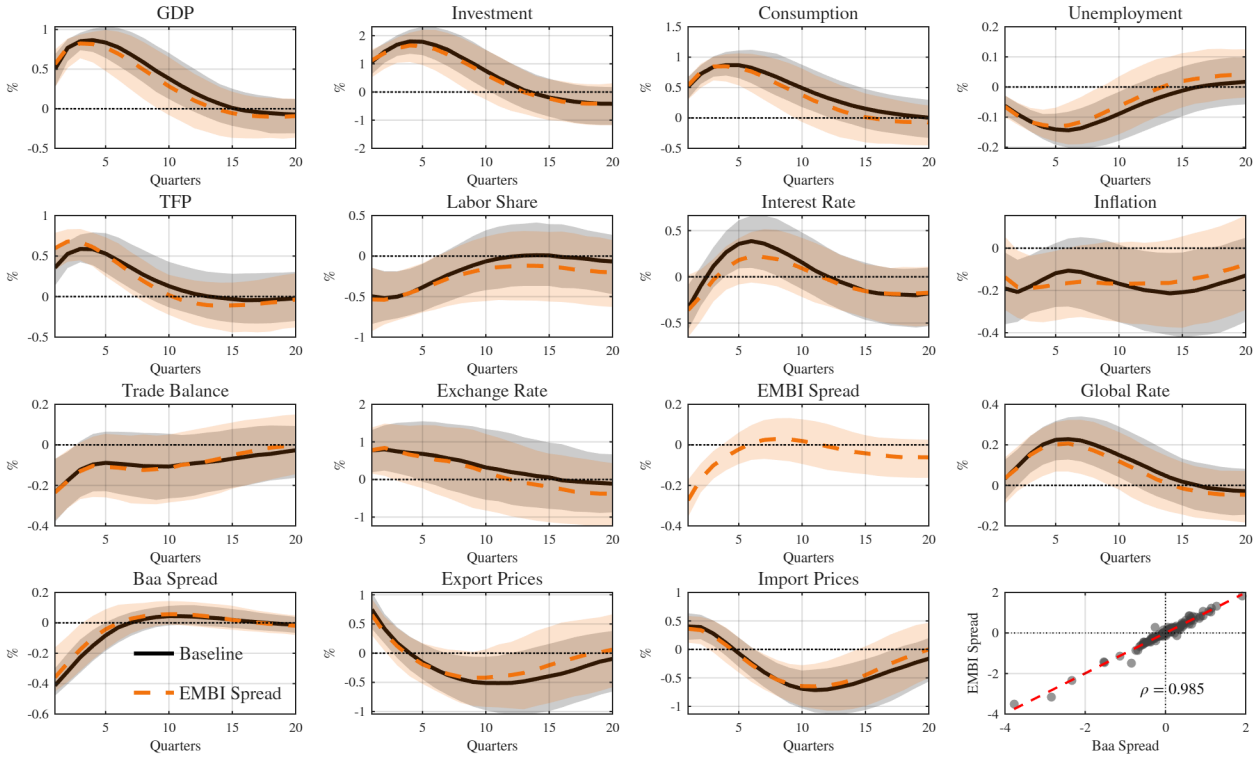


Figure C.6: Impulse Responses to the MBC Shock for Mexico: Adding the EMBI Spread

Notes: The figure reports impulse responses to the main business-cycle shock for Mexico for two different VAR specifications. The first specification is the baseline, while in the second specification, we also include the EMBI sovereign spread for Mexico. The shock is identified as the innovation that explains the largest share of GDP fluctuations. Shaded areas report 68 percent posterior bands. Responses are shown to a one-standard-deviation shock.

Table C.8: Variance Contributions of the MBC Shock for Mexico: Adding the Market-Policy Rate Wedge

	Business Cycle $(6\text{–}32q)$	Long Run $(80\text{–}\infty q)$
GDP	65.54	18.75
	[56.63, 75.48]	[6.82, 38.58]
Investment	46.76	11.98
	[33.65, 59.10]	[4.31, 29.31]
Consumption	51.08	14.00
	[38.10, 61.81]	[4.66, 34.61]
Unemployment	34.48	11.19
	[20.84, 50.27]	[3.08, 29.62]
TFP	47.57	8.02
	[34.03, 58.72]	[1.87, 25.40]
Labor Share	26.77	9.81
	[13.39, 40.86]	[2.27, 28.89]
Interest Rate	15.92	7.46
	[6.77, 31.27]	[1.86, 22.60]
Inflation	8.33	10.56
	[3.67, 19.40]	[3.10, 27.65]
Trade Balance to GDP	10.48	11.08
	[4.05, 24.46]	[2.98, 27.55]
Exchange Rate	11.00	8.70
	[4.31, 26.96]	[2.28, 25.00]
Market–Policy Rate Wedge	8.18	7.11
	[2.42, 20.06]	[1.78, 20.81]
Global Rate	20.18	12.25
	[9.39, 36.16]	[3.73, 29.37]
Baa Spread	44.19	11.81
	[21.31, 67.53]	[3.35, 32.05]
Export Prices	20.43	7.42
	[10.37, 36.35]	[1.73, 24.05]
Import Prices	28.45	9.28
	[15.88, 45.03]	[2.47, 26.86]

Notes: The table reports the contribution of the main business-cycle shock to the variance of each variable over two frequency bands. The business-cycle band corresponds to periodicities between 6 and 32 quarters. The long-run band corresponds to periodicities between 80 quarters and infinity. The VAR includes the market-policy rate wedge in addition to the baseline specification. Entries are posterior medians, expressed in percent. Brackets report 68 percent posterior credible intervals.

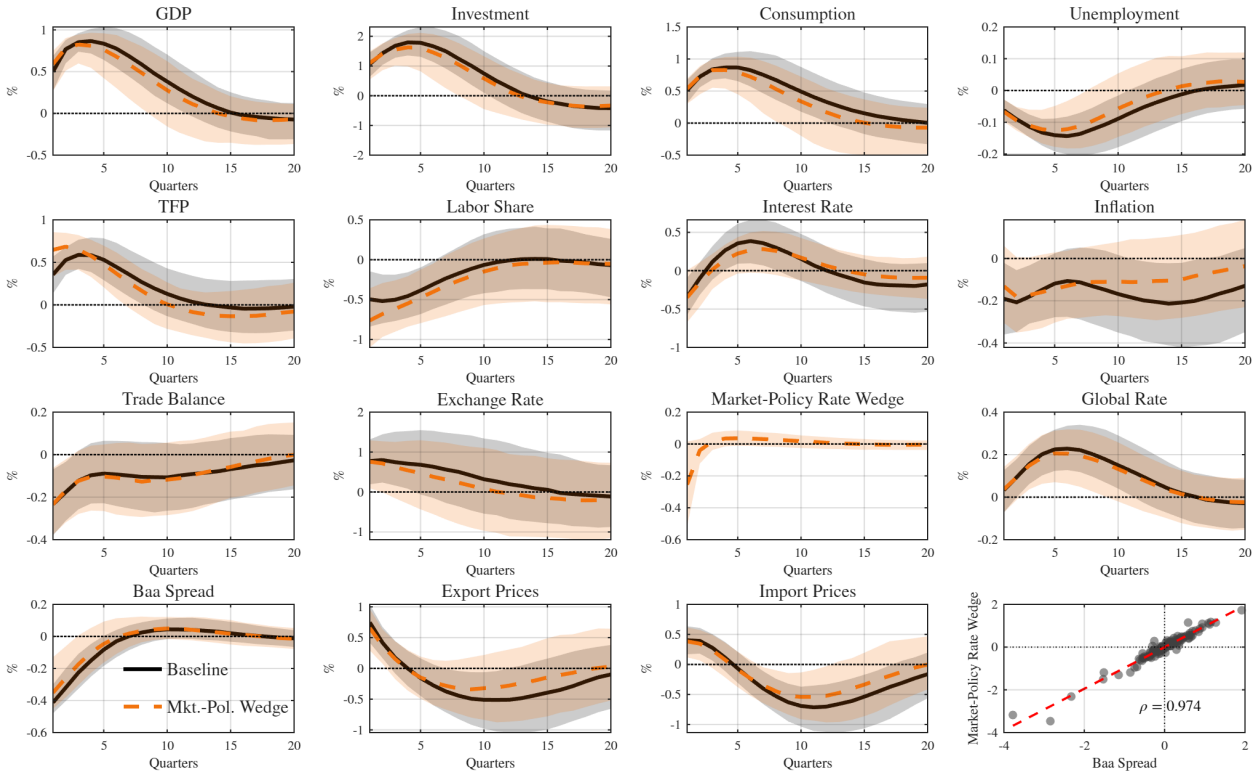


Figure C.7: Impulse Responses to the MBC Shock for Mexico: Adding the Market-Policy Rate Wedge

Notes: The figure reports impulse responses to the main business-cycle shock for Mexico for two different VAR specifications. The first specification is the baseline, while in the second specification, we also include the market-policy rate wedge for Mexico. The shock is identified as the innovation that explains the largest share of GDP fluctuations. Shaded areas report 68 percent posterior bands. Responses are shown to a one-standard-deviation shock.

Table C.9: Variance Contributions of the MBC Shock for Mexico: Adding the US Dollar Index

	Business Cycle $(6\text{–}32q)$	Long Run $(80\text{–}\infty q)$
GDP	68.45	20.56
	[58.82, 76.63]	[8.41, 43.75]
Investment	51.43	14.13
	[39.04, 62.96]	[4.74, 33.21]
Consumption	53.34	15.99
	[40.82, 64.35]	[5.86, 37.12]
Unemployment	37.66	10.64
	[23.69, 53.63]	[3.57, 27.53]
TFP	34.84	8.56
	[22.13, 49.41]	[2.60, 23.31]
Labor Share	22.89	10.08
	[11.05, 37.69]	[2.81, 26.16]
Interest Rate	19.74	7.64
	[8.35, 38.24]	[1.85, 21.30]
Inflation	9.33	11.15
	[3.98, 21.55]	[3.59, 29.40]
Trade Balance to GDP	11.13	10.36
	[4.52, 24.40]	[2.90, 26.39]
Exchange Rate	14.73	9.04
	[4.96, 32.92]	[2.50, 23.55]
Dollar Index	23.77	7.50
	[10.62, 44.97]	[1.63, 23.22]
Global Rate	24.21	10.82
	[11.79, 40.57]	[3.58, 27.23]
Baa Spread	58.01	14.84
	[34.86, 74.70]	[4.47, 36.58]
Export Prices	24.78	7.47
	[13.12, 43.48]	[1.80, 23.44]
Import Prices	32.51	10.29
	[17.18, 50.52]	[2.66, 29.16]

Notes: The table reports the contribution of the main business-cycle shock to the variance of each variable over two frequency bands. The business-cycle band corresponds to periodicities between 6 and 32 quarters. The long-run band corresponds to periodicities between 80 quarters and infinity. The VAR includes the Dollar Index in addition to the baseline specification. Entries are posterior medians, expressed in percent. Brackets report 68 percent posterior credible intervals.

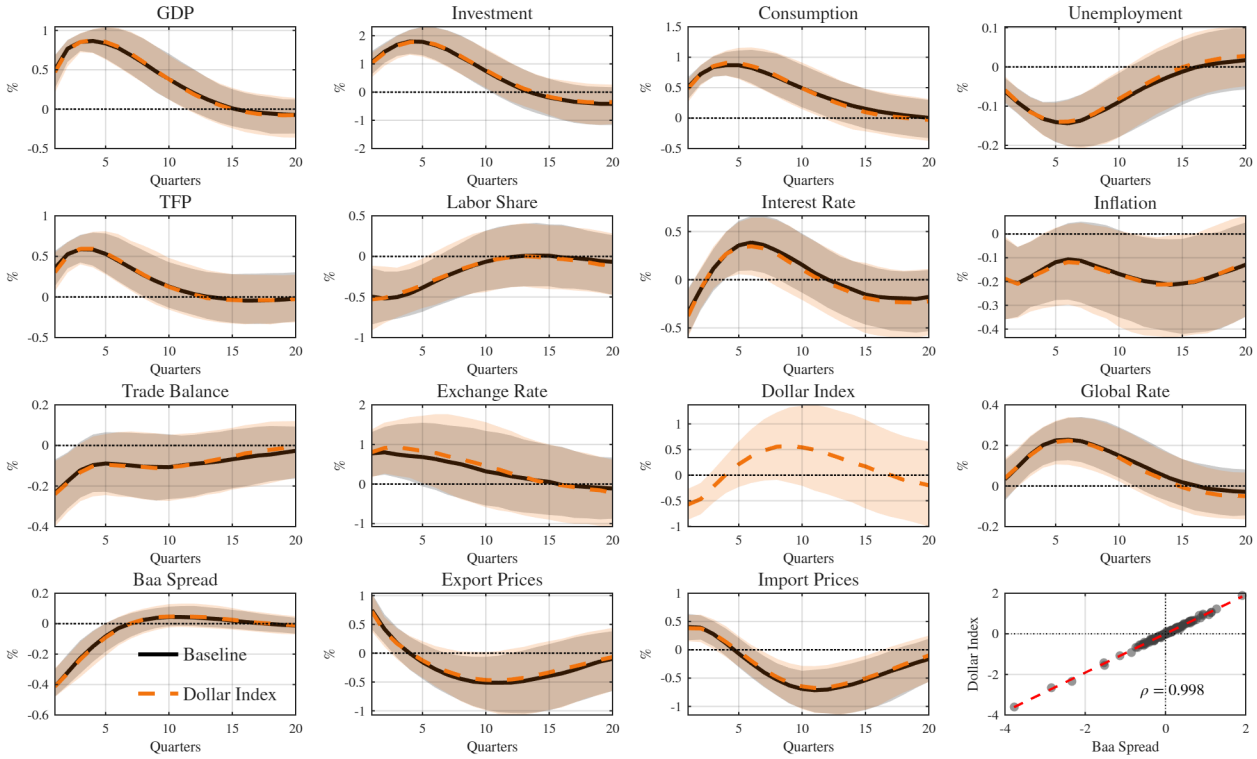


Figure C.8: Impulse Responses to the MBC Shock for Mexico: Adding the US Dollar Index

Notes: The figure reports impulse responses to the main business-cycle shock for Mexico for two different VAR specifications. The first specification is the baseline, while in the second specification, we also include the US Dollar index. The shock is identified as the innovation that explains the largest share of GDP fluctuations. Shaded areas report 68 percent posterior bands. Responses are shown to a one-standard-deviation shock.

Table C.10: Variance Contributions of the MBC Shock for Mexico: US Dollar Index Specification

	Business Cycle $(6\text{–}32q)$	Long Run $(80\text{–}\infty q)$
GDP	80.44	22.73
	[71.32, 87.20]	[9.93, 44.67]
Investment	49.91	13.18
	[39.47, 59.62]	[4.96, 28.77]
Consumption	53.55	13.70
	[43.10, 62.77]	[4.90, 31.36]
Unemployment Rate	32.70	9.99
	[21.64, 44.33]	[3.05, 25.59]
TFP	34.71	5.92
	[22.04, 47.12]	[2.02, 17.95]
Labor Share	28.40	10.69
	[18.24, 39.77]	[3.21, 25.21]
Interest Rate	9.38	4.94
	[3.51, 17.98]	[1.42, 16.04]
Inflation	4.19	6.76
	[1.80, 9.42]	[1.75, 18.57]
Trade Balance to GDP	5.92	7.33
	[1.80, 13.46]	[1.93, 20.56]
Exchange Rate	4.53	5.43
	[1.77, 11.26]	[1.50, 15.87]
Global Rate	15.97	11.45
	[8.29, 26.58]	[3.40, 25.23]
Dollar Index	10.87	5.05
	[5.14, 19.82]	[1.21, 16.07]
Export Prices	13.64	5.53
	[6.93, 22.92]	[1.43, 17.51]
Import Prices	20.02	9.11
	[11.93, 31.32]	[2.56, 22.85]

Notes: The table reports the contribution of the main business-cycle shock to the variance of each variable over two frequency bands. The business-cycle band corresponds to periodicities between 6 and 32 quarters. The long-run band corresponds to periodicities between 80 quarters and infinity. In this specification, we substitute Baa spread with the US Dollar Index. Brackets report 68 percent posterior credible intervals.

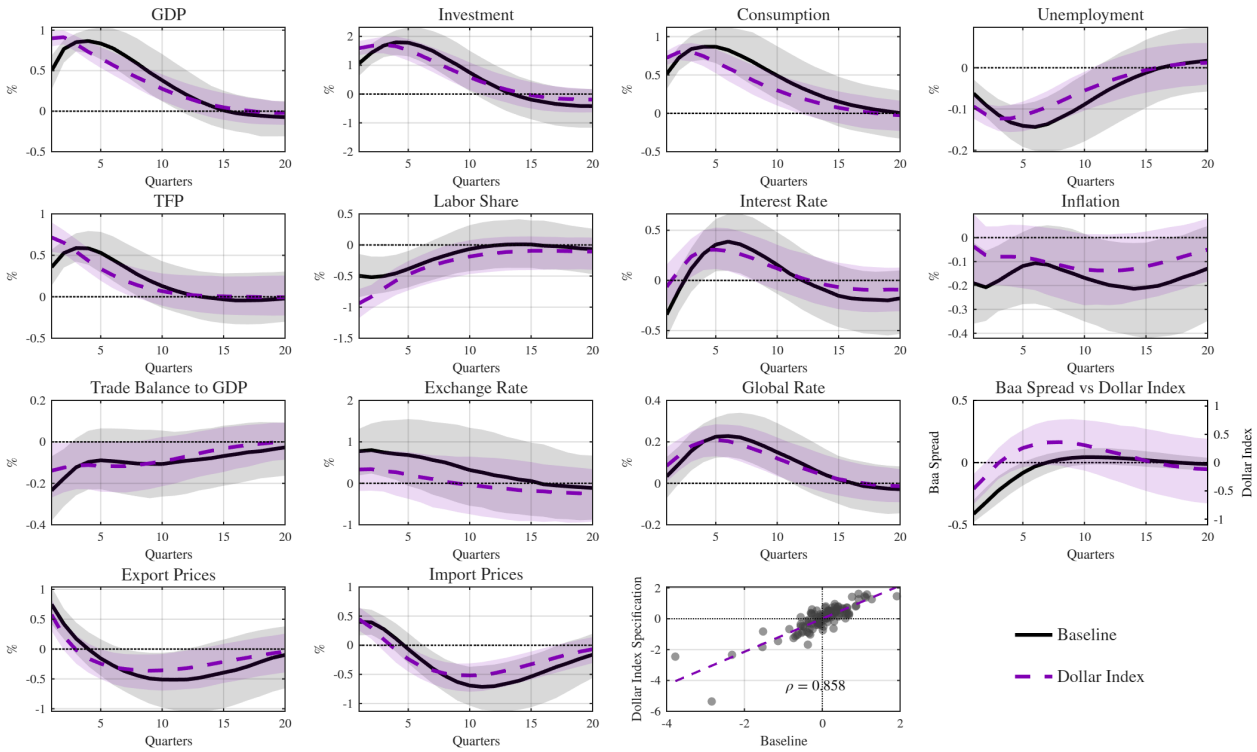


Figure C.9: Impulse Responses to the MBC Shock for Mexico: Baa Spread and US Dollar Index Specification

Notes: The figure reports impulse responses to the main business-cycle shock for Mexico for two different VAR specifications. The first specification is the baseline, while in the second specification, we substitute Baa Spread with the US Dollar index. The shock is identified as the innovation that explains the largest share of GDP fluctuations. Shaded areas report 68 percent posterior bands. Responses are shown to a one-standard-deviation shock.

Table C.11: Variance Contributions of the MBC Shock for Mexico: Adding the NEER

	Business Cycle $(6\text{–}32q)$	Long Run $(80\text{–}\infty q)$
GDP	66.51	20.48
	[57.23, 75.72]	[7.82, 41.61]
Investment	51.36	13.38
	[37.12, 62.21]	[4.33, 29.95]
Consumption	50.47	17.89
	[37.99, 61.85]	[6.30, 37.76]
Unemployment	35.19	11.83
	[21.86, 51.54]	[3.73, 32.70]
TFP	39.89	14.67
	[26.37, 53.32]	[4.80, 36.73]
Labor Share	22.49	12.62
	[10.91, 35.81]	[3.47, 33.80]
Interest Rate	19.51	8.91
	[8.89, 36.99]	[2.10, 23.90]
Inflation	9.35	11.43
	[3.74, 21.15]	[3.36, 30.82]
Trade Balance to GDP	10.99	11.61
	[4.58, 22.88]	[3.48, 28.26]
Real Exchange Rate	12.31	8.43
	[4.59, 28.49]	[2.47, 24.95]
Nominal Exchange Rate	12.40	7.95
	[5.10, 26.97]	[1.79, 24.83]
Global Rate	25.42	14.86
	[11.92, 40.29]	[4.54, 34.95]
Baa Spread	58.49	15.50
	[36.42, 74.36]	[4.30, 39.65]
Export Prices	27.64	8.59
	[15.66, 43.88]	[2.07, 27.31]
Import Prices	34.28	13.05
	[21.04, 50.81]	[3.28, 34.63]

Notes: The table reports the contribution of the main business-cycle shock to the variance of each variable over two frequency bands. The business-cycle band corresponds to periodicities between 6 and 32 quarters. The long-run band corresponds to periodicities between 80 quarters and infinity. The VAR includes the nominal effective exchange rate in addition to the baseline specification. Entries are posterior medians, expressed in percent. Brackets report 68 percent posterior credible intervals.

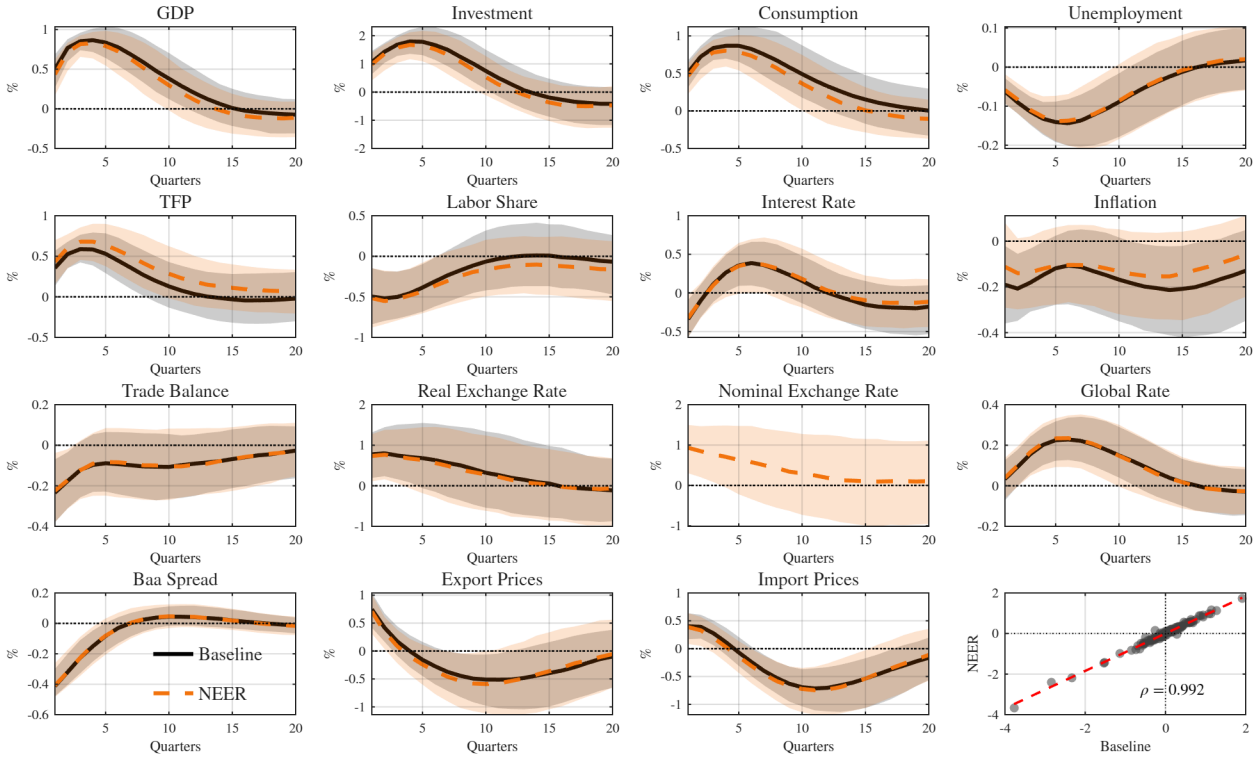


Figure C.10: Impulse Responses to the MBC Shock for Mexico: Adding the NEER

Notes: The figure reports impulse responses to the main business-cycle shock for Mexico for two different VAR specifications. The first specification is the baseline, while in the second specification, we also include the Nominal effective exchange rate for Mexico. The shock is identified as the innovation that explains the largest share of GDP fluctuations. Shaded areas report 68 percent posterior bands. Responses are shown to a one-standard-deviation shock.

Table C.12: Variance Contributions of the MBC Shock for Mexico Adding the UIP Premium and the Interest Rate Differential

	Business Cycle $(6\text{–}32q)$	Long Run $(80\text{–}\infty q)$
GDP	64.91	16.06
	[55.89, 74.54]	[5.97, 34.53]
Investment	47.66	11.35
	[35.36, 60.01]	[3.85, 27.00]
Consumption	50.67	14.13
	[38.34, 62.10]	[5.38, 30.91]
Unemployment	34.39	10.08
	[21.27, 49.48]	[2.91, 26.66]
TFP	46.45	8.96
	[33.56, 58.67]	[2.54, 25.25]
Labor Share	24.63	10.85
	[12.29, 38.73]	[2.80, 28.79]
Interest Rate	16.61	6.68
	[6.79, 33.78]	[1.81, 20.06]
Inflation	9.81	11.60
	[4.18, 20.76]	[3.68, 28.18]
Trade Balance to GDP	11.62	10.39
	[4.84, 24.88]	[2.82, 25.80]
s^{us}	16.27	7.51
	[7.61, 31.47]	[1.88, 22.07]
λ^{us}	15.22	9.40
	[7.10, 26.40]	[2.84, 24.48]
$i^{mx} - i^{us}$	15.94	8.66
	[6.04, 31.87]	[2.64, 22.91]
Global Rate	20.83	11.07
	[9.46, 36.79]	[2.86, 25.92]
Baa Spread	46.39	10.93
	[22.99, 65.91]	[3.03, 29.03]
Export Prices	24.11	7.61
	[12.58, 40.01]	[1.74, 23.19]
Import Prices	32.63	10.13
	[19.54, 48.47]	[2.70, 27.42]

Notes: The table reports the contribution of the main business-cycle shock to the variance of each variable over two frequency bands. The business-cycle band corresponds to periodicities between 6 and 32 quarters. The long-run band corresponds to periodicities between 80 quarters and infinity. The VAR augments the baseline specification with the Mexico–U.S. uncovered interest parity premium, λ^{us}, and the interest rate differential between Mexico and the United States, $i^{mx} - i^{us}$. In this specification the exchange rate, s^{us} is the bilateral peso–dollar rate rather than the real effective exchange rate of the baseline. Entries are posterior medians, expressed in percent. Brackets report 68 percent posterior credible intervals.

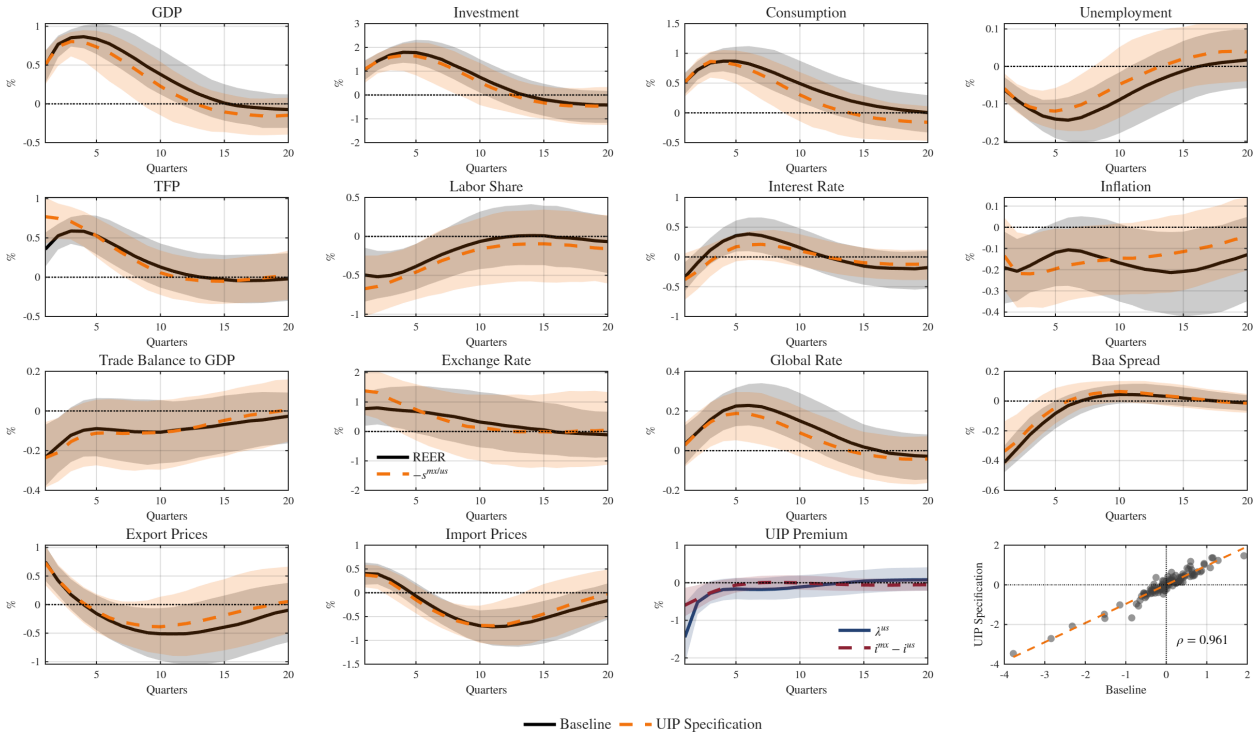


Figure C.11: Impulse Responses to the MBC Shock for Mexico: Adding the UIP Premium and the Interest Rate Differential

Notes: The figure reports impulse responses to the main business-cycle shock for Mexico for two different VAR specifications. The first specification is the baseline, while in the second specification we also include the Mexico–U.S. uncovered interest parity premium, λ^{us}, and the interest rate differential between Mexico and the United States, $i^{mx} - i^{us}$. The shock is identified as the innovation that explains the largest share of GDP fluctuations. In the exchange-rate panel, the baseline response refers to Mexico's real effective exchange rate, whereas the augmented specification includes the bilateral peso–dollar rate $s^{mx/us}$, reported with the opposite sign so that in both cases an increase denotes an appreciation of the peso. The panel labelled UIP Premium reports the two variables that enter only the augmented specification and therefore has no baseline counterpart. The bottom-right panel plots the shock recovered from the augmented specification against its baseline counterpart, with the dashed line reporting the fitted regression line and ρ the correlation between the two series. Shaded areas report 68 percent posterior bands. Responses are shown to a one-standard-deviation shock.

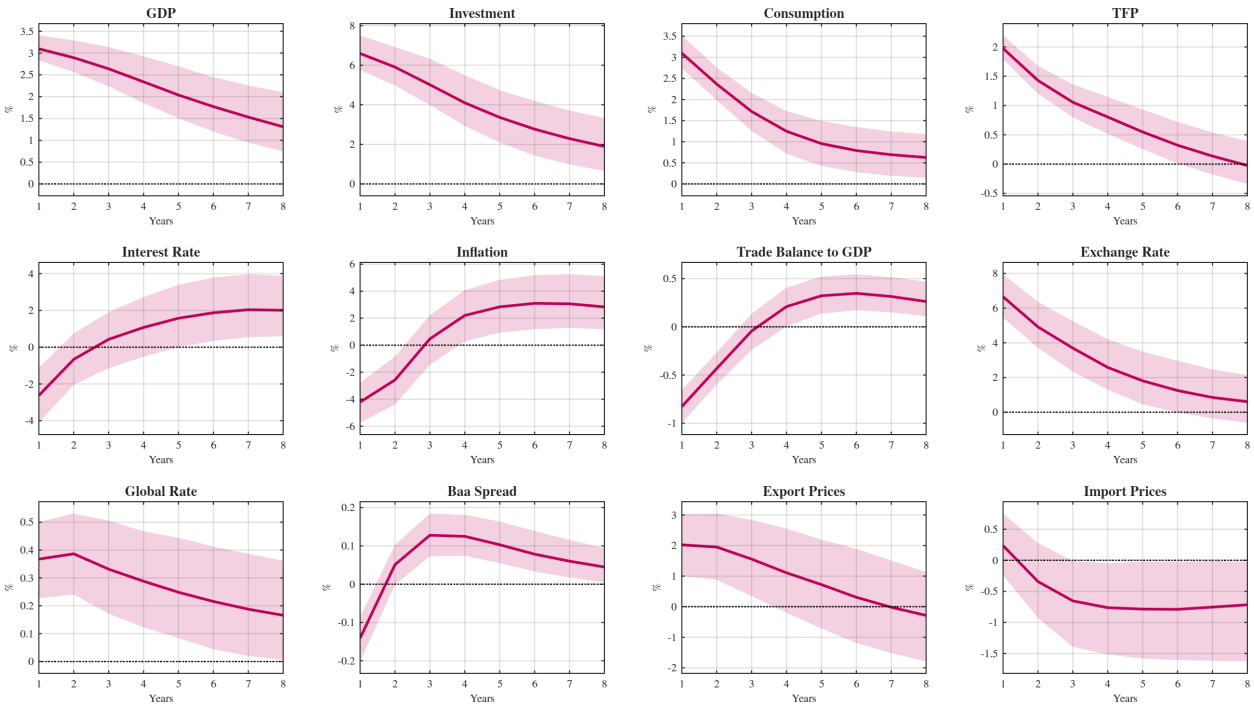


Figure C.12: Impulse Responses to the MBC Shock for Mexico: Annual VAR

Notes: The figure reports the impulse responses to the main business-cycle shock for Mexico, estimated on annual data over 1963–2023 with three lags. The shock is identified as the innovation that explains the largest share of GDP fluctuations at business-cycle frequencies, between 2 and 10 years. Responses are shown to a one-standard-deviation shock. Solid lines represent posterior medians, while the shaded areas correspond to the 68% posterior credible bands.

C.1 The Main Business-Cycle Shock in EMDEs

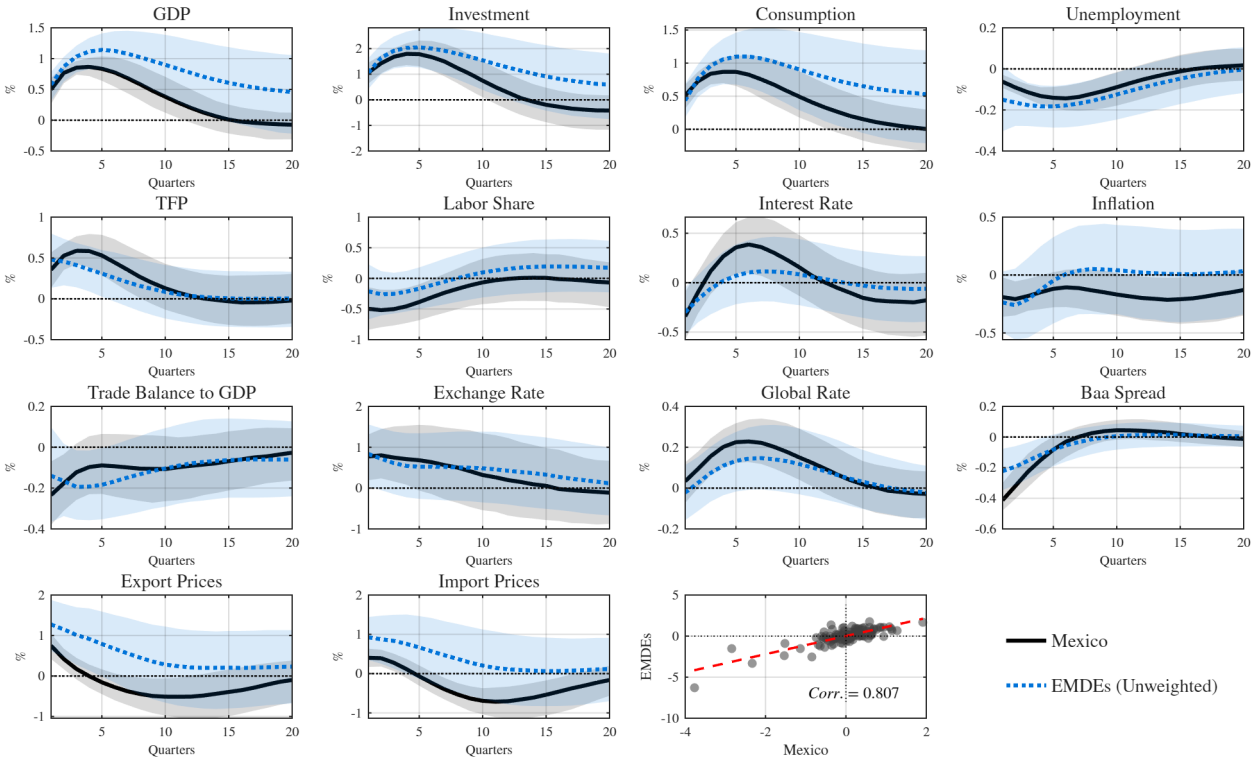


Figure C.13: Impulse Responses to the Main Business-Cycle Shock: Mexico and EMDEs Aggregate

Notes: The figure compares impulse responses to the main business-cycle shock in Mexico and in the EMDEs aggregate. For each country, the shock is identified as the innovation that explains the largest share of GDP fluctuations at business-cycle frequencies. The solid black line reports the Mexican response. The dotted blue line reports the unweighted average response across the EMDEs sample. Shaded areas report 68 percent posterior bands. Responses are normalized so that the shock generates an expansion in GDP. The bottom-right panel displays a scatter plot of the MBC shock for Mexico and the first principal component of the MBC shocks of the EMDEs sample, along with the fitted linear regression line and the correlation between them. The EMDEs sample includes Mexico, Chile, Brazil, India, South Africa, Türkiye, Indonesia, and Philippines.

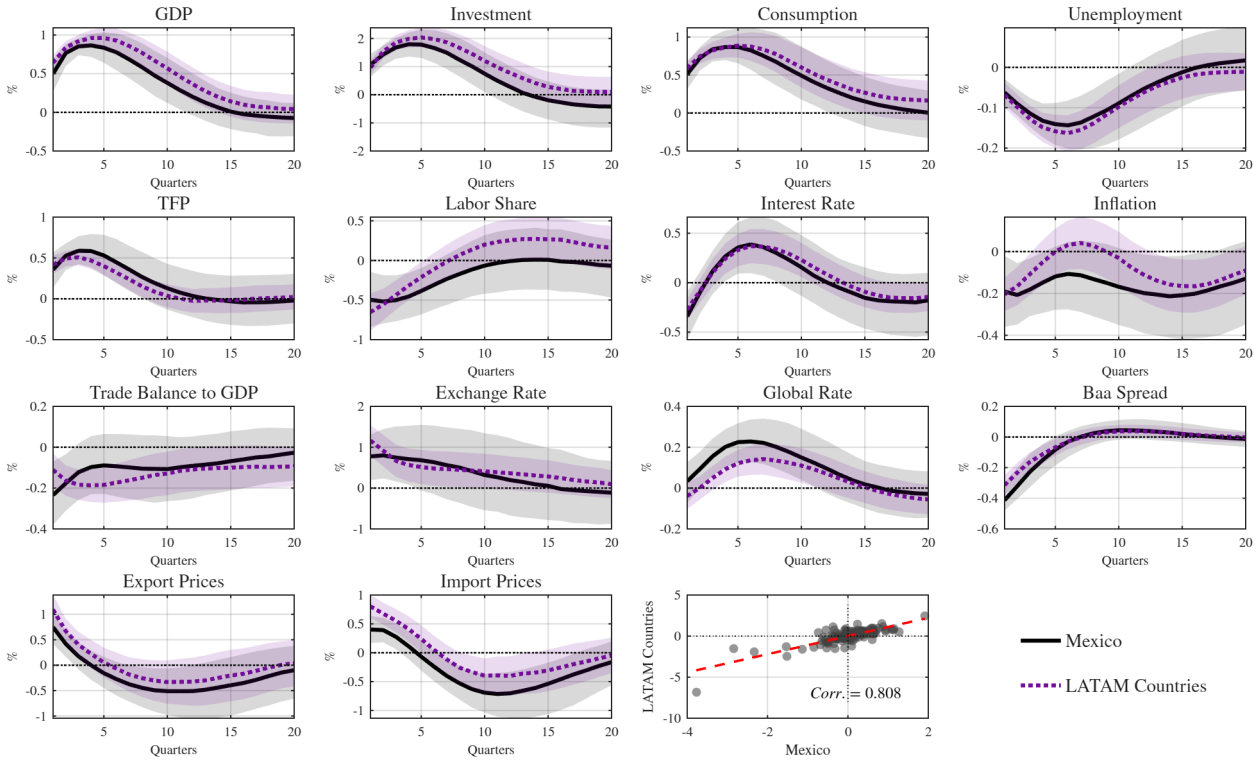


Figure C.14: Impulse Responses to the Main Business-Cycle Shock: Mexico and LATAM Aggregate

Notes: The figure compares impulse responses to the main business-cycle shock in Mexico and in the LATAM aggregate. For each country, the shock is identified as the innovation that explains the largest share of GDP fluctuations at business-cycle frequencies. The solid black line reports the Mexican response. The dotted blue line reports the inverse-variance-weighted average response across the LATAM sample. Shaded areas report 68 % posterior bands. Responses are normalized so that the shock generates an expansion in GDP. The bottom-right panel displays a scatter plot of the MBC shock for Mexico and the first principal component of the MBC shocks of the LATAM sample, along with the fitted linear regression line and the correlation between them. The LATAM sample includes Mexico, Chile, and Brazil.

Table C.13: LATAM Countries: Variance Contributions of the MBC Shock

	Business Cycle $(6\text{–}32q)$	Long Run $(80\text{–}\infty q)$
Variable	LATAM Countries	LATAM Countries
GDP	67.42	22.63
	[65.91, 68.94]	[20.89, 24.36]
Investment	43.55	18.12
	[35.84, 51.26]	[9.88, 26.36]
Consumption	45.32	18.93
	[35.53, 55.10]	[16.54, 21.31]
Unemployment Rate	28.50	15.93
	[15.13, 41.87]	[0.35, 31.51]
TFP	32.73	12.25
	[26.03, 39.43]	[5.16, 19.35]
Labor Share	27.87	12.36
	[18.97, 36.77]	[3.77, 20.95]
Interest Rate	17.89	9.71
	[11.60, 24.17]	[5.17, 14.24]
Inflation	10.87	11.62
	[0.60, 21.14]	[10.44, 12.79]
Trade Balance to GDP	12.69	16.09
	[4.86, 20.53]	[9.09, 23.08]
Exchange Rate	12.07	10.71
	[7.13, 17.00]	[0.11, 21.32]
Global Rate	14.88	11.57
	[8.58, 21.17]	[6.71, 16.42]
Baa Spread	29.08	12.53
	[7.30, 50.86]	[9.97, 15.09]
Export Prices	27.67	11.63
	[20.02, 35.32]	[5.42, 17.84]
Import Prices	33.97	14.51
	[28.19, 39.74]	[9.10, 19.92]

Notes: The table reports the variance contribution of the main business-cycle shock for the LATAM countries aggregate. For each country, the shock is identified as the innovation that explains the largest share of GDP fluctuations at business-cycle frequencies. Country-level variance contributions are aggregated using inverse-variance weights. The business-cycle band corresponds to periodicities between 6 and 32 quarters. The long-run band corresponds to periodicities between 80 quarters and infinity. Entries are posterior medians, expressed in percent. The LATAM countries sample includes Mexico, Chile, and Brazil.

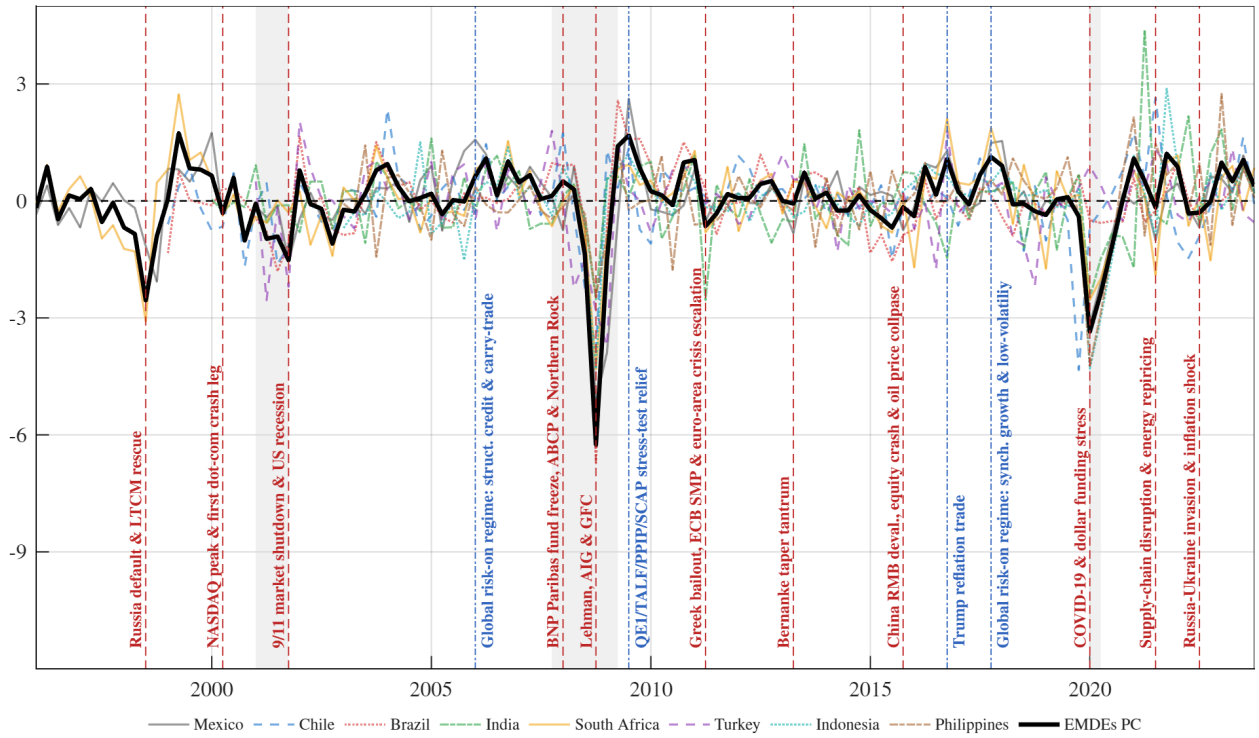


Figure C.15: Country Level MBC shocks and Principal Component

Notes: The figure plots the standardized country-specific business-cycle shocks (colored lines) together with their first principal component (solid black line). Each country-specific shock is identified as the innovation explaining the largest share of GDP fluctuations at business-cycle frequencies and is standardized to zero mean and unit variance over its available sample. The first principal component is extracted via expectation-maximization PCA to accommodate the unbalanced panel, standardized to unit variance, and signed so as to be positively correlated with the Mexican shock. Vertical lines and arrows mark major global financial episodes over the sample. Shaded vertical bands mark NBER U.S. recessions.

D Derivations and Proof for Section 6

This appendix derives the main equations in Section 6 and proves Proposition 1.

Household optimality

The representative household chooses C_t and N_t taking w_t, Π_t, and T_t as given. Preferences are given by (3),

$$\mathbb{E}_0 \sum_{t=0}^{\infty} \beta^t u\left(C_t - G(N_t)\right), \qquad G(N_t) = \frac{\chi}{1+\varphi} N_t^{1+\varphi}.$$

Since the household budget constraint is static within the period,

$$C_t = w_t N_t + \Pi_t + T_t,$$

the household's problem in period t can be written as choosing N_t to maximize

$$u\left(w_t N_t + \Pi_t + T_t - G(N_t)\right).$$

The first-order condition is

$$u'\left(C_t - G(N_t)\right)\left[w_t - G'(N_t)\right] = 0.$$

Using $u' > 0$ and $G'(N_t) = \chi N_t^{\varphi}$, the intratemporal condition is

$$w_t = \chi N_t^{\varphi}.$$

This is the labor-supply condition used in the main text.

Firm labor demand and the working-capital wedge

Firm i produces according to (5),

$$y_{it} = a_i n_{it}^{\alpha}, \qquad 0 < \alpha < 1.$$

The firm must finance a fraction q_i of its wage bill in advance. Given the gross working-capital rate R_t, the firm-specific wedge is given by (8),

$$\omega_i(R_t) = 1 + q_i(R_t - 1).$$

Thus the effective unit cost of labor for firm i is $w_t \omega_i(R_t)$. The firm's static problem is

$$\max_{n_{it} \geq 0} \left\{ a_i n_{it}^{\alpha} - w_t \omega_i(R_t) n_{it} \right\}.$$

For an interior solution, the first-order condition is $\alpha a_i n_{it}^{\alpha-1} = w_t \omega_i(R_t)$. Solving for labor demand gives

$$n_{it} = \left(\frac{\alpha a_i}{w_t \omega_i(R_t)} \right)^{\frac{1}{1-\alpha}}.$$

This is the firm-level labor-demand equation stated in the main text.

The frictionless deterministic benchmark employment level $\bar{n}_i$ is obtained by setting the working-capital wedge equal to one. Hence

$$\alpha a_i \bar{n}_i^{\alpha-1} = \bar{w},$$

so that

$$\bar{n}_i = \left(\frac{\alpha a_i}{\bar{w}} \right)^{\frac{1}{1-\alpha}}.$$

Since $0 < \alpha < 1$, $\bar{n}_i$ is strictly increasing in a_i. Therefore, under the exposure function (7),

$$q_i = q_0 + q_1 \kappa(\bar{n}_i), \qquad \kappa'(\bar{n}_i) > 0,$$

more productive firms have greater working-capital exposure whenever $q_1 > 0$.

Derivation of aggregate labor, equation (10)

Aggregate labor is

$$N_t = \int_0^1 n_{it}\, di.$$

Using firm labor demand,

$$N_t = \int_0^1 \left(\frac{\alpha a_i}{w_t \omega_i(R_t)} \right)^{\frac{1}{1-\alpha}} di.$$

Rearranging,

$$N_t = \left(\frac{\alpha}{w_t} \right)^{\frac{1}{1-\alpha}} \int_0^1 a_i^{\frac{1}{1-\alpha}} \omega_i(R_t)^{-\frac{1}{1-\alpha}}\, di.$$

Using labor supply, $w_t = \chi N_t^{\varphi}$, gives

$$N_t = \left(\frac{\alpha}{\chi N_t^{\varphi}} \right)^{\frac{1}{1-\alpha}} \int_0^1 a_i^{\frac{1}{1-\alpha}} \omega_i(R_t)^{-\frac{1}{1-\alpha}}\, di.$$

Therefore,

$$N_t^{1+\frac{\varphi}{1-\alpha}} = \left(\frac{\alpha}{\chi} \right)^{\frac{1}{1-\alpha}} \int_0^1 a_i^{\frac{1}{1-\alpha}} \omega_i(R_t)^{-\frac{1}{1-\alpha}}\, di.$$

Raising both sides to the power $(1-\alpha)/(1-\alpha+\varphi)$ yields

$$N_t = \left[\frac{\alpha}{\chi}\left(\int_0^1 a_i^{\frac{1}{1-\alpha}}\omega_i(R_t)^{-\frac{1}{1-\alpha}}\,di\right)^{1-\alpha}\right]^{\frac{1}{1-\alpha+\varphi}},$$

which is equation (10).

Derivation of aggregate TFP, equation (11)

Aggregate output is

$$Y_t = \int_0^1 a_i n_{it}^{\alpha}\,di.$$

Substituting firm labor demand,

$$Y_t = \int_0^1 a_i\left(\frac{\alpha a_i}{w_t\omega_i(R_t)}\right)^{\frac{\alpha}{1-\alpha}}\,di.$$

Thus

$$Y_t = \left(\frac{\alpha}{w_t}\right)^{\frac{\alpha}{1-\alpha}}\int_0^1 a_i^{\frac{1}{1-\alpha}}\omega_i(R_t)^{-\frac{\alpha}{1-\alpha}}\,di.$$

From the expression for aggregate labor,

$$N_t = \left(\frac{\alpha}{w_t}\right)^{\frac{1}{1-\alpha}}\int_0^1 a_i^{\frac{1}{1-\alpha}}\omega_i(R_t)^{-\frac{1}{1-\alpha}}\,di.$$

Therefore,

$$N_t^{\alpha} = \left(\frac{\alpha}{w_t}\right)^{\frac{\alpha}{1-\alpha}}\left[\int_0^1 a_i^{\frac{1}{1-\alpha}}\omega_i(R_t)^{-\frac{1}{1-\alpha}}\,di\right]^{\alpha}.$$

Since aggregate TFP is defined by the aggregate representation

$$Y_t = A(R_t)N_t^{\alpha},$$

we obtain

$$A(R_t) = \frac{\int_0^1 a_i^{\frac{1}{1-\alpha}}\omega_i(R_t)^{-\frac{\alpha}{1-\alpha}}\,di}{\left[\int_0^1 a_i^{\frac{1}{1-\alpha}}\omega_i(R_t)^{-\frac{1}{1-\alpha}}\,di\right]^{\alpha}},$$

which is equation (11).

If exposure is common across firms, so that $q_i = q$ for all i, then

$$\omega_i(R_t) = \omega(R_t)$$

for all i. In this case,

$$A(R_t) = \frac{\omega(R_t)^{-\frac{\alpha}{1-\alpha}} \int_0^1 a_i^{\frac{1}{1-\alpha}} \, di}{\left[\omega(R_t)^{-\frac{1}{1-\alpha}} \int_0^1 a_i^{\frac{1}{1-\alpha}} \, di\right]^{\alpha}}.$$

The powers of $\omega(R_t)$ cancel, leaving

$$A = \left(\int_0^1 a_i^{\frac{1}{1-\alpha}} \, di\right)^{1-\alpha}.$$

Thus, when the working-capital wedge is common across firms, aggregate TFP is independent of global financial conditions.

Two-type relative employment, equation (14)

Consider the two-type version in the main text, with productivities $a_H > a_L$ and wedges

$$\omega_j(R_t) = 1 + q_j(R_t - 1), \qquad j \in \{L, H\}.$$

Firm-level labor demand implies

$$n_{jt} = \left(\frac{\alpha a_j}{w_t \omega_j(R_t)}\right)^{\frac{1}{1-\alpha}}.$$

Therefore,

$$\frac{n_{Ht}}{n_{Lt}} = \left[\frac{a_H}{a_L} \frac{\omega_L(R_t)}{\omega_H(R_t)}\right]^{\frac{1}{1-\alpha}}.$$

This is equation (14).

When $q_H > q_L$, an increase in R_t raises $\omega_H(R_t)$ more than $\omega_L(R_t)$. Indeed,

$$\frac{\partial}{\partial R_t} \log\left(\frac{\omega_L(R_t)}{\omega_H(R_t)}\right) = \frac{q_L}{\omega_L(R_t)} - \frac{q_H}{\omega_H(R_t)}.$$

Since

$$\frac{q}{1 + q(R_t - 1)}$$

is increasing in q for $R_t > 1$, the derivative is negative whenever $q_H > q_L$. Thus a financial tightening lowers n_{Ht}/n_{Lt}, while a financial easing raises it.

Proof of Proposition 1

We prove each part of the proposition.

Part (i): aggregate labor and GDP. From equation (10),

$$N_t = \left[\frac{\alpha}{\chi}\left(\int_0^1 a_i^{\frac{1}{1-\alpha}}\omega_i(R_t)^{-\frac{1}{1-\alpha}}\,di\right)^{1-\alpha}\right]^{\frac{1}{1-\alpha+\varphi}}.$$

Define

$$S(R_t) = \int_0^1 a_i^{\frac{1}{1-\alpha}}\omega_i(R_t)^{-\frac{1}{1-\alpha}}\,di.$$

Then

$$N_t = \left[\frac{\alpha}{\chi}S(R_t)^{1-\alpha}\right]^{\frac{1}{1-\alpha+\varphi}}.$$

Because

$$\omega_i(R_t) = 1 + q_i(R_t - 1),$$

we have

$$\frac{\partial\omega_i(R_t)}{\partial R_t} = q_i.$$

Therefore,

$$S'(R_t) = -\frac{1}{1-\alpha}\int_0^1 a_i^{\frac{1}{1-\alpha}}\omega_i(R_t)^{-\frac{1}{1-\alpha}-1}q_i\,di.$$

Since $a_i > 0$, $\omega_i(R_t) > 0$, and $q_i \geq 0$, it follows that

$$S'(R_t) \leq 0.$$

The inequality is strict whenever $q_i > 0$ for a set of firms of positive measure. Hence,

$$\frac{\partial N_t}{\partial R_t} < 0$$

under a nondegenerate working-capital friction. A global financial tightening therefore lowers aggregate labor; equivalently, a global financial easing raises aggregate labor.

Aggregate output satisfies

$$Y_t = A(R_t)N_t^{\alpha}.$$

Part (ii) below establishes that

$$\frac{\partial A(R_t)}{\partial R_t} \leq 0.$$

Since $\alpha > 0$ and $\partial N_t/\partial R_t < 0$, it follows that

$$\frac{\partial Y_t}{\partial R_t} < 0.$$

Thus a global financial tightening lowers GDP, while a global financial easing raises GDP.

Part (ii): aggregate TFP. aggregate TFP is given by equation (11),

$$A(R_t) = \frac{\int_0^1 a_i^{\frac{1}{1-\alpha}} \omega_i(R_t)^{-\frac{\alpha}{1-\alpha}}\, di}{\left[\int_0^1 a_i^{\frac{1}{1-\alpha}} \omega_i(R_t)^{-\frac{1}{1-\alpha}}\, di\right]^{\alpha}}.$$

Let

$$B(R_t) = \int_0^1 a_i^{\frac{1}{1-\alpha}} \omega_i(R_t)^{-\frac{\alpha}{1-\alpha}}\, di$$

and

$$S(R_t) = \int_0^1 a_i^{\frac{1}{1-\alpha}} \omega_i(R_t)^{-\frac{1}{1-\alpha}}\, di.$$

Then

$$A(R_t) = \frac{B(R_t)}{S(R_t)^{\alpha}}.$$

Taking logs,

$$\log A(R_t) = \log B(R_t) - \alpha \log S(R_t).$$

Differentiating with respect to R_t,

$$\frac{\partial \log A(R_t)}{\partial R_t} = \frac{B'(R_t)}{B(R_t)} - \alpha \frac{S'(R_t)}{S(R_t)}.$$

Now,

$$B'(R_t) = -\frac{\alpha}{1-\alpha} \int_0^1 a_i^{\frac{1}{1-\alpha}} \omega_i(R_t)^{-\frac{\alpha}{1-\alpha}} \frac{q_i}{\omega_i(R_t)}\, di,$$

and

$$S'(R_t) = -\frac{1}{1-\alpha} \int_0^1 a_i^{\frac{1}{1-\alpha}} \omega_i(R_t)^{-\frac{1}{1-\alpha}} \frac{q_i}{\omega_i(R_t)}\, di.$$

Hence

$$\frac{\partial \log A(R_t)}{\partial R_t} = \frac{\alpha}{1-\alpha} \left[\mathbb{E}_S\left(\frac{q_i}{\omega_i(R_t)}\right) - \mathbb{E}_B\left(\frac{q_i}{\omega_i(R_t)}\right)\right],$$

where $\mathbb{E}_S$ denotes the average using weights proportional to

$$a_i^{\frac{1}{1-\alpha}} \omega_i(R_t)^{-\frac{1}{1-\alpha}},$$

and $\mathbb{E}_B$ denotes the average using weights proportional to

$$a_i^{\frac{1}{1-\alpha}} \omega_i(R_t)^{-\frac{\alpha}{1-\alpha}}.$$

More explicitly, define the normalized weights

$$w_i^S(R_t) = \frac{a_i^{\frac{1}{1-\alpha}} \omega_i(R_t)^{-\frac{1}{1-\alpha}}}{S(R_t)}, \qquad w_i^B(R_t) = \frac{a_i^{\frac{1}{1-\alpha}} \omega_i(R_t)^{-\frac{\alpha}{1-\alpha}}}{B(R_t)}.$$

Then the two expectations are

$$\mathbb{E}_S\left(\frac{q_i}{\omega_i(R_t)}\right) = \int_0^1 w_i^S(R_t)\frac{q_i}{\omega_i(R_t)}\,di, \qquad \mathbb{E}_B\left(\frac{q_i}{\omega_i(R_t)}\right) = \int_0^1 w_i^B(R_t)\frac{q_i}{\omega_i(R_t)}\,di.$$

The two weighting schemes share the same productivity term $a_i^{1/(1-\alpha)}$, but they differ in how strongly they penalize firms with high working-capital wedges. The S-weights use the exponent $-1/(1-\alpha)$, while the B-weights use the smaller-in-absolute-value exponent $-\alpha/(1-\alpha)$. Equivalently,

$$w_i^S(R_t) \propto w_i^B(R_t)\omega_i(R_t)^{-1}.$$

Thus, relative to the B-weights, the S-weights attach an additional factor $\omega_i(R_t)^{-1}$ to each firm. To determine the sign, note first that for $R_t > 1$,

$$\frac{q_i}{\omega_i(R_t)} = \frac{q_i}{1 + q_i(R_t - 1)}$$

is increasing in q_i:

$$\frac{\partial}{\partial q_i}\left[\frac{q_i}{1 + q_i(R_t - 1)}\right] = \frac{1}{[1 + q_i(R_t - 1)]^2} > 0.$$

Second, the wedge $\omega_i(R_t)$ is increasing in q_i when $R_t > 1$. Therefore the additional factor

$$\omega_i(R_t)^{-1}$$

places relatively more weight on firms with lower q_i.

In other words, the S-weighted distribution is tilted toward low-exposure firms relative to the B-weighted distribution. Since $q_i/\omega_i(R_t)$ is increasing in exposure q_i, this tilt lowers its weighted average under S relative to B.

Therefore,

$$\mathbb{E}_S\left(\frac{q_i}{\omega_i(R_t)}\right) \leq \mathbb{E}_B\left(\frac{q_i}{\omega_i(R_t)}\right).$$

Consequently,

$$\frac{\partial \log A(R_t)}{\partial R_t} \leq 0.$$

Since $A(R_t) > 0$, this implies

$$\frac{\partial A(R_t)}{\partial R_t} \leq 0,$$

which is equation (13).

If $q_1 = 0$, then $q_i = q_0$ for all firms and the wedge is common across firms. As shown above, the common wedge cancels out of aggregate TFP, so

$$\frac{\partial A(R_t)}{\partial R_t} = 0.$$

If $q_1 > 0$, then q_i is strictly increasing in $\bar{n}_i$. In turn, as $\bar{n}_i$ is strictly increasing in a_i, more productive firms have higher working-capital exposure. In a nondegenerate productivity distribution, this means that q_i is not constant across firms. The S-weights then strictly tilt away from high-q_i firms relative to the B-weights, while $q_i/\omega_i(R_t)$ is strictly increasing in q_i. Therefore,

$$\mathbb{E}_S\left(\frac{q_i}{\omega_i(R_t)}\right) < \mathbb{E}_B\left(\frac{q_i}{\omega_i(R_t)}\right),$$

and hence

$$\frac{\partial A(R_t)}{\partial R_t} < 0.$$

Thus a global financial tightening lowers aggregate TFP whenever exposure is scale dependent, while a global financial easing raises aggregate TFP. This completes the proof of Proposition 1.

D.1 Illustrative Amplification from Heterogeneous Working-Capital Exposure

This section provides an illustrative magnitude for the amplification associated with scale-dependent working-capital exposure. We consider a reduction in the working-capital rate while varying the degree of scale dependence, q_1, and the dispersion of firm productivity. Firm productivity satisfies $\log a_i = \sigma_a z_i$, with $z_i \sim \mathcal{N}(0,1)$, while working-capital exposure is $q_i = q_0 + q_1\kappa_i$, where $\kappa_i = [1 + \exp\{-(\log a_i - \text{median}(\log a_i))\}]^{-\eta}$. When $q_1 > 0$, more productive firms are therefore more exposed to working-capital costs and benefit disproportionately from a financial easing.

Figure D.1 reports the aggregate output response to the same reduction in the working-capital rate for different values of q_1 and σ_a.[3] When $q_1 = 0$, exposure is common across firms and the financial easing operates only through the aggregate labor-cost channel. Increasing q_1 raises average working-capital exposure and, when productivity is heterogeneous, its dispersion across firms. Accordingly, even in the absence of productivity heterogeneity, the output response rises because the same reduction in R generates a larger common decline in effective labor costs. With productivity heterogeneity, scale-dependent exposure adds a second margin: the easing disproportionately reduces the effective production costs of more productive firms and reallocates activity toward them. The output response therefore becomes more sensitive to q_1 as productivity dispersion increases.

[3]The benchmark economy has an annual gross working-capital rate of $R = 1.10$, while the shocked economy lowers this rate by 300 basis points. We set $q_0 = 0.30$ and vary q_1 over the range shown in Figure D.1. We consider $\sigma_a \in \{0, 0.40, 0.70\}$, spanning economies with no, moderate, and high productivity dispersion. The value $\sigma_a = 0.40$ is close to that used by Gopinath et al. (2017) for Spain, while $\sigma_a = 0.70$ provides an illustrative high-dispersion case motivated by the substantial cross-firm productivity dispersion documented for emerging economies (Hsieh and Klenow, 2009). The remaining parameters are $\eta = 2.5$, $\alpha = 0.65$, and $\varphi = 3$. Each economy contains $M = 20{,}000$ firms, and χ is calibrated so that aggregate labor in the benchmark economy equals $N = 0.33$.

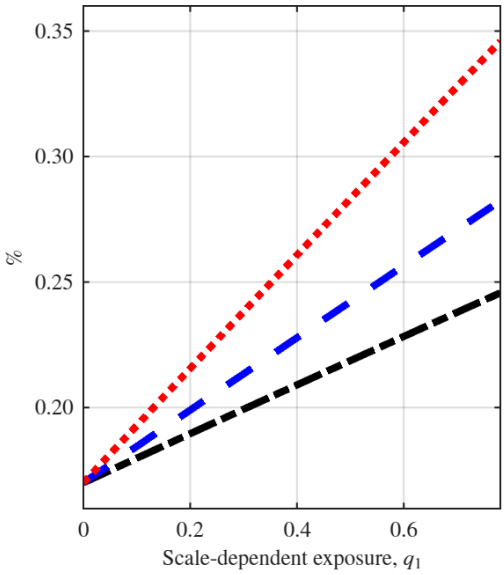


Figure D.1: Heterogeneity and the Amplification of Aggregate Output

Notes: The figure reports the aggregate output response to a reduction in the annual working-capital rate for different degrees of scale-dependent working-capital exposure, q_1, and firm-productivity dispersion, σ_a. The black dashed line corresponds to no productivity dispersion, $\sigma_a = 0$; the blue dashed and red dotted lines correspond to $\sigma_a = 0.40$ and $\sigma_a = 0.70$, respectively. When $q_1 = 0$, working-capital exposure is common across firms. As q_1 increases, both average exposure and its cross-sectional variation increase. With productivity heterogeneity, the resulting financial easing is also increasingly tilted toward more productive firms, generating the reallocation margin described in Section 6.2. Output responses are expressed in percent.

Figure D.1 shows that this additional amplification can be economically meaningful. Greater productivity dispersion strengthens the output response associated with scale-dependent working-capital exposure because a given differential easing shifts production across firms with more widely separated productivity levels. The exercise is purely illustrative and is not intended to isolate the allocative component quantitatively or to discipline the quantitative model. Rather, it shows that the interaction between firm heterogeneity and scale-dependent financial exposure can materially strengthen the aggregate response to a global financial easing. The magnitude of the overall amplification is comparable to that associated with the procyclical TFP channel in Section 6.4.

E Firm-Level Evidence: Additional Details

Data construction and productivity rankings. This appendix provides additional details on the firm-level evidence reported in Section 6. We use annual Orbis financial statements from Moody's DataHub, cleaned following Kalemli-Özcan et al. (2024). The cleaning keeps one filing per firm-year, prefers unconsolidated and twelve-month statements, maps fiscal years to calendar years, annualizes part-year flows, treats nonpositive activity and credit stocks as missing, excludes financial firms, public administration, and households, and deflates nominal variables by the country CPI. Productivity measures are winsorized at the 1st and 99th percentiles within 3-digit NACE sector–year cells. The Mexican extract contains roughly 83,000 cleaned

firm-year filings, of which 4,852 enter the ranked samples, spanning 52 rankable 3-digit sectors and 612 sector–base-year ranking cells over 2007–2025. The Canadian extract contains 16,426 ranked filings in 54 sectors and 681 sector–base-year cells over 2004–2025. As in Kalemli-Özcan et al. (2024), the analysis conditions on the variables needed for each object; no reweighting to national size distributions is applied, so the results should be interpreted as statements about the covered Orbis stratum rather than the national firm population.[4]

Firms are assigned to productivity groups using only predetermined information. For each base year t, a firm is ranked within its 3-digit NACE sector using the trailing average of its three most recent productivity observations available as of $t-1$: $\bar{\xi}_{i,t-1} = \frac{1}{3}\sum_{\tau\in\mathcal{T}_i(t-1)} \xi_{i,\tau}$, where $\mathcal{T}_i(t-1)$ denotes the three most recent years no later than $t-1$ in which the productivity proxy is observed. A firm is ranked only if at least three such observations are available, and a sector–year enters only if at least eight firms can be ranked. For Mexico, the productivity proxy is average revenue labor productivity, $\xi_{i,t} = \log(R_{i,t}/N_{i,t})$, where $R_{i,t}$ is operating revenue and $N_{i,t}$ is employment. For Canada, employment is sparsely reported in Orbis, so the ranking uses revenue per dollar of wage bill, $\xi_{i,t} = \log(R_{i,t}/WB_{i,t})$. This alternative proxy is appropriate for cross-sectional comparisons within narrowly defined sectors if average wages are relatively homogeneous within sector–year cells. In that case, $WB_{i,t} \simeq w_{s,t}N_{i,t}$, so ranking firms by $R_{i,t}/WB_{i,t}$ is equivalent to ranking them by revenue per worker up to the common sector–year wage. Canadian Orbis reports employment for only a small share of ranked filings, while wage-bill coverage is much broader, which motivates this choice. For this reason, the Canadian exercise is best interpreted as an advanced-economy benchmark rather than as a fully symmetric replication of the Mexican firm-level test.

Local-projection design. For each sector s, base year t, horizon $h = 0,\dots,3$, and outcome Z, we compute the log ratio of high- to low-productivity group sums,

$$\varrho^{Z}_{s,t+h} = \log\left(\frac{\sum_{i\in H_{s,t}} Z_{i,t+h}}{\sum_{i\in L_{s,t}} Z_{i,t+h}}\right),$$

where Z is either revenue or short-term loans. The local-projection outcome is the long difference $\Delta_h\varrho^{Z}_{s,t} = \varrho^{Z}_{s,t+h} - \varrho^{Z}_{s,t-1}$. The groups $H_{s,t}$ and $L_{s,t}$ are formed using the predetermined ranking at base year t. The sums are computed over firms with positive values of Z at both $t-1$ and $t+h$, and we require at least two firms in each group. Thus, the outcome compares the same high- and low-productivity groups over the horizon and does not load on entry or exit.

The baseline specification is

$$\Delta_h\varrho^{Z}_{s,t} = \alpha_{s,h} + \beta_h\Delta\mathrm{Baa}_t + \boldsymbol{x}'_{s,t}\boldsymbol{\gamma}_h + u_{s,t+h}, \qquad h = 0,\dots,3,$$

[4] As a construction-standard robustness check, we also impose accounting-identity screens and drop the incompletely filed 2024–25 tail, then recompute rankings, cells, and local projections end to end. The main patterns are unchanged under these screens.

where ΔBaa_t is the change in the Baa spread with its sign reversed. The IRFs are normalized so that positive values correspond to an easing, measured in percentage points. This variable is instrumented with the annual realization of the average EMDE MBC shock. Using this common instrument isolates the global component of the recovered shocks and averages out country-specific estimation noise and idiosyncratic components. The control vector $\boldsymbol{x}_{s,t}$ includes one lag of the $h = 0$ outcome change and one lag of the Baa-spread change; only the contemporaneous Baa easing is instrumented. Standard errors follow Bai et al. (2024), allowing for cross-sector dependence of unknown form, and confidence bands use $t(T_h - 1)$ critical values, where T_h is the number of shock years at horizon h. A horizon is estimated only if there are at least 30 sector–year cells and at least five shock years. In the figures, the estimate reported at the right edge of each panel is a separate local projection for the average response over horizons $h = 0, \ldots, 3$, with dependent variable $\sum_{h=0}^{3}(\varrho^{Z}_{s,t+h} - \varrho^{Z}_{s,t-1})/4$, as discussed by Jordà and Taylor (2025). For ease of interpretation, the figures scale the estimated responses by the average first-year Baa easing associated with a one-standard-deviation MBC shock and multiply by 100. The plotted responses can therefore be read as percent changes in the high-to-low ratio after a typical expansionary MBC shock.

Split rules and credit aggregates. Figure E.1 reports the Mexican revenue response under alternative split rules. The response is strongest for the sharpest productivity contrasts. It is positive and sizeable for the quartile split, remains strong for the tertile split, and attenuates sharply at the median split. This attenuation is consistent with the model's implication that reallocation is stronger when high- and low-productivity firms are more widely separated. This pattern is also important for interpreting the short-term-loan evidence. In Mexico, revenue is observed for about 96 percent of ranked filings, while short-term loans are observed for about 52 percent. As a result, the revenue exercise can be implemented at the quartile split, but the short-term-loan exercise must use the median split: the quartile-loan cells do not satisfy the minimum group-size and estimation guards. Since coarser splits attenuate the measured revenue response, the median-split loan response reported in the main text should be interpreted as conservative. For Canada, the data allow us to use quartile splits for both revenue and short-term loans, so the absence of a Canadian credit response in the main figure is not driven by the coarser median split used for Mexican loans.

The Mexican credit response is also specific to short-term financial credit. In additional exercises, replacing short-term loans with trade payables, current liabilities, or long-term debt does not reproduce the same positive response. This specificity is useful because it distinguishes the working-capital channel from a generic balance-sheet expansion: after a global financial easing, high-productivity firms increase short-term financial borrowing relative to low-productivity firms, rather than expanding all liabilities proportionally.

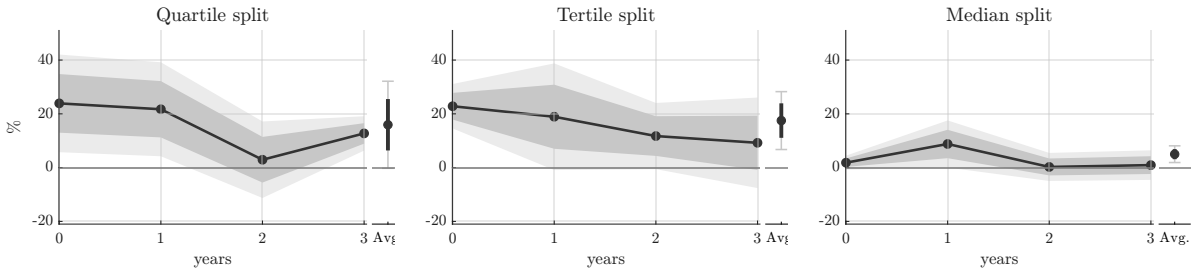


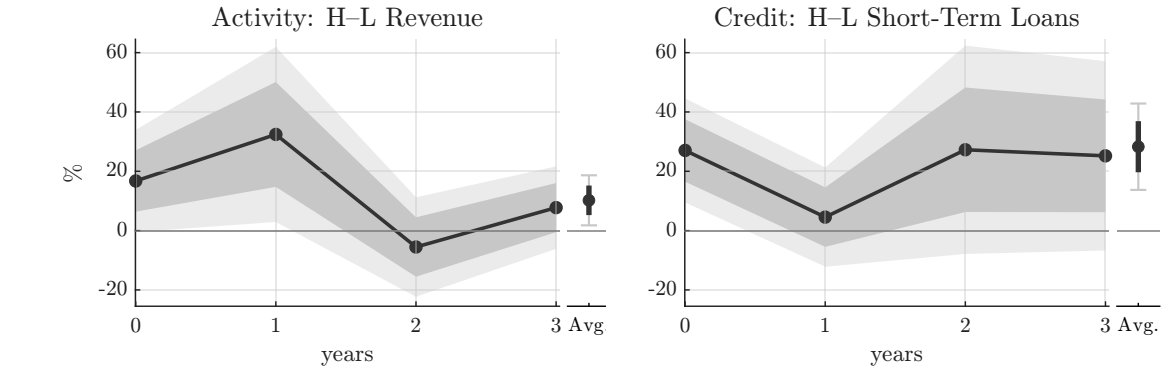
Figure E.1: Revenue Reallocation Across Alternative Mexican Productivity Splits

Notes: Mexican Orbis annual data. The figure reports long differences in the sector-level log ratio of revenue for high-productivity relative to low-productivity firms. Firms are ranked within 3-digit NACE sectors using trailing $t-1$ average revenue labor productivity. The panels compare top-versus-bottom quartile, tertile, and median splits of the within-sector productivity distribution. The estimate reported at the right edge of each panel is a separate local projection for the average response over horizons $h = 0, \ldots, 3$, with dependent variable $\sum_{h=0}^{3}(\varrho^{Z}_{s,t+h} - \varrho^{Z}_{s,t-1})/4$. Shaded areas report 68 and 90 percent confidence bands based on Bai et al. (2024) standard errors.

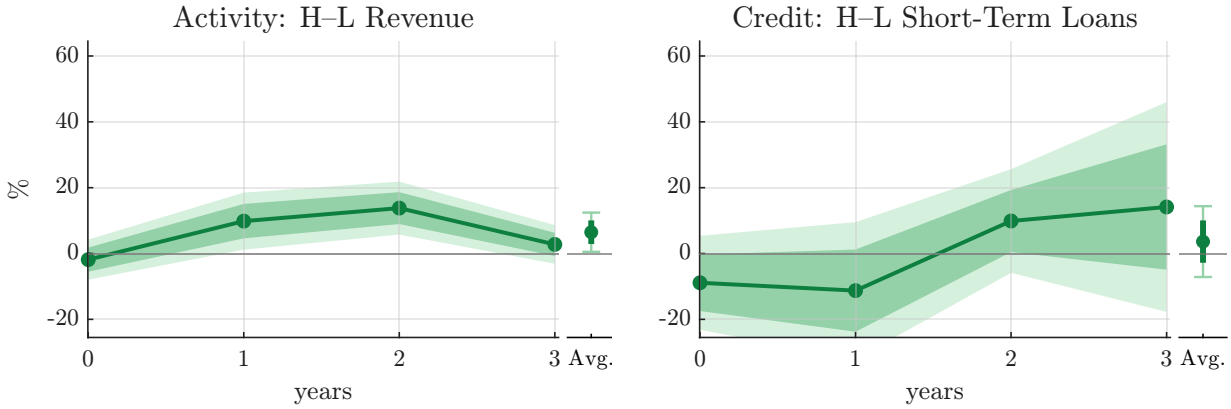
Robustness to country-specific instruments. Figure E.2 repeats the main Mexico–Canada exercise using country-specific MBC shocks as instruments, rather than the average EMDE MBC shock used in the baseline.[5] The main message is unchanged. In Mexico, high-productivity firms expand both revenue and short-term loans relative to low-productivity firms after an instrumented global-financial easing. The only noticeable difference is that the revenue response is somewhat more hump-shaped and spread over the first two years. In Canada, the relative revenue response remains modest and there is no corresponding increase in short-term loans. Thus, the robustness exercise confirms that the main conclusion does not hinge on using the common EMDE instrument: the joint activity-and-credit reallocation is present in Mexico but not in the advanced-economy benchmark.

Balance-sheet measures behind Figure 10. Figure 10 uses the ranked sample described above and no regression. For each firm and base year t of the trailing $t-1$ ranking we take the Orbis balance sheet of year t: inventories, trade receivables, trade payables, total assets, short-term loans, long-term debt and current liabilities. Operating working capital is inventories plus receivables minus payables. A component that is not reported is set to zero when at least one of the three is; this affects 13 percent of Mexican and 64 percent of Canadian balance sheets, the latter mostly firms without inventories (on filings reporting all three components the group means are 27, 30 and 34 percent of assets in Mexico and 7, 9 and 8 in Canada). The short-term share of financial debt is short-term loans over short-term loans plus long-term debt, with long-term debt set to zero when the item is not reported; among the firms that do report long-term debt, the short-term share is 41, 48 and 45 percent across the Mexican quartiles ($p = 0.27$ for the top-minus-bottom difference) and 33, 28 and 30 across the Canadian ones ($p = 0.03$). Ratios are winsorized at the 1st and 99th percentiles within calendar year. We exclude filings whose current liabilities exceed total assets after the ranking is computed, so that the groups are exactly those of Figure 9.

[5] For the country-specific MBC instruments, the $h = 0$ first-stage F-statistics for the excluded instrument are 24.7 for Mexican revenue, 17.2 for Mexican short-term loans, 74.7 for Canadian revenue, and 45.7 for Canadian short-term loans.



(a) Mexico



(b) Canada

Figure E.2: Firm-Level Reallocation After a Global Financial Easing: Country-Specific MBC Instruments

Notes: The figure reports long differences in the sector-level log ratio of high-productivity to low-productivity firms, separately for revenue and short-term loans. In each row, the left panel uses revenue and the right panel uses short-term loans. Firms are ranked within 3-digit NACE sectors using predetermined productivity measures based on information available as of $t-1$. For Mexico, productivity is measured as trailing average revenue labor productivity. For Canada, where employment is sparsely reported in Orbis, productivity is measured as trailing average revenue per unit of wage bill. For Mexico, the revenue panel uses top-versus-bottom quartiles and the short-term-loan panel uses a median split. For Canada, both panels use top-versus-bottom quartiles. Plotted responses multiply these estimates by the average first-year Baa easing associated with a one-standard-deviation country-specific MBC shock and by 100. The estimate reported at the right edge of each panel is a separate local projection for the average response over horizons $h = 0, \ldots, 3$, with dependent variable $\sum_{h=0}^{3}(\varrho^{Z}_{s,t+h} - \varrho^{Z}_{s,t-1})/4$ (see Jordà and Taylor, 2025). Shaded areas report 68 and 90 percent confidence bands based on Bai et al. (2024) standard errors.

F Quantitative Model of Global Financial Shock Transmission

This appendix provides the details of the quantitative exercise in Section 6.4. We start from the standard small-open-economy model of Uribe and Yue (2006), in which external financial conditions affect domestic activity through country borrowing costs and working-capital frictions. We augment this framework along two dimensions motivated by the empirical evidence in the paper. First, export and import prices enter the resource constraint through an external-price channel, in the spirit of Drechsel and Tenreyro (2018). Second, aggregate TFP is allowed to respond to the same global financial shock. This latter margin provides a reduced-form representation of the productivity response documented in the data and rationalized by the

reallocation mechanism in Section 6.2. We use the resulting model to assess the quantitative importance of this TFP channel for the domestic propagation of global financial shocks.

F.1 Quantitative model

The model combines external habit formation, a working-capital requirement, debt-adjustment costs, and gestation lags in capital accumulation. These ingredients are unchanged from the benchmark model. We augment the framework only by allowing export and import prices to affect domestic income and by allowing TFP to respond to the global financial shock. The latter is a reduced-form representation of the productivity channel studied in Section 6.2, rather than a structural model of cross-firm reallocation.

Households and firms. A representative household has Greenwood–Hercowitz–Huffman preferences with external habit,

$$E_0 \sum_{t=0}^{\infty} \beta^t \frac{\left(c_t - \gamma \widetilde{c}_{t-1} - \omega^{-1} h_t^{\omega}\right)^{1-\sigma} - 1}{1-\sigma}, \tag{F.1}$$

where c_t denotes consumption, h_t hours worked, $\widetilde{c}_{t-1}$ lagged aggregate consumption, and γ governs external habit formation. Let λ_t denote the marginal utility of wealth. The intratemporal optimality condition implies

$$h_t^{\omega-1} = w_t. \tag{F.2}$$

The economy borrows internationally at the gross country interest rate R_t. To induce stationarity, households face the quadratic debt-adjustment cost $\Psi(d_t) = \frac{\psi}{2}(d_t - \bar{d})^2$ (Schmitt-Grohe and Uribe, 2003). The corresponding intertemporal condition is

$$\lambda_t \left[1 - \psi(d_t - \bar{d})\right] = \beta R_t E_t \lambda_{t+1}. \tag{F.3}$$

The rate relevant for domestic borrowing is therefore

$$R_t^d = \frac{R_t}{1 - \psi(d_t - \bar{d})}. \tag{F.4}$$

External debt evolves according to

$$d_t = R_{t-1} d_{t-1} - tb_t, \tag{F.5}$$

where tb_t denotes the trade balance.

Competitive firms produce according to

$$y_t = a_t k_t^{\alpha} h_t^{1-\alpha}, \tag{F.6}$$

where a_t is aggregate TFP. Firms must hold non-interest-bearing working capital equal to at least a fraction g of the wage bill. With a positive interest rate the constraint binds, and labor demand satisfies

$$(1-\alpha)\frac{y_t}{h_t} = w_t\left[1+g\left(1-\frac{1}{R_t^d}\right)\right]. \tag{F.7}$$

Thus, changes in borrowing costs have a direct production-side effect by altering the effective cost of labor. The rental rate of capital satisfies

$$\alpha\frac{y_t}{k_t} = u_t. \tag{F.8}$$

This working-capital margin is particularly important in the original model for transmitting movements in external financial conditions to domestic production. Uribe and Yue (2006) emphasize that the constraint introduces a direct supply-side effect of borrowing costs and substantially improves the model's ability to reproduce the output response to external financial shocks.

Investment follows the four-quarter gestation structure. Let $s_{i,t}$ denote projects that are i quarters into the investment process. Total investment is $i_t = \frac{1}{4}\sum_{i=0}^{3} s_{i,t}$, with $s_{i+1,t+1} = s_{i,t}$, $i = 0, 1, 2$. Capital evolves according to

$$k_{t+1} = (1-\delta)k_t + k_t\Phi\left(\frac{s_{3,t}}{k_t}\right), \tag{F.9}$$

where $\Phi(x) = x - \frac{\phi}{2}(x-\delta)^2$. Gestation lags and convex adjustment costs generate persistence and allow investment to respond gradually to changes in financial conditions. The remaining optimality conditions associated with investment are standard and coincide with those in Uribe and Yue (2006).

External-price channel. We augment the standard resource constraint by allowing movements in export and import prices to generate income effects. In particular, the trade balance is

$$tb_t = y_t + \kappa\bar{y}\left[s_x\left(e^{\widehat{p}_t^x}-1\right) - s_m\left(e^{\widehat{p}_t^m}-1\right)\right] - c_t - i_t - \Psi(d_t), \tag{F.10}$$

where $\widehat{p}_t^x$ and $\widehat{p}_t^m$ denote log deviations of export and import prices, s_x and s_m are steady-state export and import shares of GDP, and $\kappa \geq 0$ governs the strength of the external-price channel. The specification values changes in export and import prices at steady-state trade quantities: an increase in export prices raises domestic income, while an increase in import prices lowers it. This provides a parsimonious way of introducing the external-price transmission in line with Drechsel and Tenreyro (2018).

An implication of (F.10) is that the net income effect can be small when export and import prices move by similar amounts and the economy has similar export and import shares. This feature is particularly relevant for the MBC shock studied here, which moves export and import prices broadly in parallel. This is consistent with the empirical evidence in Di Pace et al. (2025), who show that global shocks tend to have similar effects on export and import prices, limiting the associated terms-of-trade income effect when export and import

shares are also similar. With s_x and s_m of similar magnitude in Mexico, the two valuation effects therefore largely offset, limiting the amplification of aggregate activity through this channel. This limited amplification is also in line with Juvenal and Petrella (2024), who find that commodity prices play a quantitatively modest amplification role in the transmission of global risk shocks.

Country borrowing rate. Following Uribe and Yue (2006), the country risky real rate responds both to external financial conditions and to domestic fundamentals. We specify

$$\begin{aligned}\widehat{R}_t = \rho_R \widehat{R}_{t-1} + \eta_0 gfc_t + \eta_1 gfc_{t-1} + f_{y0}\widehat{y}_t + f_{y1}\widehat{y}_{t-1} \\ + f_{i0}\widehat{i}_t + f_{i1}\widehat{i}_{t-1} + f_{tb0} tby_t + f_{tb1} tby_{t-1},\end{aligned} \tag{F.11}$$

where $tby_t = tb_t/y_t$. Relative to the original Uribe–Yue specification, gfc_t takes the role of the external financial variable, while the feedback from domestic activity follows the same logic as their country-rate equation. The coefficients in (F.11) are estimated rather than imported from their application.

Global shock and exogenous processes. A single innovation μ_t represents the identified MBC shock in the quantitative model. We normalize $\mu_t > 0$ to denote an expansionary realization. The shock drives global financial conditions, export prices, import prices, and TFP according to

$$gfc_t = \rho_{g1} gfc_{t-1} + \rho_{g2} gfc_{t-2} - \left(c_{g0}\mu_t + c_{g1}\mu_{t-1} + c_{g2}\mu_{t-2}\right), \tag{F.12}$$

$$\widehat{p}^x_t = \rho_{px1}\widehat{p}^x_{t-1} + \rho_{px2}\widehat{p}^x_{t-2} + a_{x0}\mu_t + a_{x1}\mu_{t-1} + a_{x2}\mu_{t-2}, \tag{F.13}$$

$$\widehat{p}^m_t = \rho_{pm1}\widehat{p}^m_{t-1} + \rho_{pm2}\widehat{p}^m_{t-2} + a_{m0}\mu_t + a_{m1}\mu_{t-1} + a_{m2}\mu_{t-2}, \tag{F.14}$$

$$\widehat{a}_t = \rho_{a1}\widehat{a}_{t-1} + \rho_{a2}\widehat{a}_{t-2} + \theta_0\mu_t + \theta_1\mu_{t-1}. \tag{F.15}$$

Here gfc_t is measured by the Baa spread. The sign convention in (F.12) reflects the empirical fact that an expansionary MBC shock lowers global credit spreads, while the impact responses of export and import prices are positive.[6]

Equation (F.15) is the reduced-form TFP transmission process. It allows the workhorse small-open-economy model to capture the aggregate productivity response that can arise from the reallocation mechanism developed in Section 6.2. Importantly, we impose stationarity of (F.15). Hence, the global financial shock has *no long-run effect on the level of TFP*, while remaining free to generate persistent productivity movements at business-cycle horizons. This restriction mirrors the empirical evidence that the MBC shock has a pronounced TFP footprint at business-cycle frequencies but little effect on long-run productivity.

[6] In Section 4.1 and Appendix C, we show that alternative measures of global risk display very similar impulse-response profiles following an MBC shock.

Identifying the TFP channel. To quantify the contribution of the TFP channel, we compare the responses of the fitted model with those obtained after setting

$$\theta_0 = \theta_1 = 0, \tag{F.16}$$

while leaving all other estimated parameters and exogenous processes unchanged. In particular, the external-price channel remains active in this counterfactual. The difference between the two sets of impulse responses is the contribution of the procyclical TFP channel reported in Section 6.4.

F.2 Calibration

We deliberately retain the calibration of Uribe and Yue (2006) for most parameters of the domestic block. In particular, we set $\beta = 0.973$, $\sigma = 2$, $\omega = 1.455$, $\gamma = 0.2046$, $\alpha = 0.32$, $\delta = 0.025$, the working-capital parameter $g = 1.2$, and the debt-adjustment cost $\psi = 0.00042$. The export and import shares are set to their Mexican sample averages, $s_x = 0.30$ and $s_m = 0.31$, and steady-state external debt is set to one quarter of quarterly GDP. The investment-adjustment-cost parameter ϕ is instead estimated together with the remaining parameters described below.

F.3 Estimation and results

We estimate the remaining parameters jointly by minimum distance, matching the model-implied impulse responses to the posterior median responses to a one-standard-deviation expansionary MBC shock. Following the impulse-response matching approach of Christiano et al. (2005), the target vector contains the responses of the Baa spread, export and import prices, GDP, consumption, investment, the trade-balance-to-output ratio, and the domestic risky real rate over horizons up to 20 quarters. Importantly, the empirical response of TFP is not included among the targeted moments. The parameters governing (F.15) are therefore estimated only through the general-equilibrium effects of TFP on the targeted macroeconomic responses.

More formally, let $\widehat{\boldsymbol{m}}$ collect the empirical impulse responses and let $\boldsymbol{m}(\boldsymbol{\vartheta})$ denote their model counterparts, where $\boldsymbol{\vartheta}$ collects the parameters to be estimated. We solve

$$\widehat{\boldsymbol{\vartheta}} = \arg\min_{\boldsymbol{\vartheta}} \left[\widehat{\boldsymbol{m}} - \boldsymbol{m}(\boldsymbol{\vartheta})\right]' \mathbf{W} \left[\widehat{\boldsymbol{m}} - \boldsymbol{m}(\boldsymbol{\vartheta})\right]. \tag{F.17}$$

The weighting matrix $\mathbf{W}$ is diagonal, with entries given by the inverse squared posterior standard deviations of the empirical impulse responses. We approximate these standard deviations by one half of the width of the 68 percent posterior credible bands and impose a floor equal to 10 percent of the peak response of each variable, so that moments with very small posterior uncertainty do not receive disproportionate weight.

We impose $\kappa \geq 0$, $\phi > 0$, and positive impact loadings c_{g0}, a_{x0}, and a_{m0}, consistent with the normalization

Table F.1: Estimated Parameters (TFP not targeted)

Parameter	Estimate	S.E.	Parameter	Estimate	S.E.
Global financial conditions			*TFP transmission*		
$c_{g0} \times 10^3$	0.914	[0.361]	ρ_{a1}	1.806	[0.050]
$c_{g1} \times 10^3$	-0.862	[0.717]	ρ_{a2}	-0.873	[0.043]
$c_{g2} \times 10^3$	0.087	[0.477]	$\theta_0 \times 10^3$	2.772	[0.773]
ρ_{g1}	1.619	[0.155]	$\theta_1 \times 10^3$	-1.310	[1.050]
ρ_{g2}	-0.709	[0.147]	*External-price channel and investment*		
Export prices			κ	1.325	[1.278]
$a_{x0} \times 10^3$	4.843	[2.662]	ϕ	1.349	[1.030]
$a_{x1} \times 10^3$	-7.605	[5.672]	*Country risky real rate*		
$a_{x2} \times 10^3$	1.822	[4.036]	ρ_R	0.547	[3.914]
ρ_{px1}	1.886	[0.187]	η_0	1.462	[18.438]
ρ_{px2}	-0.929	[0.189]	η_1	-2.980†	[10.301]
Import prices			f_{y0}	-0.400	[2.408]
$a_{m0} \times 10^3$	4.399	[2.134]	f_{y1}	-0.192	[3.251]
$a_{m1} \times 10^3$	-3.946	[4.535]	f_{i0}	0.203	[0.565]
$a_{m2} \times 10^3$	-1.623	[3.123]	f_{i1}	0.077	[0.470]
ρ_{pm1}	1.874	[0.112]	f_{tb0}	0.893	[4.471]
ρ_{pm2}	-0.912	[0.120]	f_{tb1}	0.145	[1.641]

Notes: The table reports joint minimum-distance estimates, with standard errors in square brackets. The empirical TFP response is not included among the targeted moments. † denotes a parameter at or near the boundary of its admissible range.

that an expansionary MBC shock lowers the Baa spread and raises export and import prices on impact. Stationarity of the AR(2) processes is imposed using a partial-autocorrelation reparameterization (Monahan, 1984). As discussed above, the country-rate equation is otherwise unrestricted in sign; we impose the bounds $|\eta_j| \leq 3$, $|f_j| \leq 2$, and $\rho_R \in (0, 0.985)$ to exclude degenerate parameterizations. Estimation uses multiple starting values. Minimum-distance standard errors are computed from $(\mathbf{G}'\mathbf{W}\mathbf{G})^{-1}$, where $\mathbf{G}$ is the numerical Jacobian of the model impulse responses with respect to the estimated parameters, evaluated at $\widehat{\boldsymbol{\vartheta}}$.

Table F.1 reports the parameter estimates. Most of the estimated parameters govern the external processes and the two channels added to the benchmark model and therefore have no direct counterpart in Uribe and Yue (2006). Among the comparable structural parameters, the investment adjustment cost is notably smaller: we estimate $\phi = 1.35$, compared with 72.8 in Uribe and Yue (2006), reflecting the stronger and more rapid investment response in the Mexican data. The coefficients governing the TFP process are estimated relatively precisely despite the fact that the TFP response itself is not targeted. By contrast, the individual coefficients of the country-rate equation are imprecisely estimated, and we therefore attach no structural interpretation to them individually.

The baseline results are reported in Figure 11 in the main text. Figure F.1 reports the fit of the external-price responses. The estimated model closely reproduces the responses of both export and import prices. Their broadly similar dynamics, together with Mexico's similar export and import shares, imply that the associated income effects largely offset, consistent with the limited amplification generated by the external-price

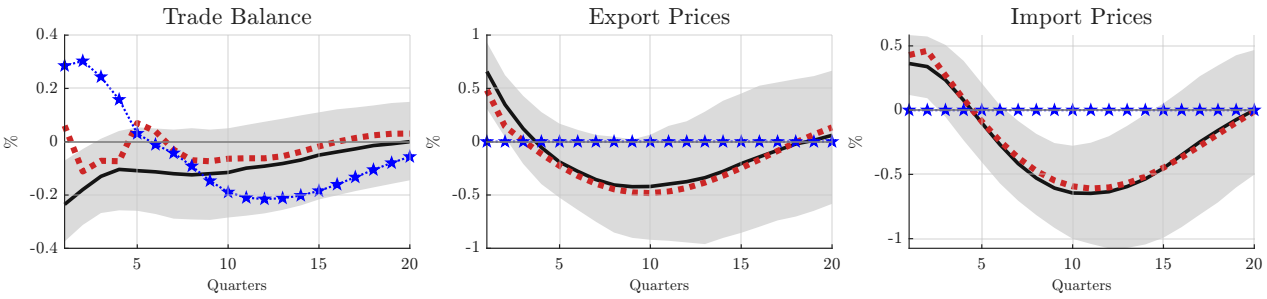


Figure F.1: Model fit: Trade Balance and External Prices

Notes: Solid black lines report the empirical impulse responses to a one-standard-deviation expansionary MBC shock, with shaded areas denoting 68 percent posterior credible bands. Red dotted lines report the responses of the fitted model. Blue dotted lines with stars report the contribution of the procyclical TFP channel, computed as the difference between the fitted response and a counterfactual that shuts down the mapping from global risk to TFP while leaving the rest of the fitted model unchanged. The trade-balance-to-output ratio, export prices, and import prices are included among the targeted responses. The contribution of the TFP channel to export and import prices is zero by construction. The trade-balance-to-output ratio is expressed in percentage points; export and import prices are expressed in percent deviations.

channel.

Figure F.1 also reports the response of the trade-balance-to-output ratio, which is included among the targeted moments. The fit is less precise than for the other macroeconomic responses: in particular, the model has difficulty reproducing the sharp deterioration of the trade balance on impact, although it generates a negative response thereafter and broadly captures its subsequent mean reversion. The decomposition also shows that the TFP component initially improves the trade balance, as the increase in current output dominates the response of domestic absorption, before turning negative as consumption and investment adjust. This reflects the familiar interaction between income, saving, and investment responses in small-open-economy models (Mendoza, 1991). More importantly, the relatively modest trade-balance response is consistent with the empirical evidence that the MBC shock accounts for only about 10 percent of trade-balance fluctuations at business-cycle frequencies, despite its much larger contribution to domestic activity and TFP. This combination echoes García-Cicco et al. (2010), where stationary productivity shocks can be important for output fluctuations while accounting for little of the variation in the trade-balance-to-output ratio, and is consistent with the distinction in Aguiar and Gopinath (2007) between the relatively limited trade-balance effects of transitory productivity shocks and the much larger effects of shocks to trend. Since the TFP response in our quantitative model is stationary and has no long-run effect, a sizable TFP amplification of domestic activity therefore need not imply that the shock is also a major driver of external-balance fluctuations.

F.4 Robustness: Targeting the TFP Response

As a robustness exercise, we re-estimate the model after adding the empirical TFP response to the set of targeted moments. All other aspects of the estimation are unchanged. This specification therefore uses the observed TFP dynamics directly to discipline the TFP transmission process, rather than identifying its parameters solely through their general-equilibrium effects on the other macroeconomic responses.

Table F.2: Estimated Parameters: Targeting the TFP Response

Parameter	Estimate	S.E.	Parameter	Estimate	S.E.
Global financial conditions			*TFP transmission*		
$c_{g0} \times 10^3$	0.895	[0.360]	ρ_{a1}	1.769	[0.049]
$c_{g1} \times 10^3$	-0.758	[0.711]	ρ_{a2}	-0.843	[0.042]
$c_{g2} \times 10^3$	0.001	[0.474]	$\theta_0 \times 10^3$	2.848	[0.723]
ρ_{g1}	1.604	[0.150]	$\theta_1 \times 10^3$	-1.089	[0.991]
ρ_{g2}	-0.693	[0.144]	*External-price channel and investment*		
Export prices			κ	1.323	[1.204]
$a_{x0} \times 10^3$	4.832	[2.658]	ϕ	0.882	[0.716]
$a_{x1} \times 10^3$	-7.706	[5.661]	*Country risky real rate*		
$a_{x2} \times 10^3$	1.909	[3.984]	ρ_R	0.149	[2.588]
ρ_{px1}	1.890	[0.178]	η_0	2.926	[34.034]
ρ_{px2}	-0.934	[0.181]	η_1	-2.972†	[13.820]
Import prices			f_{y0}	-0.220	[4.694]
$a_{m0} \times 10^3$	4.287	[2.132]	f_{y1}	-0.264	[4.932]
$a_{m1} \times 10^3$	-3.396	[4.520]	f_{i0}	0.205	[0.504]
$a_{m2} \times 10^3$	-2.032	[3.081]	f_{i1}	0.041	[0.244]
ρ_{pm1}	1.869	[0.106]	f_{tb0}	0.996	[4.203]
ρ_{pm2}	-0.910	[0.115]	f_{tb1}	-0.025	[1.223]

Notes: The table reports joint minimum-distance estimates when the empirical TFP response is included among the targeted moments. Standard errors are reported in square brackets. † denotes a parameter at or near the boundary of its admissible range.

Table F.2 reports the estimates. They are very similar to those obtained in the baseline specification. In particular, the parameters governing the external processes and the TFP transmission process change only modestly, while the estimate of the external-price coefficient κ is essentially unchanged. The investment adjustment cost is somewhat lower, $\phi = 0.88$ compared with 1.35 in the baseline, but remains far below the value estimated by Uribe and Yue (2006). The individual coefficients of the country-rate equation move somewhat more across specifications, but remain imprecisely estimated.

Figure F.2 reports the corresponding model fit and decomposition. Adding TFP to the target set improves the fit of the productivity response, while leaving the fit of the other macroeconomic responses essentially unchanged. The decomposition is also very similar to the baseline and, if anything, assigns a somewhat larger role to the TFP channel at short horizons. Thus, the quantitative importance of the TFP channel does not depend on leaving the empirical TFP response untargeted in the baseline estimation.

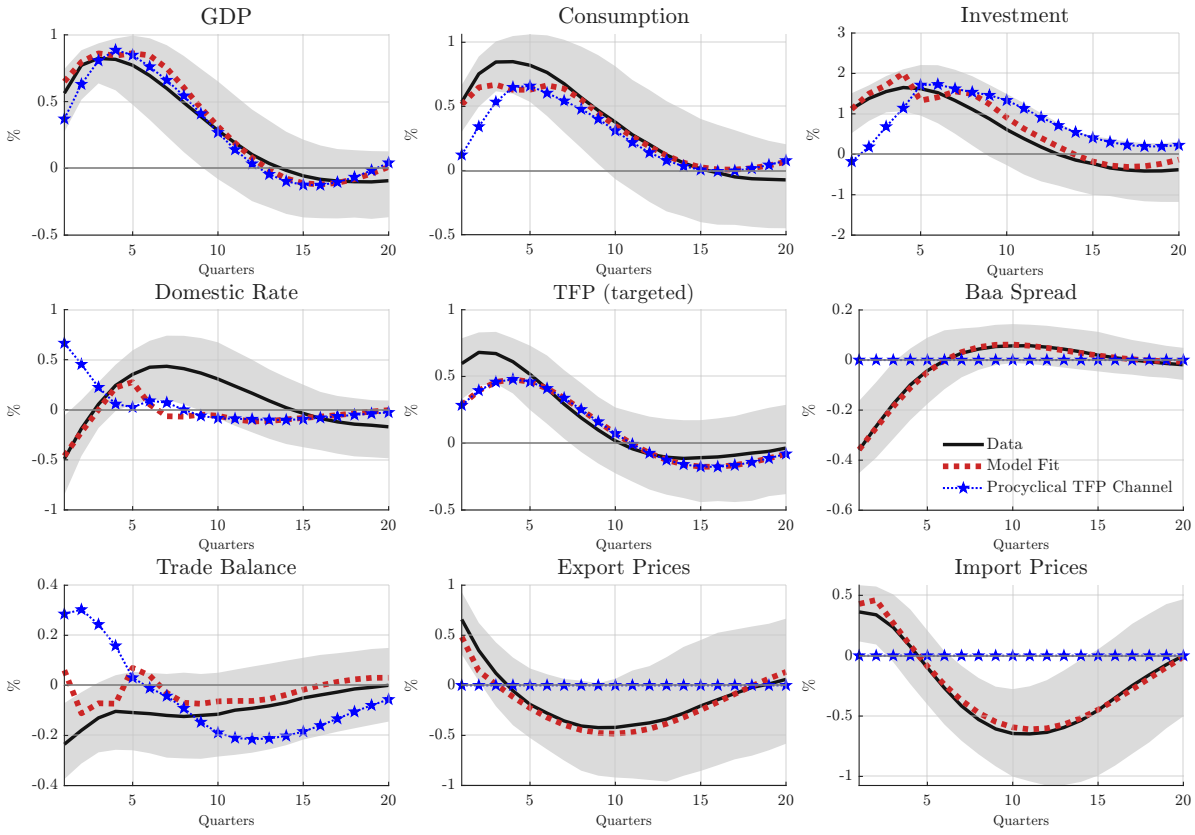


Figure F.2: Global Financial Shock Transmission: Targeting the TFP Response

Notes: Solid black lines report the empirical impulse responses to a one-standard-deviation expansionary MBC shock, with shaded areas denoting 68 percent posterior credible bands. Red dotted lines report the responses of the fitted model. Blue dotted lines with stars report the contribution of the procyclical TFP channel, computed by shutting down the mapping from global risk to TFP while leaving the remaining fitted model, including the external-price channel, unchanged. In this specification, the TFP response is included among the targeted moments together with the Baa spread, export and import prices, GDP, consumption, investment, the trade-balance-to-output ratio, and the domestic risky real rate. GDP, consumption, investment, and TFP are expressed in percent deviations; the domestic risky real rate and the Baa spread are expressed in annualized percentage points.

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