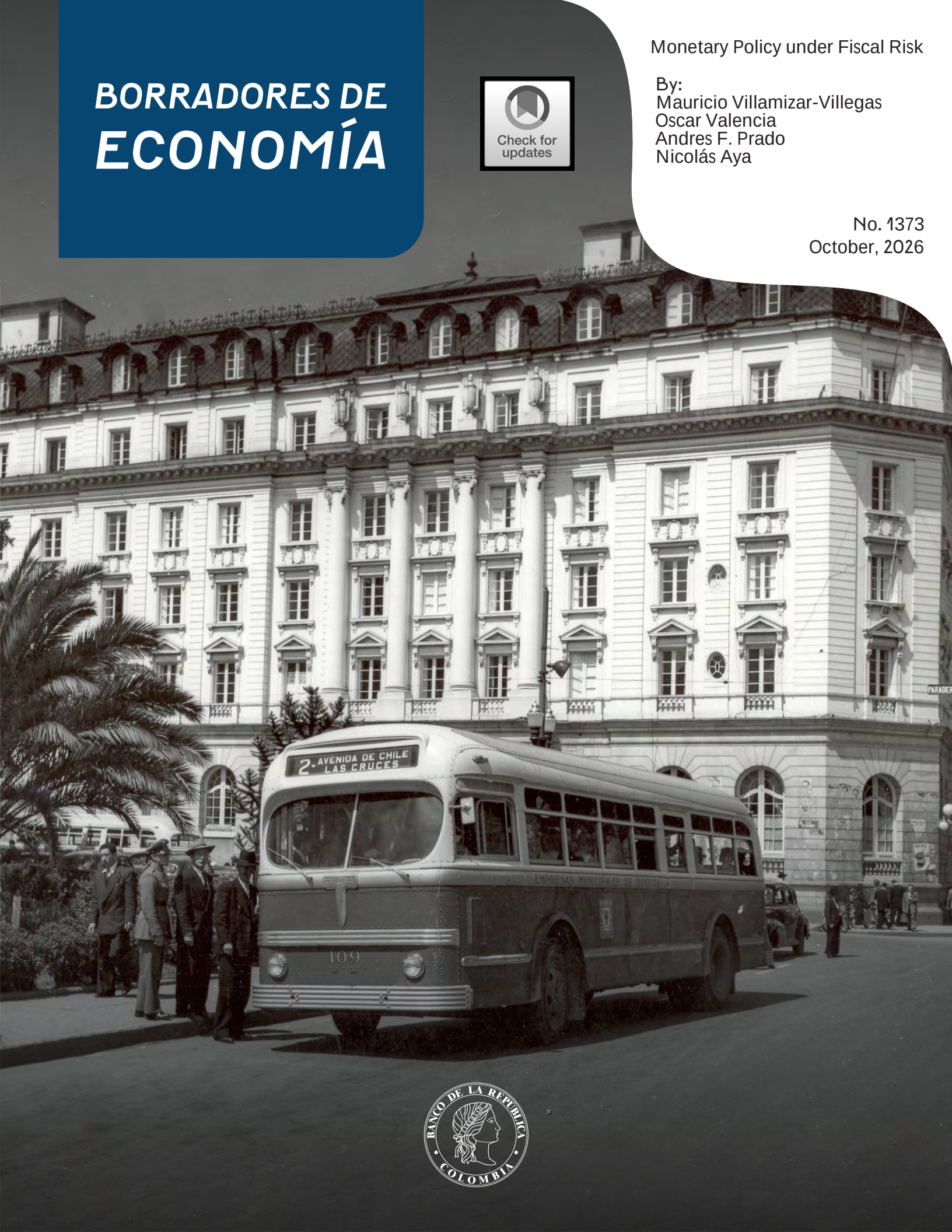
BORRADORES DE ECONOMÍA

Monetary Policy under Fiscal Risk

By:
Mauricio Villamizar-Villegas
Oscar Valencia
Andres F. Prado
Nicolás Aya

No. 1373
October, 2026



BANCO DE LA REPÚBLICA
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Mauricio Villamizar-Villegas
Andres F. Prado
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Abstract

Fiscal stance and sovereign credibility shape monetary policy transmission even outside fiscal dominance. Using an annual macro-fiscal data panel since the mid-1990s and a quarterly panel of policy actions and outcomes covering 2000 to 2025, we show that sovereign-risk regimes differ less by headline debt than by borrowing costs, debt composition, and interest burdens. Elevated sovereign risk weakens the transmission of monetary policy, foreign-exchange intervention, macroprudential tools, and capital-flow measures to prices, exchange rates, and output. A small open-economy model with a fiscal block rationalizes these patterns. Overall, emerging markets operate under tighter fiscal constraints, rely more on multi-instrument configurations, and face a narrower stabilization frontier, including cases in which conventional tightening loses its disinflationary effect.

JEL Classification: E52, E62, F31, F34.
Keywords: monetary policy transmission; sovereign risk; fiscal space; foreign-exchange intervention; macroprudential policy.

*Villamizar-Villegas: Banco de la República (mvillavi@banrep.gov.co); Valencia: Inter-American Development Bank (oscarva@iadb.org); Prado: Inter-American Development Bank (apradogarcia@iadb.org); Aya: Banco de la República (nayanune@banrep.gov.co). We are grateful to Bibiana Taboada, Carlos Giraldo, Leonardo Villar and Ignacio Lozano for their valuable comments and suggestions.

Política monetaria bajo riesgo fiscal

Mauricio Villamizar-Villegas, Oscar Valencia,
Andres F. Prado Nicolás Aya

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Resumen

La posición fiscal y la credibilidad soberana condicionan la transmisión de la política monetaria incluso en ausencia de dominancia fiscal. Utilizando un panel de economías avanzadas y emergentes desde mediados de la década de 1990, mostramos que los regímenes de riesgo soberano difieren menos por los niveles de deuda pública que por los costos de financiamiento, la composición de la deuda y la carga de intereses. Un mayor riesgo soberano debilita la transmisión de la política monetaria, la intervención cambiaria, las medidas macroprudenciales y los controles a los flujos de capital sobre los precios, el tipo de cambio y la actividad económica. Un modelo de economía pequeña y abierta con un bloque fiscal permite racionalizar estos resultados. Las economías emergentes operan bajo restricciones fiscales más estrechas, dependen en mayor medida de combinaciones de instrumentos y enfrentan una frontera de estabilización más limitada, incluyendo episodios en los que un endurecimiento monetario convencional pierde su efecto desinflacionario.

Códigos JEL: E52; E62; F31; F34.

Palabras clave: transmisión de la política monetaria; riesgo soberano; espacio fiscal; intervención cambiaria; política macroprudencial.

"*There is no such thing as an unbalanced federal budget. You're paying for it. If you're not paying for it in the form of explicit taxes, you're paying for it indirectly in the form of inflation or in the form of borrowing.*"

—Milton Friedman, remarks on government spending, taxation, and deficits [lecture transcript]

I. Introduction

Fiscal conditions can constrain monetary policy before outright fiscal dominance becomes the relevant regime. Central banks choose interest rates, foreign-exchange intervention, and macro-financial tools in environments where sovereign risk affects funding costs, exchange-rate expectations, bank balance sheets, and the credibility of stabilization policy. Yet much empirical work treats fiscal space as background: relevant for debt sustainability, but not as a state variable governing the transmission of monetary and financial instruments. We show that the transmission of these instruments varies systematically with sovereign risk.

We study a panel of advanced economies (AEs) and emerging market economies (EMEs) since the mid-1990s and ask whether sovereign risk changes the transmission of three classes of policy instruments: conventional monetary policy (MPR), foreign-exchange intervention (FXI), and macroprudential and capital-flow management measures (MPCFM). The main result is that a given policy tightening delivers less stabilization when sovereign risk is high. When fiscal space is tight, the same policy action has smaller effects and, in some cases, responses with the opposite sign. These reversals are consistent with adverse fiscal-risk feedbacks that can offset or dominate conventional transmission, narrowing what monetary policy can achieve without credible fiscal backing. Our estimates characterize conditional responses to policy surprises and observed policy actions, rather than an optimal policy rule.

Our empirical analysis proceeds in two steps. First, we document that differences in fiscal regimes are driven less by headline debt ratios than by borrowing costs, debt composition, and interest burdens. Debt-to-GDP ratios overlap substantially across AEs and EMEs, but the market price and balance-sheet structure of that debt differ sharply. EMEs face higher sovereign spreads, larger foreign-currency debt shares, higher interest payments relative to revenues, and greater joint exposure to currency, banking, and sovereign stress. These facts motivate our use of sovereign risk, rather than public debt alone, as the conditioning variable in the transmission estimates.

Second, we estimate smooth-transition local projections in which impulse responses vary continuously with sovereign risk, measured by sovereign credit default swap (CDS) spreads standardized relative to each country's historical distribution. We use CDS rather than the individual fiscal indicators discussed in Section III because consistent quarterly data on

fiscal balances, interest burdens, and debt composition are not jointly available across the full country–time sample. CDS spreads provide a forward-looking summary of perceived sovereign repayment capacity, making them a relevant proxy for fiscal risk rather than an identified fiscal shock. In the baseline specification, high stress denotes elevated sovereign risk relative to a country's own history. Appendix specifications assess the sensitivity of the estimates to the choice of control sets and address common global and regional influences through region-by-quarter fixed effects.

The estimated responses differ substantially across sovereign-risk states. In AEs under low sovereign stress, a 100 basis point contractionary monetary surprise lowers prices by about 1.3 percent, measured as the cumulative log change in CPI, around quarter 4 and contracts output. Under high stress the same shock is followed by higher prices and no output contraction. In EMEs, baseline monetary transmission is weaker even in tranquil times, and under high stress the cumulative price response turns positive. FXI shows a similar dependence on fiscal conditions. Reserve sales are followed by domestic currency appreciation under low stress, but the response is substantially attenuated when sovereign risk is elevated. MPCFM tightening generates more heterogeneous responses, but its stabilizing effects also weaken under stress.

To help rationalize these findings, we provide an illustrative model exercise based on the small open-economy environment of Adrian et al. (2020). We augment this environment with a fiscal block that affects inflation expectations, sovereign risk premia, and monetary pass-through, and calibrate it separately for AEs and EMEs. Under these assumptions and calibrations, the model generates patterns consistent with the empirical evidence: weaker transmission under high sovereign stress, sharper stabilization trade-offs in EMEs, and differences across policy instruments. The exercise offers a possible explanation for these patterns without seeking to match the full paths of the empirical responses.

Our empirical findings are also consistent with several mechanisms through which fiscal space and sovereign risk condition policy transmission, each studied separately in the literature (Corsetti et al., 2013; Campos et al., 2024). For conventional monetary policy, limited fiscal space can weaken transmission through both bank lending and the fiscal backing of price stability. Greater government borrowing can induce banks to reallocate their portfolios away from private loans and toward government securities, crowding out private credit (Broner et al., 2014; Önder et al., 2024) and strengthening the sovereign–bank nexus (Gennaioli et al., 2014). Insufficient fiscal backing can also make fiscal slippages inflationary (Woodford, 2001). Monetary tightening can compound these pressures by raising government debt-service burdens and weakening bank balance sheets. Where the resulting increase in sovereign risk generates depreciation or raises inflation expectations, it can offset the dis-

inflationary effect of weaker private demand. Weak fiscal credibility can further limit the effectiveness of tightening by undermining monetary credibility (Sargent and Wallace, 1981).

Sovereign risk also shapes external adjustment, particularly when countries finance current-account deficits through portfolio inflows into government bonds. As fiscal positions deteriorate, investors demand higher risk compensation, raising sovereign spreads (Clark and Kassimatis, 2015). Capital-flow volatility rises and domestic financial conditions tighten; in environments marked by currency mismatches and high exchange-rate pass-through, disinflation becomes more costly. This external margin is also where foreign-exchange intervention operates. Fiscal space and public-sector balance-sheet strength condition both the capacity and the effectiveness of FXI, since sterilized interventions generate quasi-fiscal costs that become increasingly difficult to sustain when public debt and sovereign risk premia are high (Adler and Mano, 2016). Heavily managed exchange-rate regimes can temporarily relax fiscal constraints but tend to amplify vulnerabilities and force sharper adjustments when underlying fiscal weaknesses persist (Daniel, 2001), and recent work emphasizes that FXI interacts with financial stability through public and private balance sheets, reinforcing the link between fiscal capacity and exchange-rate policy effectiveness (Hofmann et al., 2019; Davis et al., 2023; Agénor et al., 2026).

Macroprudential and capital-flow management measures can themselves affect sovereign financing conditions. Tools that steer bank portfolios toward government securities or impose binding liquidity requirements can lower sovereign rollover risk and borrowing costs by raising captive demand for public debt, often at the expense of private credit and risk sharing, and operating as a form of financial repression (Reinhart and Sbrancia, 2015). When fiscal conditions deteriorate, the tightening or persistence of such measures can turn procyclical, constraining credit and amplifying downturns rather than supporting stability (Forbes et al., 2015; Vargas et al., 2015).

Our findings also inform the Integrated Policy Framework (IPF), which rationalizes the joint use of interest rates, FXI, capital-flow management measures, and macroprudential tools in financially open economies (Basu et al., 2020; Basu and Gopinath, 2024; Rey, 2015; Miranda-Agrippino and Rey, 2020). The IPF emphasizes financial frictions and external constraints. Our evidence suggests that fiscal space should be incorporated as an additional state variable governing how much stabilization each instrument can deliver.

II. Data and country groupings

We assemble a multi-country panel that brings together macro-fiscal indicators, sovereign risk measures, and policy tools for both advanced economies (AEs) and emerging market

economies (EMEs). Country classifications follow IMF and BIS standards and are reported in Online Appendix Figure A.1. We merge IMF and BIS data with information on FX interventions from Adler et al. (2021), macroprudential actions from the IMF's iMaPP database (Alam et al., 2019), and capital-flow measures from Acosta-Henao et al. (2025), at annual and higher frequencies. Coverage varies across variables: fiscal balances, debt, and revenues are available for most countries since the mid-1990s; sovereign credit default swap (CDS) spreads start in the mid-2000s; and some composition variables (such as the currency and investor base of public debt) are available only for the last decade.

Our baseline sample runs from 1995 to 2025 at annual frequency, which is employed for the macro–fiscal stylized facts. This sample is supplemented with higher-frequency information where relevant (e.g. quarterly CDS). For each country and year, we observe inflation, public debt and deficits (total and primary), interest payments, government revenues, the share of public debt denominated in foreign currency, the share held by non-resident investors, and sovereign risk premia. Fiscal aggregates come from the IMF World Economic Outlook and Government Finance Statistics; prices and output from IMF International Financial Statistics, supplemented with national statistics where coverage is incomplete; exchange rates from the World Bank and BIS; and sovereign CDS spreads and central bank policy rates from Bloomberg. In Section III, we summarize cross-country differences by reporting medians and interquartile ranges (IQRs) for AEs and EMEs separately, and by comparing their pooled distributions. For the local projection estimate in Section IV, we construct a quarterly panel covering 2000Q1–2025Q4 that merges these macro outcomes with policy shock measures described in that section.

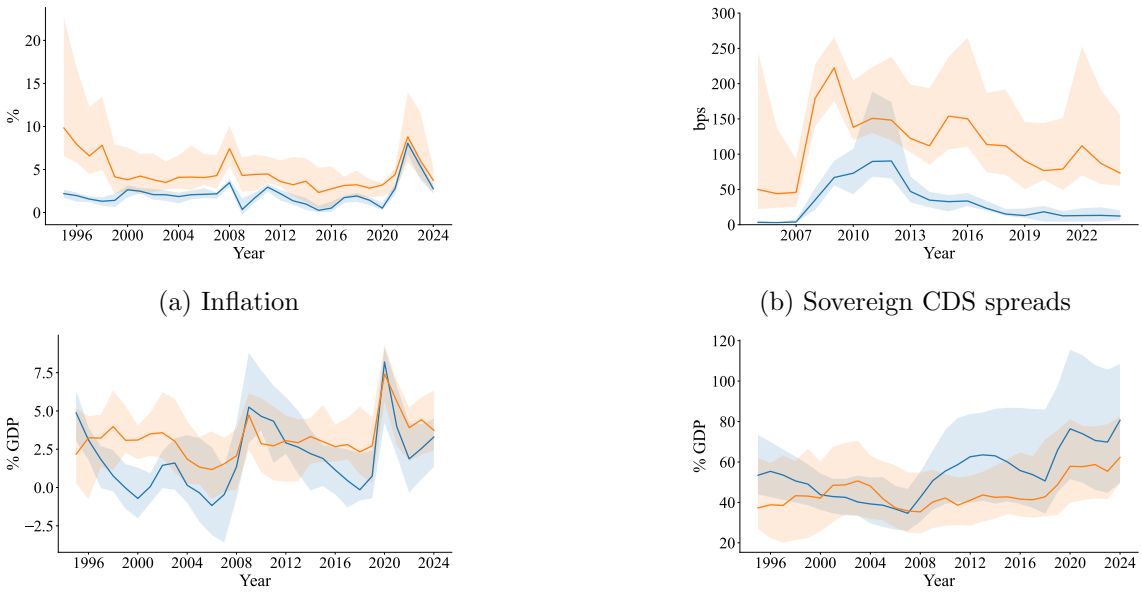
III. Fiscal Regimes and Sovereign Risk: AEs vs. EMEs

This section documents three stylized facts that define the macro-fiscal environment in which monetary and financial policies operate. Using pooled distributions and time-series medians for AEs and EMEs, we show that differences between the two groups lie less in headline fiscal aggregates than in risk premia, debt composition and cost, and crisis dynamics that shape policy effectiveness.

Stylized Fact 1. *Advanced and emerging market economies exhibit broadly similar public debt levels, yet emerging markets face systematically higher sovereign risk premia and higher inflation.*

We start by summarizing the macro-fiscal backdrop for AEs and EMEs in a single four-panel figure. Figure 1 plots, for each group, the median and interquartile range (IQR)

of inflation, five-year sovereign Credit Default Swaps (CDS) spreads, overall fiscal deficits, and public debt-to-GDP ratios over time. This provides a compact view of how nominal conditions, sovereign risk, and fiscal aggregates evolved across global cycles.



(a) Inflation

(b) Sovereign CDS spreads

(c) Overall fiscal deficit

(d) Public debt-to-GDP

Figure 1. Macro-fiscal backdrop: AEs vs EMEs

Notes: Figure displays medians and interquartile ranges (IQRs) for AEs in blue solid lines and EMEs in orange solid lines. Shaded areas represent the IQR for each group. Inflation is measured as year-on-year CPI inflation; sovereign risk corresponds to 5-year CDS spreads; the fiscal balance is the overall general-government deficit; and public debt is general-government gross debt as a percent of GDP.

The top panels show that EMEs operate in a regime of systematically higher inflation and sovereign risk. Median inflation and sovereign CDS spreads exceed those of AEs throughout most of the sample. The wider interquartile ranges observed for EMEs also point to greater dispersion across countries. The post-pandemic inflation surge is marginally larger but substantially more dispersed across EMEs. Sovereign CDS spreads display an even sharper asymmetry: EMEs face higher premia in levels and much wider dispersion, with gaps that widen around global stress episodes such as the global financial crisis and the COVID-19 shock.

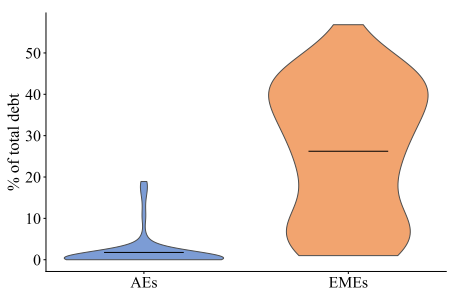
The bottom panels reveal a more nuanced picture for fiscal aggregates. Both AEs and EMEs widened fiscal deficits in response to major shocks, and their debt-to-GDP paths overlap over the sample. While some AEs carry very high debt ratios, median differences in debt and deficits between groups are modest when compared with the gaps in inflation and sovereign risk.

Stylized Fact 2. *Emerging market economies operate with more limited fiscal space and face tighter funding conditions.*

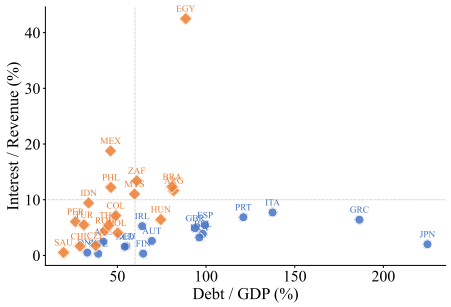
EMEs face tighter fiscal constraints due to both the composition and cost of their debt, which amplifies their exposure to exchange rate movements and sovereign risk premia. Figure 2 illustrates two key indicators. Panel (a) shows that a substantially larger share of public debt in EMEs is denominated in foreign currency, with median values several times higher than in AEs and considerable cross-country dispersion. While many EMEs have made progress in overcoming the so-called "original sin" problem, the inability to issue long-term debt in domestic currency, particularly acute in the 1990s (Eichengreen and Hausmann, 1999), reliance on foreign-currency-denominated liabilities remains significant. As a result, exchange rate depreciations directly worsen debt ratios and raise interest burdens in EMEs, tightening fiscal space precisely when global financial conditions deteriorate. By contrast, AEs issue debt almost entirely in domestic currency, largely insulating public finances from valuation effects.

Panel (b) plots interest payments as a share of government revenues against public debt as a percentage of GDP. Each dot is a country average, so the figure identifies a level difference, not a within-country marginal relationship. The figure shows a clear separation between advanced economies (AEs) and emerging market economies (EMEs): for a given level of debt, EMEs face systematically higher interest burdens relative to their revenues. By contrast, AEs cluster at lower levels of interest burdens, even at comparatively higher debt ratios, consistent with more favorable financing conditions. This pattern suggests that EMEs face a higher effective cost of borrowing and higher interest burdens at comparable debt levels. From a fiscal-space perspective, this implies that EMEs have less room to expand debt without crowding out other expenditures, as a larger fraction of their revenues must be allocated to debt servicing.

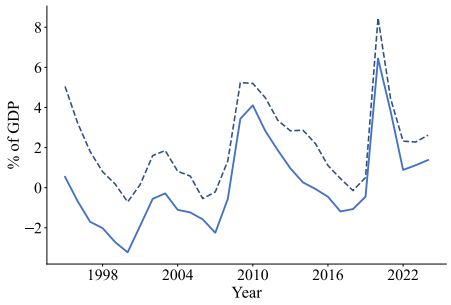
A complementary dimension is the composition of fiscal adjustment. Panels (c) and (d) of Figure 2 plot median primary and total fiscal deficits by country group. At first sight, differences in overall deficits between AEs and EMEs are modest: both groups widen deficits around global shocks and consolidate afterward. The gap between primary and total balances, however, is much larger and more persistent in EMEs. Since the 2000s, many EMEs have run primary surpluses or small deficits, yet their total balances remain significantly negative because interest payments absorb a large share of revenues. AEs, by contrast, can sustain small primary deficits while keeping total deficits manageable, precisely because their interest burden is lower. In sum, EMEs need stronger primary efforts just to stabilize debt, and their ability to use fiscal policy countercyclically is tightly constrained by



(a) Share of public debt in foreign currency



(b) Interest payments over revenues



(c) Primary and Total Fiscal Deficit – AEs



(d) Primary and Total Fiscal Deficit – EMEs

Figure 2. Fiscal Space Indicators: AEs vs EMEs

Notes: Panel (a) reports the share of general-government debt denominated in foreign currency for AEs and EMEs from 2014-2024. Panel (b) plots interest payments as a percent of government revenues against general-government gross debt as a percent of GDP; each dot is a country average. Panel (c) displays median primary and total deficit as a percent of GDP for AEs (blue) and Panel (d) for EMEs (orange). The solid lines correspond to primary deficit while dashed are total deficit. The gap between them reflects interest burdens and financing pressures.

the combination of foreign-currency exposure and high interest-to-revenue ratios.

Stylized Fact 3. *Emerging market economies accumulate more crisis years and exhibit greater joint vulnerabilities, particularly through more frequent currency and banking crises, than advanced economies.*

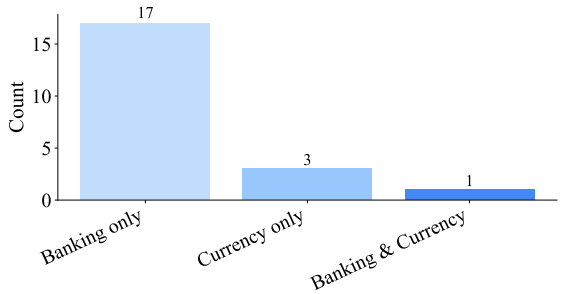




Figure 3. Crisis Incidence and Overlap – AEs vs EMEs

Notes: The figure reports the incidence of different types of crises in AEs and EMEs. Crises are classified into banking, currency, and sovereign events. Bars show the count of country-years experiencing each crisis type, as well as combinations where two or more crises occur simultaneously (e.g., banking–currency, banking–sovereign, currency–sovereign, and all three).

Figure 3 reports crisis counts by type (banking, currency, sovereign) and the composition of overlapping patterns. EMEs accumulate more country–years with any crisis and, in particular, more currency and banking crises than AEs. Moreover, they record more country–years in which multiple crises occur simultaneously, most visibly combinations involving banking crises, while AEs experience more isolated episodes.

IV. Policy Transmission under Sovereign Risk

This section examines whether fiscal conditions shape the effectiveness of monetary policy tools. We estimate state-dependent impulse responses for three instruments, monetary policy rate (MPR), foreign-exchange intervention (FXI), and macroprudential and capital-flow management measures (MPCFM), and assess whether transmission to prices, exchange rates, and output weakens when sovereign risk is elevated.[1]

A. Empirical framework

We use local projections (Jordà, 2005) with a smooth-transition interaction to allow impulse responses to vary continuously with fiscal conditions. For each policy instrument and outcome, we estimate

$$\Delta y_{i,t+h} = \alpha_i + \delta_t + \left[\beta_h + \gamma_h\, G(z_{it})\right] x_{it} + \lambda_h\, G(z_{i,t}) + \mathbf{W}'_{it}\boldsymbol{\phi}_h + \varepsilon_{i,t+h}, \tag{1}$$

for horizons $h = 1, \ldots, 8$ quarters, where $\Delta y_{i,t+h} = y_{i,t+h} - y_{i,t-1}$ denotes the cumulative percent change in outcome Y (in log points $\times$ 100). The terms α_i and δ_t are country and quarter fixed effects. Country fixed effects absorb time-invariant cross-country heterogeneity, while quarter fixed effects absorb shocks and trends common to all countries within each estimation sample. Identification therefore comes from within-country variation in the policy shock and its interaction with lagged sovereign stress, net of common quarterly conditions. The vector $\mathbf{W}_{it}$ collects the cell-specific controls detailed in Online Appendix Section B. The function

[1] Sample coverage varies by instrument due to data availability: monetary policy and MPCFM estimations include 19 AEs and 13–14 EMEs, while FXI estimations include 7 AEs and 13–16 EMEs; country lists are reported in Online Appendix Figure A.1.

$G(z_{it})$ is a logistic transition function of z_{it}, defined as the CDS spread[2] expressed in standardized units relative to the historical distribution of CDS spreads for country i. It varies smoothly between zero, corresponding to low fiscal stress, and one, corresponding to high fiscal stress, so that β_h captures the impulse response under tranquil conditions and $\beta_h + \gamma_h$ captures the response under acute sovereign stress. The impulse responses are evaluated half an interquartile range below and above each country's median, $z = \mp 0.5$, so the reported responses are $\beta_h + 0.08\,\gamma_h$ and $\beta_h + 0.92\,\gamma_h$. The country-specific standardization ensures that a given value of z captures unusual stress relative to each country's own baseline, rather than comparing CDS levels across countries with structurally different sovereign risk premia.

Policy variables. All policy variables are signed so that positive values denote tightening.[3]

1. Monetary policy surprise: deviation of the actual policy rate change from the Bloomberg median survey expectation, in percentage points. A one-unit shock corresponds to an unexpected 100-basis-point tightening.[4]

2. FX intervention (policy actions): net foreign-currency sales, measured in billions of U.S. dollars, are constructed from the broad FXI proxy in Adler et al. (2021), which combines spot and derivative interventions. A one-unit shock corresponds to USD 1 billion in net reserve sales, interpreted as reserve drawdowns intended to appreciate the domestic currency.[5]

3. Macroprudential and capital-flow management measures: the quarterly sum of net macroprudential policy actions from the IMF iMaPP database (Alam et al., 2019) and net capital-control changes from Acosta-Henao et al. (2025). A one-unit shock corresponds to one additional net tightening action.

[2]We use CDS spreads rather than the individual fiscal indicators documented in Section III because consistent quarterly data on fiscal balances, interest burdens, and debt composition are not jointly available over the full country and time sample. CDS spreads are correlated with key fiscal indicators. As a result, they contain substantial information about the fiscal position of the sovereign and provide a market-based approximation of fiscal vulnerabilities. Moreover, CDS spreads provide a forward-looking and consistently measured summary of perceived sovereign risk at the frequency required by the local projections. Because they also embed nonfiscal risks and global risk appetite, we interpret them as a reduced-form measure of sovereign stress, rather than as a fiscal shock or a pure measure of fiscal fundamentals.

[3]Because the policy shock enters the baseline specification linearly, the estimates impose symmetry between equally sized positive and negative shocks within each stress state. The baseline impulse responses therefore do not provide an empirical test of whether tightening and easing have asymmetric effects. Nor do they identify the optimal policy response.

[4]We exclude crisis windows (2007Q1–2009Q4, 2020Q1–2021Q4) from monetary policy estimations to avoid conflating conventional and unconventional policy.

[5]An FX intervention of US$1 billion is sizable for many economies, though less so for some advanced economies, such as Japan. We use this normalization to facilitate comparison with Arango-Lozano et al. (2024), who examine 279 reported estimates from 74 empirical studies.

Unlike the monetary policy measure, FXI and MPCFM capture observed policy actions rather than surprises relative to prior expectations. We account for part of their systematic response to economic conditions through the controls in Equation (1). Depending on the policy–outcome specification, these include lagged exchange-rate movements, inflation, policy rates, sovereign spreads, and outcome dynamics, alongside country and quarter fixed effects (see online appendix Table B.1). Conditioning on these variables helps absorb policy responses to observed conditions. It does not, however, recover an independently identified policy innovation: authorities may respond to contemporaneous developments, private information, or anticipated shocks not captured by the controls. We therefore interpret the FXI and MPCFM estimates as conditional responses to policy actions, with a causal interpretation requiring that the remaining policy variation be unrelated to unobserved determinants of future outcomes.

Outcomes. The dependent variables are core CPI, the nominal exchange rate, and real GDP. All responses are cumulative log changes from $t-1$, multiplied by 100, and can be read as cumulative percent changes. We refer to the cumulative changes in CPI as inflation throughout the text. The exchange rate is the end-of-period rate in local currency per U.S. dollar, so a positive response denotes a cumulative percent domestic currency depreciation.

B. Results

Figure 4 presents the 18 estimated impulse responses, corresponding to three policy instruments, two country groups, and three outcomes, under low stress (circles) and high stress (diamonds). Several patterns emerge.

General pattern. Across most of the 18 cells, the low-stress IRFs (solid lines) display the expected negative responses to a tightening shock: prices and output fall, and the exchange rate appreciates. Under high fiscal stress (dashed lines), these responses are systematically attenuated, that is, the dashed path lies closer to zero than the solid path over most of the horizon. This dampening is our central result: sovereign risk weakens the transmission of all three policy instruments, though the degree and timing of attenuation vary across policies, outcomes, and country groups.

Monetary policy. In AEs, monetary tightening under low sovereign stress produces a persistent decline in prices: a 100 basis point contractionary monetary surprise lowers the price level by about 1.3 percent around quarter 4, measured as the cumulative log change in

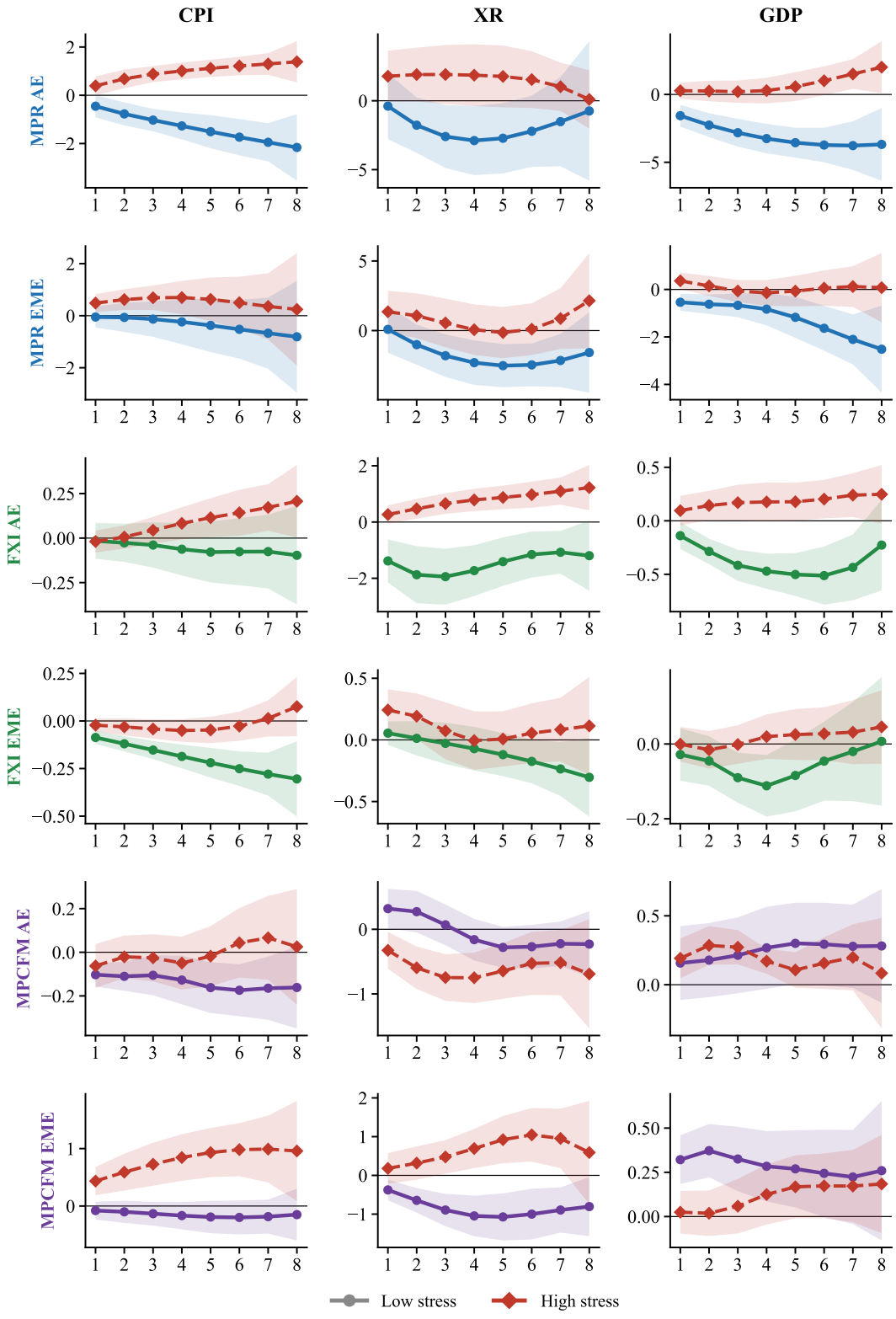


Figure 4. State-dependent impulse responses to policy tightening shocks

Notes: Each panel shows the cumulative response (percent) of the column variable to a one-unit tightening shock in the row policy (100 bps monetary surprise, $1 bn FXI sale, or 1 net MPCFM tightening), estimated via Equation (1). Circles (solid lines): low fiscal stress. Diamonds (dashed lines): high fiscal stress. Vertical bars: 90% confidence intervals (two-way clustered standard errors). Horizons in quarters.

CPI. Output contracts and the exchange rate appreciates. Under high stress, the point estimates instead indicate higher prices, depreciation, and no output contraction; the trajectory-weighted CPI response moves from -1.3 to $+1.0$ percent. One possible interpretation follows fiscal-theory logic: if higher debt-service costs are not backed by expected fiscal adjustment, monetary tightening can raise sovereign risk premia and inflation expectations, counteracting its conventional disinflationary effect (Cochrane, 2023).

In EMEs, monetary transmission is weaker than in AEs even under low sovereign stress. A 100 basis point contractionary monetary surprise lowers the price level by about 0.24 percent around quarter 4. This smaller response is consistent with shallower financial markets and weaker monetary pass-through (Brandao-Marques et al., 2020). Under high sovereign stress, the cumulative CPI response turns positive, reaching 0.70 percent around quarter 4. The GDP and exchange-rate responses in this state are not statistically distinguishable from zero, so the evidence for an exchange-rate channel is less clear; their insignificance alone does not establish a difference across stress states. Across both groups, the baseline price reversals are consistent with fiscal-risk feedbacks outweighing conventional disinflationary forces, although the estimates do not separately identify these mechanisms.

Our monetary policy surprises may combine unexpected changes in the policy stance with information conveyed by the central bank about the economic outlook (Jarociński and Karadi, 2020; Miranda-Agrippino and Ricco, 2021; Bolhuis et al., 2024). We cannot separate these components, and their relative importance may itself vary with sovereign stress. The combination of higher prices and depreciation in the high-stress AE point estimates is consistent with fiscal-risk feedbacks, but it does not distinguish them from state-dependent information effects. We therefore treat the fiscal channel as a plausible interpretation rather than a separately identified mechanism.

Foreign exchange intervention. FXI tightening, defined as net reserve sales, is followed by exchange-rate appreciation under low sovereign stress in both AEs and EMEs. A USD 1 billion net sale is associated with an appreciation of about 1.73 percent in AEs and 0.10 percent in EMEs. The inflation response is more visible in EMEs than in AEs, consistent with higher exchange-rate pass-through in emerging markets (Bems et al., 2020). Output responses are small and less precisely estimated. Overall, the low-stress estimates suggest that FXI operates primarily through the exchange rate, with more limited evidence of downstream effects on prices and activity.

Under high sovereign stress, the exchange-rate response to FXI is substantially attenuated in both groups. The price and output responses also become weaker and are generally not statistically distinguishable from zero. This attenuation is consistent with the view that

sovereign stress reduces the credibility, persistence, or perceived effectiveness of reserve sales. One possible channel is quasi-fiscal: sterilized interventions become more costly when domestic interest rates and sovereign risk premia are elevated. We interpret this mechanism cautiously, since the estimates speak directly to weaker FXI transmission under stress rather than to the precise source of that weakening.

Macroprudential and capital-flow management measures. The effects of MPCFM tightening are generally modest and less systematic than those of monetary policy or FXI. Under low sovereign stress, tightening reduces inflation in AEs and produces a transitory exchange-rate appreciation in EMEs, although these responses are relatively small. Under high stress, the effects in AEs are statistically indistinguishable from zero in CPI, while the CPI response in EMEs turns positive, reaching about 0.84 percent at quarter 4. Elevated sovereign risk therefore appears to weaken, and in EMEs may reverse, the transmission of macroprudential and capital-flow management measures (Biljanovska et al., 2023). Output, by contrast, rises persistently after a tightening in both country groups and stress states. We do not read this as an expansionary effect: these measures are typically adopted during credit booms or surges in capital inflows, so the estimated responses likely reflect, at least in part, the cyclical conditions that prompt them. This endogeneity is a well-known challenge in the empirical literature on macroprudential policy (Richter et al., 2019).

The baseline estimates indicate that policy transmission varies with sovereign stress, although the strength of the evidence differs across instruments, outcomes, and country groups. Several responses weaken or change sign under high stress. We next assess which of these patterns survive alternative specifications.

Robustness. Online Appendix Section B.8 examines whether the results depend on the choice of control sets or reflect common regional conditions. First, we re-estimate every cell under three alternative rules for selecting the control blocks: a uniform control set common to all cells, a purely statistical ranking of the admissible candidates, and the top-ranked specification in each cell (Online Appendix Tables B.2–B.4). Second, we replace quarter fixed effects with region-by-quarter fixed effects while retaining country fixed effects (Online Appendix Table B.6). This specification absorbs disturbances common to countries within a region in a given quarter. The main patterns of state dependence are robust to both exercises. Under every control set, monetary tightening in AEs lowers prices and contracts output under low stress, while under high stress the price response turns positive and the output contraction disappears; the same configuration is preserved under region-by-quarter fixed effects, and the price reversal following MPCFM tightening in EMEs is present in every

variant. Across both exercises, the sign of nearly all economically meaningful responses is unchanged.

C. Model-based interpretation

We next compare the empirical impulse responses with those implied by a quantitative small open-economy model calibrated separately for AEs and EMEs. This exercise is not a robustness check in the usual econometric sense. Its purpose is to ask whether a model with explicit fiscal and financial channels can generate the same qualitative patterns documented above: weaker transmission under sovereign stress, sharper trade-offs in EMEs, and heterogeneous responses across instruments. The comparison therefore provides a disciplined interpretation of the empirical results, rather than a formal test of the model.

Model. We build on the linearized New Keynesian small open-economy model of Adrian et al. (2020), which features discounted Euler and Phillips equations following Gabaix (2020), sticky prices and wages, and an endogenous UIP risk premium (Gabaix and Maggiori, 2015). We extend the model by adding a fiscal block with three stress-state channels. First, a fiscal-theory term enters inflation expectations in the Phillips curve, so that elevated public debt, measured relative to each country group's baseline, raises expected partial monetization. Second, the UIP risk premium increases in high-debt states, generating depreciation pressure when sovereign risk is elevated. Third, monetary pass-through to private lending rates becomes state dependent, a candidate mechanism not identified by the local projections. The model is then shocked with the three policy instruments used in the empirical analysis: a monetary policy surprise, a foreign-exchange intervention shock normalized to a USD 1 billion reserve sale, and a macroprudential and capital-flow management tightening shock.

Calibration. The calibration uses selected low-stress local-projection moments to discipline policy-instrument loadings and imposes restrictions governing their behavior under stress. In particular, the FXI calibration sets the effective high-stress loading close to zero, so attenuation along that margin is partly built into the exercise; the macroprudential and capital-flow-management loadings, by contrast, take the same value in both stress states. The high-stress monetary–fiscal regime is a theoretical benchmark of weak fiscal backing, not a classification of the high-CDS observations as fiscally dominant. Parameters common to both country groups, and the group-specific nominal-rigidity block, follow Adrian et al. (2020). AEs are calibrated with public debt equal to 78 percent of GDP, higher monetary-policy inertia, and a flatter Phillips curve. EMEs are calibrated with lower public debt, 48 percent of GDP, faster policy-rate normalization, and a steeper, more backward-looking supply curve, reflecting less well-anchored inflation expectations. The high-stress configuration activates the fiscal-monetization channel, raises the sovereign-risk component of the UIP premium, and

reduces the effective Taylor-rule response, capturing the weaker room for monetary tightening when fiscal constraints bind. FXI effectiveness is allowed to vary by stress state. In line with the local projections, the portfolio-balance coefficient is moderate under low stress but close to zero under high stress, reflecting the weak exchange-rate response of reserve sales when sovereign risk is elevated. The full calibration is detailed in Online Appendix Section C.

Figure 5 reports the model-implied responses under low and high fiscal stress. The model is able to reproduce the main qualitative pattern in the data. Across instruments, transmission is stronger under low stress and weaker under high stress. For monetary policy, the model captures the disinflationary response in AEs under low stress and its attenuation, or reversal, when sovereign risk is elevated. In EMEs, the model generates weaker baseline monetary transmission and a positive inflation response under high stress, consistent with tighter fiscal constraints and weaker credibility. For FXI, the model produces exchange-rate appreciation under low stress in both country groups and little exchange-rate response under high stress. For macroprudential and capital-flow measures, the model generates more modest and heterogeneous responses, as in the empirical estimates.

The exercise should be read as a model-based interpretation, not as a full quantitative validation. The model matches the main signs, rankings, and differences across stress states, but it is not estimated to fit the full path of each impulse response. Its value is to show that a standard small open-economy environment, once augmented with fiscal stress channels, can rationalize the central empirical finding: sovereign risk weakens the transmission of monetary, foreign-exchange, and macro-financial tools.

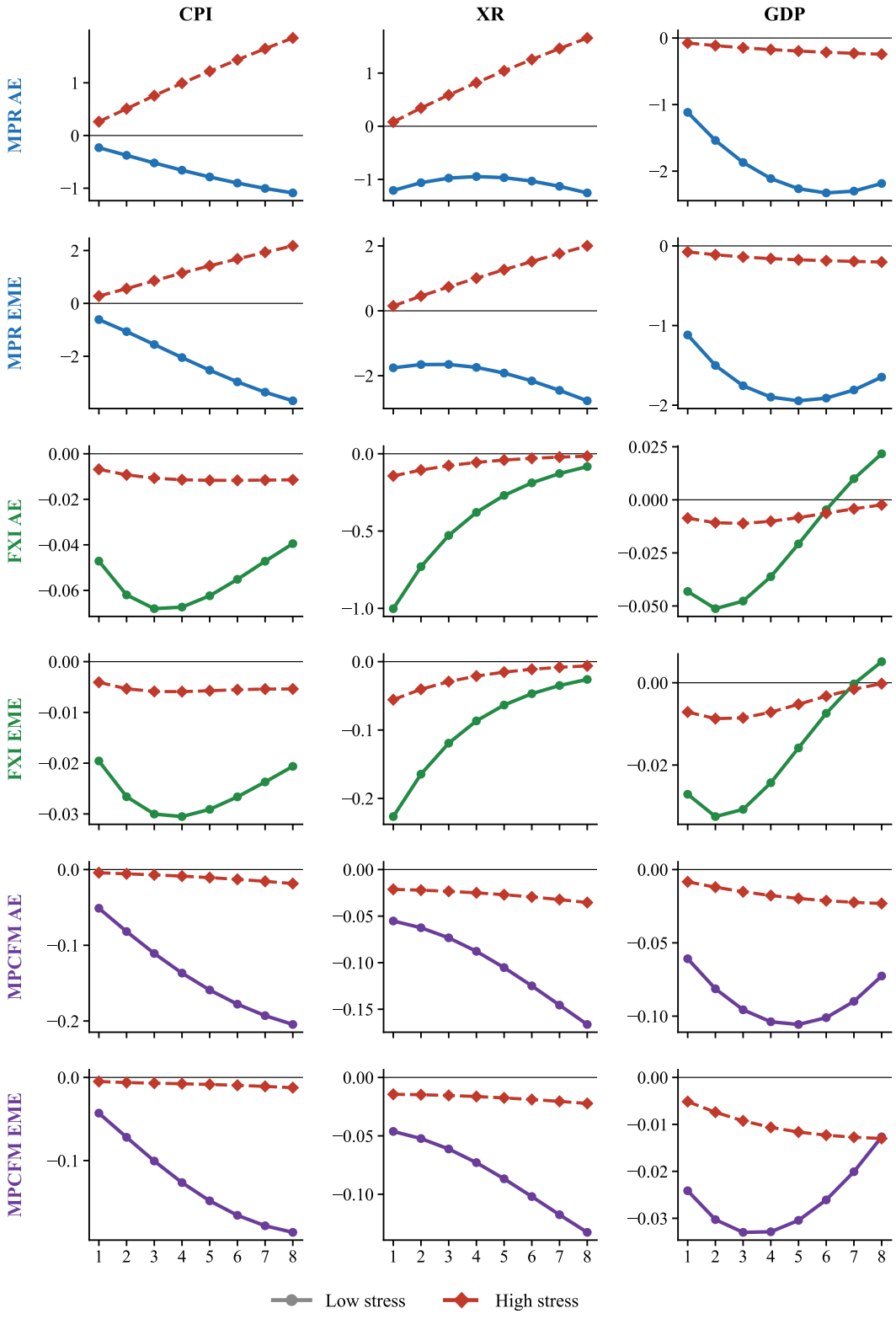


Figure 5. Model impulse responses

Notes: Model-implied impulse responses from the extended Adrian et al. (2020) framework, calibrated to AE (top rows) and EME (bottom rows) characteristics. Solid lines: low-stress regime. Dashed lines: high-stress regime. Columns: CPI inflation, nominal exchange rate (positive = depreciation), and GDP. Monetary shock normalized to 100 bps; FXI shock to $1 bn reserve sale; MPCFM shock to a one-standard-deviation tightening. Horizons in quarters.

V. Discussion: Fiscal space as a policy constraint

A standard view treats monetary policy, foreign-exchange intervention, and macroprudential and capital-flow measures as instruments that can be deployed conditional on macroeconomic and financial conditions, but largely separately from the sovereign balance sheet. Our results suggest that this separation is incomplete. When sovereign risk is low, policy responses have the expected signs: monetary tightening lowers inflation and output, FXI appreciates the currency, and macroprudential and capital-flow tightenings are followed by modest disinflation. When sovereign risk is high, the responses become smaller, less precise, or change sign. Fiscal space is therefore not only a constraint on fiscal policy. It also affects the feasible set of monetary and macro-financial policies.

This has immediate practical relevance. Under tight fiscal conditions, monetary tightening activates two opposing forces. The conventional channel reduces demand and inflation. At the same time, higher interest rates increase public debt-service costs and can intensify sovereign-bank exposures, risk premia, depreciation pressures, and expectations of future fiscal accommodation. As fiscal stress rises, these feedbacks weaken the disinflationary response to a given tightening surprise and can eventually dominate the conventional channel. In that case, the problem is no longer adequately described as merely a higher sacrifice ratio: the sign of the inflation-output trade-off itself becomes state dependent. Importantly, this finding does not imply that the central bank should mechanically cut rates when sovereign risk is high. Our estimates identify the conditional response to an unexpected tightening, not the optimal policy rule. Moreover, because the baseline specification is linear in the policy shock, an equally sized easing shock is mechanically assigned the opposite response. That symmetry is a modeling restriction, not an independent empirical finding about the consequences of easing. A sustained change in the policy stance could also alter exchange-rate expectations, sovereign risk, fiscal behavior, and the stress regime itself, mechanisms that are outside the local experiment.

The appropriate policy implication is therefore not to invert the monetary-policy rule, but to recognize that the central bank's unilateral stabilization frontier narrows under fiscal stress. Under stress the same tightening delivers less disinflation and, in severe cases, may amplify adverse fiscal-risk feedbacks. Restoring conventional monetary transmission then plausibly requires credible fiscal backing; whether a coordinated instrument mix can substitute for it is a question we do not test. Similarly, FXI may have only short-lived effects when markets perceive reserve losses or sterilization costs as fiscally difficult to sustain.

Our findings connect directly to the IMF's Integrated Policy Framework (IPF), which rationalizes the joint use of interest rates, FXI, capital-flow management measures, and

macroprudential tools in financially open economies (Basu et al., 2020; Basu and Gopinath, 2024; Rey, 2015; Miranda-Agrippino and Rey, 2020). In its current form, the IPF gives limited explicit role to fiscal space and sovereign risk as state variables conditioning policy transmission. Our evidence suggests that incorporating such variables, including interest-to-revenue ratios, foreign-currency debt shares, and sovereign spreads, would help explain why similar policy actions produce different outcomes across countries. It would also help interpret why EMEs rely more heavily on multi-instrument configurations and why, under severe sovereign stress, the problem may extend beyond a steeper conventional trade-off to a deterioration of the transmission mechanism itself.

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Online Appendix

This online appendix accompanies "Monetary Policy under Fiscal Risk." Appendix A describes the country groups and the sources and construction of all variables. Appendix B details the state variable, the sample windows, the cell-by-cell control sets, and the robustness of the estimates to the choice of controls. Appendix C documents the calibration of the model and the sources for each parameter.

A. Data Sources and Country Groups

We assemble a panel of advanced economies (AEs) and emerging market economies (EMEs) since the mid-1990s, listed in Figure A.1. The effective sample used in each regression is a subset of this universe, determined by three factors: (i) coverage of the policy shocks, which differ across sources and starting dates; (ii) availability of the outcome variables—core CPI, the nominal exchange rate, and real GDP; and (iii) representation of the euro area, which is proxied by Germany in the exchange-rate regressions.

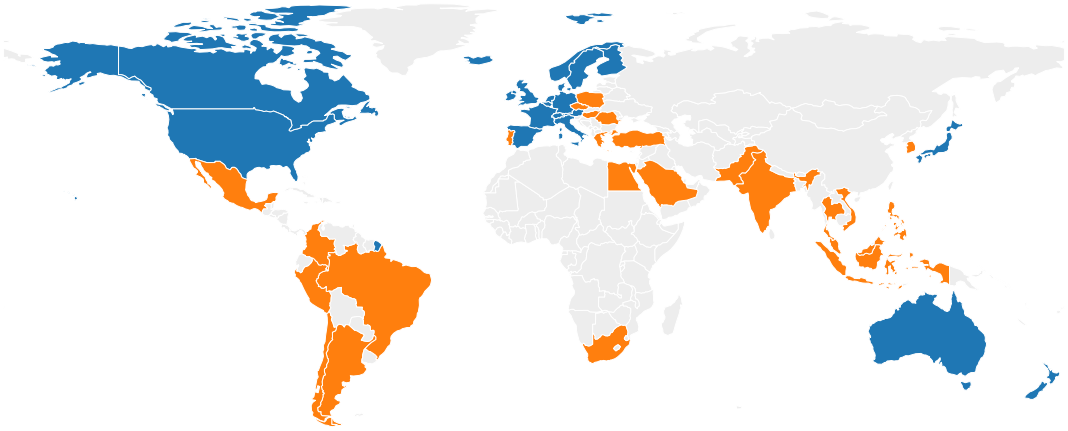

Figure A.1. Country groups

Notes: Advanced economies (AEs) are shaded in blue and emerging market economies (EMEs) in orange; countries in grey are outside the sample. AEs: Australia, Austria, Belgium, Canada, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Spain, Sweden, Switzerland, United Kingdom, and United States. EMEs: Argentina, Brazil, Chile, Colombia, Czech Republic, Egypt, Greece, Hungary, India, Indonesia, Malaysia, Mexico, Pakistan, Peru, Philippines, Poland, Portugal, Romania, Saudi Arabia, South Africa, South Korea, Thailand, Turkey, and Vietnam.

Accordingly, the annual panel 1995–2025 is employed for the macro–fiscal stylized facts, while the quarterly panel 2000Q1–2025Q4 is used in the local projection estimates. Tables A.1 and A.2 describe the construction of each variable and its source: Table A.1 covers

the quarterly estimation panel and Table A.2 the annual macro–fiscal panel. The policy shocks combine Bloomberg policy-rate surveys, the FX intervention proxies of Adler et al. (2021), the IMF integrated Macroprudential Policy (iMaPP) database (Alam et al., 2019), and the capital-control measures of Acosta-Henao et al. (2025). Monthly series are aggregated to quarterly frequency by summing within the quarter.

Table A.1. Data sources and variable definitions: quarterly estimation panel

Variable	Source	Construction / definition	Frequency & coverage
Monetary policy surprise	Bloomberg policy-rate decision surveys	Policy rate at each decision minus the median survey expectation, in percentage points; monthly surprises summed within the quarter.	Monthly → quarterly sum; 2003 onward.
FX intervention	Adler et al. (2021)	Broad proxy: spot intervention plus changes in derivatives positions, in U.S. dollars; rescaled to USD billions in estimation.	Monthly → quarterly sum.
Macroprudential actions	IMF iMaPP database (Alam et al., 2019)	Net number of tightening minus loosening actions summed across 17 macroprudential instrument categories.	Monthly → quarterly sum.
Capital controls	Acosta-Henao et al. (2025)	Net changes in five components (reserve requirements, unremunerated and FX reserve requirements, taxes on inflows and outflows), each coded ±1, summed.	Quarterly.
Sovereign CDS spreads (5-year)	Bloomberg	Five-year sovereign CDS spreads, in basis points; gaps of up to two months filled by linear interpolation.	Monthly; mid-2000s onward.
Headline and core CPI	World Bank global inflation database (Ha et al., 2023)	Consumer price indices (headline and core); core CPI is the baseline price measure.	Quarterly.
Nominal exchange rate	BIS US dollar exchange rates (WS_XRU)	End-of-period bilateral exchange rate, local currency per U.S. dollar; an increase denotes a depreciation.	Monthly → end-of-quarter.
Real GDP	IMF quarterly national accounts	Gross domestic product at constant prices, seasonally adjusted; supplemented with national sources for Peru and Malaysia.	Quarterly.
Policy rate	Bloomberg	Central bank policy rate level, in percent; monthly observations averaged within the quarter. Used as a control variable.	Monthly → quarterly average.

Notes: The combined macroprudential-plus-capital-controls indicator used in the estimation is the sum of the quarterly iMaPP net tightening actions and the quarterly capital-control net changes. FX intervention shocks are signed so that a positive shock corresponds to a policy tightening. The CPI, exchange-rate, and GDP indices are rebased to 100 at the first observation per country and log-transformed.

Table A.2. Data sources and variable definitions: annual macro–fiscal panel

Variable	Source	Construction / definition	Frequency & coverage
Fiscal aggregates	IMF WEO and GFS	Overall balance ob, primary balance pb, gross debt, and revenues rev, in percent of GDP. Interest payments: $int = pb - ob$; interest burden: $100 \times int/rev$.	Annual; 1995–2025.
Inflation	IMF IFS	Annual CPI inflation, in percent; supplemented with national statistics where coverage is incomplete.	Annual; 1995–2025.
FX share of public debt	World Bank Fiscal Space Database (Kose et al., 2022)	General government debt denominated in foreign currency, in percent of the total.	Annual; last decade.
Crisis indicators	Laeven and Valencia (2020)	Banking, currency, and sovereign debt crisis indicators.	Annual.

B. Local Projections: State Variable, Samples, and Controls

This appendix documents the elements of the local-projection design that are not fully specified in the main text: the smooth-transition sample split into low- and high-stress states, the construction of the sovereign-stress state variable, the sample windows, the cell-by-cell control sets, and the robustness of the estimates to the choice of controls.

B.1. Estimating equation: appendix conventions

The impulse responses are estimated from the smooth-transition local projection of Equation (1) in the main text, following Auerbach and Gorodnichenko (2013). Relative to the compact statement in the text, two conventions are worth making explicit. First, advanced-economy (AE) and emerging-market (EME) responses are estimated on separate samples, so all coefficients are group-specific, and standard errors are clustered two-way, by country and by quarter. Second, the reported low- and high-stress responses are linear combinations of β_h and γ_h evaluated half an interquartile range below and above the country-specific median of the state, $z = \mp 0.5$:

$$\beta_h^{\text{low}} = \beta_h + G(-\tfrac{1}{2})\,\gamma_h, \tag{B.1}$$

$$\beta_h^{\text{high}} = \beta_h + G(+\tfrac{1}{2})\,\gamma_h, \tag{B.2}$$

with standard errors computed from the joint covariance matrix of (β_h, γ_h). The paper displays horizons $h = 1$ through 8, smoothed following Barnichon and Brownlees (2019).

B.2. State variable

The fiscal-stress state is based on five-year sovereign credit default swap (CDS) spreads. To capture persistent rather than transient stress, we smooth the spread with an eight-quarter backward moving average, $\text{CDS}_{i,t}^{MA8} = \frac{1}{8}\sum_{j=0}^{7} \text{CDS}_{i,t-j}$. The state entering the estimating equation is the one-quarter lag of this smoothed spread, normalized country by country:

$$z_{i,t} \;=\; \frac{\text{CDS}_{i,t-1}^{MA8} - \text{median}_i}{\text{IQR}_i}, \qquad G(z) \;=\; \frac{1}{1+e^{-\kappa z}}, \qquad \kappa = 5, \tag{B.3}$$

where median_i and IQR_i are the median and interquartile range of the lagged smoothed spread for country i, computed over the estimation sample of each cell. The logistic transition follows Auerbach and Gorodnichenko (2013) and Tenreyro and Thwaites (2016). Lagging the

state one quarter mitigates contemporaneous feedback from the shock to measured stress. Country-specific normalization means that "high stress" is defined relative to each country's own history, so the state comparison is within country rather than across the very different CDS levels of advanced and emerging economies; countries with a degenerate (non-positive) interquartile range are excluded. With $\kappa = 5$, the regime weights at the evaluation points $z = \mp 0.5$ are approximately 0.08 and 0.92, so the reported low- and high-stress responses are evaluated close to the two ends of the transition.

B.3. CDS correlation with Fiscal Indicators

Figure B.1 plots average CDS spreads against net interest payments as a share of GDP for advanced and emerging market economies. We focus on net interest payments because, unlike the stock of gross debt, they combine the size of the debt burden with the cost at which governments finance it, and therefore embed how markets price each sovereign's risk. CDS spreads are positively associated with net interest payments in both groups, with correlations of 0.43 for advanced economies and 0.40 for emerging market economies. This pattern indicates that CDS spreads contain meaningful information about the debt-servicing burden governments face, and supports their use as a market-based proxy for fiscal vulnerabilities.

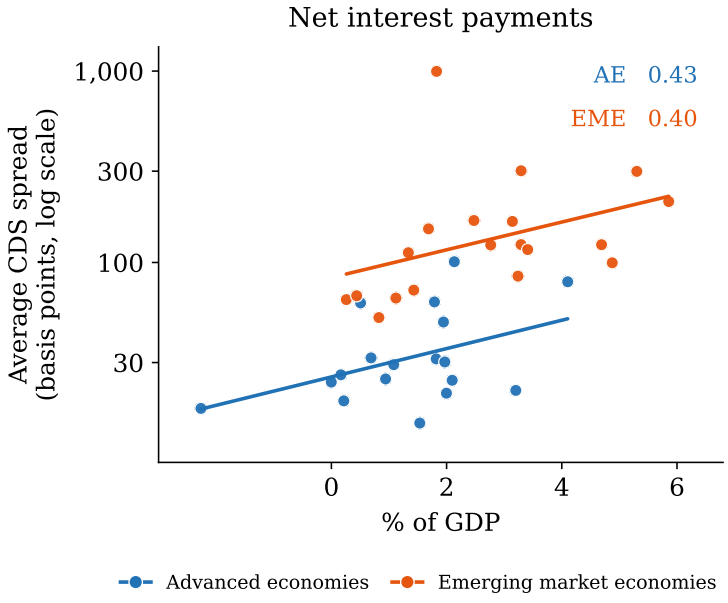

Figure B.1. CDS correlation

Notes: The figure plots sovereign CDS spreads against net interest payments. Blue (orange) markers correspond to advanced (emerging market) economies. Solid lines denote linear fits estimated separately for each group. Correlation coefficients are reported in the panel. Each dot is the country average.

B.4. Monetary Policy Shocks Distributions

Figure B.2 reports the distribution of the monetary policy surprises used throughout the analysis. Most country-quarter observations are associated with a zero surprise, reflecting the infrequent nature of monetary policy actions. Restricting attention to non-zero realizations, the distributions are centered around zero but display substantial heterogeneity across countries and over time. Emerging market economies exhibit somewhat greater dispersion than advanced economies, indicating larger and more variable monetary policy surprises in those countries.

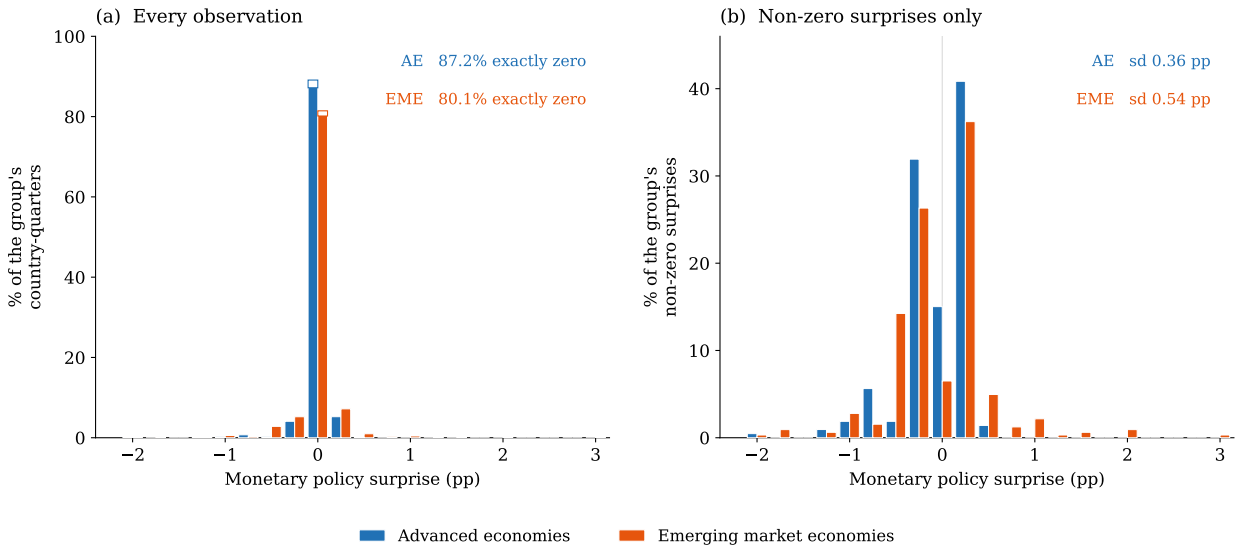

Figure B.2. Monetary Policy Shocks

Notes: The figure shows the distribution of monetary policy surprises for advanced economies (blue) and emerging market economies (orange). Panel (a) includes all country-quarter observations, while panel (b) excludes observations with a zero surprise. The percentages of observations with exactly zero surprises and the standard deviations of non-zero surprises are reported within the corresponding panels.

B.5. Sample windows

The panel is quarterly and spans 2000Q1 through 2025Q4 for the advanced and emerging economies listed in Figure A.1; country and observation counts vary by cell with data availability, for the reasons given in Appendix A. Two sample windows are used. The full sample uses all available quarters. The non-crisis sample excludes the global financial crisis (2007Q1–2009Q4) and the COVID-19 pandemic (2020Q1–2021Q4). As recorded in Table B.1, all six FXI and all six MPCFM cells use the full sample, because interventions and regulatory actions are concentrated in turbulent periods and excluding those periods would discard much of the identifying variation. All six MPR cells use the non-crisis sample, since during the two

crisis windows policy decisions and survey expectations were dominated by common global shocks.

Country composition adjustments. Three adjustments apply to specific cells. First, euro-area members share a single exchange rate against the dollar; to avoid replicating the same currency movement across countries, the euro area keeps a single representative in the exchange-rate cells: only Germany is retained in the advanced-economy exchange-rate cells for MPR and FXI shocks (the "euro-collapsed" AE sample). Second, in the MPR–AE–XR cell, Norway and Iceland are excluded: leave-one-country-out diagnostics identified them as influential outliers, reflecting oil-price exposure and the 2008 banking collapse, respectively. Third, Switzerland is excluded from the three FXI cells for advanced economies, whose interventions between 2011 and 2015 defended a minimum exchange rate against the euro.

B.6. Control sets by baseline cell

Table B.1 records, for each of the 18 baseline cells (3 policies × 2 country groups × 3 outcomes), which blocks of controls enter the vector $W_{i,t}$ and the sample window. Controls are drawn from a common set: the sovereign CDS spread; the level of the policy rate; the change in the policy rate; exchange-rate growth; CPI inflation; lags of the one-quarter growth of the outcome; and lags of the dependent variable. The table marks which blocks are active; in every cell the active blocks enter with one or two lags.

Table B.1. Control blocks and sample window for the 18 baseline local-projection cells

Policy	Outcome	CDS spread	Policy rate	ΔPolicy rate	XR growth	CPI growth	Outcome lags	Sample
MPR	CPI	✓	✓	✓				Non-crisis
MPR	XR[a,b]	✓	✓				✓[d]	Non-crisis
MPR	GDP	✓	✓			✓	✓	Non-crisis
FXI	CPI[c]	✓			✓			Full
FXI	XR[a,c]				✓	✓	✓	Full
FXI	GDP[c]	✓					✓	Full
MPCFM	CPI	✓						Full
MPCFM	XR				✓	✓	✓	Full
MPCFM	GDP					✓	✓	Full

Notes: Each row is one policy–outcome pair; its advanced- and emerging-economy cells use the same control blocks and the same sample window. A checkmark indicates that the corresponding control block enters $W_{i,t}$. Active blocks enter with one or two lags; contemporaneous values are included only for the CDS spread and the policy-rate level. "Outcome lags" denotes lags of the one-quarter growth of the outcome, and "ΔPolicy rate" denotes the first difference of the policy rate. All controls enter linearly, in addition to country and quarter fixed effects, the shock, and its interaction with $G(z)$. "Non-crisis" excludes 2007Q1–2009Q4 and 2020Q1–2021Q4; "Full" uses all quarters. In the advanced-economy cell: [a] euro-area members are represented by Germany only; [b] Norway and Iceland are excluded; [c] Switzerland is excluded. [d] Lags of the horizon-specific long-differenced dependent variable. Blocks are selected as described in Section B.7.

B.7. Choice of control sets

The relevant conditioning set differs across policies and outcomes: MPR regressions require conditioning on sovereign risk and the stance of policy, exchange-rate regressions require lags of the outcome, and data coverage varies across instruments. We therefore select the control blocks for each policy–outcome pair from the common set of Section B.6, applying the same procedure to every pair and the same blocks to its advanced- and emerging-economy cells; sample windows are uniform within each policy (Section B.5).

For each pair, we estimate all combinations of control blocks from the menu and keep those that satisfy the conditioning and minimum-sample requirements in both country groups; the conditioning requirements follow the specification lessons in Ha et al. (2025) for monetary transmission in emerging markets. Table B.1 lists the selected blocks, and Section B.8 shows that the estimates are insensitive to this choice.

B.8. Robustness

We assess the baseline estimates along three dimensions: the choice of control blocks, the fixed-effect structure, and the stability of the estimates over the sample period. The first two exercises are reported as complete horizon paths. Each row of Tables B.2–B.4 and B.6 gives the eight coefficients β_h^{low} or β_h^{high}, $h = 1, \ldots, 8$, of one cell—one policy, one country group, and one outcome—under one specification, together with the trajectory-weighted average $\bar{\beta} = \sum_h w_h \beta_h / \sum_h w_h$ over $h = 1$–8, with weights $w = (0.5, 0.8, 1, 1, 1, 0.8, 0.6, 0.4)$, which emphasize the middle horizons—where the responses are most precisely estimated—over the short and long ends. The third exercise is reported in Figure B.3. Unless stated otherwise, each exercise holds the shocks, the sample windows of Section B.5, the country groups, and the state variable at their baseline values, so that one element of the design varies at a time. The tables report point estimates; standard errors are clustered two-way by country and by quarter.

Choice of control sets. Tables B.2–B.4 report the responses under three alternative control-set choices, one table per policy: (i) uniform, one common control set for all price and output cells and one for all exchange-rate cells; (ii) statistical, which ranks the admissible candidates on stability, precision, and parsimony only; and (iii) top rank, the top-ranked specification in every cell. The baseline of Table B.1 appears in the first row of each block.

The main results are stable. For the monetary shock in advanced economies, core CPI declines steadily under low stress in all four specifications, from between -0.8 and -0.5 at $h = 1$ to between -2.6 and -2.2 at $h = 8$, and is positive at every horizon under high stress, so that the trajectory-weighted response moves from between -1.8 and -1.3 to between

+0.9 and +1.1; the output contraction is between −3.6 and −3.1 in all four columns and disappears under high stress; and the MPCFM–EME CPI reversal is present in every variant. In 16 of the 18 cells the sign of the low-stress $\bar{\beta}$ is the same in all four specifications, and in 12 of 18 for the high-stress response; among the cells whose baseline response is not economically negligible ($|\bar{\beta}| \geq 0.1$), the sign agrees in 23 of 26.

Table B.2. Robustness to the choice of control sets: monetary policy (MPR) shock

		Horizon h (quarters)								
Cell	Controls	1	2	3	4	5	6	7	8	$\bar{\beta}$
Panel A. Low fiscal stress: β_h^{low}										
AE–CPI	Base	−0.45	−0.77	−1.03	−1.27	−1.51	−1.74	−1.95	−2.16	−1.32
	Unif.	−0.66	−1.11	−1.43	−1.67	−1.88	−2.06	−2.23	−2.41	−1.66
	Stat.	−0.76	−1.22	−1.54	−1.78	−1.99	−2.19	−2.39	−2.61	−1.79
	Top	−0.76	−1.22	−1.54	−1.78	−1.99	−2.19	−2.39	−2.61	−1.79
AE–XR	Base	−0.39	−1.77	−2.60	−2.89	−2.72	−2.21	−1.52	−0.74	−2.10
	Unif.	0.12	−0.89	−1.59	−1.98	−2.06	−1.92	−1.67	−1.41	−1.54
	Stat.	−0.34	−1.78	−2.65	−2.99	−2.86	−2.37	−1.70	−0.95	−2.20
	Top	−0.34	−1.78	−2.65	−2.99	−2.86	−2.37	−1.70	−0.95	−2.20
AE–GDP	Base	−1.57	−2.26	−2.82	−3.25	−3.56	−3.73	−3.77	−3.68	−3.10
	Unif.	−1.95	−2.66	−3.23	−3.68	−4.00	−4.20	−4.28	−4.24	−3.55
	Stat.	−1.95	−2.66	−3.23	−3.68	−4.00	−4.20	−4.28	−4.24	−3.55
	Top	−1.95	−2.66	−3.23	−3.68	−4.00	−4.20	−4.28	−4.24	−3.55
EME–CPI	Base	−0.05	−0.07	−0.13	−0.24	−0.37	−0.52	−0.67	−0.81	−0.32
	Unif.	0.38	0.40	0.25	0.01	−0.25	−0.48	−0.65	−0.75	−0.09
	Stat.	−0.01	−0.05	−0.10	−0.14	−0.14	−0.07	0.08	0.29	−0.05
	Top	−0.01	−0.05	−0.10	−0.14	−0.14	−0.07	0.08	0.29	−0.05
EME–XR	Base	0.09	−1.01	−1.81	−2.31	−2.52	−2.47	−2.15	−1.58	−1.85
	Unif.	0.51	0.24	−0.20	−0.57	−0.71	−0.61	−0.42	−0.28	−0.31
	Stat.	−0.51	−1.80	−2.49	−2.69	−2.63	−2.53	−2.58	−2.83	−2.33
	Top	−0.51	−1.80	−2.49	−2.69	−2.63	−2.53	−2.58	−2.83	−2.33
EME–GDP	Base	−0.54	−0.62	−0.67	−0.83	−1.17	−1.64	−2.11	−2.52	−1.15
	Unif.	−0.34	−0.39	−0.45	−0.66	−1.05	−1.52	−1.94	−2.24	−0.97
	Stat.	−0.58	−0.66	−0.67	−0.81	−1.15	−1.62	−2.09	−2.52	−1.15
	Top	−0.58	−0.66	−0.67	−0.81	−1.15	−1.62	−2.09	−2.52	−1.15
Panel B. High fiscal stress: β_h^{high}										
AE–CPI	Base	0.39	0.68	0.88	1.01	1.12	1.21	1.30	1.39	0.99
	Unif.	0.36	0.63	0.80	0.92	1.04	1.16	1.27	1.38	0.93
	Stat.	0.48	0.78	1.00	1.16	1.28	1.39	1.50	1.60	1.14
	Top	0.48	0.78	1.00	1.16	1.28	1.39	1.50	1.60	1.14
AE–XR	Base	1.78	1.90	1.91	1.86	1.77	1.54	1.02	0.10	1.61
	Unif.	1.63	1.75	1.77	1.75	1.71	1.60	1.27	0.63	1.59
	Stat.	1.86	1.87	1.81	1.75	1.72	1.61	1.22	0.42	1.62
	Top	1.86	1.87	1.81	1.75	1.72	1.61	1.22	0.42	1.62
AE–GDP	Base	0.28	0.25	0.20	0.29	0.57	1.01	1.51	2.01	0.64
	Unif.	0.01	−0.01	−0.10	−0.04	0.26	0.71	1.17	1.58	0.33
	Stat.	0.01	−0.01	−0.10	−0.04	0.26	0.71	1.17	1.58	0.33
	Top	0.01	−0.01	−0.10	−0.04	0.26	0.71	1.17	1.58	0.33
EME–CPI	Base	0.49	0.62	0.69	0.70	0.63	0.50	0.36	0.24	0.57
	Unif.	−0.02	−0.02	0.09	0.29	0.47	0.60	0.67	0.73	0.33
	Stat.	0.05	−0.08	−0.15	−0.20	−0.29	−0.33	−0.25	−0.03	−0.18
	Top	0.05	−0.08	−0.15	−0.20	−0.29	−0.33	−0.25	−0.03	−0.18
EME–XR	Base	1.35	1.07	0.55	0.06	−0.14	0.10	0.86	2.15	0.57
	Unif.	0.26	0.59	0.78	0.83	0.74	0.52	0.16	−0.34	0.54
	Stat.	2.01	1.92	1.47	1.00	0.85	1.29	2.45	4.37	1.66
	Top	2.01	1.92	1.47	1.00	0.85	1.29	2.45	4.37	1.66
EME–GDP	Base	0.36	0.15	−0.07	−0.14	−0.07	0.06	0.12	0.08	0.03
	Unif.	0.12	0.01	−0.13	−0.23	−0.21	−0.12	−0.10	−0.22	−0.12
	Stat.	0.43	0.22	−0.02	−0.11	−0.03	0.09	0.11	−0.06	0.06
	Top	0.43	0.22	−0.02	−0.11	−0.03	0.09	0.11	−0.06	0.06

Notes: Entries are the state-dependent coefficients β_h^{low} (Panel A) and β_h^{high} (Panel B) of the smooth-transition local projection, obtained from equations (B.1) and (B.2) at $z = \mp 0.5$, half an interquartile range below and above the country-specific median of the state; columns are horizons h in quarters. $\bar{\beta}$ is the trajectory-weighted average $\sum_h w_h \beta_h / \sum_h w_h$ over $h = 1$–8, with $w = (0.5, 0.8, 1, 1, 1, 0.8, 0.6, 0.4)$. The four specifications share the shocks, the state variable, and the country and quarter fixed effects. Standard errors are clustered two-way by country and by quarter; † marks specifications whose clustered covariance matrix is singular at one or more horizons.

Table B.3. Robustness to the choice of control sets: FX intervention (FXI) shock

		Horizon h (quarters)								
Cell	Controls	1	2	3	4	5	6	7	8	$\bar{\beta}$
Panel A. Low fiscal stress: β_h^{low}										
AE–CPI	Base	−0.02	−0.03	−0.04	−0.06	−0.08	−0.08	−0.08	−0.10	−0.06
	Unif.	−0.02	0.01	0.00	−0.02	−0.01	0.01	0.02	0.01	−0.00
	Stat.	−0.01	0.01	0.02	−0.01	−0.01	0.01	0.02	0.01	0.01
	Top	−0.01	0.01	0.02	−0.01	−0.01	0.01	0.02	0.01	0.01
AE–XR	Base	−1.38	−1.87	−1.94	−1.73	−1.41	−1.16	−1.07	−1.20	−1.53
	Unif.	−0.25	−0.20	−0.16	−0.18	−0.28	−0.48	−0.66	−0.68	−0.32
	Stat.	−0.25	−0.20	−0.16	−0.18	−0.28	−0.48	−0.66	−0.68	−0.32
	Top	−0.25	−0.20	−0.16	−0.18	−0.28	−0.48	−0.66	−0.68	−0.32
AE–GDP	Base	−0.14	−0.29	−0.42	−0.47	−0.50	−0.51	−0.44	−0.23	−0.40
	Unif.	−0.03	−0.11	−0.17	−0.18	−0.18	−0.18	−0.14	−0.00	−0.14
	Stat.	−0.03	−0.11	−0.17	−0.18	−0.18	−0.18	−0.14	−0.00	−0.14
	Top	−0.03	−0.11	−0.17	−0.18	−0.18	−0.18	−0.14	−0.00	−0.14
EME–CPI	Base	−0.09	−0.12	−0.15	−0.19	−0.22	−0.25	−0.28	−0.30	−0.19
	Unif.	−0.02	−0.01	−0.01	−0.01	−0.01	−0.02	−0.02	−0.01	−0.01
	Stat.	−0.07	−0.09	−0.11	−0.14	−0.16	−0.18	−0.19	−0.20	−0.14
	Top	−0.07	−0.09	−0.11	−0.14	−0.16	−0.18	−0.19	−0.20	−0.14
EME–XR	Base	0.05	0.01	−0.03	−0.07	−0.12	−0.17	−0.24	−0.30	−0.10
	Unif.	0.01	0.03	0.01	−0.06	−0.08	−0.06	−0.09	−0.14	−0.04
	Stat.	0.01	0.03	0.01	−0.06	−0.08	−0.06	−0.09	−0.14	−0.04
	Top	0.01	0.03	0.01	−0.06	−0.08	−0.06	−0.09	−0.14	−0.04
EME–GDP	Base	−0.03	−0.05	−0.09	−0.11	−0.08	−0.05	−0.02	0.01	−0.06
	Unif.	−0.02	−0.04	−0.07	−0.09	−0.10	−0.11	−0.11	−0.13	−0.09
	Stat.	−0.03	−0.05	−0.08	−0.11	−0.11	−0.10	−0.11	−0.12	−0.09
	Top	−0.03	−0.05	−0.08	−0.11	−0.11	−0.10	−0.11	−0.12	−0.09
Panel B. High fiscal stress: β_h^{high}										
AE–CPI	Base	−0.02	0.01	0.04	0.08	0.11	0.14	0.17	0.21	0.09
	Unif.	−0.02	0.00	0.03	0.04	0.03	0.02	0.02	0.02	0.02
	Stat.	−0.02	−0.01	0.02	0.03	0.03	0.02	0.03	0.03	0.02
	Top	−0.02	−0.01	0.02	0.03	0.03	0.02	0.03	0.03	0.02
AE–XR	Base	0.27	0.47	0.66	0.79	0.87	0.97	1.10	1.22	0.78
	Unif.	0.27	0.32	0.36	0.40	0.42	0.45	0.46	0.47	0.39
	Stat.	0.27	0.32	0.36	0.40	0.42	0.45	0.46	0.47	0.39
	Top	0.27	0.32	0.36	0.40	0.42	0.45	0.46	0.47	0.39
AE–GDP	Base	0.10	0.14	0.17	0.18	0.18	0.20	0.24	0.25	0.18
	Unif.	0.05	0.10	0.11	0.08	0.05	0.04	0.04	0.03	0.07
	Stat.	0.05	0.10	0.11	0.08	0.05	0.04	0.04	0.03	0.07
	Top	0.05	0.10	0.11	0.08	0.05	0.04	0.04	0.03	0.07
EME–CPI	Base	−0.02	−0.03	−0.04	−0.05	−0.05	−0.03	0.01	0.08	−0.03
	Unif.	0.03	0.04	0.03	0.02	−0.00	−0.02	−0.03	−0.04	0.01
	Stat.	−0.03	−0.04	−0.05	−0.07	−0.07	−0.05	−0.01	0.05	−0.04
	Top	−0.03	−0.04	−0.05	−0.07	−0.07	−0.05	−0.01	0.05	−0.04
EME–XR	Base	0.24	0.19	0.07	−0.01	0.01	0.06	0.08	0.11	0.08
	Unif.	0.03	−0.04	−0.05	0.00	0.03	−0.01	−0.04	−0.01	−0.01
	Stat.	0.03	−0.04	−0.05	0.00	0.03	−0.01	−0.04	−0.01	−0.01
	Top	0.03	−0.04	−0.05	0.00	0.03	−0.01	−0.04	−0.01	−0.01
EME–GDP	Base	−0.00	−0.02	−0.00	0.02	0.03	0.03	0.03	0.05	0.01
	Unif.	−0.01	−0.02	−0.01	0.01	0.03	0.02	0.01	0.02	0.01
	Stat.	−0.01	−0.02	−0.01	0.02	0.03	0.03	0.02	0.02	0.01
	Top	−0.01	−0.02	−0.01	0.02	0.03	0.03	0.02	0.02	0.01

Notes: As in Table B.2, for the FX intervention shock. Entries are β_h^{low} (Panel A) and β_h^{high} (Panel B) at horizon h, and $\bar{\beta}$ is their trajectory-weighted average over $h = 1$–8. "Base", "Unif.", "Stat.", and "Top" are the four control-set choices defined there. All six FXI cells use the full sample window (Table B.1). † marks specifications whose clustered covariance matrix is singular at one or more horizons. Switzerland is excluded from the three AE cells in all four specifications.

Table B.4. Robustness to the choice of control sets: macroprudential and capital-flow measures (MPCFM)

		Horizon h (quarters)								
Cell	Controls	1	2	3	4	5	6	7	8	$\bar{\beta}$
Panel A. Low fiscal stress: β_h^{low}										
AE–CPI	Base	−0.10	−0.11	−0.11	−0.13	−0.16	−0.17	−0.16	−0.16	−0.14
	Unif.	−0.05	−0.07	−0.04	−0.04	−0.07	−0.09	−0.06	−0.01	−0.06
	Stat.	−0.09	−0.09	−0.06	−0.06	−0.09	−0.08	−0.04	0.00	−0.07
	Top	−0.09	−0.09	−0.06	−0.06	−0.09	−0.08	−0.04	0.00	−0.07
AE–XR	Base	0.32	0.27	0.07	−0.16	−0.28	−0.27	−0.22	−0.23	−0.07
	Unif.	0.30	0.22	0.18	0.17	0.18	0.19	0.20	0.19	0.20
	Stat.	0.49	0.50	0.35	0.23	0.33	0.59	0.75	0.65	0.45
	Top	0.49	0.50	0.35	0.23	0.33	0.59	0.75	0.65	0.45
AE–GDP	Base	0.16	0.18	0.21	0.27	0.30	0.29	0.28	0.28	0.25
	Unif.	0.34	0.34	0.34	0.38	0.41	0.41	0.40	0.39	0.38
	Stat.	0.03	−0.00	0.06	0.11	0.04	−0.03	0.04	0.04	0.04
	Top	0.03	−0.00	0.06	0.11	0.04	−0.03	0.04	0.04	0.04
EME–CPI	Base	−0.08	−0.10	−0.13	−0.17	−0.19	−0.20	−0.18	−0.15	−0.15
	Unif.	−0.25	−0.33	−0.41	−0.52	−0.62	−0.67	−0.64	−0.56	−0.51
	Stat.	−0.24	−0.30	−0.39	−0.49	−0.57	−0.61	−0.59	−0.51	−0.47
	Top	−0.24	−0.30	−0.39	−0.49	−0.57	−0.61	−0.59	−0.51	−0.47
EME–XR	Base	−0.38	−0.64	−0.89	−1.05	−1.07	−1.00	−0.89	−0.81	−0.88
	Unif.	−0.36	−0.44	−0.48	−0.48	−0.43	−0.35	−0.23	−0.08	−0.39
	Stat.	−0.43	−0.54	−0.61	−0.62	−0.58	−0.49	−0.34	−0.15	−0.51
	Top	−0.43	−0.54	−0.61	−0.62	−0.58	−0.49	−0.34	−0.15	−0.51
EME–GDP	Base	0.32	0.37	0.33	0.28	0.27	0.24	0.22	0.26	0.29
	Unif.	0.18	0.18	0.17	0.19	0.21	0.22	0.28	0.45	0.22
	Stat.	0.09	−0.04	−0.06	0.10	0.11	−0.03	0.01	0.24	0.04
	Top	0.09	−0.04	−0.06	0.10	0.11	−0.03	0.01	0.24	0.04
Panel B. High fiscal stress: β_h^{high}										
AE–CPI	Base	−0.06	−0.02	−0.03	−0.05	−0.02	0.04	0.07	0.03	−0.01
	Unif.	−0.01	0.03	−0.04	−0.15	−0.15	−0.11	−0.13	−0.22	−0.09
	Stat.	0.00	0.05	−0.02	−0.12	−0.12	−0.10	−0.12	−0.20	−0.07
	Top	0.00	0.05	−0.02	−0.12	−0.12	−0.10	−0.12	−0.20	−0.07
AE–XR	Base	−0.33	−0.60	−0.75	−0.75	−0.65	−0.53	−0.52	−0.69	−0.62
	Unif.	−0.07	−0.08	−0.02	0.10	0.21	0.28	0.30	0.26	0.11
	Stat.	−0.50	−0.51	−0.26	0.05	0.26	0.28	0.09	−0.33	−0.07
	Top	−0.50	−0.51	−0.26	0.05	0.26	0.28	0.09	−0.33	−0.07
AE–GDP	Base	0.19	0.29	0.27	0.17	0.11	0.16	0.20	0.08	0.19
	Unif.	0.19	0.30	0.29	0.15	0.04	0.08	0.15	0.04	0.16
	Stat.	0.18	0.13	0.02	−0.03	0.02	0.08	0.03	−0.20	0.03
	Top	0.18	0.13	0.02	−0.03	0.02	0.08	0.03	−0.20	0.03
EME–CPI	Base	0.43	0.59	0.73	0.84	0.93	0.98	0.99	0.96	0.81
	Unif.	0.45	0.57	0.67	0.79	0.93	1.03	1.06	0.99	0.81
	Stat.	0.45	0.56	0.67	0.79	0.92	1.03	1.07	1.03	0.81
	Top	0.45	0.56	0.67	0.79	0.92	1.03	1.07	1.03	0.81
EME–XR	Base	0.18	0.32	0.48	0.69	0.92	1.05	0.95	0.59	0.67
	Unif.	0.02	−0.07	−0.21	−0.10	0.12	0.04	−0.27	−0.55	−0.09
	Stat.	−0.12	−0.24	−0.38	−0.23	0.09	0.16	−0.11	−0.49	−0.15
	Top	−0.12	−0.24	−0.38	−0.23	0.09	0.16	−0.11	−0.49	−0.15
EME–GDP	Base	0.02	0.02	0.06	0.12	0.17	0.17	0.17	0.18	0.11
	Unif.	0.06	0.05	0.11	0.21	0.26	0.27	0.30	0.38	0.20
	Stat.	0.08	0.09	0.06	−0.00	−0.04	−0.02	0.02	−0.01	0.02
	Top	0.08	0.09	0.06	−0.00	−0.04	−0.02	0.02	−0.01	0.02

Notes: As in Table B.2, for the macroprudential and capital-flow-measure shock. Entries are β_h^{low} (Panel A) and β_h^{high} (Panel B) at horizon h, and $\bar{\beta}$ is their trajectory-weighted average over $h = 1$–8. "Base", "Unif.", "Stat.", and "Top" are the four control-set choices defined there. All six MPCFM cells use the full sample window (Table B.1). † marks specifications whose clustered covariance matrix is singular at one or more horizons.

Table B.5. Regional groupings

	Region	N	Countries
Advanced economies	AE Europe	15	Austria, Belgium, Denmark, Finland, France, Germany, Iceland, Ireland, Italy, Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom
	AE non-Europe	5	Australia, Canada, Japan, New Zealand, United States
Emerging markets	Emerging Asia	8	India, Indonesia, Malaysia, Pakistan, Philippines, South Korea, Thailand, Vietnam
	Emerging Europe	7	Czech Republic, Greece, Hungary, Poland, Portugal, Romania, Turkey
	Latin America	6	Argentina, Brazil, Chile, Colombia, Mexico, Peru
	Middle East and Africa	3	Egypt, Saudi Arabia, South Africa
	Total	44	

Notes: Regional groupings used for the region × quarter fixed effects of Table B.6. N is the number of countries in the universe of Appendix A; the sample entering each regression is smaller and varies across cells with data availability.

Region × time fixed effects. The baseline absorbs common global conditions with a quarter fixed effect, which constrains every country to load identically on the global cycle in a given quarter. Table B.6 replaces it with a region × quarter fixed effect, with regions as defined in Table B.5, so that identification comes from differences across countries within the same region and quarter. Shocks common to the countries of a region—the commodity cycle for Latin America, euro-area developments for European advanced economies—are then absorbed rather than assumed to affect every country alike.

The estimates are essentially unchanged. For the monetary shock in advanced economies, the low-stress CPI path is almost identical to the baseline ($\bar{\beta} = -1.25$ against -1.32) and the high-stress reversal survives ($+0.90$ against $+0.99$); the output contraction is likewise preserved (-3.00 against -3.10). Across the 36 cell–state combinations the sign of $\bar{\beta}$ agrees with the baseline in 28 cases, and in 24 of the 26 combinations whose baseline response is not economically negligible. Six of the eight sign changes involve cells that both specifications place within 0.21 of zero. The other two are the low-stress exchange-rate response to the monetary shock in advanced economies ($+2.16$ against -2.10), a cell that rests on seven countries, and the high-stress CPI response in emerging markets (-0.24 against $+0.57$).

Leave-one-year-out jackknife. A final check tests whether the results depend on any particular period of the sample. Figure B.3 reports a leave-one-year-out jackknife: for the

Table B.6. Robustness to the fixed-effect structure: region × quarter fixed effects

		Horizon h (quarters)								$\bar{\beta}$	
Policy	Cell	1	2	3	4	5	6	7	8	Alt.	Base
Panel A. Low fiscal stress: β_h^{low}											
MPR	AE–CPI	−0.55	−0.81	−1.05	−1.28	−1.47	−1.58	−1.62	−1.63	−1.25	−1.32
	AE–XR	2.55	2.50	2.46	2.42	2.32	2.05	1.48	0.51	2.16	−2.10
	AE–GDP	−1.80	−2.48	−2.93	−3.20	−3.32	−3.35	−3.32	−3.25	−3.00	−3.10
	EME–CPI	−0.09	−0.32	−0.54	−0.78	−1.04	−1.32	−1.58	−1.82	−0.88	−0.32
	EME–XR	−0.25	−1.41	−2.31	−2.97	−3.37	−3.52	−3.43	−3.08	−2.62	−1.85
	EME–GDP	−0.70	−0.80	−1.10	−1.65	−2.35	−3.04	−3.54	−3.76	−1.99	−1.15
FXI	AE–CPI	0.07	0.09	0.11	0.13	0.15	0.17	0.19	0.19	0.13	−0.06
	AE–XR	−0.49	−0.70	−0.66	−0.41	−0.07	0.19	0.23	0.03	−0.27	−1.53
	AE–GDP	0.02	−0.16	−0.34	−0.41	−0.40	−0.38	−0.33	−0.19	−0.30	−0.40
	EME–CPI	−0.08	−0.10	−0.09	−0.10	−0.11	−0.13	−0.15	−0.17	−0.11	−0.19
	EME–XR	0.11	0.09	0.07	0.04	0.02	−0.00	−0.03	−0.05	0.04	−0.10
	EME–GDP	−0.08	−0.08	−0.13	−0.19	−0.17	−0.12	−0.10	−0.11	−0.13	−0.06
MPCFM	AE–CPI	−0.10	−0.12	−0.14	−0.18	−0.21	−0.23	−0.23	−0.22	−0.18	−0.14
	AE–XR	0.33	0.23	−0.02	−0.27	−0.38	−0.34	−0.29	−0.34	−0.15	−0.07
	AE–GDP	0.12	0.14	0.16	0.19	0.22	0.22	0.21	0.20	0.18	0.25
	EME–CPI	−0.15	−0.22	−0.33	−0.47	−0.60	−0.70	−0.73	−0.69	−0.48	−0.15
	EME–XR	−0.35	−0.65	−0.99	−1.20	−1.20	−0.94	−0.50	0.08	−0.84	−0.88
	EME–GDP	0.26	0.27	0.20	0.16	0.14	0.11	0.09	0.17	0.17	0.29
Panel B. High fiscal stress: β_h^{high}											
MPR	AE–CPI	0.27	0.56	0.74	0.85	0.96	1.13	1.35	1.61	0.90	0.99
	AE–XR	1.68	1.72	1.57	1.29	0.94	0.50	−0.11	−0.98	0.98	1.61
	AE–GDP	0.04	0.09	0.17	0.37	0.74	1.18	1.61	1.97	0.67	0.64
	EME–CPI	0.31	0.30	0.11	−0.13	−0.38	−0.61	−0.87	−1.14	−0.24	0.57
	EME–XR	0.54	0.55	0.29	0.02	0.02	0.49	1.58	3.35	0.61	0.57
	EME–GDP	0.02	−0.31	−0.50	−0.52	−0.37	−0.10	0.26	0.71	−0.21	0.03
FXI	AE–CPI	−0.02	0.00	0.03	0.05	0.07	0.08	0.10	0.11	0.05	0.09
	AE–XR	0.15	0.23	0.30	0.36	0.41	0.45	0.48	0.50	0.36	0.78
	AE–GDP	0.11	0.21	0.23	0.19	0.17	0.20	0.24	0.23	0.20	0.18
	EME–CPI	−0.02	0.00	0.00	−0.02	−0.03	0.01	0.08	0.12	0.01	−0.03
	EME–XR	0.21	0.17	0.08	0.02	−0.00	−0.02	−0.08	−0.15	0.03	0.08
	EME–GDP	0.02	−0.02	−0.03	−0.01	0.00	0.01	0.01	0.04	−0.00	0.01
MPCFM	AE–CPI	−0.06	−0.02	−0.02	−0.04	−0.00	0.07	0.10	0.05	0.01	−0.01
	AE–XR	−0.11	−0.28	−0.42	−0.47	−0.43	−0.38	−0.43	−0.64	−0.39	−0.62
	AE–GDP	0.18	0.28	0.27	0.15	0.06	0.10	0.15	0.05	0.16	0.19
	EME–CPI	0.39	0.53	0.65	0.76	0.85	0.91	0.95	0.95	0.75	0.81
	EME–XR	0.54	0.79	0.97	1.16	1.34	1.43	1.35	1.04	1.10	0.67
	EME–GDP	0.12	0.13	0.17	0.25	0.33	0.37	0.36	0.35	0.26	0.11

Notes: Entries are the state-dependent coefficients β_h^{low} (Panel A) and β_h^{high} (Panel B) at horizon h, estimated as in Table B.2 but replacing the quarter fixed effect with a region × quarter fixed effect; the country fixed effect, the control vector, the sample windows, and the state variable are those of the baseline. Regions are defined in Table B.5. Identification therefore comes from variation across countries within a region and quarter, so that shocks common to the countries of a region—the commodity cycle, euro-area developments, the global financial cycle—are absorbed. Columns "Alt." and "Base" report the trajectory-weighted average $\bar{\beta} = \sum_h w_h \beta_h / \sum_h w_h$ over $h = 1$–8, with $w = (0.5, 0.8, 1, 1, 1, 0.8, 0.6, 0.4)$, for this specification and for the baseline. Singleton region–quarter cells are absorbed, so the estimation sample is smaller than in the baseline. Standard errors are clustered two-way by country and by quarter; † marks cells whose clustered covariance matrix is singular at one or more horizons.

policy–outcome pairs of interest we re-estimate the trajectory-weighted response $\bar{\beta}$ twenty-six times, each time dropping one calendar year from 2000 to 2025. The markers are the full-sample estimates and the bars span the range across the twenty-six subsamples. For the monetary CPI response in advanced economies, the high-stress reversal keeps its sign across the subsamples, and the low-stress disinflation in every subsample but one: dropping 2006 brings it to +0.05. The ranges that cross zero belong to responses already imprecise in the full sample: the low-stress EME CPI response and both EME FXI responses. Apart from 2006 for the low-stress CPI response in advanced economies, no single year drives the results.

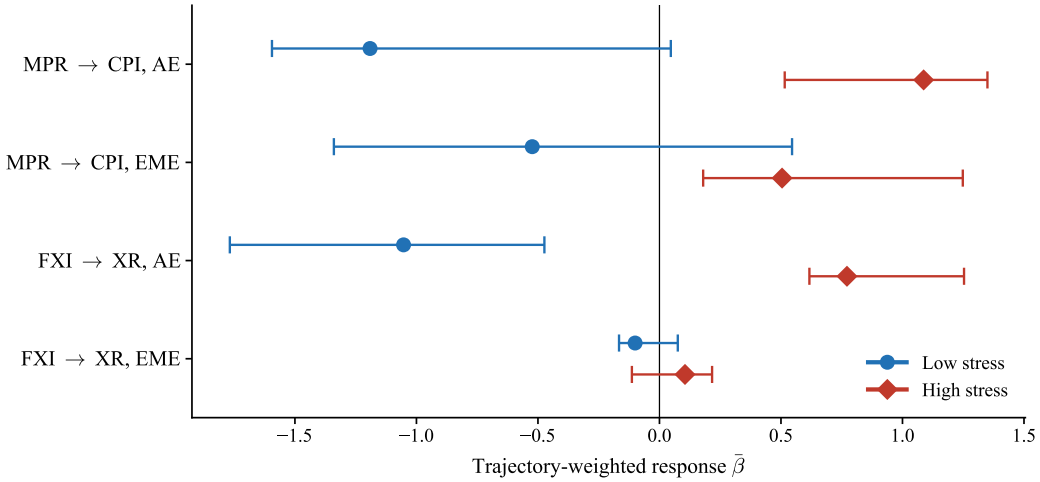

Figure B.3. Leave-one-year-out temporal jackknife

Notes: Trajectory-weighted responses $\bar{\beta} = \sum_h w_h \beta_h / \sum_h w_h$ over horizons $h = 1$–8, for the monetary shock on core CPI and the FXI shock on the exchange rate, in advanced (AE) and emerging (EME) economies. Circles and diamonds mark the full-sample estimates under low and high fiscal stress; the bars span the range across the twenty-six estimates that each drop one calendar year (2000–2025).

Taken together, the three exercises point in the same direction. The transmission of monetary policy to prices and activity in advanced economies is strong under low fiscal stress and muted, or reversed, under high stress. This configuration holds under every control set and under region × quarter fixed effects; for prices, it also holds in every leave-one-year-out subsample but one. The exercises also agree on where the evidence is weakest: the exchange-rate cell of the monetary shock for advanced economies, which rests on seven countries, and the FXI cells for advanced economies, whose responses are indistinguishable from zero under every specification.

C. Model Calibration

This appendix documents the calibration of the small open economy New Keynesian model used to interpret the state-dependent transmission patterns estimated in Appendix B. The model extends the quantitative Integrated Policy Framework model of Adrian et al. (2020) with a sovereign risk premium, a fiscal block with monetary–fiscal regime switching, and a capital-flow-management tax. It is linearized around a zero-growth steady state and solved at quarterly frequency, and comprises: (i) an IS block with external consumption habit and quasi-GHH preferences, in which the marginal utility of consumption is $\lambda_{c,t} = -\sigma_\lambda(c_t - \kappa_c c_{t-1})$, so that the semi-elasticity of consumption to the real borrowing rate is $1/\sigma_\lambda$ (Neumeyer and Perri, 2005; Aguiar and Gopinath, 2007), and the policy rate passes into effective borrowing costs with a group-specific coefficient χ_{is}; (ii) a hybrid New Keynesian Phillips curve with backward indexation ι_d and slope κ_{mc}, augmented under stress by a fiscal-dominance term in public debt with coefficient κ_{debt}, together with Calvo-style import- and export-price Phillips curves (stickiness ξ_M, ξ_X) and a hybrid wage Phillips curve; (iii) an inertial Taylor rule that responds, with smoothing γ_i, to an eight-quarter window of CPI inflation—the average of expected inflation over the next four quarters and realized inflation over the current and previous three—and to output with coefficient γ_y; (iv) an uncovered interest parity (UIP) condition whose premium carries a sovereign-risk term $\theta_{sov}\, b_{g,t}$, the linearization of a convex default hazard priced by foreign lenders (Bi, 2012); (v) a foreign-exchange intervention (FXI) block in which reserve sales lower the currency premium with a portfolio-balance loading γ_{fx}, the static limit of the intermediary demand of Gabaix and Maggiori (2015); (vi) a capital-flow-management (CFM) tax that enters the UIP premium with loading γ_τ and domestic inflation with loading κ_{cfm}; and (vii) a one-period government budget constraint in which inherited nominal debt is carried at the ex-post real rate, so that surprise inflation revalues outstanding debt—the fiscal-theory valuation channel (Cochrane, 2023)—with a tax rule responding to lagged debt with coefficient τ_t. Replacing that budget with long-duration debt was explored and rejected, because it delivers the "stepping on a rake" dynamics of **?**, which contradict the early inflation reversal in the local projections.

The model is calibrated separately for advanced economies (AE) and emerging market economies (EME), and each economy switches between two fiscal–monetary regimes that mirror the low- and high-stress states of the local projections. The normal regime is the standard active-money/passive-fiscal configuration; the high sovereign-stress regime is passive-money/active-fiscal, i.e., fiscal dominance in the sense of Leeper (1991) and Sargent and Wallace (1981), with regime-dependent expectations as in Bianchi and Melosi (2017) and the valuation mechanics emphasized by Cochrane (2023). The calibration strategy proceeds

in three tiers. Tier 1 fixes standard structural parameters at values from the literature (Table C.1) and group-specific parameters at values that respect documented AE/EME orderings (Table C.2). Tier 2 calibrates the sovereign-risk premium to our own CDS–debt panel, estimated separately by group and stress state (Table C.4). Tier 3 matches the transmission loadings to the low-stress local-projection responses of Appendix B. The policy-stance parameters that define the high-stress regime are fixed at theory priors—the inflation response falls from $\gamma_\pi = 1.5$ to 0.9 and the fiscal response from $\tau_t = 0.6$ to 0—with no search over the parameter space (Table C.3). Interest-rate smoothing and the borrowing-rate pass-through are the same in both regimes.

C.1. Common structural parameters

Table C.1 reports the parameters held common across the two economies. Preferences, technology and expenditure shares are standard for small open economy New Keynesian models; the Phillips-curve architecture follows the hybrid formulation of Galí and Gertler (1999) and the open-economy framework of Adrian et al. (2020), and the quasi-GHH preference specification follows the emerging-market business-cycle literature (Neumeyer and Perri, 2005; Aguiar and Gopinath, 2007).

Table C.1. Common structural parameters

Parameter	Symbol	Value	Source
Discount factor	β	0.995	Adrian et al. (2020)
Steady-state real rate	r	0.0050	$1/\beta - 1$
Consumption habit	κ_c	0.85	Standard range
Intertemporal curvature	σ	1	Log utility
Marginal-utility curvature	σ_λ	0.20	Neumeyer and Perri (2005)
Inverse Frisch elasticity	χ	2	Adrian et al. (2020)
Capital share	α	0.3	Adrian et al. (2020)
Euler discount factor	δ_c	0.95	Adrian et al. (2020)
Phillips discount factor	δ_π	0.92	Adrian et al. (2020)
Import share in GDP	M_Y	0.20	Adrian et al. (2020)
Government spending share	G_Y	0.20	Adrian et al. (2020)
Consumption share	C_Y	0.80	$1 - G_Y$
Import demand elasticity	ϵ_c	0.8	Adrian et al. (2020)
Export demand elasticity	ϵ_{c^*}	0.8	Adrian et al. (2020)
Taylor output response	γ_y	0.125	Standard range
External-debt premium elasticity	ϕ_d	0.02	Schmitt-Grohé and Uribe (2003)
Tax revenue share	τ_y	0.20	National accounts
Debt loading on the private spread	κ_b	0.01	Corsetti et al. (2013)
CFM loading on the UIP premium	γ_τ	0.02	Standard
FXI position persistence	ρ_{bm}	0.75	Standard
CFM tax persistence	ρ_τ	0.90	Long-standing controls (Klein, 2012)

Notes: All parameters are quarterly. The monetary shock is an innovation of 100 annualized basis points to the policy rule. In Figure 5 the monetary responses are scaled so that the low-stress policy rate rises by 100 basis points on impact, with the same group-specific factor applied to the high-stress paths, whose impact response is therefore larger, at 137 and 133 basis points. FXI responses are converted to a one billion U.S. dollar intervention. CFM responses carry a fixed normalizing factor, since the model does not pin down the absolute size of a macroprudential shock.

C.2. Group-specific parameters

Table C.2 reports the parameters that differ between advanced and emerging economies. The orderings are anchored in the literature rather than fit to the impulse responses: the Phillips curve is flatter and domestic price indexation weaker in advanced economies, trade prices adjust more frequently in emerging markets and are more strongly indexed there (Adrian et al., 2020), the import content of the CPI is lower in EMEs once non-traded distribution margins are accounted for (Burstein et al., 2003), and steady-state government debt is higher in advanced economies.

Table C.2. Group-specific parameters (advanced vs. emerging economies)

Parameter	Symbol	AE	EME	Source
Phillips-curve slope	κ_{mc}	0.005	0.020	Adrian et al. (2020)
Domestic price indexation	ι_d	0.50	0.75	Adrian et al. (2020)
Wage Phillips slope	κ_w	0.020	0.030	Adrian et al. (2020)
Wage indexation	ι_w	0	0.75	Adrian et al. (2020)
Import-price stickiness	ξ_M	0.800	0.667	Adrian et al. (2020)
Export-price stickiness	ξ_X	0.800	0.667	Adrian et al. (2020)
Trade-price indexation	ι_M, ι_X	0.50	0.75	Adrian et al. (2020)
Import share in CPI	M_C	0.20	0.15	Burstein et al. (2003)
Spread persistence	ρ_ψ	0.90	0.75	Calibrated; see notes
Steady-state debt/GDP	$\bar{b}_g$	0.78	0.48	Group medians in the panel
Interest-rate smoothing	γ_i	0.85	0.70	Estimated Taylor rules

Notes: Emerging-market inflation is both more responsive to marginal cost and more backward-looking, reflecting less well-anchored expectations. The spread persistences are calibrated rather than estimated.

C.3. Regime-dependent policy stance

The model regimes are theoretical benchmarks rather than empirical classifications. In particular, the passive-money/active-fiscal calibration provides a limiting representation of weak fiscal backing; it does not imply that high-CDS observations in the empirical analysis are episodes of fiscal dominance. Table C.3 reports the policy-stance parameters in the two fiscal–monetary regimes. In the normal regime, monetary policy is active ($\gamma_\pi = 1.5$) and fiscal policy is passive ($\tau_t = 0.6$): taxes respond to debt and the Taylor principle holds. In the high sovereign-stress regime the stance flips to passive money/active fiscal: γ_π falls to 0.9 and the tax response to debt shuts down ($\tau_t = 0$), so that the price level—not surpluses—must absorb fiscal imbalances (Leeper, 1991; Sargent and Wallace, 1981; Cochrane, 2023). Three further coefficients switch. The sovereign slope of the UIP premium is zero in the normal regime, on the flat segment of the default hazard, and equals the stress-state slope of the CDS–debt panel under stress. The fiscal-dominance term of the Phillips curve is

active only under stress, standing in for the inflation expectations generated by anticipated monetization (Bianchi and Melosi, 2017). The FXI loading falls to near zero.

Table C.3. Regime-dependent parameters: normal vs. high sovereign stress

		AE		EME	
Parameter	Symbol	Normal	Stress	Normal	Stress
Taylor inflation response	γ_π	1.50	0.90	1.50	0.90
Tax response to debt	τ_t	0.60	0	0.60	0
Sovereign slope of the UIP premium	θ_{sov}	0	0.0018	0	0.011
Fiscal-dominance term	κ_{debt}	0	2.0	0	2.0
FXI portfolio-balance loading	γ_{fx}	0.356	0.05	0.133	0.02

Notes: The stance parameters γ_π and τ_t are fixed at theory-based priors with no grid search. Interest-rate smoothing and the borrowing-rate pass-through are identical across regimes. Debt is one-period nominal in both regimes, so its real value is revalued one-for-one by the current quarter's inflation surprise. The normal-regime FXI loadings are matched to the low-stress local projections; their stress values are set directly rather than derived.

C.4. Data-calibrated and moment-matched parameters

Sovereign-risk sensitivity. The semi-elasticity of sovereign CDS spreads to public debt is estimated in our quarterly panel,

$$\mathrm{CDS}_{i,t} \;=\; \alpha_i + \delta_t + \theta^{raw}\, b_{i,t-1} + u_{i,t}, \tag{C.1}$$

where CDS is in annual basis points and debt b in percent of GDP, with country and quarter fixed effects and two-way clustered standard errors, estimated separately by group and by stress state on the subsamples below and above each country's median of the smoothed, lagged CDS state of Section B.2. Model units convert as $\theta_{sov} = \theta^{raw}/400$. For EMEs the regressions yield $\theta^{raw} = 1.44$ ($t \approx 3.2$) under low stress and 4.40 ($t \approx 3.1$) under high stress—a convexity of approximately three, the shape predicted by fiscal-limit models (Bi, 2012) and estimated in the fiscal-fatigue literature (Ghosh et al., 2013). For AEs the within-country relationship is statistically insignificant, and the between-country relationship is generated by Greece, consistent with De Grauwe and Ji (2013). We therefore set the AE low-stress value from the ex-Greece between-country point estimate and apply the EME convexity factor for the high-stress value. The AE values are a prior, not a data estimate.

Pass-through. The sovereign premium loads onto private borrowing spreads in line with the sovereign-to-corporate evidence surveyed by Corsetti et al. (2013).

FXI block. The portfolio-balance loading γ_{fx} is matched to the impact response of the exchange rate to FXI shocks in the low-stress local projections. Its high-stress value is set directly, close to zero, in line with the weak exchange-rate response of reserve sales when

sovereign risk is elevated.

CFM block. The CFM inflation loading κ_{cfm} is identified from the low-stress CPI response to macroprudential and capital-control shocks; the UIP-premium loading γ_τ is set small and is not moment-matched.

Table C.4. Data-calibrated and moment-matched parameters

Parameter	Symbol	AE	EME	Target
Sovereign hazard slope, low stress	θ_{sov}^{lo}	0.0006	0.0036	CDS–debt panel
Sovereign hazard slope, high stress	θ_{sov}^{hi}	0.0018	0.011	CDS–debt panel, stress split
Borrowing-rate pass-through	χ_{is}	0.025	0.010	Monetary→GDP: −3.10 / −1.15
FXI loading, normal regime	γ_{fx}	0.356	0.082	FXI→XR: −1.53 / −0.10
CFM inflation loading	κ_{cfm}	0.203	0.203	CFM→CPI (AE): −0.14

Notes: The low-stress sovereign slopes are reported because they identify the convexity of the hazard; only the high-stress values enter the model. The targets are trajectory-weighted low-stress local-projection responses, in percentage points per 100 basis points of monetary surprise for χ_{is}, per billion U.S. dollars of intervention for γ_{fx}, and per unit of the macroprudential and capital-control indicator for κ_{cfm}.