# LAC-7 Model Lab

## A Transparent Semi-Structural Projection and Scenario Tool for Latin America

Version 1.0

LAC-7 Model Lab Project

Draft for discussion

**Abstract.** This paper documents LAC-7 Model Lab, a deterministic quarterly projection and scenario tool for Brazil, Mexico, Chile, Colombia, Peru, Costa Rica, and Argentina. The model follows the semi-structural forecasting and policy-analysis tradition but is deliberately smaller and more transparent than a full central-bank quarterly projection model. Each country contains dynamic expectations, an IS relation, a hybrid Phillips curve, a consumption error-correction equation, Okun's law, a nominal-rate rule, an exchange-rate block, and exact level identities. A common external block feeds country-specific world-demand, terms-of-trade, imported-price, dollar, and U.S. interest-rate channels. Country models are solved independently and aggregated ex post with fixed GDP weights. The baseline begins in 2026Q3 and is anchored to public information available through 23 July 2026, supplemented by explicit judgment and visible equation add-factors. Behavioral coefficients are calibrated, not estimated. They are selected to produce plausible lag structures and standardized monetary-policy impulse responses; the retained baseline trajectories are then reconciled equation by equation. Under a 100-basis-point rate-path shock lasting four quarters, the Brazilian output gap is 0.45 percentage point lower in the fourth quarter and 12-month inflation is 0.30 percentage point lower in the seventh quarter. The paper states precisely what the tool can support—conditional trajectory and scenario analysis—and what it cannot establish, including causal identification, forecast optimality, probabilistic uncertainty, or equivalence to official central-bank models.

**JEL codes:** E17, E31, E37, E47, E52, F41. **Keywords:** semi-structural model; monetary-policy transmission; Latin America; FPAS; scenario analysis.

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# 1. Purpose and positioning

Forecasting and policy analysis systems (FPAS) use a collection of data, judgment, models, and institutional processes to organize forward-looking macroeconomic analysis. Small semi-structural models are often the core device for enforcing accounting consistency, making transmission assumptions explicit, and translating alternative exogenous paths into conditional projections (Berg, Karam, and Laxton, 2006; Mæhle et al., 2021; Adrian, Laxton, and Obstfeld, 2018). LAC-7 Model Lab adopts that logic for seven Latin American economies while emphasizing portability and auditability: the complete application is a single browser-based file; parameters, external assumptions, add-factors, and source annotations are exposed to the user; and all calculations are performed locally.

The tool is intended for three related uses. First, it provides a disciplined way to construct and compare quarterly macroeconomic trajectories. Second, it supports deterministic scenario exercises involving global activity, U.S. rates, the dollar, and commodity prices. Third, it makes the assumed timing and magnitude of monetary-policy transmission directly inspectable through standardized impulse responses. It is not presented as a replica of any central bank's production model, an estimated structural model, or an official forecast. In particular, the model does not produce statistically identified monetary-policy shocks, density forecasts, or optimal policy prescriptions.

The public implementation covers Brazil (BR), Mexico (MX), Chile (CL), Colombia (CO), Peru (PE), Costa Rica (CR), and Argentina (AR). The default projection horizon is 12 quarters, from 2026Q3 through 2029Q2. Monetary-policy impulse responses are computed over 20 quarters, and a separate 60-quarter extension is used as a convergence diagnostic.

# 2. Architecture and timing

## 2.1. State variables, units, and solution order

The country index is suppressed below. The output gap $x_t$ and consumption gap $z_t$ are measured as 100 times the logarithm of the level relative to trend. Inflation $\pi_t$ and expected inflation $\pi_t^e$ are 12-month rates. The nominal rate $i_t$ is annualized, unemployment $u_t$ is a percentage rate, and exchange-rate depreciation $d_t$ is a quarterly percentage change, with a positive value denoting depreciation. The terms-of-trade state is $q_t$. Every behavioral equation has an additive term $\alpha_t^j$ that can represent judgment, omitted variables, short-run measurement discrepancies, or a desired conditional path.

The model is block recursive. Within each quarter, the solution order is: external composites and terms of trade; exchange rate; inflation expectations; output gap; inflation; consumption; unemployment; nominal rate; and level identities. Current-period variables only enter an equation when they have already been determined in that sequence. Consequently, no within-period fixed point or rational-expectations solver is required. This is a defining simplification: expectations are dynamic and partially anchored, but they are not model-consistent expectations of future endogenous variables.

Four historical quarters are stored explicitly. They supply the lags required by year-on-year identities, distributed pass-through, the real-rate gap, and the activity equations. The default historical profiles are transparent backcasts rather than outputs from a multivariate filter.

## 2.2. Common external block

The external block contains 13 exogenous quarterly paths: the federal funds rate and a U.S. neutral-rate benchmark; output gaps for the United States, China, and the rest of the world; the DXY; and changes in oil, soybeans, copper, coffee, iron ore, food prices, and traded-goods prices. Country-specific exposure weights map these series into world demand $x_t^w$, a terms-of-trade innovation $\Delta q_t^{\text{ext}}$, and an imported-price innovation $m_t$. The terms-of-trade state is stationary by

construction:

$$q_t = \rho_q q_{t-1} + \Delta q_t^{\text{ext}}, \qquad 0 \le \rho_q < 1. \tag{1}$$

This avoids the permanent output-gap displacement that would arise from cumulating commodity-price changes without mean reversion.

For the six inflation-targeting economies, quarterly depreciation relative to its reference drift $\bar{d}_t$ follows

$$d_t - \bar{d}_t = \rho_d(d_{t-1} - \bar{d}_{t-1}) + \beta_D \Delta DXY_t - \beta_{id}\, \widetilde{id}_{t-1} + \alpha_t^d, \tag{2}$$

$$\widetilde{id}_{t-1} = (i_{t-1} - i_{t-1}^{US}) - \left[(r_{t-1}^* + \bar{\pi}_{t-1}) - i_{t-1}^{US,n}\right], \tag{3}$$

where $i^{US}$ is the federal funds rate and $i^{US,n}$ its neutral benchmark. The specification is reduced form: $\alpha_t^d$ absorbs country risk, intervention, portfolio shifts, and other exchange-rate determinants. Argentina is treated separately; its depreciation path is exogenous and is stored in the $\alpha_t^d$ row itself.

### 2.3. Expectations and aggregate demand

Expected inflation is a persistent state that moves toward a combination of lagged inflation and the inflation target or nominal anchor four quarters ahead:

$$\pi_t^e = \rho_e \pi_{t-1}^e + (1 - \rho_e)\left[(1 - \omega_t)\pi_{t-1} + \omega_t \bar{\pi}_{t+4}\right] + \alpha_t^e. \tag{4}$$

The parameter $\rho_e$ governs expectation inertia; $\omega_t$ governs anchoring. The two concepts are therefore separated rather than represented by a single coefficient.

The ex ante real-rate gaps are

$$g_{t-j}^r = i_{t-j} - \pi_{t-j}^e - r_{t-j}^*, \qquad j \in \{1, 2\}, \tag{5}$$

and the effective stance is a convex combination $\widetilde{g}_t^r = \chi_r g_{t-1}^r + (1 - \chi_r) g_{t-2}^r$. World demand similarly combines current and lagged foreign activity, $\widetilde{x}_t^w = \chi_w x_t^w + (1 - \chi_w) x_{t-1}^w$. The IS relation is

$$x_t = \rho_x x_{t-1} + \beta_w \widetilde{x}_t^w + \beta_q q_{t-1} - \beta_r \widetilde{g}_t^r + \alpha_t^x. \tag{6}$$

Thus, the policy rate does not affect output in the quarter in which it is set. The direct real-rate channel begins in the following quarter and is distributed between the first and second lags. By contrast, part of the foreign-demand channel may be contemporaneous, which is more important for highly integrated economies.

### 2.4. Inflation, consumption, and unemployment

Inflation follows a hybrid Phillips curve:

$$\begin{aligned}\pi_t = {} & \lambda_b \pi_{t-1} + (1 - \lambda_b)\pi_t^e + \kappa_x\left[\delta_x x_t + (1 - \delta_x) x_{t-1}\right] \\ & + \kappa_d \sum_{j=0}^{3} w_j^d (d_{t-j} - \bar{d}_{t-j}) + \kappa_m \sum_{j=0}^{3} w_j^m (m_{t-j} - \bar{m}_{t-j}) + \alpha_t^\pi.\end{aligned} \tag{7}$$

The weights $w_j^d$ and $w_j^m$ are non-negative and normalized to sum to one. The interface parameterizes each distribution by a contemporaneous share and a geometric decay factor. Activity is predominantly lagged in the default calibration: $\delta_x$ is between 0.10 and 0.20 across countries. The exchange-rate and imported-price terms enter as deviations from their steady-state references, so a permanent nominal drift does not mechanically lift steady-state inflation above the target.

The consumption gap is a genuine error-correction model:

$$z_t = z_{t-1} + \gamma_s(x_t - x_{t-1}) + \gamma_{ec}(z_{t-1} - \alpha_{ec} x_{t-1}) + \alpha_t^z, \qquad \gamma_{ec} < 0. \tag{8}$$

The long-run relation is therefore $z = \alpha_{ec} x$, while $\gamma_s$ controls short-run co-movement. Unemployment follows a partial-adjustment Okun relation,

$$u_t = u^* + \rho_u(u_{t-1} - u^*) - \phi\,[\delta_u x_t + (1 - \delta_u)x_{t-1}] + \alpha_t^u, \tag{9}$$

with only a small contemporaneous activity share in the default calibration.

### 2.5. Nominal-rate rules and identities

For the six inflation-targeting economies, the end-of-quarter nominal rate is

$$\begin{aligned} i_t = \max\Big\{0,\, \rho_i i_{t-1} + (1-\rho_i)\big[r_t^* + \bar{\pi}_t + \theta_{\pi,t}(\pi_t^e - \bar{\pi}_{t+4}) + \theta_x x_t \\ + \theta_d(d_t - \bar{d}_t) + \theta_f(i_t^{US} - i_t^{US,n})\big] + \alpha_t^i\Big\}. \end{aligned} \tag{10}$$

The rule uses the current output-gap nowcast because the rate is interpreted as an end-of-quarter decision. The inflation term is prospective in the limited sense that expected inflation is compared with the target four quarters ahead. The default $\theta_f$ is zero, although the channel is implemented.

Argentina does not use this rule. The model rate is a TAMAR-based market-rate proxy, not an official policy-rate instrument. Its reduced-form equation replaces $r^* + \bar{\pi}$ with an exogenous nominal anchor path and retains expectation-gap and activity terms. The inflation anchor, credibility weight, real neutral rate, rate proxy, and exchange-rate depreciation follow terminal-absorbing glide paths. This special block is designed for coherent scenario arithmetic under the current regime; it does not claim to recover a conventional Taylor rule for Argentina.

Potential output and consumption trend grow geometrically at declared annual rates. Levels and year-on-year growth are exact identities:

$$Y_t = Y_t^p \exp(x_t/100), \qquad Y_t^p = Y_{t-1}^p (1 + g_p/100)^{1/4}, \tag{11}$$

$$g_t^{Y,YoY} = 100(Y_t/Y_{t-4} - 1), \tag{12}$$

with analogous expressions for consumption. No log-linear approximation is used in the year-on-year reconstruction.

### 2.6. LAC-7 aggregation

Countries are solved independently. The regional block is an ex-post weighted average with fixed weights: Brazil 0.40, Mexico 0.32, Argentina 0.10, Colombia 0.07, Chile 0.06, Peru 0.04, and Costa Rica 0.01. Quarterly gaps, inflation, unemployment, nominal rates, GDP growth, and consumption growth are averaged using those weights. Exchange-rate depreciation is not aggregated. The regional nominal-rate series is an index of heterogeneous national measures and includes Argentina's market-rate proxy; it should not be read as a regional policy rate. There are no endogenous trade, financial, or policy spillovers among the seven country blocks.

## 3. Calibration and baseline construction

### 3.1. Information set and trajectory guides

The default jump-off and baseline use public information available through 23 July 2026. Sources include the June 2026 Monetary Policy Report and Focus survey for Brazil; Banco de México's 2026Q1 Quarterly Report; the June 2026 IPoM for Chile; the April 2026 Monetary Policy Report for Colombia; the June 2026 Inflation Report for Peru; the April 2026 Monetary Policy Report for Costa Rica; and the June 2026 REM for Argentina (Banco Central do Brasil, 2026; Banco de México, 2026; Banco Central de Chile, 2026; Banco de la República, 2026; Banco Central de Reserva del Perú, 2026; Banco Central de Costa Rica, 2026; Banco Central de la República Argentina, 2026). These sources are not homogeneous. Some entries are observed data, some

are official staff projections, some are survey medians, and others are explicit model judgments. The application labels those categories rather than presenting all values as observations or official forecasts.

For Argentina, REM values are private-sector survey medians and are not BCRA forecasts. The TAMAR is used as a nominal market-rate proxy because there is no single policy-rate target directly comparable with the Selic or the rates of the other inflation-targeting central banks. The output gap, NAIRU, credibility path, late-horizon nominal anchor, and several quarterly interpolations remain judgmental.

The baseline is specified as quarterly reference paths for $x_t$, $\pi_t$, $z_t$, $u_t$, and $i_t$. Equation add-factors are then preloaded so that the model reproduces those paths under the default external scenario. The largest absolute reproduction error across the seven countries, five guided variables, and 12 quarters is $1.1 \times 10^{-6}$ percentage point, a numerical rounding difference. This exact matching is a calibration device; it is not evidence that the unguided behavioral equations fit historical data.

### 3.2. Propagation parameters and impulse-response targets

Behavioral coefficients are calibrated rather than estimated. The calibration combines qualitative restrictions, plausible lag structures, steady-state convergence, central-bank documentation, and a small set of impulse-response moments. No likelihood, posterior distribution, historical filtering objective, or formal minimum-distance estimator is implemented. The country-specific ranges used to assess impulse responses are working calibration bands, not sampling confidence intervals.

The standardized monetary-policy experiment raises the nominal rate by 100 basis points relative to the baseline rule for four consecutive quarters. It begins from a steady-state history, uses the baseline external block, sets ordinary add-factors to zero, and then allows the rate to revert endogenously. The response is the difference between the shocked and unshocked simulations over 20 quarters. Argentina is excluded because its TAMAR-based proxy is not comparable to the policy-rate instruments of the six inflation-targeting economies.

For Brazil, the working target was approximately a 0.5 percentage-point reduction in the output gap around four to five quarters and a 0.3 percentage-point reduction in 12-month inflation in the seventh quarter. The output timing is consistent with the maintained-rate experiment in Minella and Souza-Sobrinho (2009), which reports an output decline of 0.5 percent in the fifth quarter. That historical study reports a much larger 1.9 percentage-point decline in four-quarter inflation in the seventh quarter. Version 1.0 does *not* adopt that inflation magnitude: the 0.3-point benchmark is a judgmental contemporary working prior and must not be attributed to the cited paper or to a current BCB production model.

The other country bands are less tightly identified. Chilean evidence informs the relative timing of output and price responses (Gredig, Schmidt-Hebbel, and Valdés, 2007); the Peruvian calibration is guided by the documented structure of the updated BCRP quarterly projection model (Aguirre et al., 2023); the Colombian range uses central-bank evidence that activity reacts before prices (Banco de la República, 2008); and the relatively weak Costa Rican response reflects incomplete and heterogeneous pass-through from the policy rate to bank lending rates (Barquero-Romero, 2024). Mexican priors are conservative and emphasize that the direct interest-rate channel is only one of several transmission channels (Banco de México, 2016). These references discipline direction and timing; they do not provide a common, directly comparable set of estimated IRFs.

### 3.3. Annual reporting conventions

Because the projection starts in 2026Q3, the 2026 annual line is hybrid. For GDP, consumption, and unemployment, the reported value equals the country annual reference plus one quarter of the

model deviation from the reference in each of Q3 and Q4:

$$A_{2026} = A^{ref}_{2026} + \frac{1}{4}\left[(a_{Q3} - a^{ref}_{Q3}) + (a_{Q4} - a^{ref}_{Q4})\right]. \tag{13}$$

Inflation and the nominal rate are Q4 values. For 2027 and 2028, GDP and consumption are the geometric mean of four quarterly year-on-year growth rates; inflation and the nominal rate are Q4 values; and unemployment is the four-quarter average. The geometric-mean convention is a house reporting rule and is not equal to growth of the annual-average level. Incomplete 2029 is omitted. For LAC-7, the 2026 hybrid measure is constructed from country annual measures and fixed weights.

**Table 1:** Selected baseline outcomes

| | 2026 | | | 2027 | | |
|---|---|---|---|---|---|---|
| Country | GDP* | CPI, Q4 | Rate, Q4 | GDP | CPI, Q4 | Rate, Q4 |
| Brazil | 2.00 | 5.20 | 13.75 | 1.42 | 3.70 | 12.00 |
| Mexico | 1.10 | 3.50 | 6.50 | 2.11 | 3.00 | 6.50 |
| Chile | 1.38 | 4.20 | 4.50 | 2.15 | 3.00 | 4.00 |
| Colombia | 2.40 | 6.40 | 12.30 | 2.09 | 3.70 | 10.60 |
| Peru | 3.40 | 2.80 | 4.25 | 3.11 | 2.00 | 3.80 |
| Costa Rica | 3.50 | 2.10 | 3.25 | 3.54 | 3.10 | 4.25 |
| Argentina | 3.00 | 30.00 | 22.00 | 3.03 | 20.00 | 18.50 |
| LAC-7 | 1.87 | 7.03 | 11.11 | 1.98 | 4.99 | 9.91 |

Notes: Percent unless stated otherwise. The 2026 GDP column is the hybrid annual measure described in Section 3.3. For 2027, GDP is the geometric mean of four quarterly year-on-year rates, not growth of the annual-average level. "Rate" is the policy rate for the six inflation-targeting economies, a TAMAR-based nominal-rate proxy for Argentina, and a GDP-weighted nominal-rate index for LAC-7.

Table 1 is a conditional reference path, not a forecast evaluation. It illustrates the substantial heterogeneity embedded in the tool: disinflation is largely complete by 2027 in Mexico, Chile, Peru, and Costa Rica; the Brazilian and Colombian paths retain restrictive nominal rates; and Argentina remains a distinct high-inflation, market-rate-proxy case. The regional figures combine these different regimes mechanically.

### 3.4. Visible steering and baseline tension

Add-factors are the model's native judgment layer. They are not hidden constants: each equation-quarter entry is visible and editable. Their root mean square provides a useful diagnostic of how much the retained baseline relies on judgment rather than unguided propagation.

**Table 2:** Baseline steering intensity: root mean square of quarterly add-factors

| Country | $\alpha^x$ (IS) | $\alpha^\pi$ (Phillips) | $\alpha^i$ (rate) | $\alpha^d$ (FX) |
|---|---|---|---|---|
| Brazil | 0.882 | 0.292 | 0.177 | 1.169 |
| Mexico | 0.148 | 0.204 | 0.115 | 0.095 |
| Chile | 0.030 | 0.313 | 0.097 | 0.048 |
| Colombia | 0.388 | 0.420 | 0.402 | 0.941 |
| Peru | 0.027 | 0.090 | 0.069 | 0.039 |
| Costa Rica | 0.024 | 0.220 | 0.077 | 0.082 |

Notes: Native equation units, over the 12-quarter baseline. The FX term is a reduced-form risk-premium/residual for the six countries shown. Argentina is omitted because its $\alpha^d$ is the exogenous depreciation path itself, not a residual. Large values indicate tension between the retained baseline trajectory and the unguided structural propagation; they are not standard errors or shock estimates.

The largest steering requirements among the six comparable economies occur in Brazil and Colombia. In Brazil, the stronger calibrated monetary transmission, together with a high initial real-rate gap, would generate more contraction than the retained activity path in the absence of a positive IS residual. The large FX residuals in Brazil and Colombia also reveal the limits of the parsimonious DXY-plus-interest-differential equation. These residuals can represent missing risk premia, intervention, fiscal or credit conditions, and other omitted drivers; the model does not separately identify those mechanisms. For Argentina, the RMS inflation and rate add-factors are also material, while the FX row is an exogenous path and is therefore not comparable with a residual.

## 4. Selected monetary-policy properties

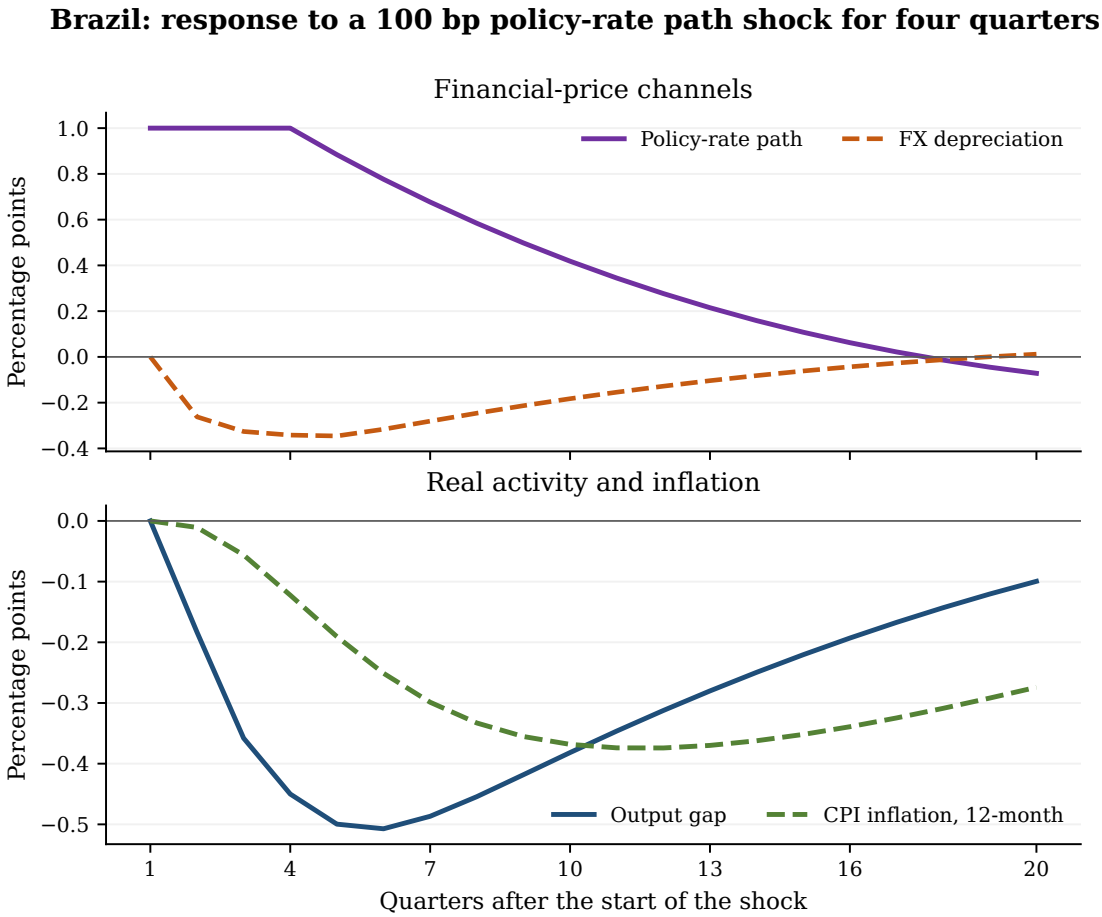



**Figure 1:** Brazilian monetary-policy impulse response

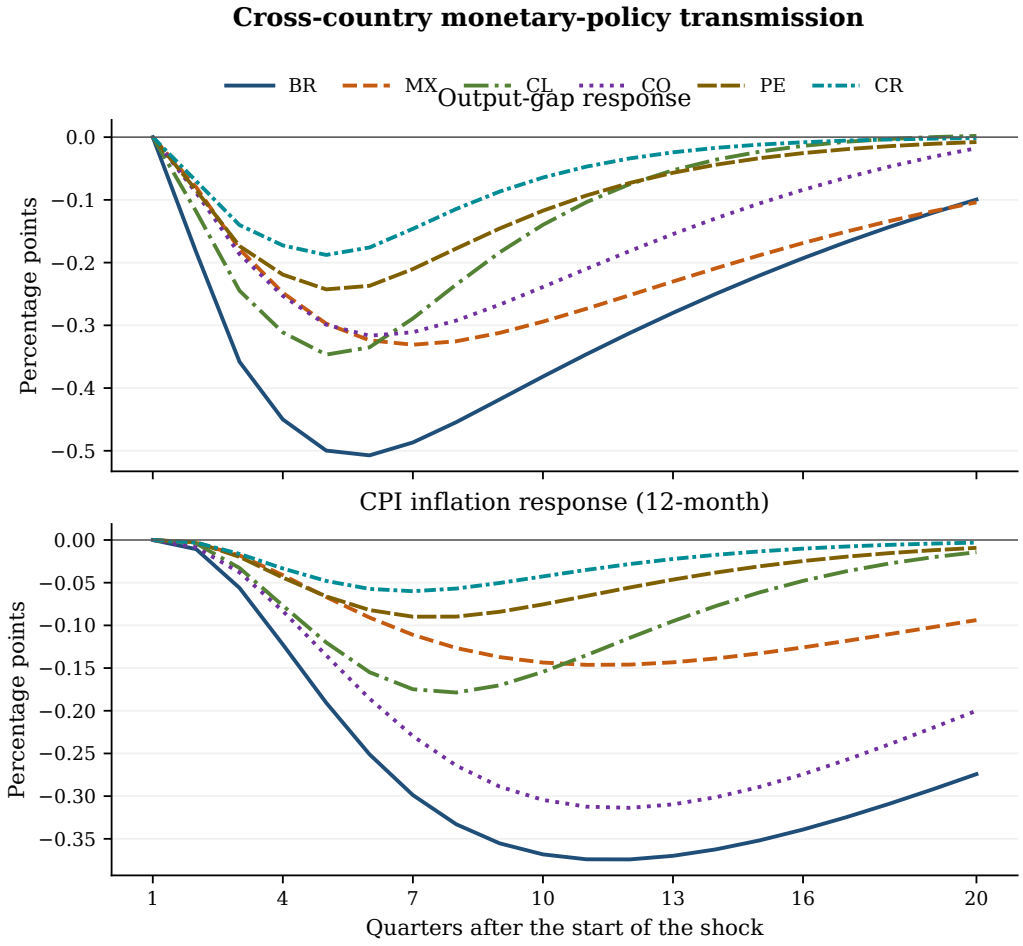
In the standardized Brazilian experiment, the output gap is 0.450 percentage point below baseline in the fourth quarter and reaches a trough of 0.507 point in the sixth quarter. Twelve-month inflation is 0.299 point lower in the seventh quarter and reaches a trough of 0.374 point in the twelfth. The exchange-rate channel begins with a lag because the FX equation uses the lagged interest differential; the largest decline in depreciation is 0.346 point in the fifth quarter. The response is hump-shaped rather than immediate, reflecting rate smoothing, the distributed real-rate gap, lagged activity in the Phillips and Okun equations, dynamic expectations, and four-quarter pass-through distributions.

**Table 3:** Standardized monetary-policy impulse responses

| Country | Gap, Q4 | Gap trough | CPI, Q7 | CPI trough | FX peak |
|---|---|---|---|---|---|
| Brazil | -0.450 | -0.507 (Q6) | -0.299 | -0.374 (Q12) | -0.346 (Q5) |
| Mexico | -0.248 | -0.331 (Q7) | -0.111 | -0.146 (Q11) | -0.163 (Q5) |
| Chile | -0.311 | -0.347 (Q5) | -0.175 | -0.179 (Q8) | -0.214 (Q5) |
| Colombia | -0.253 | -0.317 (Q6) | -0.230 | -0.314 (Q12) | -0.298 (Q5) |
| Peru | -0.219 | -0.243 (Q5) | -0.090 | -0.090 (Q7) | -0.164 (Q5) |
| Costa Rica | -0.173 | -0.188 (Q5) | -0.060 | -0.060 (Q7) | -0.137 (Q5) |

Notes: Percentage-point deviations from an unshocked steady-state baseline. The nominal policy rate is held 100 basis points above the baseline rule for Q1–Q4 and then reverts endogenously. "FX peak" is the most negative response of quarterly depreciation, hence an appreciation. Ordinary add-factors are zero. Argentina is excluded because the tool uses a TAMAR-based proxy rather than a directly comparable policy-rate instrument.

Table 3 shows that the same nominal-rate path does not imply the same macroeconomic response across countries. Brazil has the strongest output response among the six default calibrations. Colombia's inflation response is relatively persistent, while Peru and Costa Rica have smaller effects. Chile's output response peaks earlier than those of Mexico and Colombia. These differences are calibration properties of the model, not empirical rankings with standard errors.




Note: 100 bp rate path shock for four quarters; steady-state baseline, zero ordinary add-factors. Argentina is excluded.

**Figure 2:** Cross-country monetary-policy transmission

The standardized experiment is deliberately narrow. It does not incorporate changes in fiscal

policy, bank lending standards, sovereign spreads, nonlinear risk premia, or central-bank communication beyond the endogenous variables already in the model. It is therefore best read as a controlled comparison of the encoded mechanisms, not as a forecast of the consequences of an actual policy decision.

## 5. Implementation and validation

The application is written in HTML, CSS, and JavaScript. It runs locally in a standard browser and stores state in local storage. Users can edit parameters, historical states, external exposure weights, and add-factors; choose external presets; layer step, ramp, or pulse shocks; pin a comparison baseline; and import or export calibration files in JSON. The calculations do not require a server. The chart library is presentation-only: tables, controls, and model calculations remain available if charts fail to load.

The default build is subject to several implementation checks. First, all country and aggregate trajectories must be finite. Second, the baseline must reproduce the retained quarterly guides to numerical precision. Third, the pass-through weights are constrained to be non-negative and to sum to one. Fourth, a 60-quarter extension holds the external block at steady state and turns off ordinary post-horizon add-factors; Argentina's exogenous FX path holds its terminal value. The heuristic flags non-finite paths, large terminal deviations, late-horizon divergence relative to earlier deviations, and a terminal inflation coefficient no greater than one for the inflation-targeting countries. All default country blocks pass this heuristic. The test is not an eigenvalue analysis and does not establish global stability.

## 6. Limitations and non-claims

**No econometric estimation or causal identification.** The coefficients are calibrated values. Output gaps, NAIRUs, neutral real rates, expectation states, and several historical series are partly judgmental. The model has not been estimated jointly, subjected to Bayesian posterior analysis, or validated through a systematic historical forecast competition. Its IRFs are controlled simulations around a calibrated steady state, not statistically identified causal effects.

**Trajectory fit is obtained partly through add-factors.** Exact reproduction of the baseline is intentional, but it does not validate the behavioral equations. Large residuals—especially in the Brazilian IS and FX equations and in several Colombian blocks—signal tension between the retained path and the parsimonious propagation mechanism. Scenario results depend on whether those residuals are held fixed, altered, or removed.

**Expectations are not model consistent.** Equation (4) is dynamic and forward-anchored, but agents do not solve for future endogenous inflation or activity. The policy rule uses a current activity nowcast and an expectation state; it is not the solution of an intertemporal optimization problem. Accordingly, the model is in the FPAS/QPM tradition but is not a canonical forward-looking QPM or a DSGE model.

**Inflation is modeled directly in 12-month rates.** This convention is convenient for communication but creates mechanical overlap between adjacent observations and can make measured persistence difficult to interpret. Distributed FX and import-price terms reduce, but do not eliminate, the limitations associated with base effects. A quarterly seasonally adjusted price equation with an exact price-index identity would be structurally cleaner.

**The external and financial blocks are intentionally sparse.** There is no explicit fiscal impulse, credit quantity, lending-rate, sovereign-risk, macroprudential, balance-sheet, or interven-

tion equation. The exchange rate is reduced form, and the terms-of-trade effect enters aggregate demand rather than a separate potential-output or income block. Shocks that work mainly through omitted channels will appear in add-factors or risk-premium residuals.

**Countries do not interact endogenously.** The shared external block creates common shocks, but trade, financial, migration, and policy spillovers among the seven economies are absent. Fixed aggregation weights ignore changes in relative GDP. The LAC-7 rate index combines non-equivalent instruments, and no regional FX series is constructed.

**No probabilistic uncertainty.** The tool produces deterministic paths. Scenario variation is not a probability distribution, the IRF bands are not confidence intervals, and the stability badge is a heuristic. There are no fan charts, stochastic shocks, parameter uncertainty, or model-averaging weights.

**Annual figures require care.** The 2026 line is a hybrid of external annual anchors and two projected quarters. The 2027–28 GDP and consumption measures are geometric means of quarterly year-on-year rates, not conventional annual-average growth computed from levels. Users comparing the table with official annual forecasts must account for this difference.

**Argentina is not directly comparable.** The TAMAR-based rate is a market proxy, FX is exogenous, and several nominal parameters follow judgmental glide paths. REM values are survey medians. The Argentine block is useful for conditional consistency and sensitivity analysis, but it should not be interpreted as an estimated representation of a conventional policy-rate regime or as a BCRA forecast.

## 7. Conclusion

LAC-7 Model Lab provides a compact, transparent environment for constructing conditional macroeconomic trajectories and examining monetary and external transmission across seven Latin American economies. Its principal strengths are explicit timing, exact identities, visible judgment, editable country heterogeneity, and reproducible scenario arithmetic. Its principal weakness is the same source of its transparency: important mechanisms are represented by deliberately parsimonious equations, while baseline consistency may require material add-factors.

The appropriate interpretation is therefore disciplined but limited. The tool can answer questions of the form: *given this calibration, these external paths, these judgments, and this policy-rate experiment, what internally consistent trajectories follow?* It cannot establish that the calibration is statistically preferred, that the baseline is the most likely forecast, or that the simulated policy effects are causal estimates. Future research should replace backcast histories with filtered data, estimate or formally match selected propagation parameters, add fiscal and financial-condition blocks, evaluate out-of-sample forecasts, and introduce probabilistic uncertainty while preserving the current auditability.

## A. Selected calibration values

Table 4 reports a subset of the default propagation coefficients. The full calibration, historical state, exposure weights, glide paths, and quarter-specific add-factors are available in the application's export file. The values in this table are sufficient to illustrate the degree of cross-country heterogeneity but are not a substitute for the complete model state.

**Table 4:** Selected propagation parameters

| Country | $\rho_x$ | $\beta_r$ | $\rho_e$ | $\lambda_b$ | $\kappa_x$ | $\beta_{id}$ | $\rho_i$ | $\theta_\pi$ |
|---|---|---|---|---|---|---|---|---|
| Brazil | 0.525 | 0.262 | 0.782 | 0.700 | 0.162 | 0.262 | 0.900 | 1.700 |
| Mexico | 0.703 | 0.122 | 0.548 | 0.650 | 0.105 | 0.131 | 0.900 | 1.600 |
| Chile | 0.527 | 0.182 | 0.497 | 0.600 | 0.184 | 0.162 | 0.760 | 1.700 |
| Colombia | 0.679 | 0.126 | 0.649 | 0.750 | 0.166 | 0.210 | 0.850 | 1.800 |
| Peru | 0.512 | 0.130 | 0.448 | 0.500 | 0.145 | 0.131 | 0.800 | 1.650 |
| Costa Rica | 0.463 | 0.108 | 0.549 | 0.450 | 0.112 | 0.110 | 0.750 | 1.550 |
| Argentina | 0.541 | 0.035 | 0.700 | 0.452 | 0.100 | 0.000 | 0.613 | 0.138 |

Notes: Calibrated values, not econometric estimates. For Argentina, $\theta_\pi$ belongs to the reduced-form TAMAR-proxy rule; $\beta_{id} = 0$ because FX is exogenous. Several Argentine parameters follow terminal-absorbing glide paths; the table reports the initial value stored in the calibration.

## B. Summary of the within-quarter algorithm

For each country and each projected quarter, the implementation performs the following operations in order:

1. Read the common external paths and construct country-specific world demand, terms-of-trade innovations, imported-price innovations, the Fed gap, and the DXY shock.
2. Update the stationary terms-of-trade state and determine exchange-rate depreciation.
3. Update the expected-inflation state using lagged expectations, lagged inflation, and the four-quarter-ahead target or anchor.
4. Compute the two lagged real-rate gaps and solve the IS equation.
5. Solve the Phillips curve using the current/lagged output-gap blend and four-quarter FX and imported-price pass-through distributions.
6. Update the consumption gap through the error-correction relation and unemployment through Okun's law.
7. Set the nominal rate from the inertial policy rule or, for Argentina, the TAMAR-proxy rule.
8. Advance potential and trend levels and compute exact year-on-year GDP and consumption growth against the fourth lag.

Because every right-hand-side variable is predetermined or solved earlier in the same quarter, this sequence is a complete algorithm rather than an iterative equilibrium procedure.

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