Contractionary Depreciations in Latin America During the 2000s

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Structure of the Presentation

- We build on the contractionary devaluation hypothesis
- Usual culprits:
    1. Typical balance sheet effects
    2. Redistribution from wages to profits and rents
    3. Wealth effects (wealth misperception *alla* Heymann or pseudo wealth *alla* Guzman and Stiglitz)

- We also draw on the large literature on Inflation Targeting
- Specifically, on the branch that analyzes the cases where things go wrong
- Also, on the literature that explores the role of unconventional policies
- Finally, on the papers that argue that flexible exchange rates may not insulate the domestic economy from real shocks
- A plausible reason (at least in LA) is the presence of contractionary effects from depreciations

- The take-home points of this paper:
- The original hypothesis was developed during a period of fixed or semi-fixed exchange rates and closed capital accounts
- Still relevant for small open economies that target inflation: adding a Taylor Rule may introduce additional destabilizing effects
- Empirical results from the 5 FITs suggest that contractionary depreciations are more important in Brazil and Mexico
- The less favorable performance in those cases could be related to the nature of currency depreciations

An Example

- New Consensus Model Building Blocks:
  1. IS Curve
  2. Sticky Price Phillips Curve
  3. Taylor Rule
- In an open economy add 4) UIP or other assumptions about capital mobility
- A critical assumption that we remove: real depreciations increase aggregate (or non-tradable) demand

An Example

- New-Keynesian Phillips Curve Calvo-sytle: $\dot{\pi} = -\epsilon(ED)$
- Excess Demand is some function F: $ED = F(Q, i - \pi, stuff)$ with $F_r < 0, F_Q \lesseqgtr 0$
- Taylor Rule: $r = i - \pi = (\alpha - 1)(\pi - \Pi) + r^*$
- UIP: $i = i^* + E$
- Rate of Change of the Real Exchange Rate: $\dot{Q} = E + \pi^* - \pi$
- Combine with the UIP and assume reversion towards equilibrium: $Q = Q^* - \gamma(r - r^*)$

An Example

- Putting all-together: $\dot{\pi} = -\epsilon F[r(\pi), stuff \ldots]$
- Assume that the Taylor Principle holds $\alpha - 1 > 0$ so r is an increasing function of π
- Notice $F_\pi < 0$ if depreciations are expansionary, but $F_\pi > 0$ cannot be ruled out if depreciations are contractionary
- If depreciations are sufficiently contractionary, tight policy creates excess demand for goods. There is an infinite number of equilibrium paths that converge to $\pi = \Pi$, $r = r^*$ and $Q = Q^*$

Intuition

The Aggregate Demand curve is upward sloped in the Output/Inflation space BECAUSE $\alpha - 1 > 0$. In fact $\alpha = 0$ leads to determinacy

An Example

Remark I

Adding a predetermined variable will not work. For instance, a sticky monetary policy rule that involves: $\dot{r} = \theta[\bar{r}(\pi) - r]$ with $\bar{r}_\pi > 0$. The resulting 2x2 system on π and r (with $\frac{\partial \dot{r}}{\partial \pi} > 0$) will have two roots with negative real part. Indeterminacy is still there

Remark II

Adding output to the Taylor Rule may fail to correct the slope of the AD curve. LA central banks don't seem to be targeting output

Remark III

With a large exchange rate pass-through, determinacy may be achieved $\frac{\dot{\pi}}{\pi} > 0$, but at the cost of output instability (tight policy still creates excess demand)

Remark IV

Additional policies (or even parking the interest rate) rate can re-establish determinacy

Structure of the Presentation

Related Literature

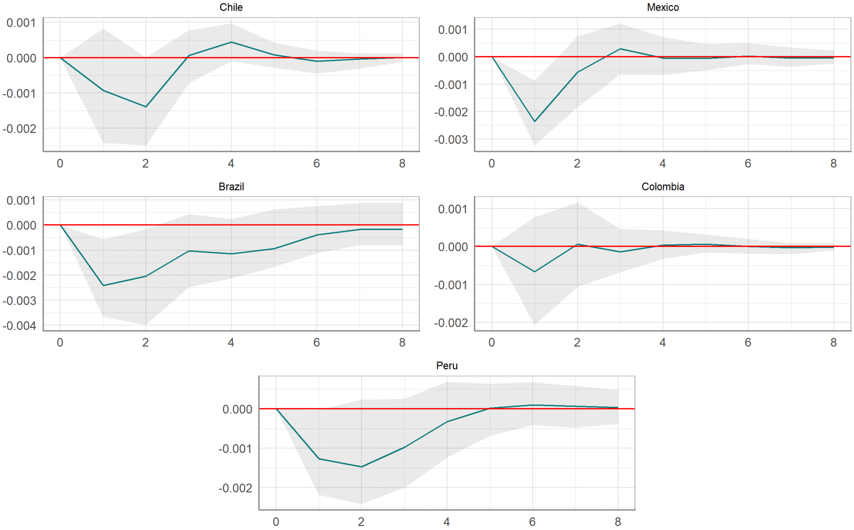
Data and Empirical Evidence

Implications

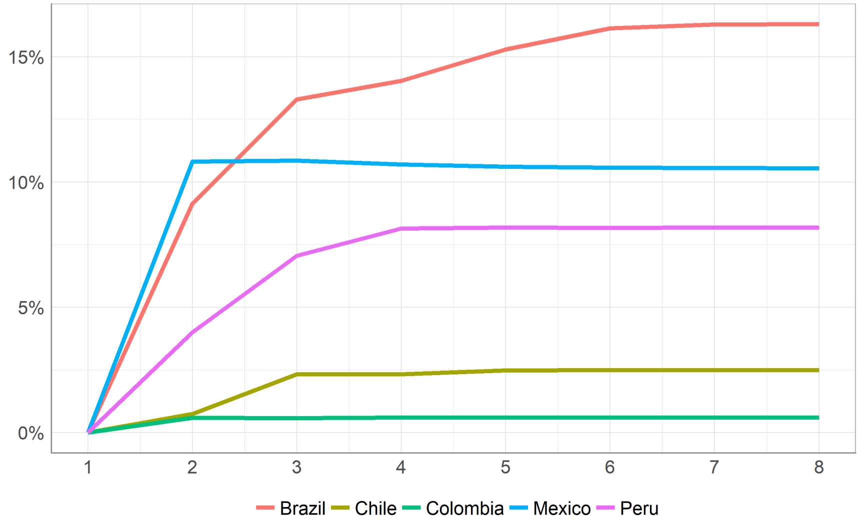
Related Results

- Brazil 1999Q2-2017Q2 (3 lags)
- Chile 1996Q1-2017Q2 (2 lags)
- Colombia 2001Q1-2017Q2 (2 lags)
- Mexico 2004Q2-2017Q2 (2 lags)
- Peru 2003Q4-2017Q2 (2 lags)
- Endogenous: baseline rate, GDP, inflation, and the nominal exchange rate
- Exogenous: federal funds rate, VIX index, and the price of commodities.
- Orthogonalization of the error terms to identify the structural shocks: we stick to the standard Cholesky decomposition of the covariance matrix

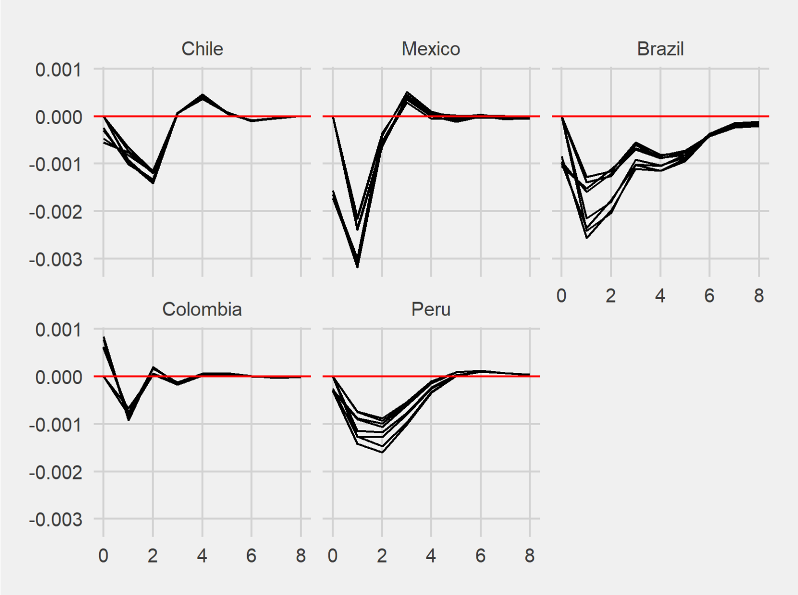
Cumulative IRF (exchange rate effect on GDP. Cholesky: exchange rate, GDP, CPI, interest rate)



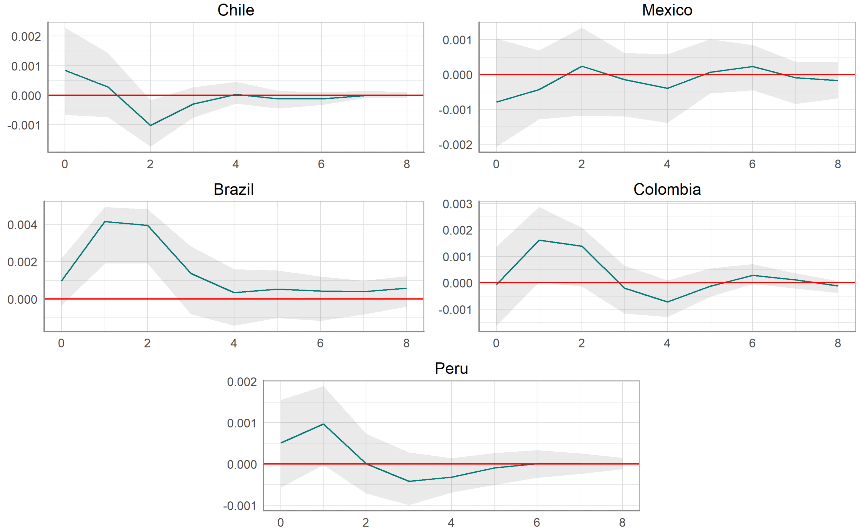
Variance decomposition (exchange rate effect on GDP)



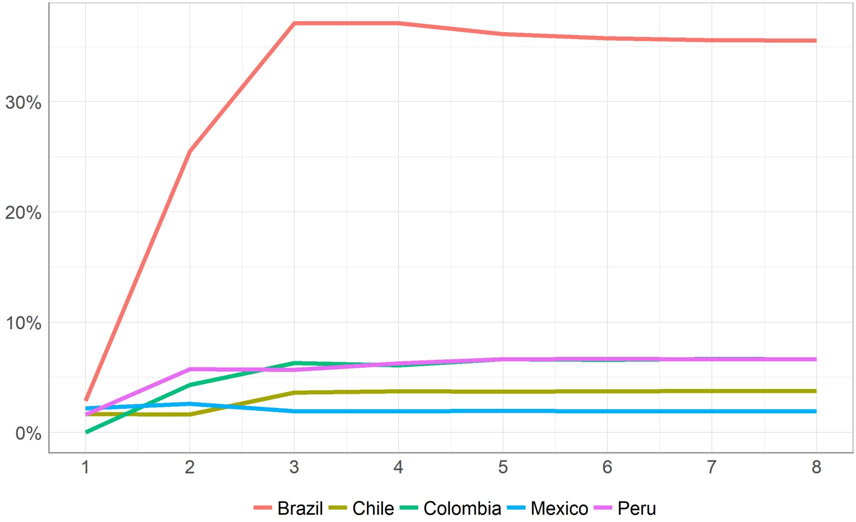
Robustness: all orderings (exchange rate effect on GDP)



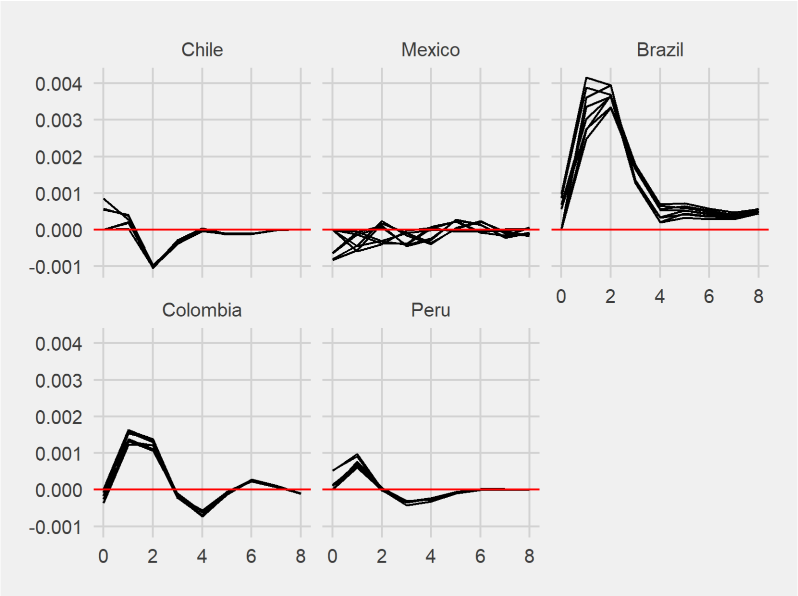
Cumulative IRF (exchange rate effect on CPI. Cholesky: exchange rate, GDP, CPI, interest rate)



Variance decomposition (exchange rate effect on CPI)



Robustness: all orderings (exchange rate effect on CPI)



Structure of the Presentation

- Inflation Targeting fared better in Chile, Colombia, and most notably in Peru
- The results in Brazil and Mexico (and Argentina!) are rather disappointing
- Interestingly, our finding show that devaluations seem to be contractionary in Brazil and Mexico
- On a related research, we also found evidence of fear of floating, mainly in Brazil and Mexico
- Punch-line: policy markers may favor appreciations with undesirable long-run implications

Some Statistics

	Growth Rate (Average)	Growth Rate (Stand. Dev.)	Inflation (Average)	Inflation (Stand. Dev.)	NEER Volatility*	REER Volatility*
Brazil	1,31%	2,96%	6,71%	2,32%	17,59%	20,71%
Chile	2,91%	2,11%	3,34%	2,17%	7,21%	6,59%
Colombia	2,74%	1,63%	5,15%	2,10%	13,40%	13,99%
Mexico	1,11%	2,53%	4,40%	1,54%	19,40%	11,44%
Peru	3,55%	2,39%	2,81%	1,70%	6,54%	4,42%

Source: authors' calculations based on IMF WEO data from 1999 to 2016.
*Estimated as the ratio of standard deviation to the sample average.

Structure of the Presentation

Table 1: LSTAR-2 Model

	Brazil	Chile	Colombia	Mexico	Peru
Lower Threshold	-3.8055***	-0.3110***	-0.3459***	-2.2718***	-1.1031***
	(0.0537)	(1.8850)	(0.0021)	(0.0026)	(0.0842)
Upper Threshold	1.7507***	0.3008***	0.2055***	1.8378	1.4677***
	(0.0873)	(0.0026)	(0.0017)	(.)	(0.0986)
Speed of Adjustment	4.3972	7577.5060	9327.3200	86.6119	12.9158**
	(7.0863)	(80147.43)	(59160.59)	(.)	(6.0913)
Linear σ^2	0.4137	0.1802	0.1727	0.1364	0.0453
Non-Linear σ^2	0.3457	0.1780	0.1697	0.1525	0.0421
Ratio	0.8354	0.9878	0.9827	0.8947	0.9299
Observations	4436	4436	4436	4436	4436
R-Squared	0.467	0.2187	0.2839	0.3837	0.1932

Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 2: Markov-Switching Model

	Brazil	Chile	Colombia	Mexico	Peru
			Lower Regime		
Transition Pb	0.9733	0.9696	0.9552	0.9846	0.8832
	(0.0048)	(0.0065)	(0.0073)	(0.0047)	(0.0146)
Expected Duration	37.4223	32.9040	22.3039	64.9711	8.5613
	(6.7705)	(7.0379)	(3.6313)	(19.9761)	(1.0669)
Variance	0.3557	0.2575	0.2091	0.2545	0.0725
			Upper Regime		
Transition Pb	0.8983	0.9057	0.8964	0.9148	0.8431
	(0.0222)	(0.0264)	(0.0167)	(0.0219)	(0.0235)
Expected Duration	9.8320	10.6001	9.6509	11.7398	6.3725
	(2.1457)	(2.9759)	(1.5544)	(3.0161)	(0.9558)
Variance	1.2112	0.7201	0.6836	0.7099	0.3128

Standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 3: GMM Estimation of Interest Rate Reaction Functions

Δ ln(Rate)	Brazil	Chile	Colombia	Mexico	Peru
Constant	-0.0013	-0.0065	-0.0116***	-0.0017*	0.0125**
	(0.0043)	(0.0060)	(0.0033)	(0.0010)	(0.0042)
Δ Inflation (t-1)	0.2949***	0.1344***	0.1806***	-0.0109	0.0788***
	(0.0403)	(0.0422)	(0.0391)	(0.0092)	(0.0227)
Outputgap (t-1)	-0.0002	0.0008	0.0008**	0.0019***	0.0024***
	(0.0008)	(0.0010)	(0.003)	(0.0007)	(0.0007)
Appreciation (t-1)	0.1774	0.3865	-0.2248	0.2531**	0.4560
	(0.1484)	(0.3256)	(0.2249)	(0.1050)	(0.5695)
Depreciation (t-1)	0.2243*	0.3894	0.1224	-0.1301*	-0.3710
	(0.1153)	(0.2386)	(0.0969)	(0.0615)	(0.3010)
Observations	183	147	82	78	103
Hansen's J χ p-value	0.4992	0.2695	0.6542	0.8652	0.8202

Instruments: Lags 2/12 of Output-gap, ΔInflation,
Domestic and Federal Funds Rates (in logs)
Standard error in parentheses (Newey-West "HAC" Covariance Matrix)
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 4: GMM Estimation of Reserve Accumulation Reaction Functions

Δ ln(Reserves)	Brazil	Chile	Colombia	Mexico	Peru
Constant	0.0169***	0.0043	0.0079***	0. 0139***	0.0144***
	(0.0040)	(0.0044)	(0.0017)	(0.0017)	(0.0017)
Δ Inflation (t-1)	-0.0631*	-0.0040	0.0235	-0.0166*	-0.0097*
	(0.0034)	(0.0050)	(0.0194)	(0.0090)	(0.0054)
Outputgap (t-1)	0.0011	0.0017***	0.0006***	0.0013***	0.0007**
	(0.0007)	(0.0005)	(0.0002)	(0.0003)	(0.0003)
Appreciation (t-1)	0.0034	0.0705	-0.2189	0.0914*	0.0892
	(0.1337)	(0.1750)	(0.1430)	(0.0502)	(0.1140)
Depreciation (t-1)	-0.3200***	-0.0089	-0.2303***	-0.1707***	-0.5477***
	(0.0633)	(0.1716)	(0.0665)	(0.0534)	(0.2045)
Observations	179	147	82	74	103
Hansen's J χ p-value	0.3554	0.5013	0.7376	0.1848	0.5598

Instruments: Lags 2/12 of Output-gap, ΔInflation,
Domestic and Federal Funds Rates (in logs)
Standard error in parentheses (Newey-West "HAC" Covariance Matrix)
*** p<0.01, ** p<0.05, * p<0.1