Monetary Policy in Resource-rich Countries

Silvana Tenreyro

London School of Economics

July, 2024

BACKGROUND

▶ Resource-rich countries are subject to large swings in commodity prices
▶ Concern that those swings might become even more frequent or virulent

    ▶ Geopolitical fragmentation
    ▶ Climate-related events

▶ Other policies need to be put in place to deal with real impact of commodity swings

▶ Monetary policy needs to address the residual impact not tackled by other policies

Two Questions

1. How does the inflation targeting framework, supported with flexible exchange rate, fare in an environment subject to commodity price swings?

   Perspectives of
   ▶ Advanced economies that are commodity exporters
   ▶ Emerging and developing economies that are commodity exporters

2. Is monetary policy effective in a world of **dollar dominance**?

ANSWERS TO QUESTIONS

1. How does the inflation targeting framework, supported with flexible exchange rate, fare in an environment subject to commodity price swings?

   ▶ IT with flexible exchange dominates over a peg

2. Is monetary policy effective in a world of **dollar dominance**?

   ▶ Yes. Monetary policy is effective when vehicle currencies are used

QUESTION 1: HOW DOES INFLATION TARGETING, COUPLED WITH FLEXIBLE ER, FARE IN THE FACE OF COMMODITY PRICE SHOCKS?

A Model-based answer

- ▶ Small open economy New Keynesian setting building on Svensson (2000), Obstfeld and Rogoff (1995) and Gali and Monacelli (2005)

    - ▶ Households maximise their utility over consumption, labour effort and asset holdings, subject to their budget constraints

    - ▶ Firms optimise profits, given technology and demand

    - ▶ Prices (wages) are sticky in the domestic good sector

    - ▶ Commodities are traded in globally competitive markets. Prices are flexible.

FINANCIAL MARKETS

▶ Imperfect global financial markets

▶ Critically, risk premium in international financial markets may be affected by commodity prices
  ▶ Captures pro-cyclicality of credit - e.g., when soy prices increase, Argentina can borrow at better terms (Drechsel and Tenreyro, 2018)
    ▶ Simple correlation: -0.78. Range of semi-elasticicities from regressions using different measures and various controls: -0.23 to -0.31. Regression table
    ▶ Evidence for other countries, e.g. Bastourre et al (2012)

LINEARIZED MODEL

Households.

$$\hat{c}_{h,t} = \alpha\hat{\tau}_t + \hat{c}_t$$
$$\hat{c}_{f,t} = (\alpha - 1)\hat{\tau}_t + \hat{c}_t$$
$$\hat{c}_{h,t}^* = \hat{\tau}_t - \alpha_{\tilde{c}}\hat{p}_{\tilde{c},t}^* + \hat{c}_t^*$$
$$\hat{c}_{nc,t} = \hat{p}_{f,t} - \hat{p}_{nc,t} + \hat{c}_{f,t}$$
$$\hat{c}_{\tilde{c},t} = \hat{p}_{f,t} - \hat{p}_{\tilde{c},t} + \hat{c}_{f,t}$$
$$\varphi\hat{n}_t + \hat{c}_t = \hat{w}_t - \hat{p}_t$$
$$\hat{c}_t = -(i_t - \mathbb{E}_t\hat{\pi}_{t+1}) + \mathbb{E}_t\hat{c}_{t+1}$$
$$i_t - \mathbb{E}_t\hat{\pi}_{t+1} = i_t^* - \mathbb{E}_t\hat{\pi}_{t+1}^* + \mathbb{E}_t\hat{s}_{t+1} - \hat{s}_t + \hat{\phi}_t$$
$$\hat{\phi}_t = \phi_{\tilde{c}}\hat{p}_{\tilde{c},t} - \phi_c\hat{p}_{c,t} - \phi_B\hat{b}_t$$
$$\beta\hat{b}_t - \hat{b}_{t-1} = \frac{s_{m,ss}}{\nu}(\hat{y}_{c,t} + \hat{p}_{c,t}^*) + s_{c^*,ss}\hat{c}_t^* +$$
$$-\mu(\hat{x}_{\tilde{c},t} + \hat{p}_{\tilde{c},t}^*) - \frac{\alpha s_{c,ss}}{1-\alpha}(\hat{c}_{f,t} + \alpha_{\tilde{c}}\hat{p}_{\tilde{c},t}^*)$$

Prices and resource constraint.

$$\hat{p}_t = \alpha\hat{p}_{f,t} + (1 - \alpha)\hat{p}_{h,t}$$
$$\hat{p}_{f,t} = \alpha_{\tilde{c}}\hat{p}_{\tilde{c},t} + (1 - \alpha_{\tilde{c}})\hat{p}_{nc,t}$$
$$\hat{\tau}_t = \hat{p}_{f,t} - \hat{p}_{h,t}$$
$$\hat{s}_t = (1 - \alpha)\hat{\tau}_t - \alpha_{\tilde{c}}\hat{p}_{\tilde{c},t}^*$$
$$\Delta\hat{e}_t = \Delta\hat{s}_t + \hat{\pi}_t - \hat{\pi}_{f,t}^*$$
$$\hat{y}_{h,t} = s_{c,ss}\hat{c}_{h,t} + s_{c^*,ss}\hat{c}_{h,t}^* + s_{m,ss}\hat{m}_{h,t}$$

Domestic goods sector.
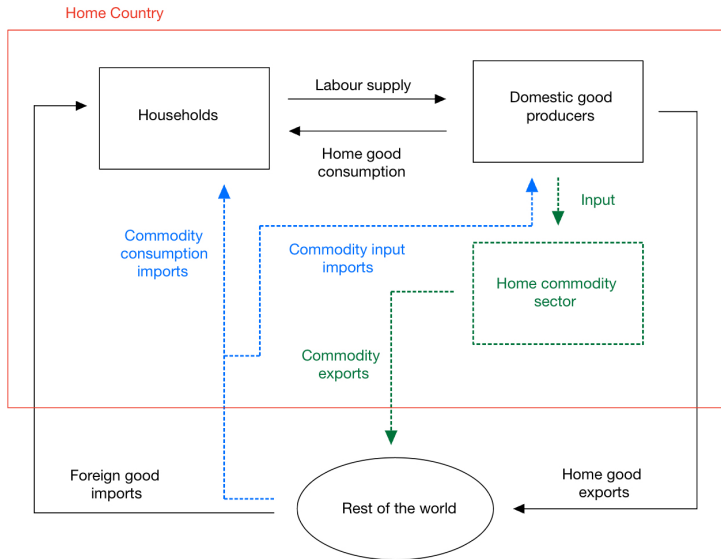
$$\hat{y}_{h,t} = \hat{a}_{h,t} + (1 - \mu)\hat{n}_t + \mu\hat{x}_{\tilde{c},t}$$
$$\hat{\pi}_{h,t} = \beta\mathbb{E}_t\hat{\pi}_{h,t+1} + \kappa\hat{mc}_t$$
$$\hat{mc}_t = (1 - \mu)(\hat{w}_t - \hat{p}_t) + \mu(\hat{p}_{\tilde{c},t}^* + \hat{s}_t) + \alpha\hat{\tau}_t - \hat{a}_{h,t}$$
$$\hat{x}_{\tilde{c},t} = \hat{n}_t + (\hat{w}_t - \hat{p}_t) - (\hat{p}_{\tilde{c},t}^* + \hat{s}_t)$$

Commodity export sector.

$$\hat{y}_{c,t} = \hat{a}_{c,t} + \nu\hat{m}_{h,t}$$
$$(1 - \nu)\hat{m}_{h,t} = \hat{p}_{c,t}^* + \alpha\hat{\tau}_t + \hat{s}_t + \hat{a}_{c,t}$$

Productive structure of the economy

POLICY FRAMEWORKS

1. Fixed exchange rate regime

2. Flexible exchange rate regime. Taylor rules:

    - ▶ Weight on CPI inflation
    - ▶ Weight on Domestic Price Inflation

Compare outcomes with efficient allocation (from a "national" social planner perspective.)

Calibration

Parameter	Description	Value	Calibration target/source
$1 - \alpha$	Home bias	0.6	Gali and Monacelli (2005)
ϕ	Inverse Frisch elasticity	3	Gali and Monacelli (2005)
β	Discount factor	0.996	Steady state interest rate $\approx 1.5\%$
$1 - \theta$	Price re-set probability	0.25	Standard value for Calvo pricing
ϵ	Elasticity of substitution	6	Gives markup of 20%
ν	Returns of scale in comm. prod.	0.6	Gives $s_{m,ss} = 0.4$
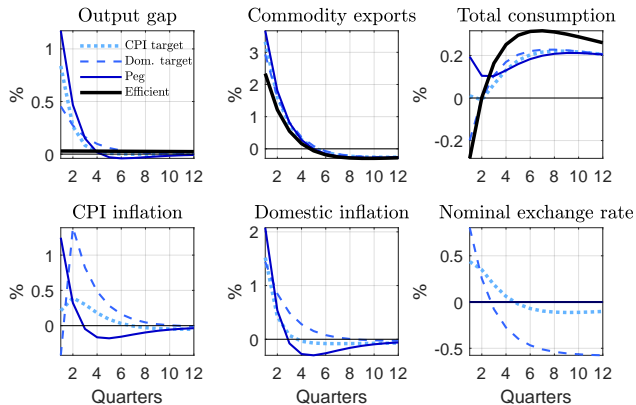
- ▶ Peg amplifies boom; output gap is too high compared to efficient allocation
- ▶ Efficient allocation would call for bigger appreciation
- ▶ Inflation-based Taylor rules dominate peg

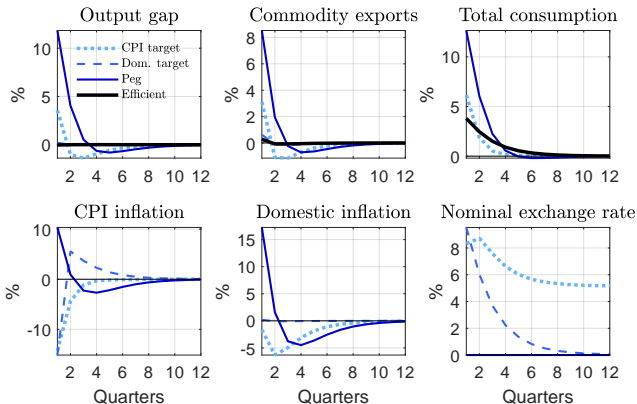|	CPI inf. target	Dom. inf. target	Nominal peg
CPI inflation	0.15	0.44	0.33
Domestic inflation	0.40	0.44	0.56
Efficient output gap	0.86	0.52	1.25

EME/DE COMMODITY EXPORTER - EXPORT PRICE SHOCK

- ▶ Fall in risk premium exacerbates the consumption boom and creates a more difficult trade-off for policy makers

- ▶ Peg is by far the worst option, leading to enormous boom and domestic inflation overshoot.

EME/DE COMMODITY EXPORTER - EXPORT PRICE SHOCK
IMPLIED STANDARD DEVIATIONS ACROSS POLICIES

	CPI inf. target	Dom. inf. target	Nominal peg
CPI inflation	3.75	4.20	2.84
Domestic inflation	2.26	0.09	4.73
Efficient output gap	4.16	0.23	12.54

ANSWER TO QUESTION 1

- ▶ Some form of IT with flexible exchange rates performs better than pegs in response to commodity price shocks
  - ▶ For AE comodity *exporters*, pegs create more volatility in inflation and output.
  - ▶ For EME/DE comodity *exporters*, volatility is amplified by an endogenous loosening of financial conditions, made worse by the peg. Domestic IT achieves a better balance.

QUESTION 2: IS MONETARY POLICY EFFECTIVE IN A WORLD OF **dollar dominance**? (CAN FLEXIBLE EXCHANGE RATES ACT AS AUTOMATIC STABILISERS?)

Recent challenges to the value of er flexibility

1. Most international trade is invoiced in a few currencies. Large US dollar role.

2. New dominant currency paradigm (DCP) has emerged, shifting policy views.
   - Makes exports unresponsive to exchange rates
   - Reduces the value of flexible exchange rates as automatic stabilisers
   - Limits the gains from independent monetary policy

3. Key DCP assumptions: 1) exporters have monopoly power and 2) dollar prices are sticky. But:
   - Many developing and EM producers are price takers. They export commodities or similar products with limited market power.
   - Commodities often quoted in US dollars, but prices are completely flexible.
   - Even advanced-economy producers often face very elastic demands in global markets.

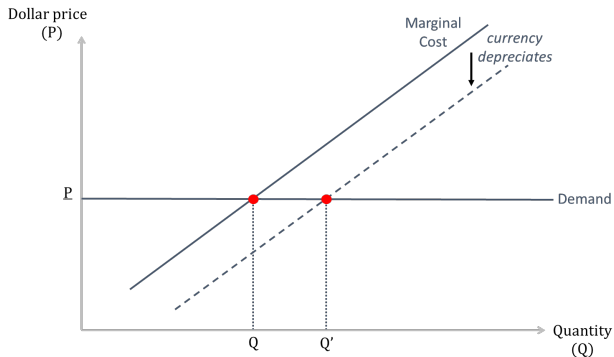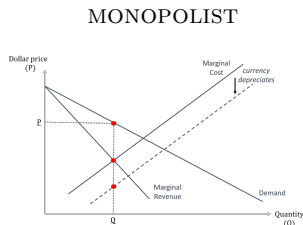# DOLLAR DOMINANCE IN TRADE: THE MONOPOLIST WITH STICKY PRICE

DEPRECIATION WITH STICKY DOLLAR PRICES: MONOPOLIST
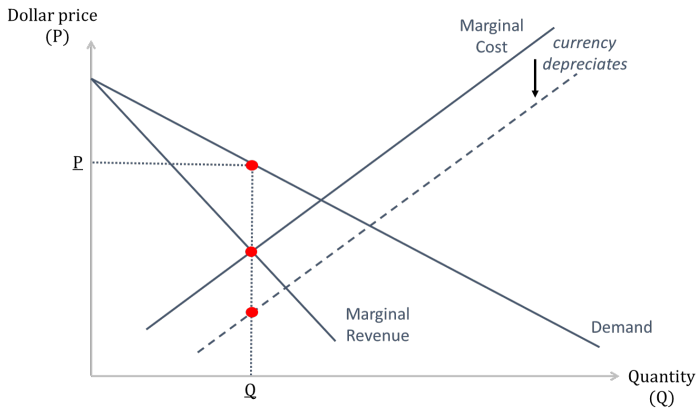
▶ With sticky dollar prices, export quantities do not change
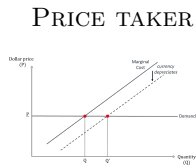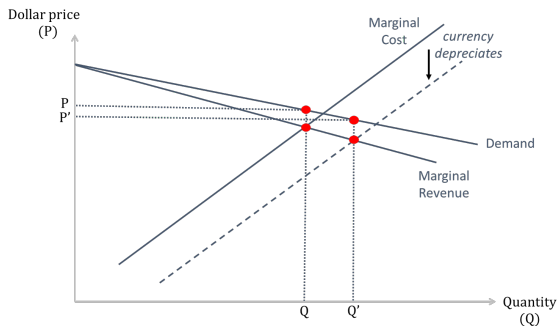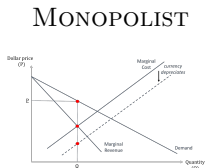
Dollar dominance in trade: the commodity producer

Depreciation for a commodity exporter: price taker

MONOPOLIST

▶ Dollar commodity prices do not change, but export quantities increase

Dollar dominance: the producer in competitive markets

Depreciation with elastic demand

Monopolist

Price taker

- For a producer facing an elastic demand, flexible prices may appear sticky in equilibrium
- Export quantities increase a lot, as for the commodity exporter

Implications for monetary policy (the ER channel)

► With monopolists and sticky USD prices, an ER depreciation does not affect export prices or quantities. Monetary policy has a small effect.

► With commodity (or commodity-like) producers and flexible USD prices, an ER depreciation does not affect export prices but causes a large increase in export quantities. Monetary policy has a large effect.

  ► Effect depends on supply capacity.

Answer to Question 2

▶ Using dominant invoicing currency does not mean prices are sticky.
  ▶ Empirical evidence suggests the opposite: the more competitive the market, the more likely a producer would invoice in a dominant currency. (E.g., commodities).

▶ Flexible exchange rates can help stabilise the economy under dollar dominance

OUTSIDE OF THE MODEL

▶ Other policies (besides monetary) to tackle climate and geopolitical shocks

▶ Need for a "real-side" policy strategy to prevent, mitigate and cope with geopolitical or climate related shocks

1. Investment on technological diversification, focused on low substitutability inputs or technologies (Koren and Tenreyro, 2010)

2. Deeper trade integration with low geopolitical-risk countries to lower exposure to domestic shocks to specific suppliers/buyers, reducing volatility (Caselli, Koren, Lisicky, and Tenreyro, 2020)

3. Inventory base to prepare for shortages in critical inputs (energy, water, etc.)

CONCLUSIONS

1. How does the inflation targeting framework, supported with flexible exchange rate, fare in an environment subject to commodity price swings?

   ▶ IT with flexible exchange dominates over a peg

2. Is monetary policy effective in a world of **dollar dominance**?

   ▶ Yes. Monetary policy is effective when vehicle currencies are used

COMMODITY PRICES AND ARGENTINE REAL SPREADS

LHS variable	(1)	(2)	(3)	(4)	(5)
	Real spread (based on World Bank measure)				
Commodity price	-0.278***	-0.233***	-0.307***	-0.313***	-0.260***
	(0.073)	(0.065)	(0.080)	(0.077)	(0.070)
Output growth		-0.668**			-0.664**
		(0.236)			(0.235)
Trade balance			-0.273		0.231
			(0.306)		(0.508)
Debt-to-GDP ratio				-0.058	-0.087
				(0.046)	(0.079)
Constant	0.049**	0.054***	0.055***	0.086**	0.105**
	(0.017)	(0.015)	(0.019)	(0.034)	(0.044)
Observations	22	22	22	22	22
R-squared	0.423	0.594	0.446	0.468	0.640

Standard errors in parentheses
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$

Back