

Discussion on "Commodity Price Shocks and Monetary Policy" by Silvana Tenreyro

Paulina Restrepo-Echavarria¹

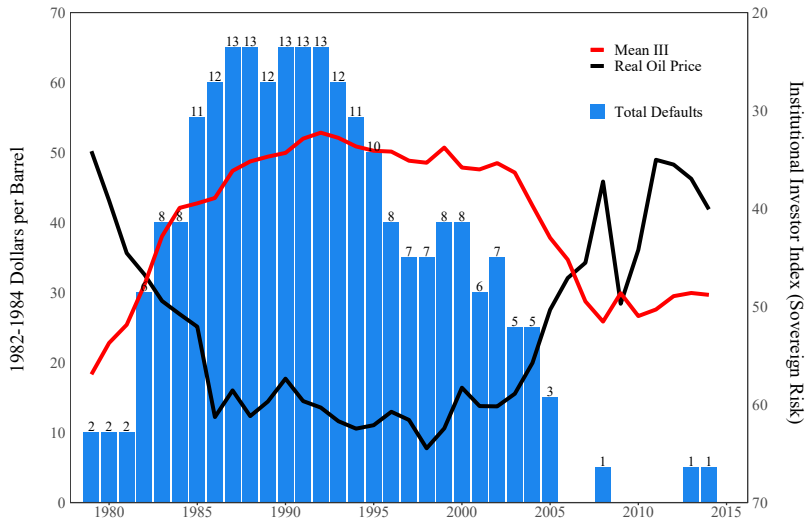
FLAR-Cartagena, August 2024

¹Federal Reserve Bank of St. Louis. The views expressed here don't represent the views of the Federal Reserve Bank of St Louis or the Federal Reserve System.

In this discussion

- ▶ Great paper, very useful tool for policy makers
- ▶ Understanding the effect and channels through which commodity prices affect inflation is key for an effective (and efficient) monetary policy
- ▶ I will focus my discussion on the case of emerging market commodity exporters and the:
 - ▶ importance of considering the stock of the commodity (not just the flow/production), and the implications for monetary policy
 - ▶ trade-off between using a financial asset (debt) versus a real asset (commodity) to smooth out consumption
 - ▶ importance of the risk premium—and the factors that determine it—for the mechanism at hand

Relationship between Sovereign risk and oil prices



Source: Hamann, Mendez-Vizcaino, Mendoza, and Restrepo-Echavarria (2024)

Stocks vs Flows/Short vs Long-Run

- ▶ Stylized Facts: the case of oil (but these hold for many food and energy commodities, Restrepo-Echavarria and Suarez (2024))
 1. Country risk worsens as debt rises (mean corr. between debt ratio and III is -0.6)
 2. Country risk worsens as real oil price falls over the business cycle (0.7 corr. with III)
 3. Conditionally (DFE panel regression), country risk worsens when oil output falls on impact but in the long-run is unaffected
 4. Conditionally, country risk does not respond to oil reserves on impact but it rises in the long-run
- ▶ Key modeling assumption for the commodity export sector:
 - ▶ $Y_{c,t} = A_{c,t} M_{h,t}^Y$
- ▶ What happens if we model both the flow and the stock?

A model with oil reserves and risk premium

- ▶ Small open economy with two sectors/goods:
 - ▶ tradable non-storable consumption good y
 - ▶ stock of oil reserves s out of which x units can be extracted at a total cost $e(x, s) = \psi\left(\frac{x}{s}\right)^\gamma x$
 - ▶ reserves law of motion $s' = s - x + \kappa$, where κ are oil discoveries
- ▶ Sovereign:
 - ▶ operates oil industry
 - ▶ sells oil at given world price p (in units of traded goods)
 - ▶ issues debt ($b < 0$) without commitment to repay
 - ▶ maximizes private utility and transfers oil profits and resources generated by debt
- ▶ p and y are exogenous stochastic processes

Commodity Prices, Debt pricing, and Risk Premium

- ▶ Conditional probability of default next period

$$P^d(b', s', y, p) = \sum_{y'} \sum_{p'} d(b', s', y', p') \pi(y', p' | y, p)$$

- ▶ No-arbitrage condition of risk-neutral foreign lenders

$$q(b', s', y, p) = q^* \left(1 - P^d(b', s', y, p) \right),$$

where $q^* \equiv 1/R^*$, and R^* is the world's risk-free real interest rate

- ▶ In Drechsel, McLeay, Tenreyro, and Turri (2024)

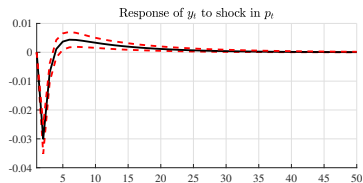
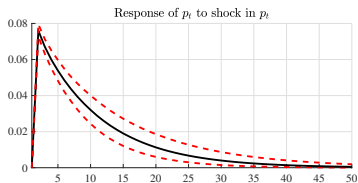
$$\frac{1}{Q_{t,t+1}} = \frac{1}{Q_{t,t+1}^*} E_t \left[\frac{\varepsilon_{t+1}}{\varepsilon_t} \Phi(\varepsilon_t, P_{\hat{c}}, P_c, B_t) \right]$$

Financial vs Real Asset/Short vs Long-Run Trade-offs

- ▶ Trading off b and s for date- t resources (**debt is better hedge**)
 - ▶ Debt repayment is non-state contingent but defaultable
 - ▶ Oil revenues rise with p (bad hedge)
- ▶ Trading off b' and s' for date- t resources (**reserves are better**)
 - ▶ Resources from borrowing ($\downarrow b'$) follow debt Laffer curve $-q(\cdot)b'$ so that $\partial c/\partial s' = -(q(\cdot) + \partial b' q(\cdot)/\partial b') \lesseqgtr 0$
 - ▶ “*Borrowing from reserves*” ($\downarrow s'$) adds resources without Laffer curve ($\partial c/\partial s' = -(p - e_x(x, s)) < 0$)
 - ▶ ... and it also adds resources under default, but less than under repayment ($\partial c/\partial s' = -(h(p) - e_x(x, s)) < 0$)

Impulse response functions to oil price shock

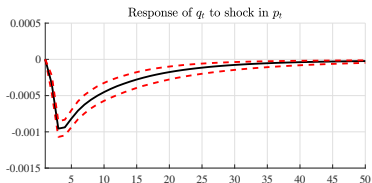
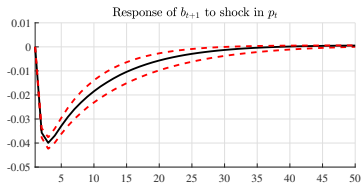
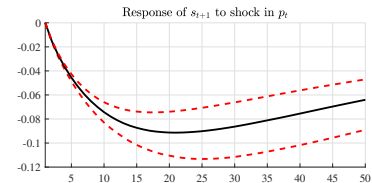
a) Exogenous variables



Note: Monte Carlo simulation for error bands (confidence level set to 95%): sample size of 1000 periods and 1000 replications.

Impulse response functions to oil price shock, contn'd

b) Endogenous variables



Note: Monte Carlo simulation for error bands (confidence level set to 95%): sample size of 1000 periods and 1000 replications.

Final Remarks

- ▶ The risk premium determines the transmission mechanism through the foreign bond Euler Equation, affecting the response of the exchange rate, consumption, and other fundamentals
- ▶ In the present paper higher commodity prices—which also result in lower debt—lower the risk premium
- ▶ However, once the commodity is both a stock and a flow the planner faces an intra- and an inter-temporal trade-off between the real (commodity) and the financial asset (debt)
- ▶ Hence, the effect of a commodity price shock might not be clear:
 - ▶ unlike the price, the relationship between the risk premium and the real asset is non-monotone over time
 - ▶ the real and the financial asset can affect the risk premium in opposite ways
- ▶ I think the non-monotonicity of the relationship between risk and reserves is of particular importance for the question at hand given the lagged effects of monetary policy

Largest 30 Net Oil Exporters

Algeria	China	India	Kuwait	Oman	Syria
Angola	Colombia	Indonesia	Libya	Qatar	U.A.E.
Argentina	Ecuador	Iran	Malaysia	Russian Fed.	Venezuela
Azerbaijan	Egypt	Iraq	Mexico	Saudi Arabia	Vietnam
Brazil	Gabon	Kazakhstan	Nigeria	Sudan	Yemen

Back

Dynamic Fixed Effects Back

	Δ Inst. Investor Index		
	Model (1)	Model (2)	Model (3)
Convergence coefficient			
Inst. Investor Index (-1)	-0.175*** (0.019)	-0.156*** (0.020)	-0.183*** (0.020)
Short-run coefficients			
Δ Oil Production	0.052** (0.021)	0.047** (0.022)	0.055** (0.022)
Δ Non-Oil GDP	0.199*** (0.058)	0.231*** (0.059)	0.198*** (0.057)
Δ Oil Reserves	0.006 (0.020)	0.014 (0.020)	0.010 (0.020)
Δ Ext. pub. debt to GDP	-0.104*** (0.038)	-0.094* (0.052)	-0.107** (0.051)
Δ Oil Discoveries	-0.003 (0.003)	-0.003 (0.004)	-0.003 (0.003)
Δ NFA		-0.040 (0.035)	-0.046 (0.034)
Long-run coefficients			
Oil Production	0.048 (0.041)	0.048 (0.049)	0.038 (0.041)
Non-oil GDP	0.095 (0.106)	-0.027 (0.120)	0.101 (0.100)
Oil Reserves	-0.162*** (0.051)	-0.141** (0.060)	-0.141*** (0.050)
Ext. pub. debt to GDP	-0.810*** (0.140)	-1.226*** (0.219)	-1.001*** (0.178)
Default	-0.369*** (0.072)		-0.379*** (0.068)
Oil Discoveries	0.045 (0.028)	0.048 (0.033)	0.039 (0.027)
NFA		-0.003 (0.141)	-0.119 (0.116)
Constant	0.245 (0.542)	0.767 (0.546)	0.219 (0.537)

Standard errors in parentheses

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