




# **Inflation responses to commodity price shocks – how and why do countries differ?**

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The background features a blue gradient with a faint world map and a large globe. Three circular icons containing upward-pointing arrows are positioned at the top and left. The main title is centered in a bold, dark blue font.

# **Inflation responses to commodity price shocks – how and why do countries differ?**

The views expressed herein are those of the author and should not be attributed to the IMF, its Executive Board, or its management

# Purpose of paper

- Relate domestic inflation impact of international food and fuel price shocks to country characteristics, policy frameworks, and policy reactions.

# Outline

- Aim of analysis
- Related literature
- At what speed does headline inflation revert to core inflation?
- Evidence from augmented Phillips curves (two approaches)
- Evidence from the 2007/2008 shock
- Conclusion

# Aim of analysis

Relate degree of transmission of commodity price shocks to domestic inflation to:

- 1) Structural features (openness, fuel intensity, net commodity exporter, shares in CPI, financial development, labor mkt flexibility, etc.)
- 2) Monetary and ER regimes
- 3) Inflation environment
- 4) Uncertainty about monetary policy
- 5) Governance, degree of CB independence.
- 6) Policy reactions

(Controlling for business cycle factors.)

# Aim of analysis

- Examine longer periods (mainly 2001-2011) using various techniques
- Also look at reaction to 2007-08 commodity price shock.

# Related literature

- IMF World Economic Outlook (Sept 2011): food price shocks have larger effects on inflation in developing economies, and in countries with high food shares in CPI. See also World Economic Outlook, Sept 2008.
- De Gregorio, Landerretche, and Neilson (2008): pass-through from oil prices to domestic inflation has declined around the world (lower oil intensity, lower exchange rate pass-through, and a more favorable inflation environment.)

# Related literature

- Neely and Rapach (2011): openness, real GDP per capita, and central bank independence are correlated with countries' sensitivity to the world factor behind domestic inflation.
- Pistelli and Riquelme (2010) analyze impact of commodity price boom/bust cycle during 2007/08 for 44 countries focusing on a few structural and cyclical variables. Not many country characteristics matter (initial price level, inflation, and openness). See also Habermeier et al (2009).



# Does headline inflation revert to core inflation?

- If headline  $\pi$  reverts quickly to core  $\rightarrow$  impact of commodity price shocks temporary
- Regression (see Cecchetti and Moessner, 2008, and Clark, 2001.)

$$\pi_t^{headline} - \pi_{t-12}^{headline} = \alpha + \beta(\pi_{t-12}^{headline} - \pi_{t-12}^{core}) + \varepsilon_t$$

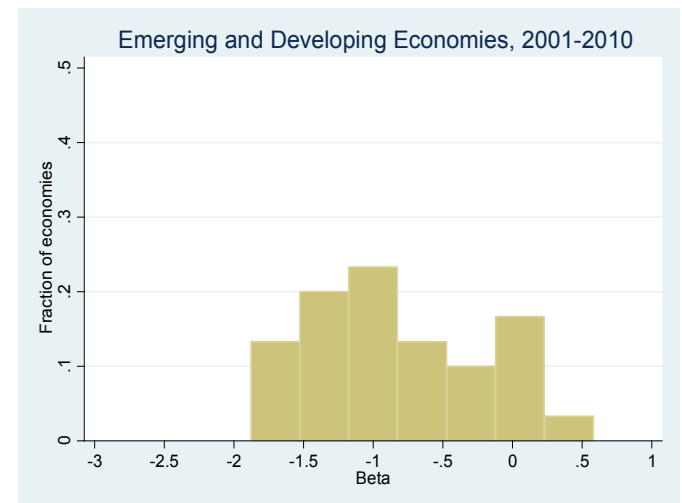
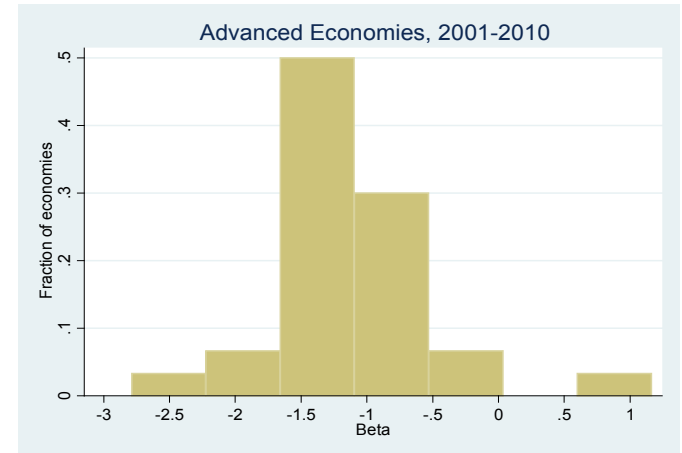
- If headline inflation reverts to core,  $\beta$  should be negative. If  $\beta = -1 \rightarrow$  headline fully reverts to core within one year

# Does headline inflation revert to core inflation?

Beta coefficients tend to be smaller for advanced than for emerging and developing countries



Headline inflation in advanced economies has been reverting to core faster

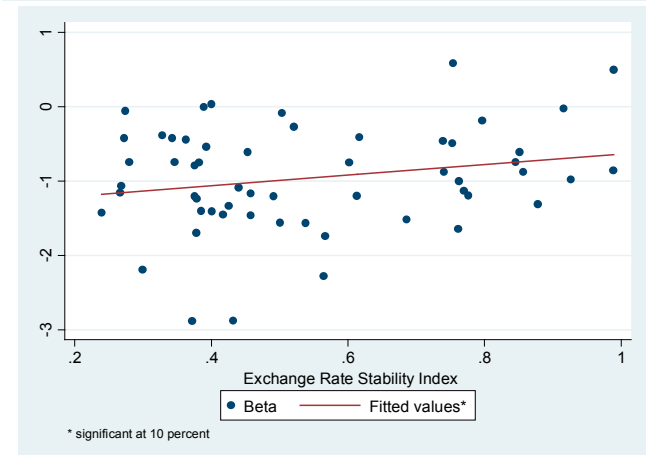
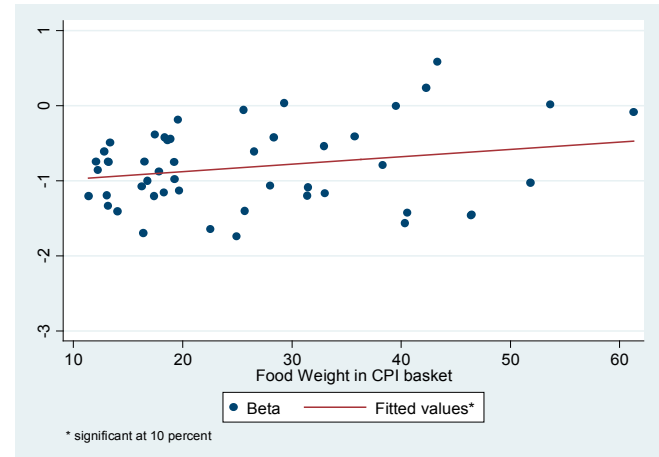


# Does headline inflation revert to core inflation?

Lower reversion speed of headline to core inflation is weakly associated with:

- Share of food in CPI
- Degree of exchange rate stability

No relation to other country characteristics/policy frameworks



# Evidence from Phillips curves

- Country-by country Phillips curves augmented by commodity prices:

$$\pi_t = \alpha + \sum_{i=1}^n \delta_{t-i} \pi_{t-i} + \sum_{i=0}^m \phi_{t-i} OutputGap_{t-i} + \sum_{i=0}^p \theta_{t-i} \pi_{t-i}^{WorldFood} + \sum_{i=0}^q \nu_{t-i} \pi_{t-i}^{WorldFuel} + \varepsilon_t$$

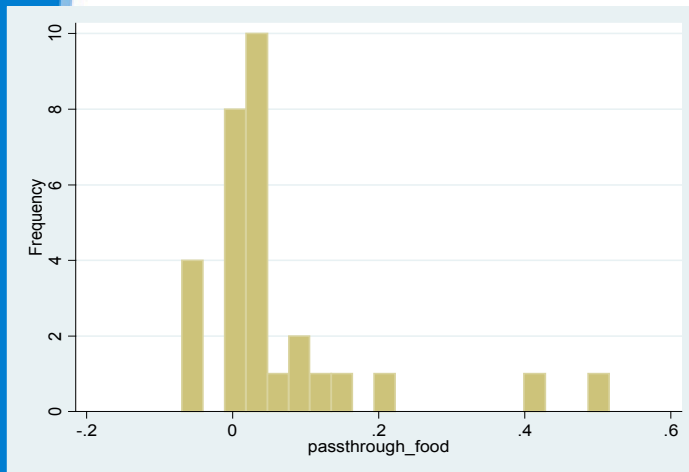
- Pass-throughs:

$$PT_{food} = \frac{\sum_{i=0}^p \theta}{1 - \sum_{i=1}^n \delta}$$

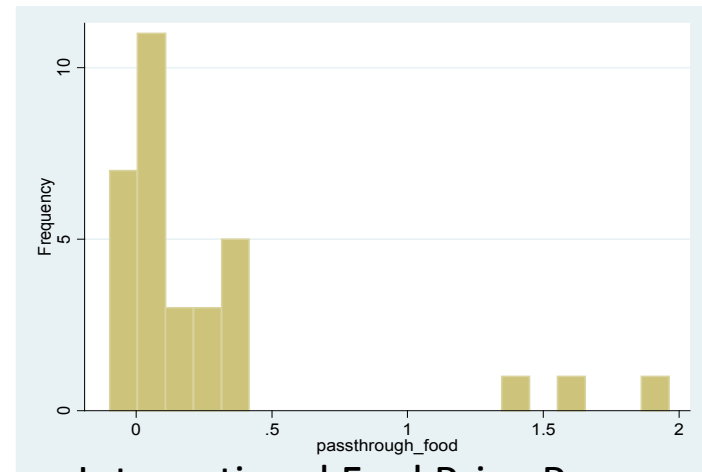
$$PT_{fuel} = \frac{\sum_{i=0}^q \nu}{1 - \sum_{i=1}^n \delta}$$

# Evidence from Phillips curves

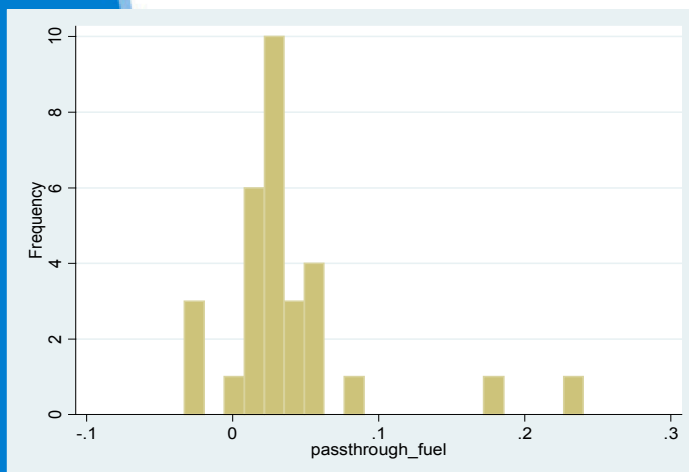
International Food Price Pass-through, Advanced economies



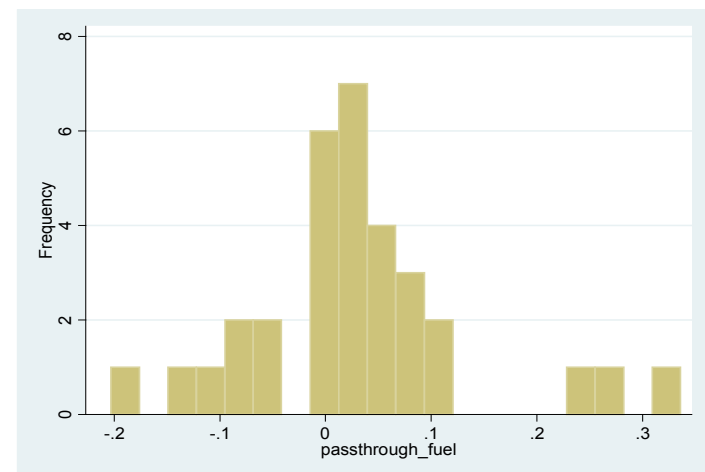
International Food Price Pass-through, Developing economies



International Fuel Price Pass-through, Advanced economies



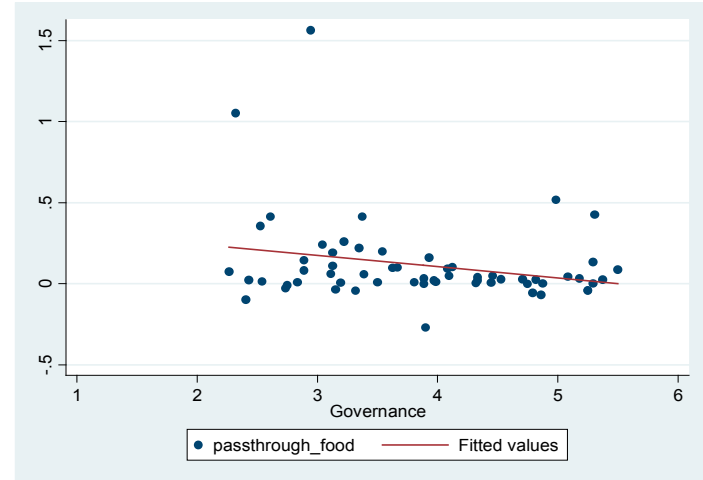
International Fuel Price Pass-through, Developing economies



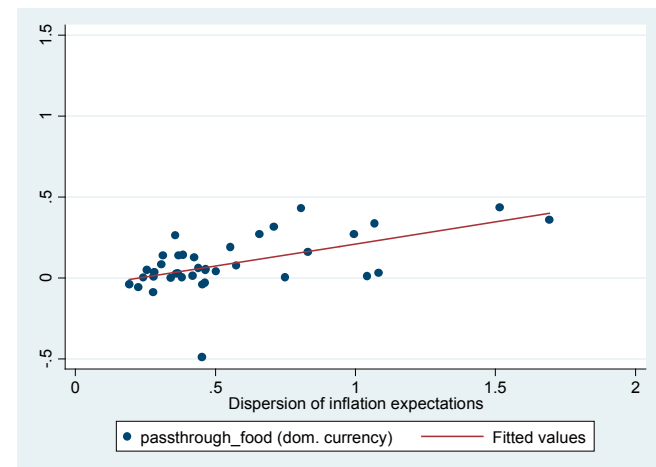
# Evidence from Phillips curves

- Size of pass-throughs correlated with CPI food weight, governance, and central bank autonomy
- Also some evidence that openness, dollarization, higher uncertainty about monetary policy are associated with higher pass-throughs
- No correlation with IT regime, debt, financial development, labor mkt flexibility, ER regime

Food Price Pass-through and Governance



Food Price Pass-through and Dispersion of Inflation Expectations



# Evidence from Phillips curves

- Panel estimates - allow for interaction with country characteristics in a richer, dynamic manner

$$\pi_{i,t} = \alpha_i + \sum_{j=1}^n \delta_{ij} \pi_{i,t-j} + \sum_{j=0}^m \phi_{ij} OutputGap_{i,t-j} + \sum_{j=0}^p \omega_{ij} RER\_dev_{i,t-j} + \sum_{j=0}^q \theta_{ij} \pi_{i,t-j}^{WorldFood} + \sum_{j=0}^q \gamma_{ij} \pi_{i,t-j}^{WorldFood} \cdot Country\_Char_{i,t-j} + \sum_{j=0}^s \vartheta_{ij} \pi_{i,t-j}^{WorldFuel} + \sum_{j=0}^s \lambda_j \pi_{i,t-j}^{WorldFuel} \cdot Country\_Char_{i,t-j} + \varepsilon_{i,t}$$

- Estimated with fixed effects, allowing for heteroskedasticity, serial correlation and cross-country dependence in the error terms

# Evidence from Phillips curves

## Panel Estimates

Variable	Effect
Fuel Intensity	++
Food Weight in CPI	++
High Inflation	+++
IT	-
CB Autonomy	n.s.
Governance	-
Net Importer Dummy	n.s.
Openness	n.s.
ER Stability	n.s.
Labor Market Flexibility	n.s.
Financial Development	n.s.
Public Debt	-
Dispersion of Expectations	n.s.



# Evidence from 2008 shock

- Pass-through estimations may suffer from problems, including measurement and specification difficulties in developing countries
- Problems less severe around big shock
- Dynamics may also be different for large shocks
- ➔ Also examine behavior around 2008

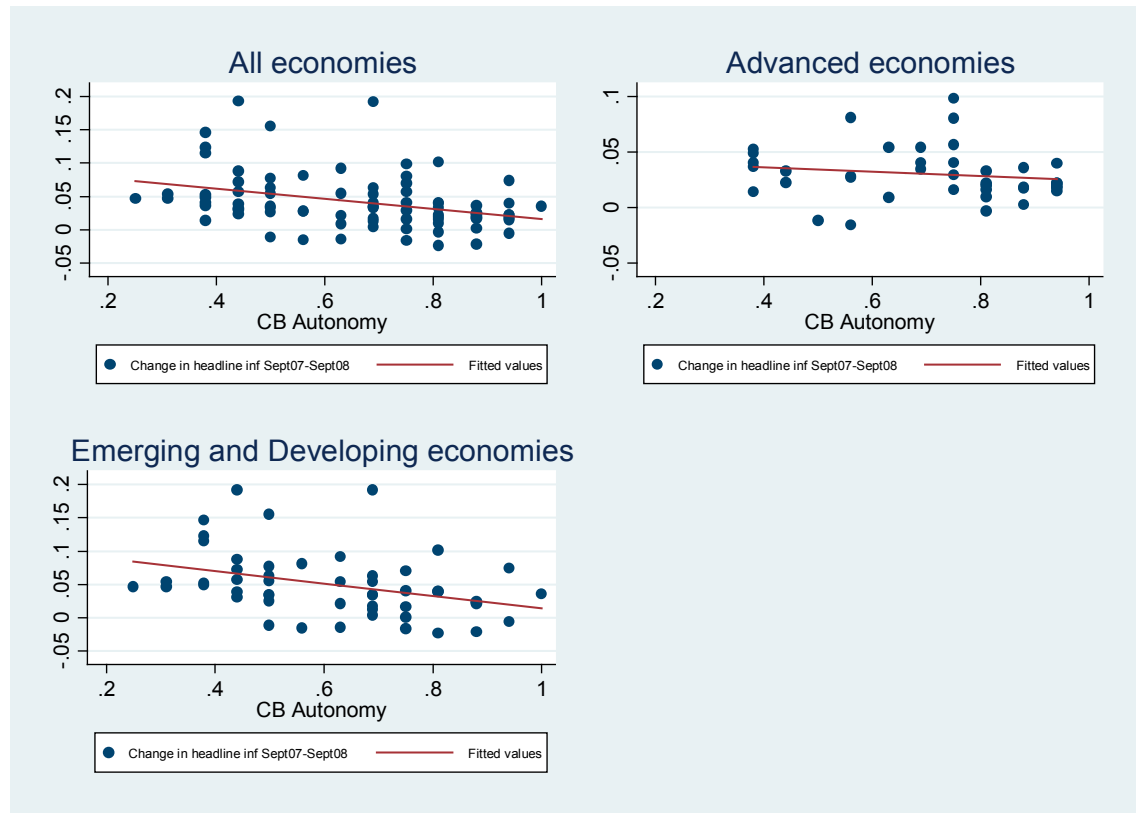
# Evidence from 2008 shock

Change in 12-month CPI headline inflation between Sept2007-Sept2008

	(1)	(2)	(3)	(4)	(5)
	<i>Including Policy Variables</i>				
Food Weight in CPI	0.0009 ** (0.001)	0.0007 * (0.000)			
Fuel Importer Dummy	-0.026 ** (0.012)	-0.02 * (0.011)			
IT Dummy	-0.012 (0.011)				
Lagged Inflation		0.5 *** (0.130)	0.39 *** (0.120)	0.31 ** (0.140)	0.36 *** (0.110)
CB Autonomy			-0.06 ** (0.030)	-0.04 (0.030)	-0.04 (0.023)
Energy Intensity			0.2 (0.150)	0.33 * (0.180)	0.21 (0.140)
ST Real Interest Rate			-0.002 ** (0.001)	-0.003 *** (0.001)	-0.003 ** (0.001)
2007 Fiscal Structural Balance				-0.003 * (0.002)	
Change in NEER					-0.18 *** (0.060)
Obs.	66	66	63	45	63
R-squared	0.21	0.35	0.42	0.55	0.51

# Evidence from 2008 shock

- Countries with more autonomous central banks => weaker increase in inflation.
- No statistically significant difference between performance of IT versus non-IT economies.



# Evidence from 2008 shock

Change in 12-month CPI core inflation between Sept2007-Sept2008

	(1)	(2)	(3)	(4)	(5)
				<i>Including Policy Variables</i>	
Food Weight in CPI	0.0009 ** (0.0003)	0.0004 (0.0003)			0.0009 *** (0.0002)
Fuel Importer Dummy	0.005 (0.010)	0.012 (0.010)			
IT Dummy	-0.004 (0.010)				
Lagged CPI Inflation		0.44 *** (0.13)		0.55 *** (0.15)	0.22 ** (0.10)
CB Autonomy		-0.07 *** (0.02)	-0.06 ** (0.02)	-0.07 ** (0.03)	
Energy Intensity			0.225 (0.16)	0.183 (0.18)	
Governance			-0.01 ** (0.004)		
ST Real Interest Rate				-0.001 (0.001)	
Fiscal Structural Balance				-0.001 (0.001)	
Change in NEER					-0.19 *** (0.033)
Obs.	48	47	54	31	48
R2	0.17	0.38	0.51	0.60	0.60

# Conclusions

Countries with certain structural characteristics are more prone to sustained inflationary effects from commodity price shocks:

- Food weight in CPI, oil intensity of the economy
- To a lesser extent - net importer or not of fuel

# Conclusion

But: countries can influence degree to which domestic inflation reacts to international commodity price movements by:

- Improving overall governance, enhancing central bank autonomy
- To a lesser extent - adopting IT framework.  
*But more overall confidence in governance/quality of bureaucracy seems to matter more than whether you call yourself an inflation targeter.*

# Conclusion

Policy actions also matter:

- Around 2008 commodity shock, tighter monetary policy helped contain inflationary impact
- To a lesser degree, this is true for tighter fiscal policy

# Conclusion

- If inflation is already relatively high to begin with, commodity price shocks have a substantially higher pass-through to domestic inflation
- More to do: examine asymmetries, expectation formation around shocks, micro evidence.





Thank You.