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Global inflation

We know it's out there but what exactly is it?

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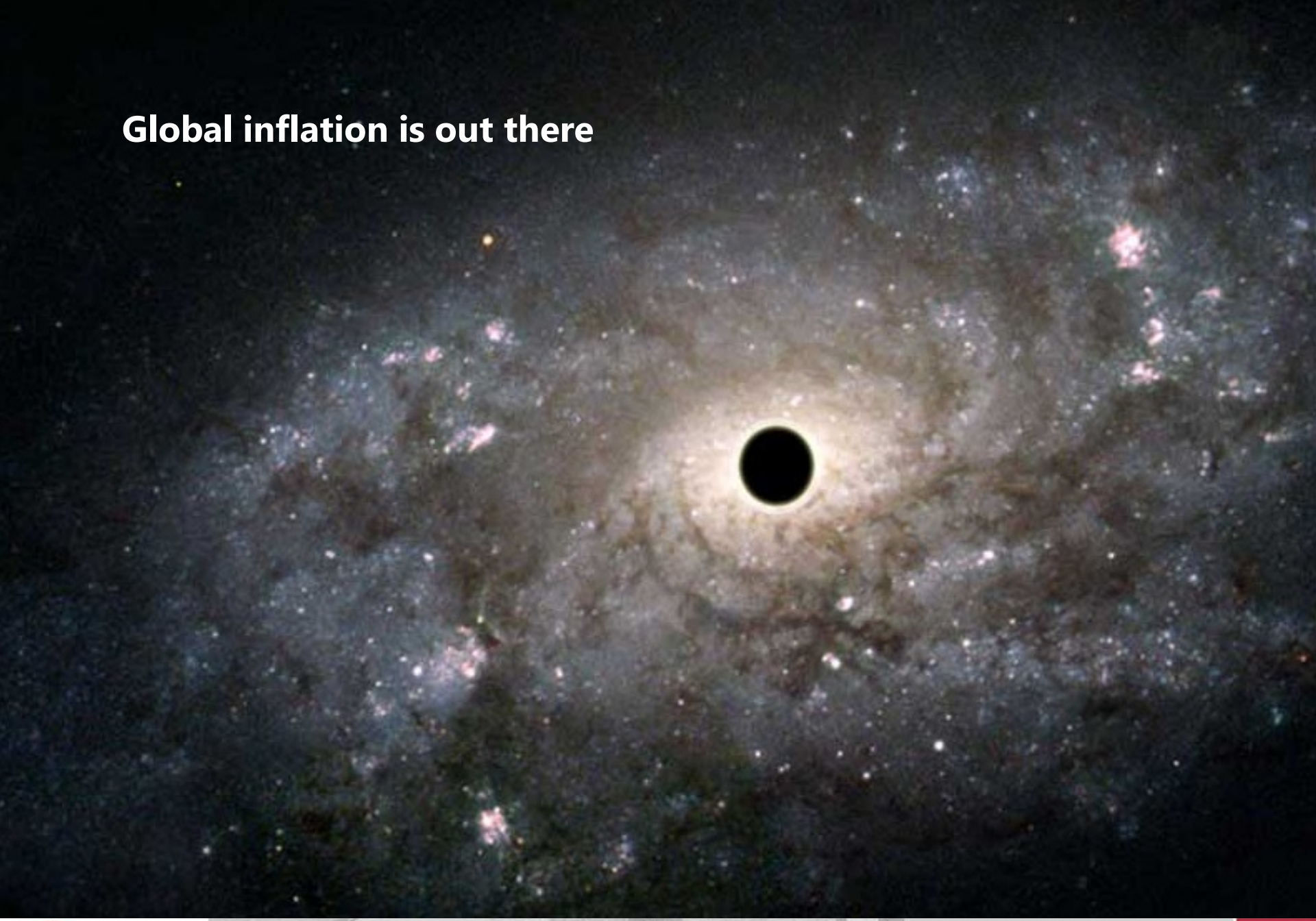
Global inflation is out there



Introduction

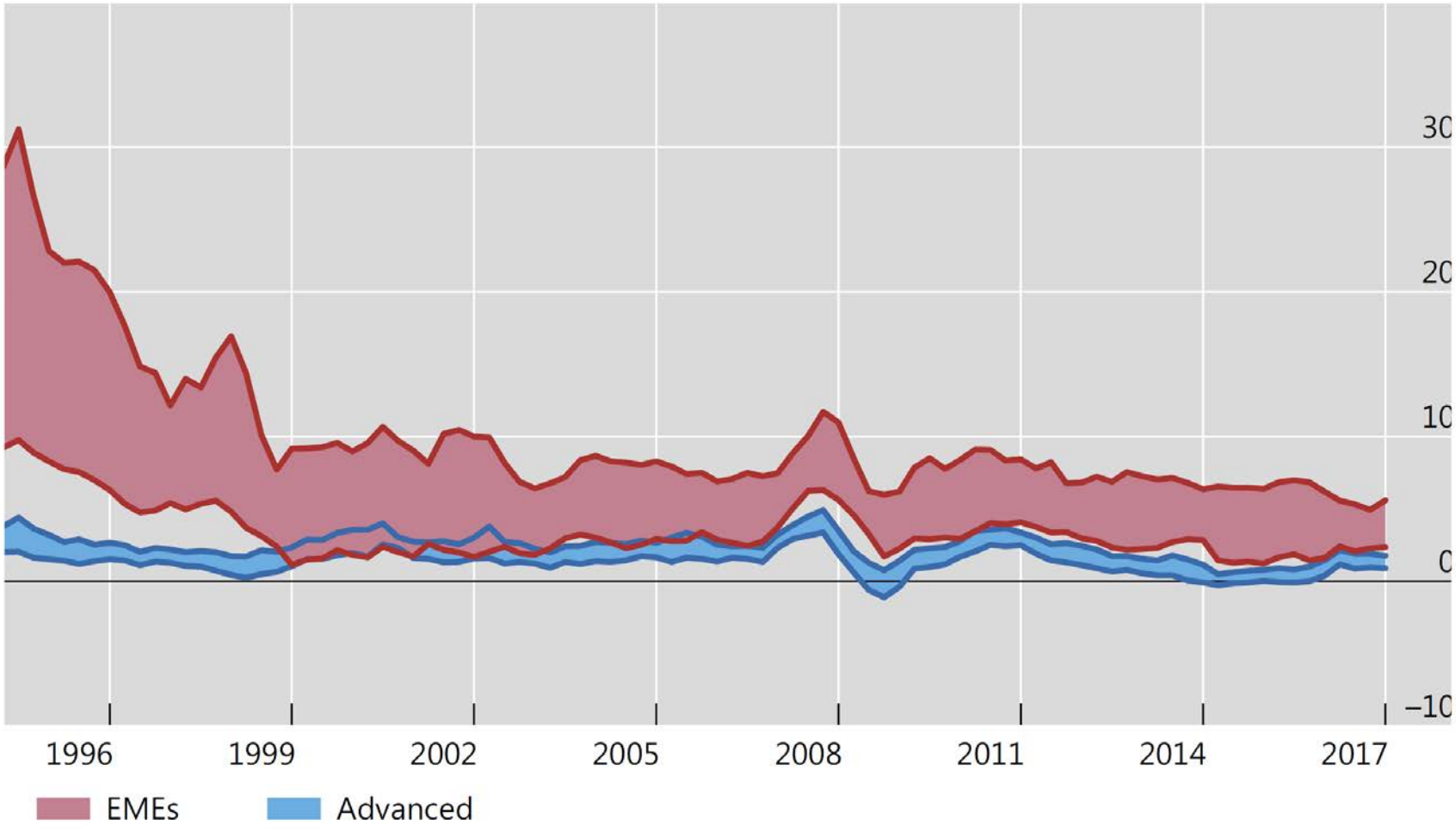
Global inflation is like a black hole in space. We know it is out there, but we are unable to observe it directly. Ciccarelli and Mojon (2010) define global inflation as the first principal component extracted from the domestic inflation rates of a large group of countries. They find that, in the face of shocks, a "robust error-correction mechanism" brings domestic inflation rates back to some long-term global level, very much like a black hole exerting its pull on stars nearby.

Introduction

To get a better sense of the theory, we consider a wider range of experience by adding emerging markets to our sample and distinguishing between the pre-crisis and post-crisis periods.

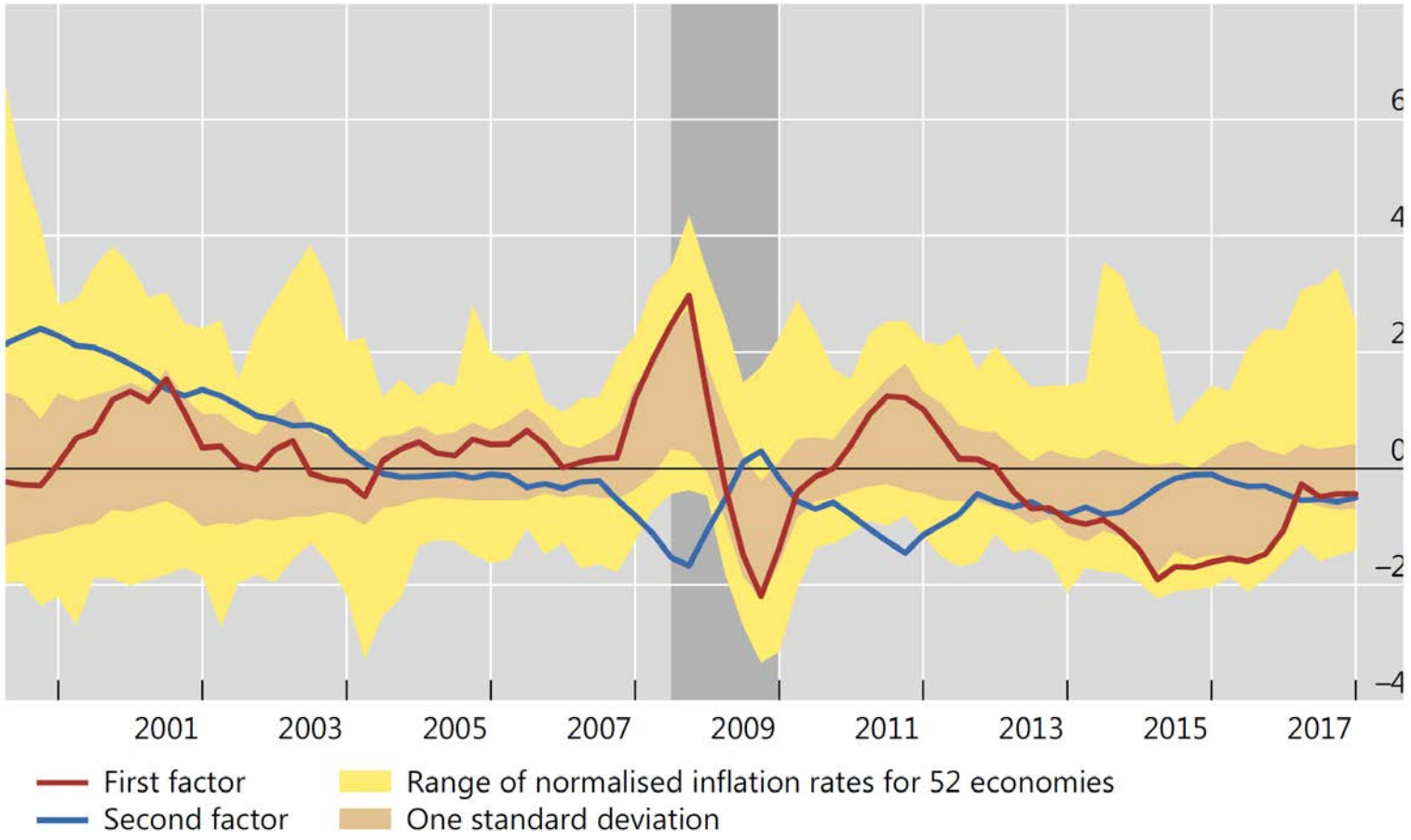
The evidence comes from a panel of domestic inflation rates

Quarterly CPI inflation rates interquartile ranges for 24 advanced economies and 28 EMEs



We also consider the possibility of an important 2nd factor

First two principal components of CPI inflation rates of 52 economies in pre-crisis and post-crisis periods



The shared components can explain a lot

Fraction of variance explained by two shared components		
	Pre-crisis	**Post-crisis**
Full sample *(52 countries)*		
First factor	31.5%	47.1%
Second factor	19.4%	14.0%
Advanced economies *(24 countries)*		
First factor	40.6%	61.2%
Second factor	21.0%	6.7%
Emerging markets *(28 countries)*		
First factor	27.4%	28.6%
Second factor	17.8%	21.6%

The shared components can explain a lot

- In our full sample, we find that the share explained by the first principal component has increased after the GFC, while the share explained by the second factor has decreased
- We observe, however, intriguing differences between advanced and emerging markets
- The increase in the share explained by the first principal component is mainly true for the advanced economies
- For emerging markets, this share has been roughly constant, while the importance of the second factor increased.
- Next, we investigate whether our principal components help forecasting individual country inflation rates

They seem to pull inflation rates towards themselves

The two shared components can help improve inflation forecasts

	Pre-crisis		Post-crisis	
Economy	**One quarter ahead**	**4 quarters ahead**	**One quarter ahead**	**4 quarters ahead**
Australia	Yes	Yes	Yes	Yes
China	Yes	Yes	Yes	Yes
Indonesia	Yes	Yes	No	Yes
Japan	Yes	Yes	No	No
Korea	No	No	Yes	Yes
Malaysia	Yes	Yes	No	Yes
New Zealand	No	Yes	Yes	Yes
Philippines	Yes	Yes	Yes	Yes
Thailand	Yes	Yes	Yes	Yes

- Light green indicates 1st factor improves inflation forecasts, dark green indicates cases where 2nd factor also helps
- Before the crisis, in 49 out of 52 cases, the first factor would have helped with 4-step ahead forecasts; in 31 cases the 2nd factor would have also helped with those forecasts
- After the crisis, in 50 out of 52 cases, the first factor would help with those forecasts; in 30 cases the 2nd factor would also help.

What's behind those shared components?

Theory

- Global inflation arises from the interaction between global economic shocks and monetary policy responses
- A commonality in policy reactions would induce comovement in inflation rates

Consider candidate cyclical global economic factors

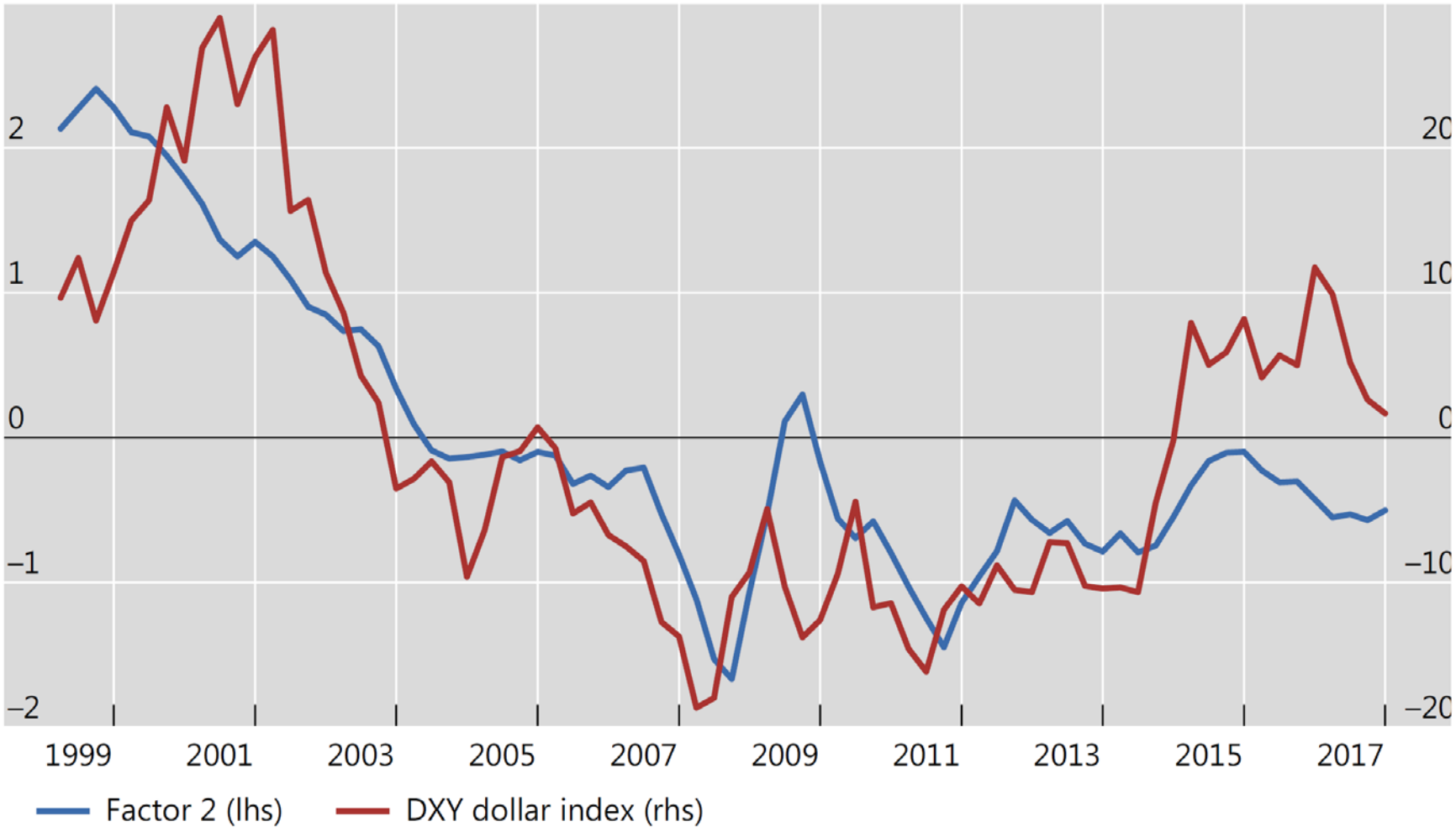
- Commodity prices (eg, Forbes 2018)
- Output gap (eg, Borio and Filardo 2007)
- US dollar
- Combinations of above

Identification strategy: analyze how loadings vary across countries

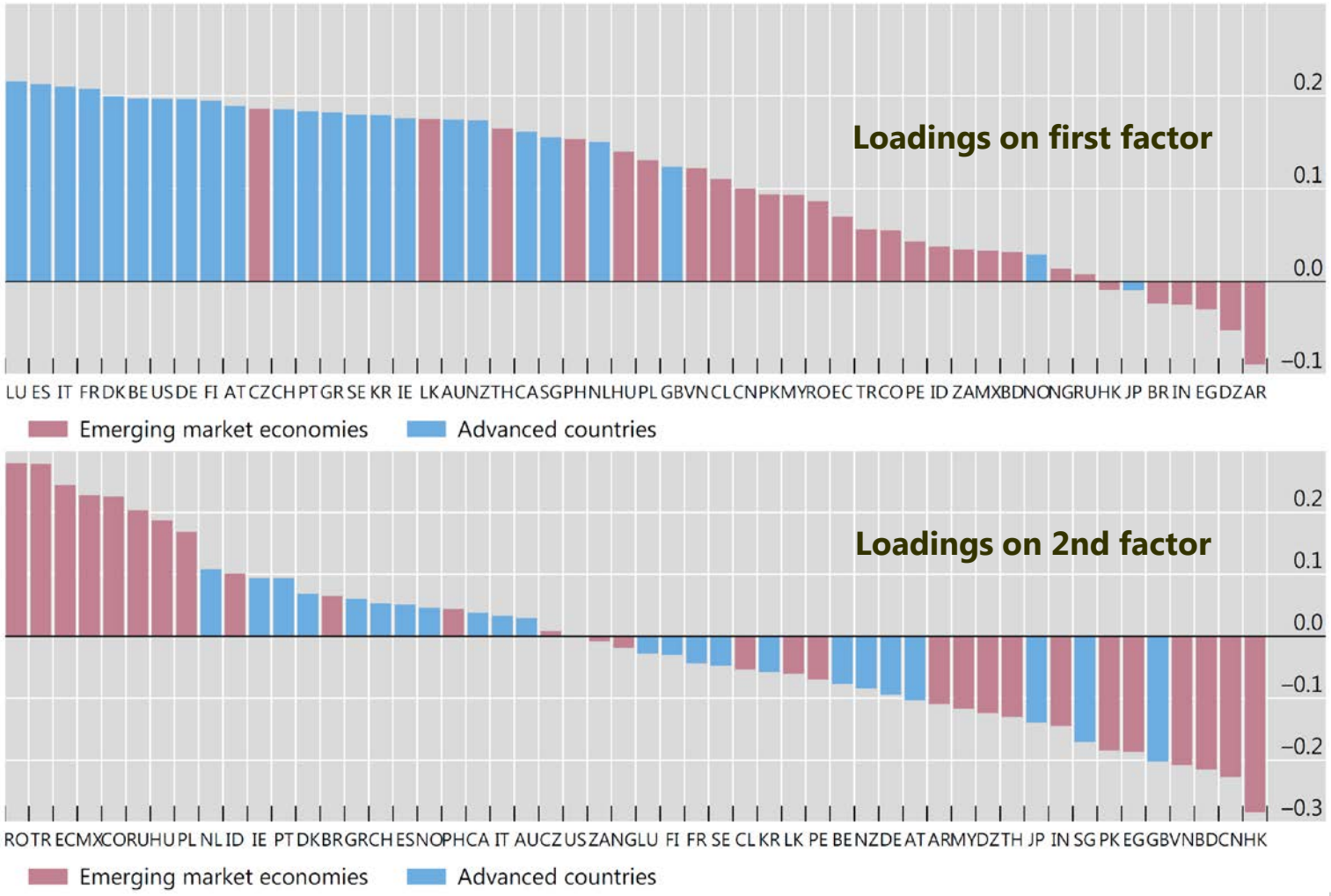
- How do they vary with economic structures?
- How do they vary with elements of monetary frameworks (Clarida 2012)?

The strong tendency behaves a lot like commodity prices

The weak tendency behaves a lot like the US dollar



How does the pull of each factor vary across countries?



How do loadings vary across countries?

- We perform a cross-section analysis of the loadings by regressing them on measures of "fundamentals"
- Indicators of exposure
  - Sensitivity to global output, measured as the loading of each country on the first principal component extracted from 52 GDP data
  - Measures of openness (total, financial, with China)
  - Participation to Global Value Chains
- Indicators of monetary policy frameworks (Jackson Hole consensus)
  - Central bank independence, IT regime, exchange rate regime etc

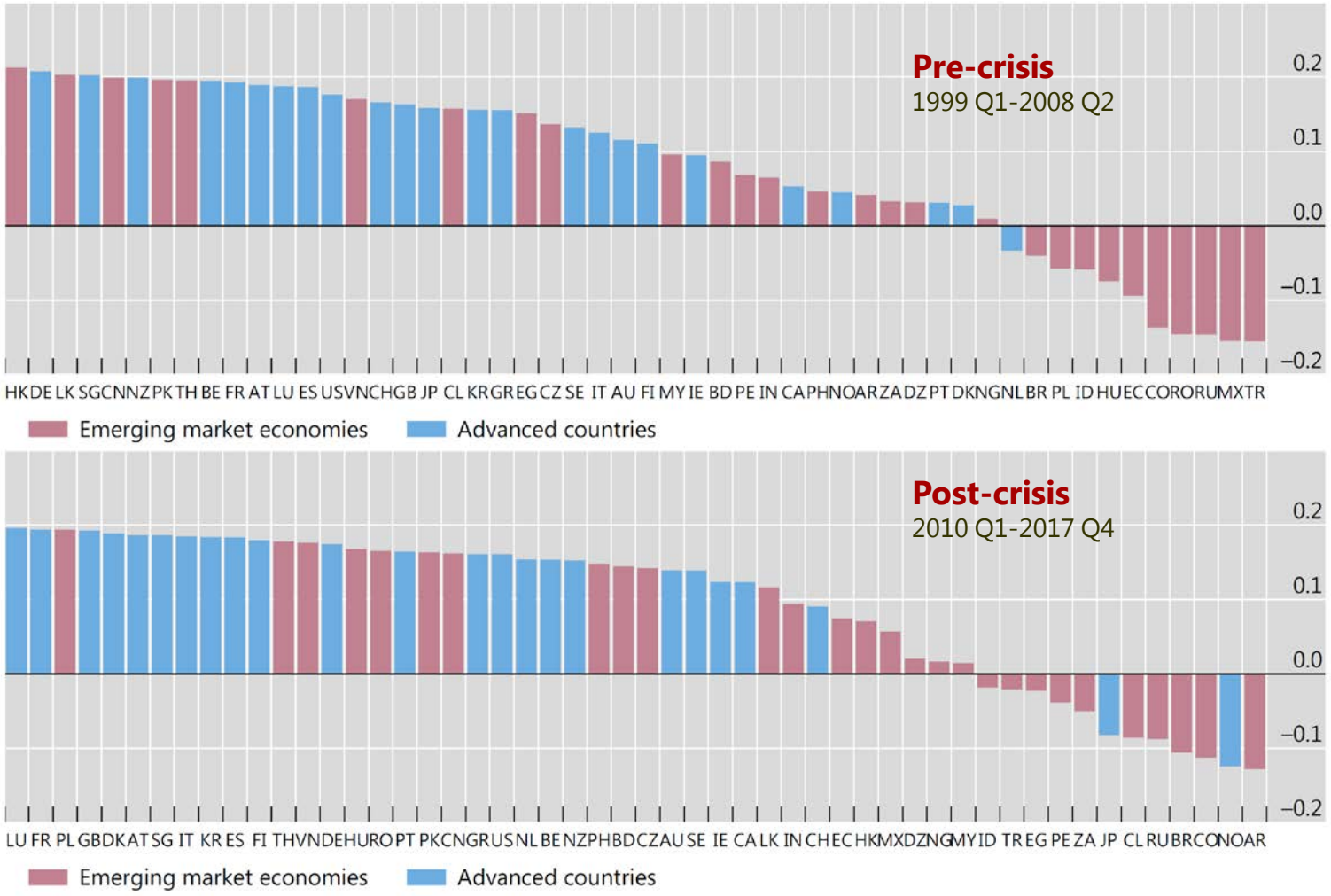
Bivariate regression results

Regression of loadings on country-specific factors, 1999-2017

	1st factor		2nd factor	
	Coefficient	P-val	Coefficient	P-val
Loading on global GDP	0.6778***	0.00	0.0371	0.92
Trade openness	0.0002	0.38	0.0007*	0.05
Net exports	-0.0009	0.55	0.0018	0.47
Participation in GVC	0.0039***	0.00	0.0007	0.76
Trade with China	-0.0007	0.23	0.0024**	0.01
Volatility of terms of trade	-0.0095***	0.00	-0.0026	0.55
Institutional quality	0.0109***	0.00	0.0020	0.63
Financial openness	0.0007	0.15	0.0002	0.81
CB independence	0.1001**	0.04	-0.1461*	0.07
Inflation targetting	0.0693***	0.01	-0.1074**	0.01
Exchange rate regime	-0.0244*	0.06	-0.0140	0.52
Euro area dummy	0.1063***	0.00	-0.0201	0.67
Use of macro pru tools	-0.0012	0.77	0.0141**	0.04
Inflation volatility	-0.0064***	0.00	-0.0123***	0.00
Average inflation	-0.0107***	0.00	-0.0126***	0.01
Log (per capita real GDP)	0.0485***	0.00	-0.0167	0.44
Emerging markets dummy	-0.1081***	0.00	-0.0124	0.75

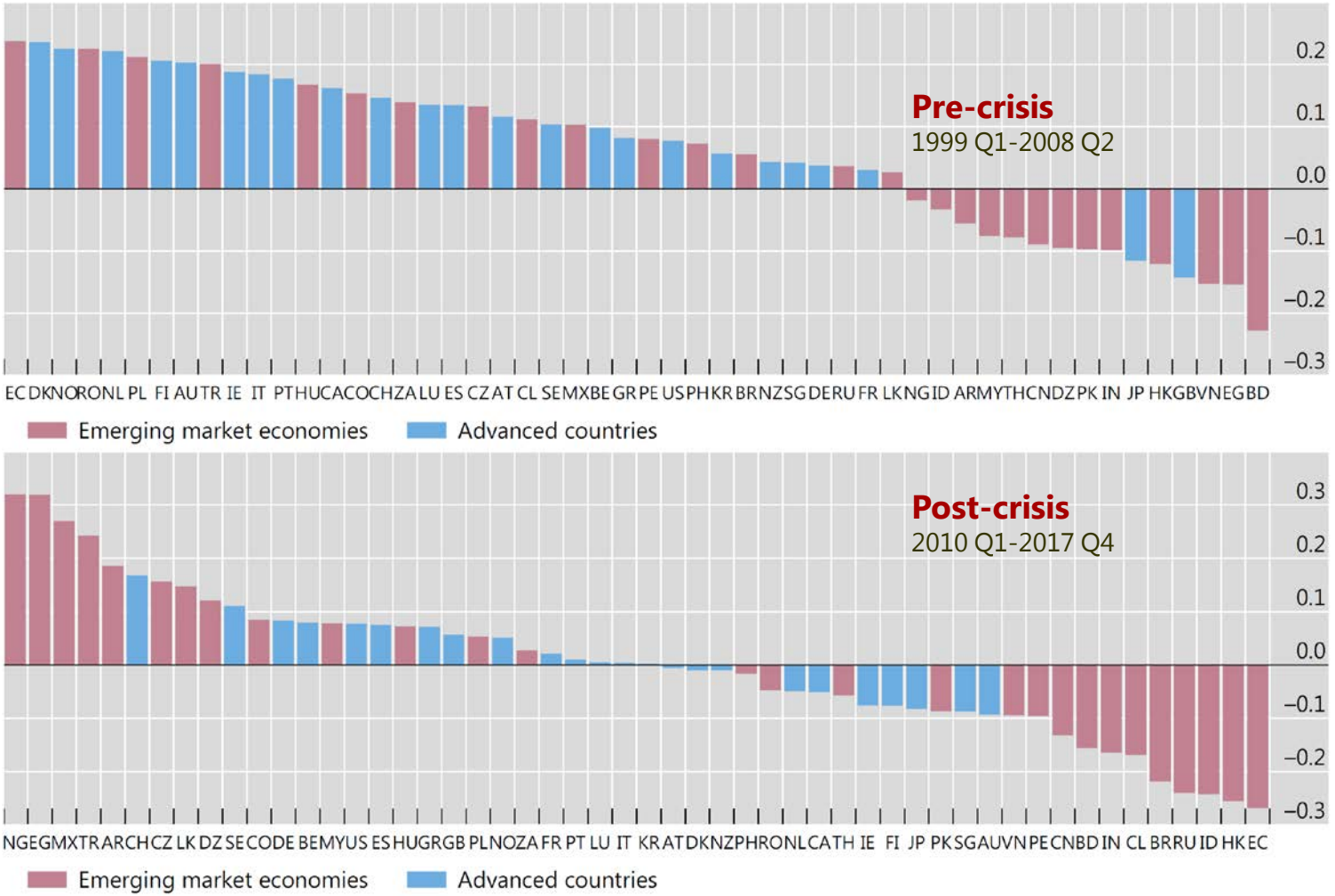
How does the pull of the 1st factor vary across countries?

Loadings on the first factor, pre-crisis and post-crisis periods



How does the pull of the 2nd factor vary across countries?

Loadings on the second factor, pre-crisis and post-crisis periods



Bivariate regression results (pre-crisis)

	1st factor		2nd factor	
	Coefficient	P-val	Coefficient	P-val
Loading on global GDP	0.2256	0.26	-0.1044	0.64
Trade openness	0.0005 *	0.07	0.0002	0.60
Net exports	0.0002	0.92	0.0013	0.50
Participation in GVC	0.0020	0.31	-0.0020	0.29
Trade with China	0.0014	0.12	0.0018 *	0.08
Volatility of terms of trade	-0.0072 **	0.04	0.0019	0.62
Institutional quality	0.0100 ***	0.00	-0.0106 ***	0.00
Financial openness	0.0008	0.24	-0.0005	0.50
CB independence	-0.0144	0.84	-0.1496 **	0.02
Inflation targeting	0.0038	0.91	-0.1419 ***	0.00
Exchange rate regime	-0.0313 *	0.06	0.0003	0.99
Euro area member dummy	0.0711 *	0.05	-0.0919 **	0.02
Use of macro pru	0.0117	0.34	0.0147	0.20
Inflation volatility	-0.0103 ***	0.00	-0.0019	0.49
Average inflation	-0.0125 ***	0.00	-0.0032	0.28
Log (per capita real GDP)	0.0317 **	0.05	-0.0615 ***	0.00
Emerging markets dummy	-0.0979 ***	0.00	0.0868 **	0.01

Bivariate regression results (post-crisis)

	1st factor		2nd factor	
	Coefficient	P-val	Coefficient	P-val
Loading on global GDP	0.3537***	0.00	0.0937	0.55
Trade openness	0.0004*	0.08	0.0005	0.19
Net exports	-0.0004	0.82	0.0028	0.28
Participation in GVC	0.0047***	0.01	-0.0003	0.89
Trade with China	-0.00001	0.99	0.0018**	0.03
Volatility of terms of trade	-0.0124***	0.00	0.0005	0.91
Institutional quality	0.0085***	0.00	-0.0007	0.86
Financial openness	0.0007	0.25	0.0001	0.94
CB independence	0.0719	0.30	-0.0553	0.49
Inflation targetting	-0.0022	0.94	-0.0063	0.88
Exchange rate regime	-0.0420***	0.00	-0.0132	0.52
Euro area member dummy	0.1017***	0.00	-0.0127	0.79
Use of macro pru	0.0050	0.66	0.0187	0.14
Inflation volatility	-0.0186*	0.05	-0.0166	0.20
Average inflation	-0.0155***	0.00	-0.0086	0.14
Log (per capita real GDP)	0.0293	0.10	-0.0138	0.44
Emerging markets dummy	-0.0907***	0.00	0.0173	0.75

Conclusions

- Global inflation has two components that significantly affect individual country inflation experiences
- The strong tendency in global inflation is highly correlated with commodity prices.
- The weak tendency seems to be related to US dollar
- Individual countries' sensitivity to global inflation is correlated with fundamentals both in terms of openness and monetary policy frameworks

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