The Macroeconomic Impact of Commodity Prices

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Motivation

- Energy and food prices boosted inflationary pressures worldwide last year
- As CBs reacted by hiking rates, growth also slowed to varying degrees
- Renewed debate on macroeconomic impact of commodity price changes
- We revisit this issue, focusing on advanced vis-à-vis emerging economies

Research questions

- Do increasing global food/fuel prices impact domestic headline inflation and growth?
- Are the effects heterogenous between advanced and emerging economies?
- Are the effects asymmetric?
- Do inflation-targeting and/or central bank independence shield economies from the macroeconomic impact of commodity price shocks?
- Main objective of the paper: Provide updated empirical evidence on these questions.

Literature

- **Chen (*Energy Economics*, 2009)** investigates oil price pass-through into inflation across 19 industrialized countries. Findings: ER appreciation, active monetary policy in response to inflation, higher degree of trade openness explain the decline in oil price pass-through.

- **Gelos and Ustyugova (*Journal of International Money and Finance*, 2017)** study the impact of commodity price shocks on inflation. Findings: higher food shares in CPI, fuel intensities, and pre-existing inflation boost inflationary effects. Higher CBI and better governance help reduce the impact. Inflation targeting plays modest role, at best.

- **Choi et al. (*Journal of International Money and Finance*, 2018)** analyze impact of fluctuations in global oil prices on domestic inflation. Findings: 10% increase in global oil inflation boosts domestic inflation by 0.4 pps on impact. Effect is asymmetric: positive shocks have larger effects.

Key Findings

- Passthrough to inflation: larger for global food prices than for fuel prices.
- Food price shocks have stronger and more diverse effects on inflation in emerging economies than in advanced economies.
- Impact of global commodity prices on inflation and growth is asymmetric. Contrary to Choi et al. (2018), we find that negative shocks generate stronger response than positive ones.
- Economies adopting IT tend to have a lower inflationary impact from global food price shocks, but also a larger decline in output.
- Macroeconomic impact measured by the Hanke misery index is varied.

Methodology

- Panel vector autoregression (PVAR) model:

$$Y_{i,t} = \mu_i + \Theta(L)Y_{i,t} + \Phi_i X_{i,t} + u_i + \varepsilon_{i,t}$$

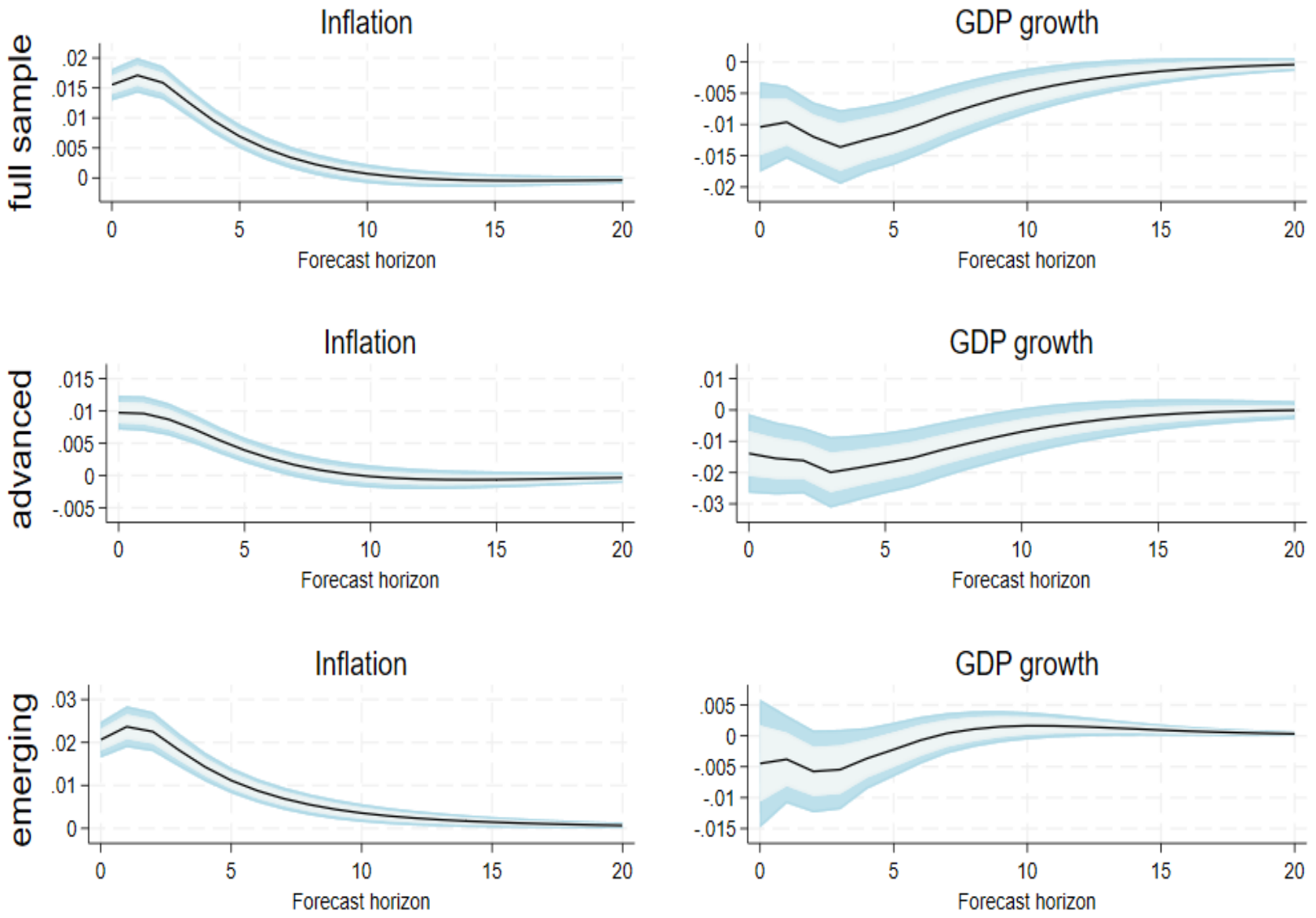
- Unbalanced panel of 96 economies (32 advanced, 64 emerging), quarterly data from 1990-2021 from various sources.

- Domestic inflation and GDP growth as endogenous variables.

- Global food and fuel price inflation as exogenous variables.

Baseline results: Global Food Inflation Shock

$\pi^{eme} > \pi^{ad}$



$GDP^{eme} < GDP^{ad}$

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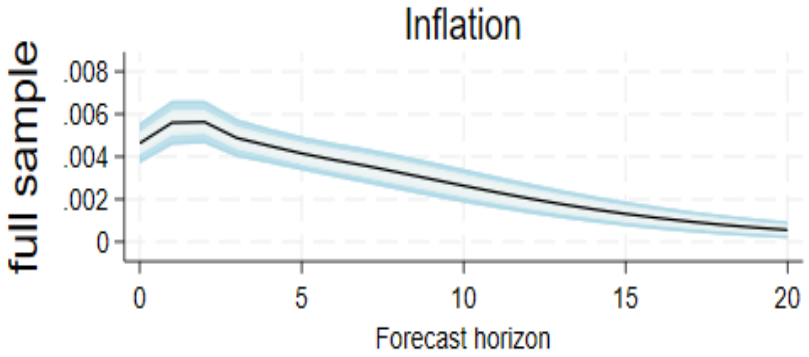

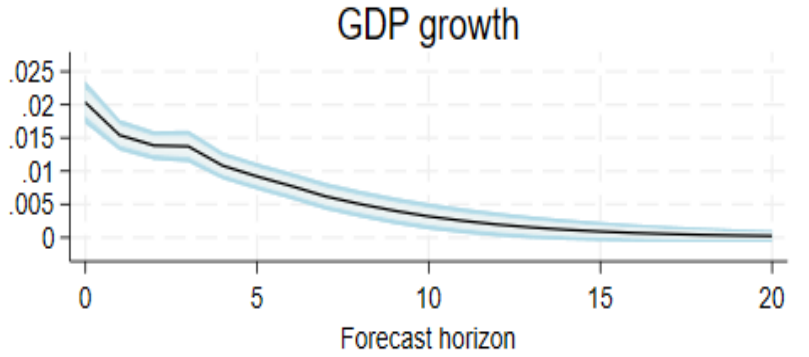

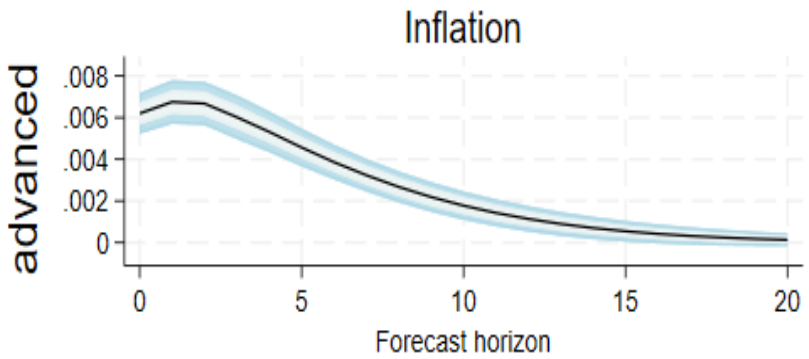

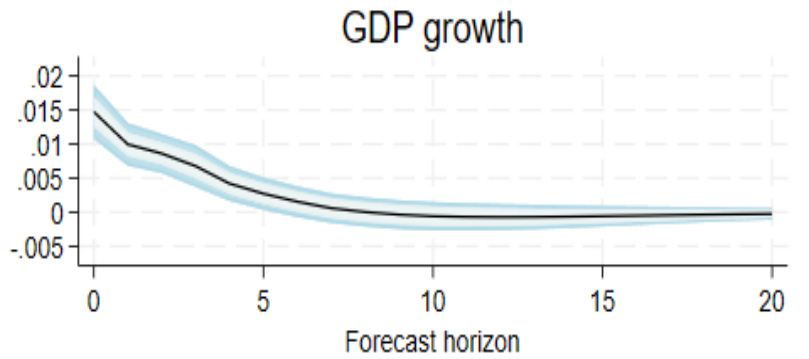

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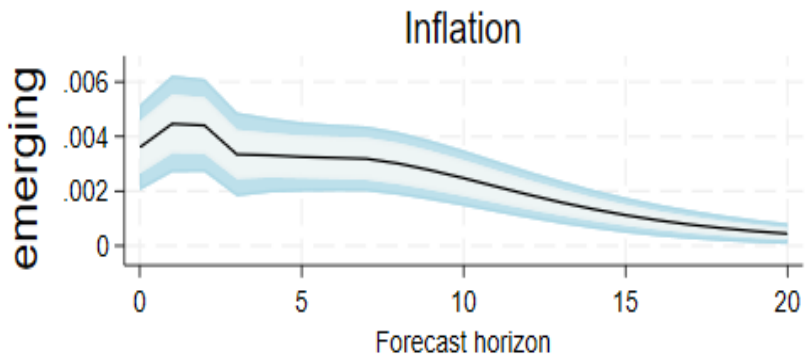
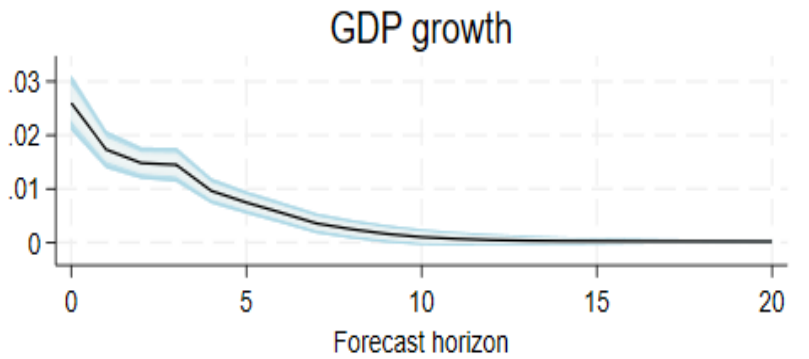




Asymmetric Effects

$$\pi_t^{c,pos} = \begin{cases} \pi_t^c, & if\ \ \pi_t^c \geq 0 \\ 0, & otherwise \end{cases} \tag{2}$$

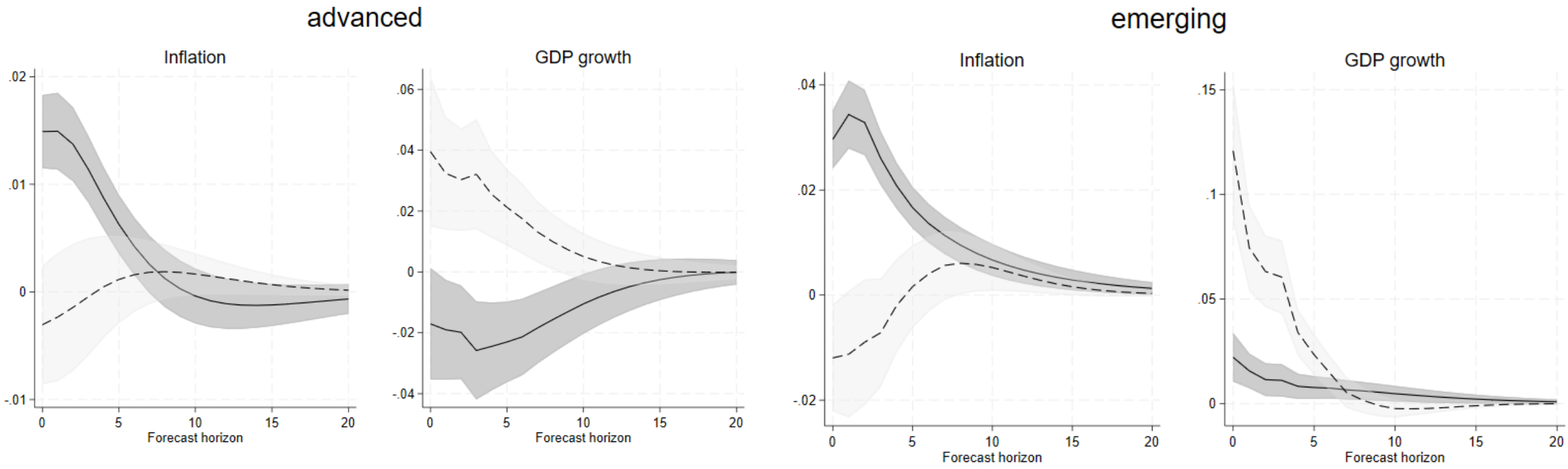
$$\pi_t^{c,neg} = \begin{cases} \pi_t^c, & if\ \ \pi_t^c < 0 \\ 0, & otherwise \end{cases} \tag{3}$$

with $\pi_t^c \in \{\pi_t^{food}, \pi_t^{fuel}\}$.

- Key finding: Negative shocks exert larger effects on inflation and GDP growth, except for the inflationary impact of food price shocks.

Global Food Price Shock: Asymmetric Effects

Solid line: Positive Shocks
Dash line: Negative Shocks



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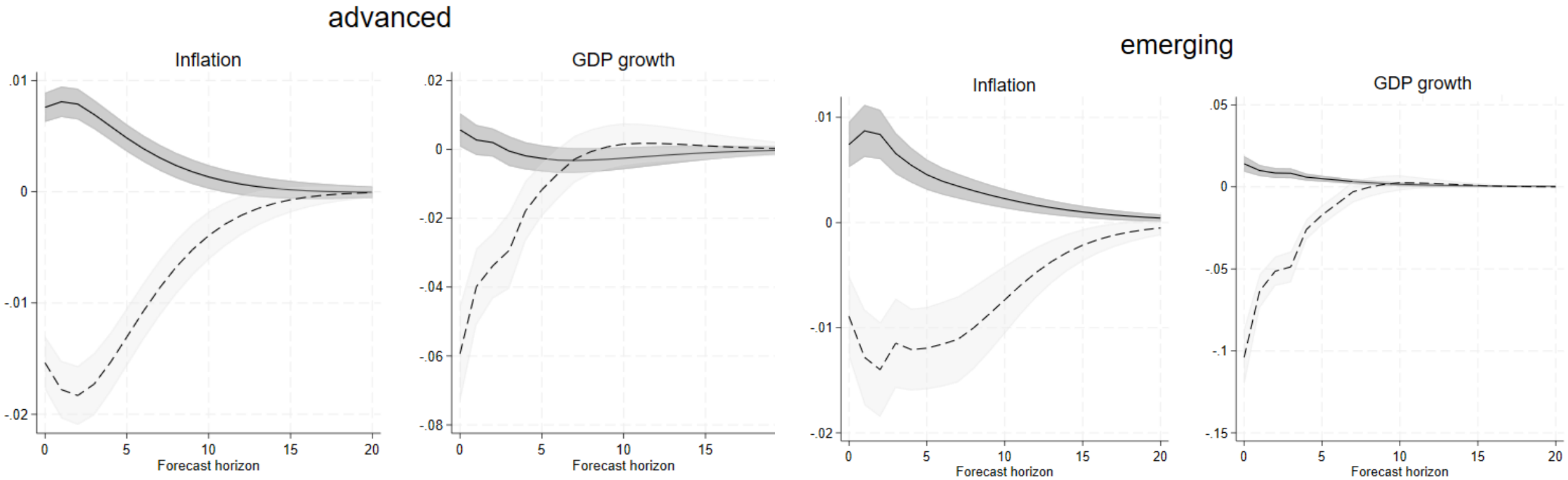
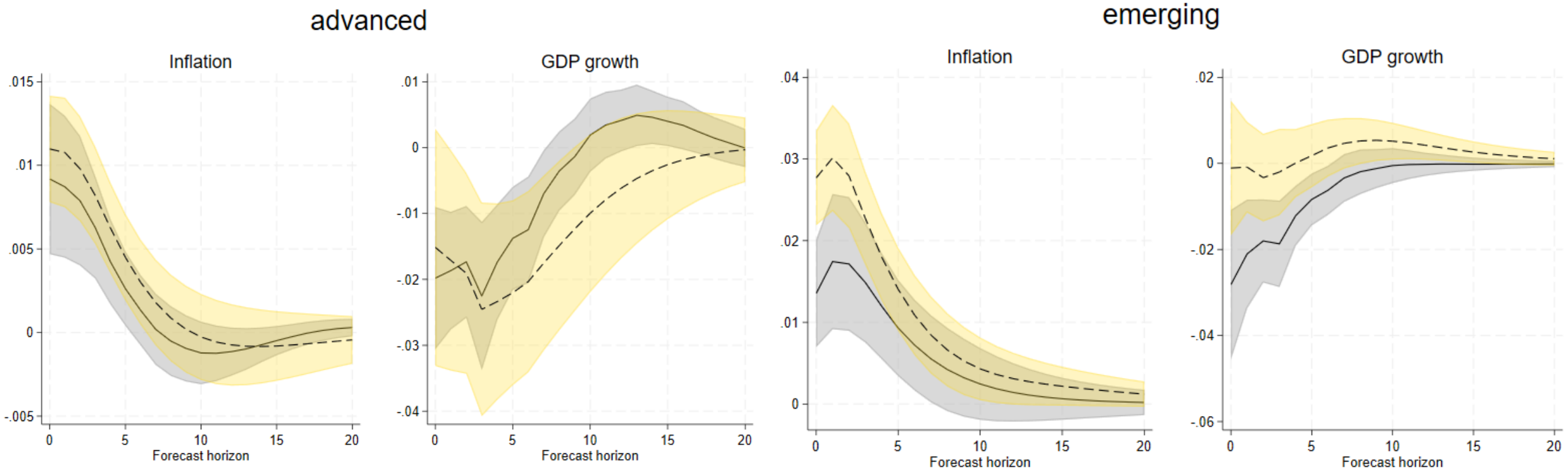


Role of Monetary Policy Framework

- Inflation targeting lowers food (and fuel) price pass-through to inflation, particularly in emerging economies…
- …but decline in GDP growth is also larger
- Results for central bank independence are mixed
  - No significant impact on the response of GDP growth to commodity shocks.
  - Reduces effect of fuel price shocks on inflation, but also marginally *increases* the effects of food price shocks.

Global Food Price Shock: Role of Inflation Targeting

Solid line: IT regime
Dash line: Non-IT regime



Global Fuel Price Shock: Role of Inflation Targeting

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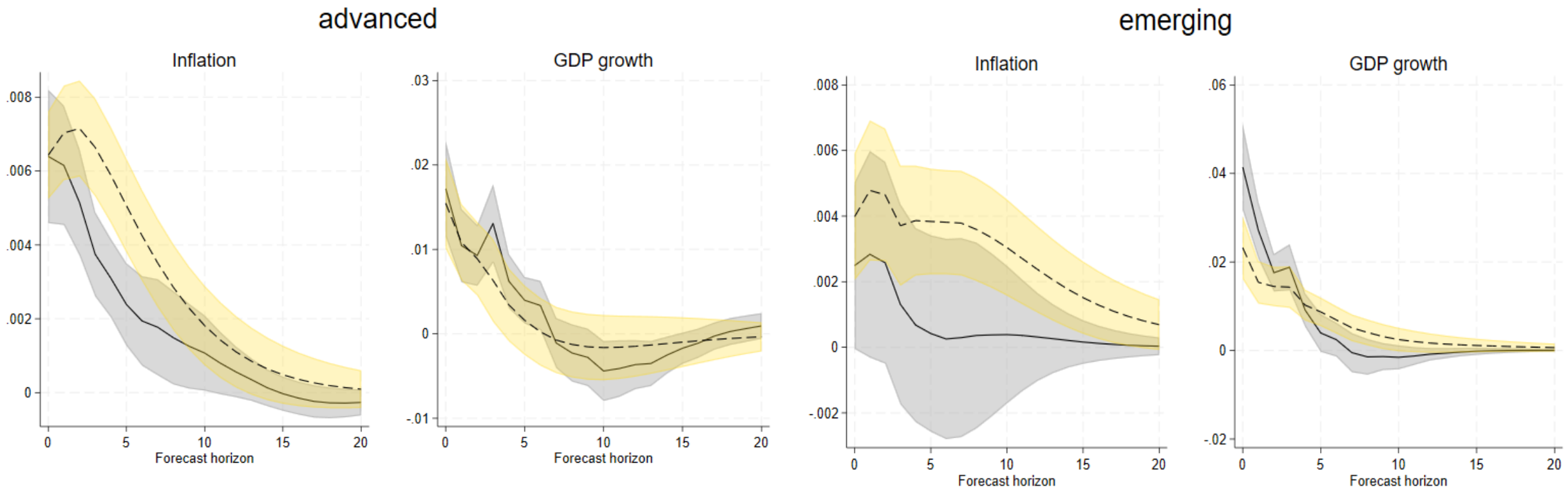
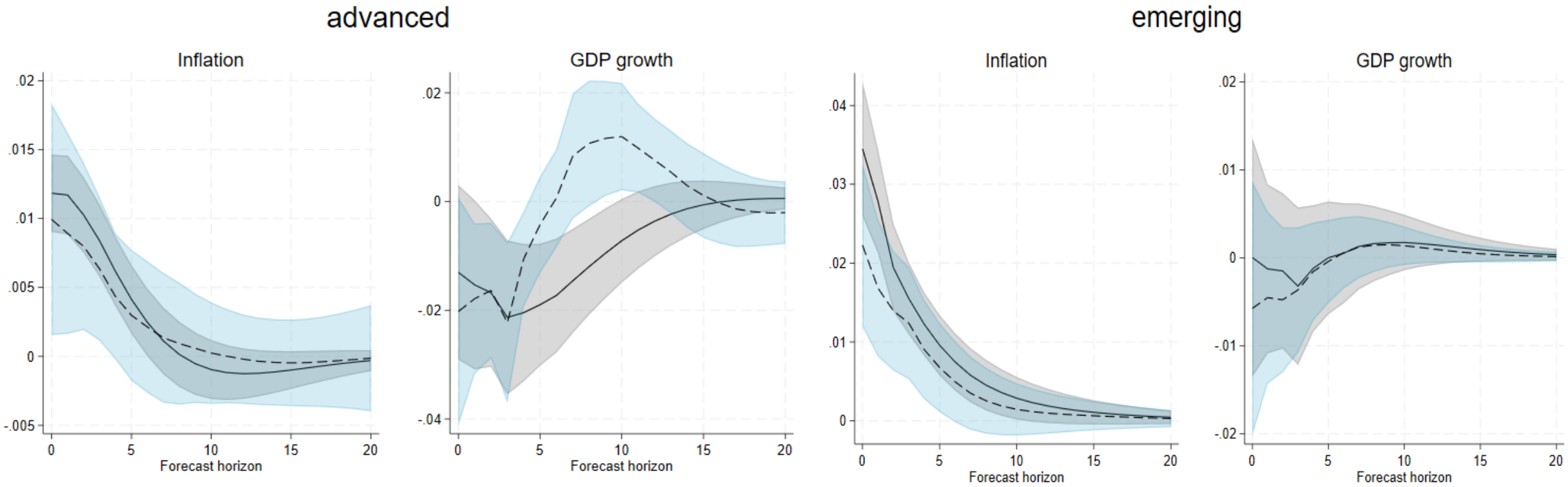


Global Food Price Shock: Role of CBI

Solid line: high CBI
Dash line: low CBI



Global Fuel Price Shock: Role of CBI

Solid line: high CBI
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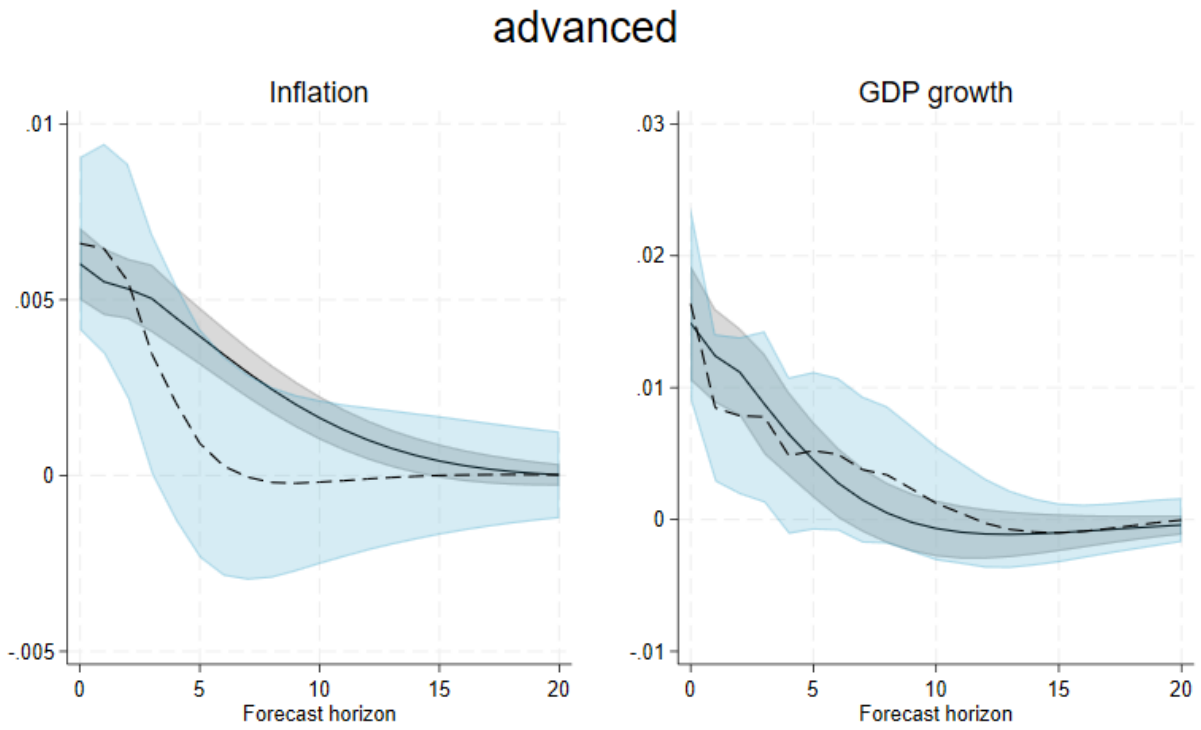
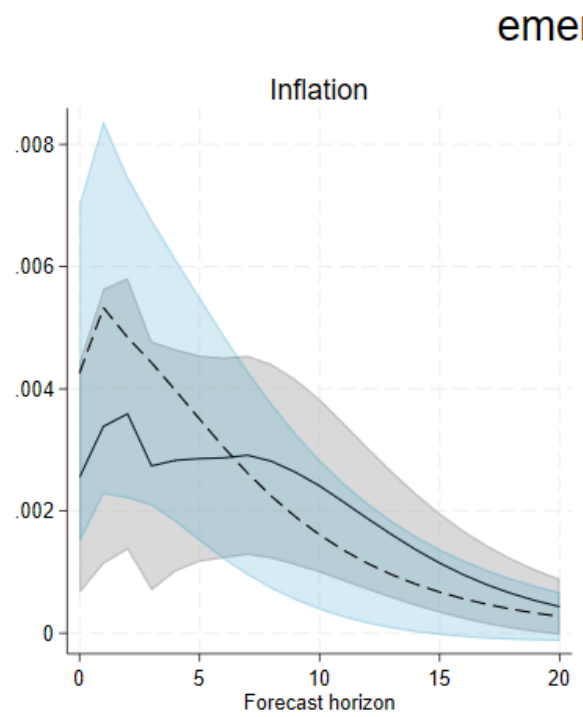
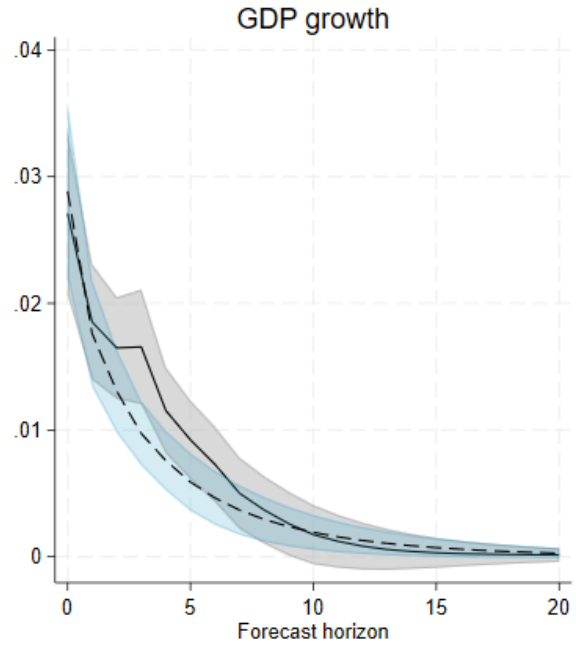






Misery index

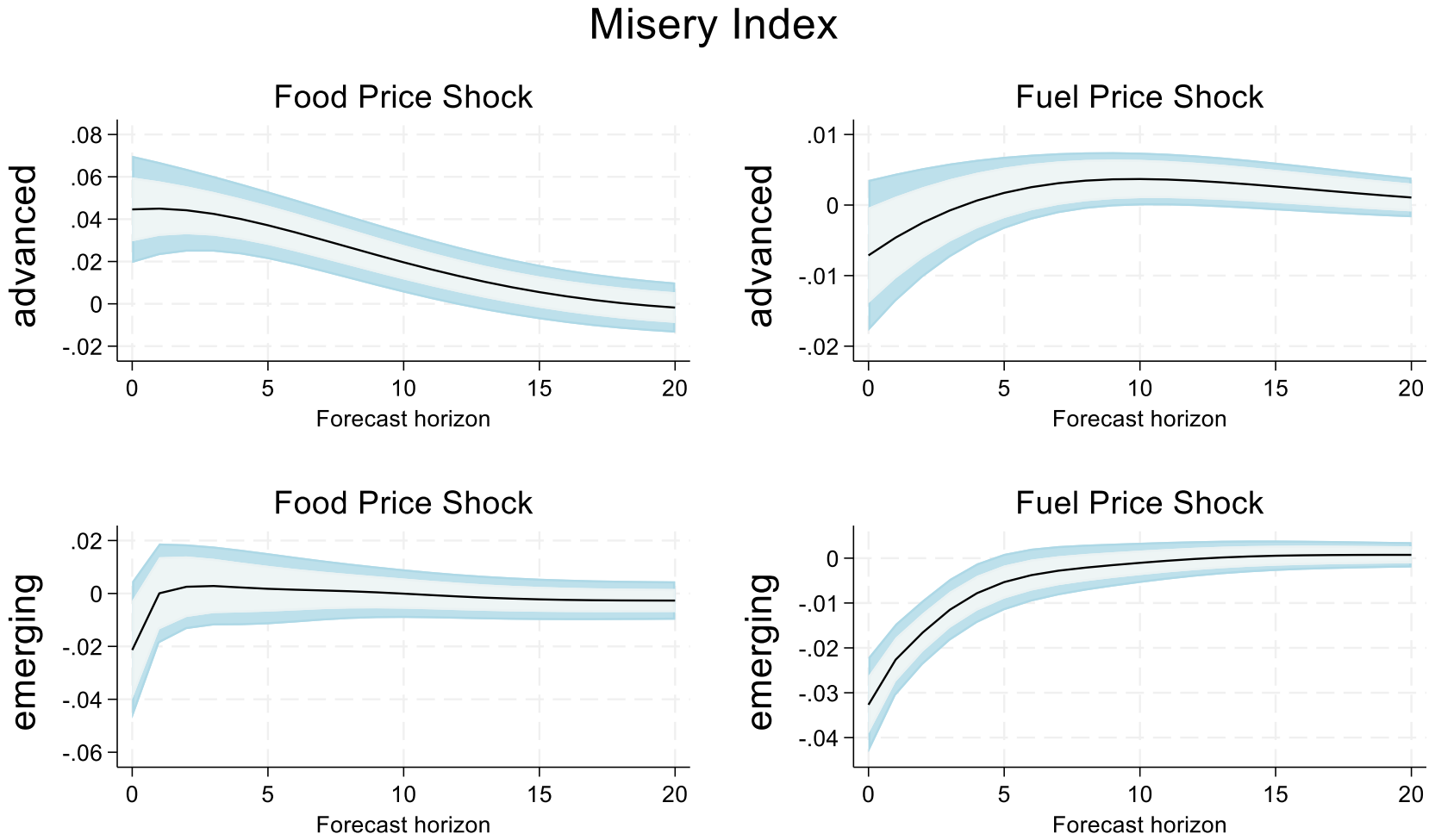
- Originally proposed by Okun as measure of economic health of a nation.
  - Sum of unemployment and inflation rates.
  - The higher the index, the greater the ‘misery’ felt by average citizens.

- To proxy macro performance with a single index, we use version modified by **Hanke (HMI).**
  - Sum of lending rates, inflation, and unemployment rates, minus the year-over-year percent change in per-capita GDP growth.
  - More comprehensive than just looking at inflation and GDP growth
  - Allows for overall assessment taking account of possibly opposite effects on its components

Misery index

Response of Inflation

Response of GDP growth



Conclusions

The macroeconomic effects of global food and fuel price shocks:

- Positive short-run relation between commodity prices and CPI inflation.
- Global food (fuel) prices are negatively (positively) associated with GDP growth.
- Inflationary effects of food (fuel) prices larger (smaller), stronger in emerging economies.
- Asymmetries: Size of response to positive/negative shocks differs substantially.
- IT and (less so) CBI play a role in determining responses to the shocks.
- Policy implications for managing commodity price volatility.

Extensions

- Robustness:
  - Additional controls
  - Interactions between IT/CBI and commodity price vbls
- Channels
  - Unpack misery index?

Thank you

Extra Slides

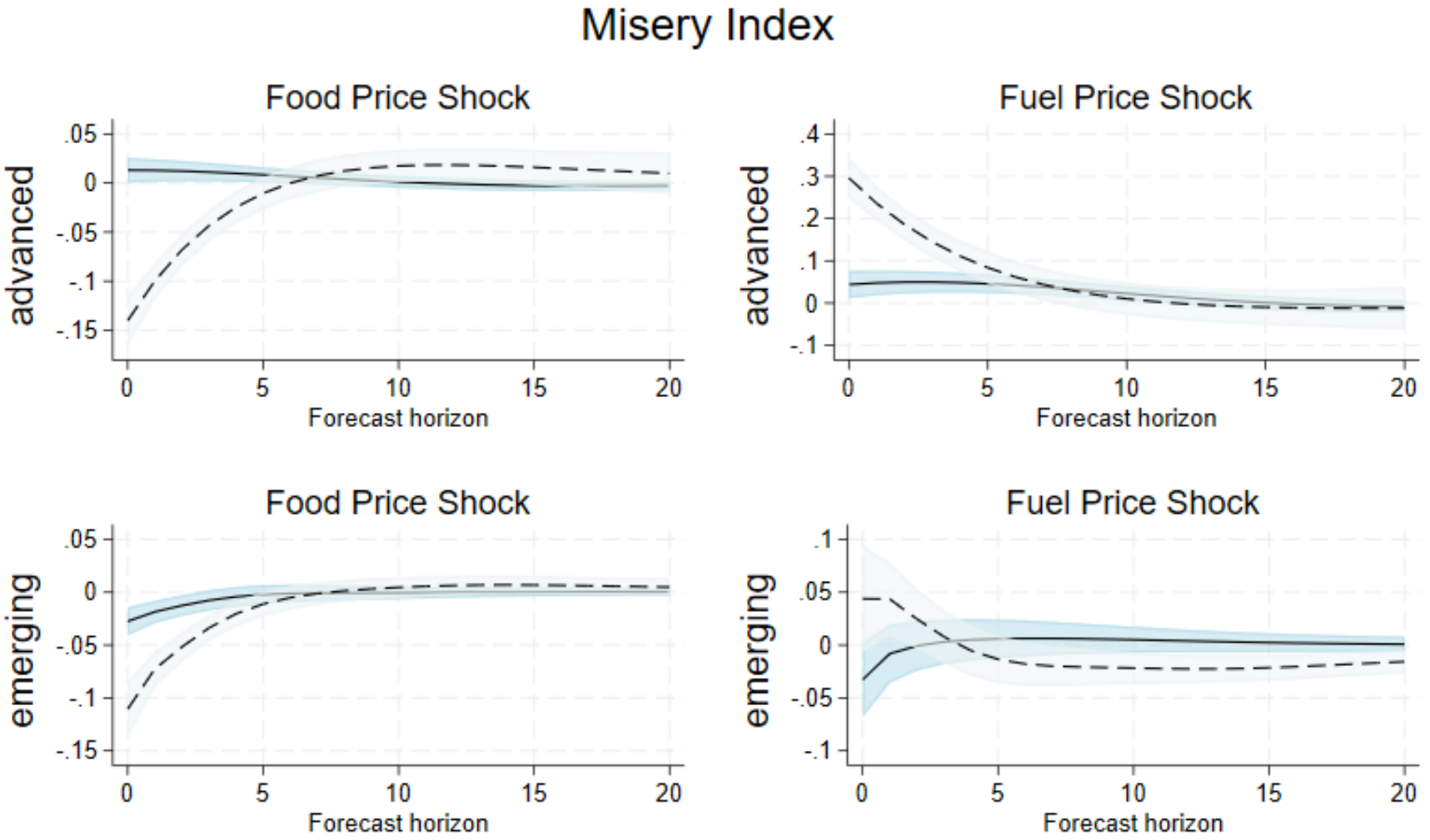
Misery index: asymmetries

Response of Inflation

Response of GDP growth

Solid line: Positive Shocks

Dash line: Negative Shocks



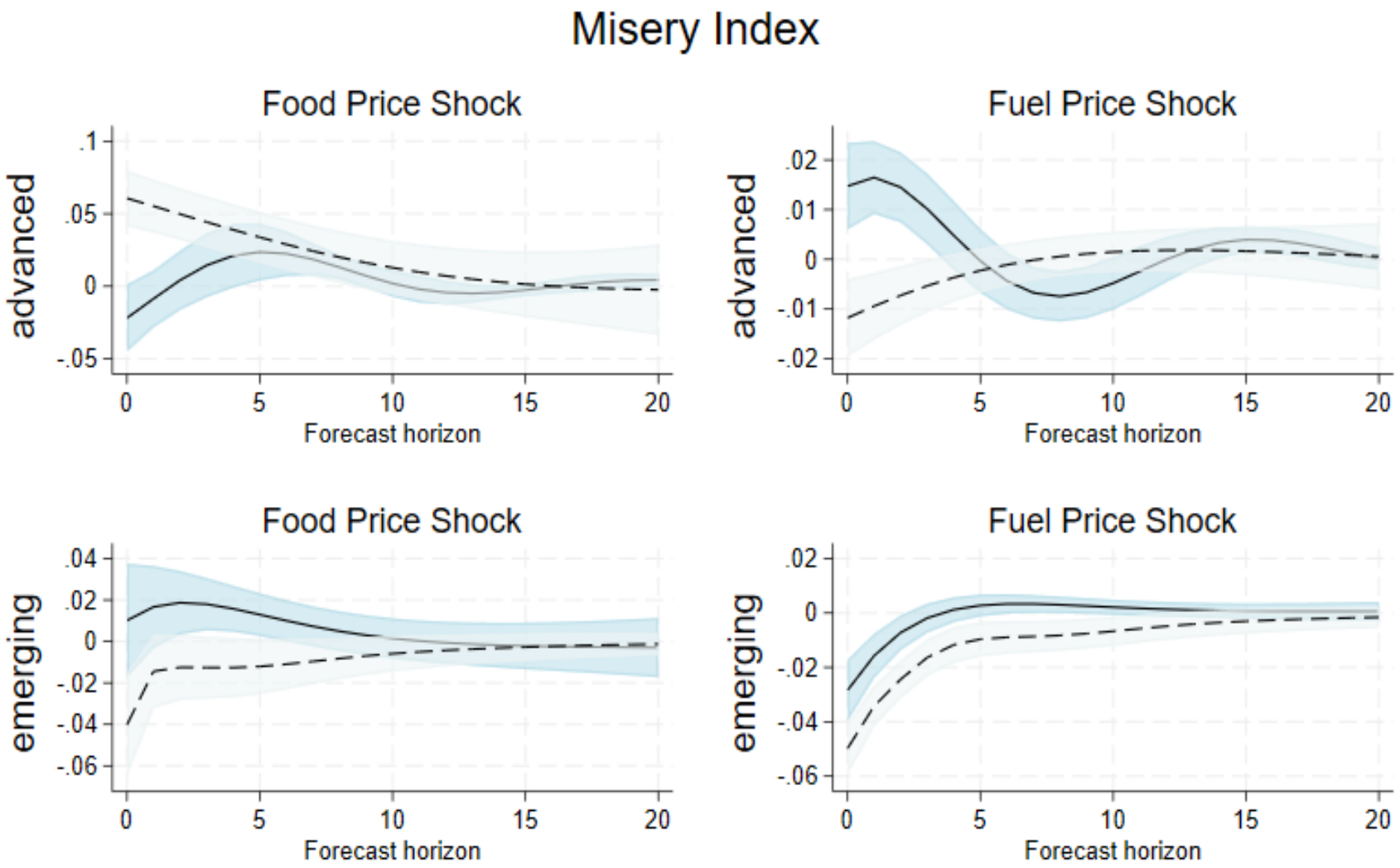
Misery index: inflation targeting

Response of Inflation

Response of GDP growth

——— Solid line: IT economies

-------- Dash line: non-IT economies



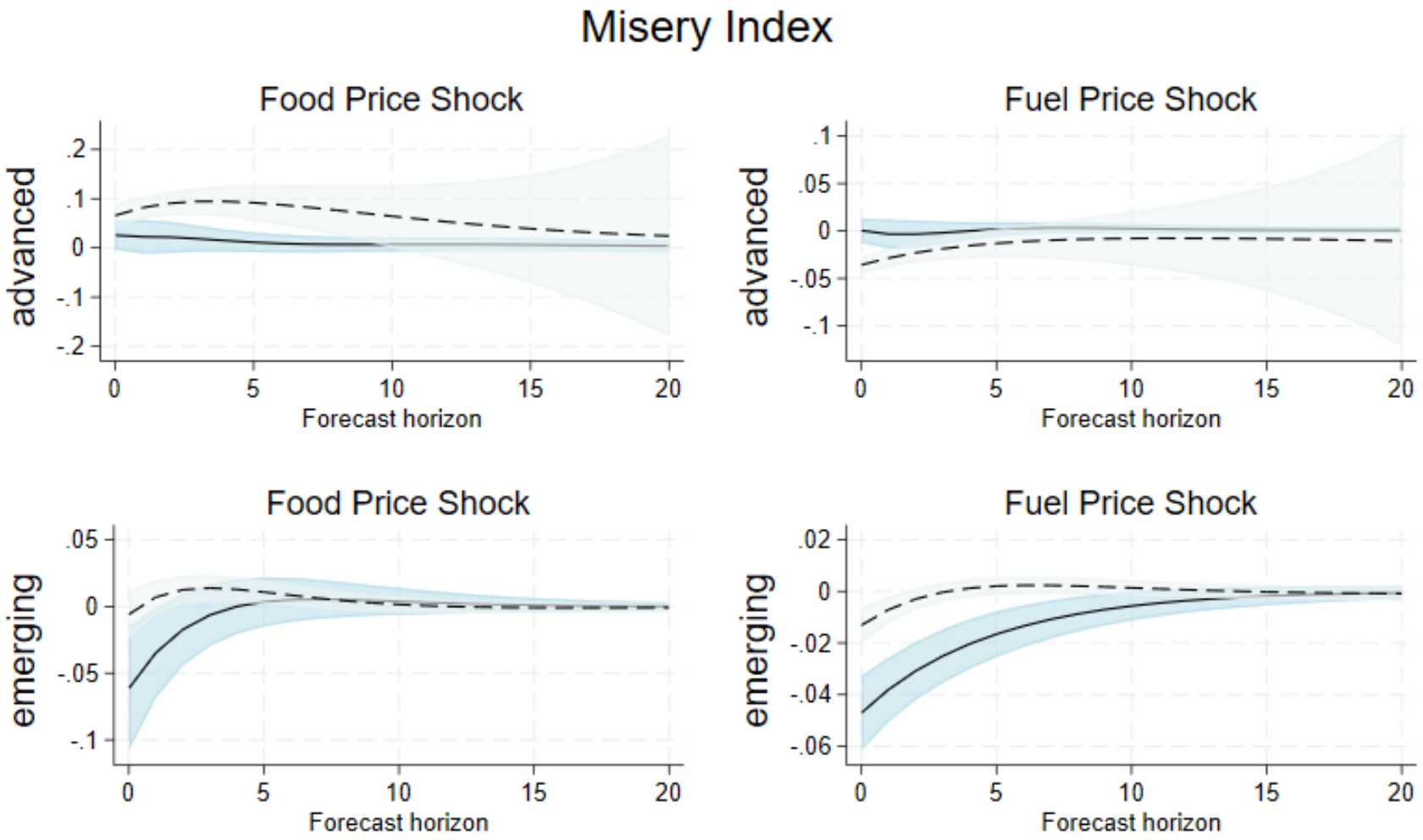
Misery index: central bank independence

Response of Inflation

Response of GDP growth

——— Solid line: High CBI

-------- Dash line: Low CBI



Advanced Economies		Emerging Economies		
Hong Kong, China	Germany	People's Republic of China	Guatemala	Ukraine
Republic of Korea	Greece	India	Honduras	Bahrain
Singapore	Ireland	Indonesia	Mexico	Botswana
Taipei,China	Italy	Malaysia	Nicaragua	Egypt
United States	Luxembourg	Mongolia	Panama	Ghana
Czech Republic	Malta	Philippines	Paraguay	Iran
Estonia	Netherlands	Sri Lanka	Peru	Jordan
Latvia	Portugal	Thailand	Uruguay	Kenya
Lithuania	Spain	Viet Nam	Albania	Kuwait
Slovakia	Denmark	Azerbaijan	Belarus	Lesotho
Israel	Sweden	Georgia	Bosnia and Herzegovina	Namibia
Austria	Norway	Kazakhstan	Bulgaria	Nigeria
Belgium	Switzerland	Argentina	Croatia	Palestine
Cyprus	United Kingdom	Belize	Hungary	Qatar
Finland	Australia	Bolivia	Kosovo	Saudi Arabia
France	New Zealand	Brazil	Moldova	South Africa
		Chile	North Macedonia	Tanzania
		Colombia	Poland	Turkey
		Costa Rica	Romania	Uganda
		Dominican Republic	Russia	Zambia
		Ecuador	Serbia	
		El Salvador	Slovenia	

Variables	Unit	Description	Source
Headline inflation	Percent	CPI inflation	Haver Analytics
GDP growth	Percent	Log difference of GDP	Haver Analytics, authors' calculations
Global food inflation	Percent	Log difference of the index of food prices	Haver Analytics, IMF
Global fuel inflation	Percent	Log difference of the index of fuel prices	Haver Analytics, IMF
HMI	Percent	Hanke Misery Index	Haver Analytics, IMF
IT	[0;1]	Inflation targeting dummy	Official sources
CBI	[0 to 1]	Central Bank Independence index	Romelli (2024)