



Inflation in Emerging and Developing Economies: Evolution, Drivers, and Policies

Jongrim Ha, M. Ayhan Kose, and Franziska Ohnsorge

www.worldbank.org/inflation



Why this book?

- 1 Debate on inflation.** *Explores whether global inflation could make a comeback after a prolonged period of low inflation.*
- 2 Inflation in EMDEs.** *Presents the first comprehensive analysis of the evolution and drivers of inflation in EMDEs whereas previous literature mostly focuses on advanced economies.*
- 3 Cutting-edge methods.** *Examines EMDE inflation using cutting-edge empirical methods that have thus far mostly been employed in studies of inflation in advanced economies.*
- 4 Database of global inflation.** *Introduces a truly global database of up to 175 economies (34 advanced economies, 141 EMDEs) for 1970-2018 for multiple measures of inflation and many country characteristics.*

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*** EMDEs = Emerging Market and Developing Economies**

What is in the book?

Introduction

PART A. Inflation: Global and Domestic Drivers

1. Inflation: Concepts, Evolution, and Correlates
2. Understanding Global Inflation Synchronization
3. Sources of Inflation: Global and Domestic Drivers

PART B. Inflation: Expectations and Pass-Through

4. Inflation Expectations: Review and Evidence
5. Inflation and Exchange Rate Pass-Through

PART C. Inflation: Low-Income Country Considerations

6. Inflation in Low-Income Countries
7. Poverty Impact of Food Price Shocks and Policies

A Cross-Country Database of Inflation and Country Characteristics

*All charts (with underlying series)
already posted on the web;
Database coming soon...*

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Four Questions

1 How has inflation evolved in EMDEs? *Declined over time thanks to the sharp fall in global inflation, supported by cyclical and structural developments. If momentum for these developments wanes, maintaining low inflation may become as difficult as achieving it.*

2 What have been the global and domestic drivers of inflation? *A wide range of shocks... A global inflation cycle has emerged and inflation synchronization has strengthened among EMDEs over time. Global shocks have become more important over time but domestic shocks remain the main source of national inflation variation.*

3 How well-anchored are EMDE inflation expectations? *Despite becoming better-anchored since the 1990s, inflation expectations remain less well anchored in EMDEs than advanced economies. Stronger monetary frameworks and central bank independence are associated with better anchoring of expectations and lower exchange rate pass-through.*

4 What are the main policy implications? *Strong monetary policy frameworks, more central bank independence, robust exchange rate regimes and resilient fiscal policy frameworks are all necessary to achieve and maintain low and stable inflation.*

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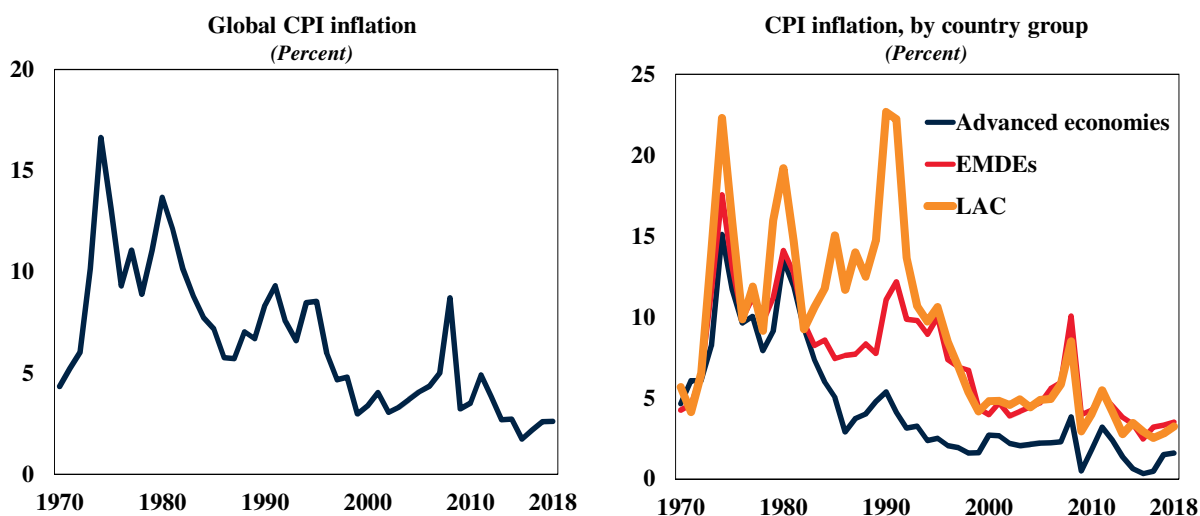
Four Questions

- 1** **How has inflation evolved in EMDEs?** Declined over time thanks to the sharp fall in global inflation, supported by cyclical and structural developments. If momentum for these developments wanes, maintaining low inflation may become as difficult as achieving it.

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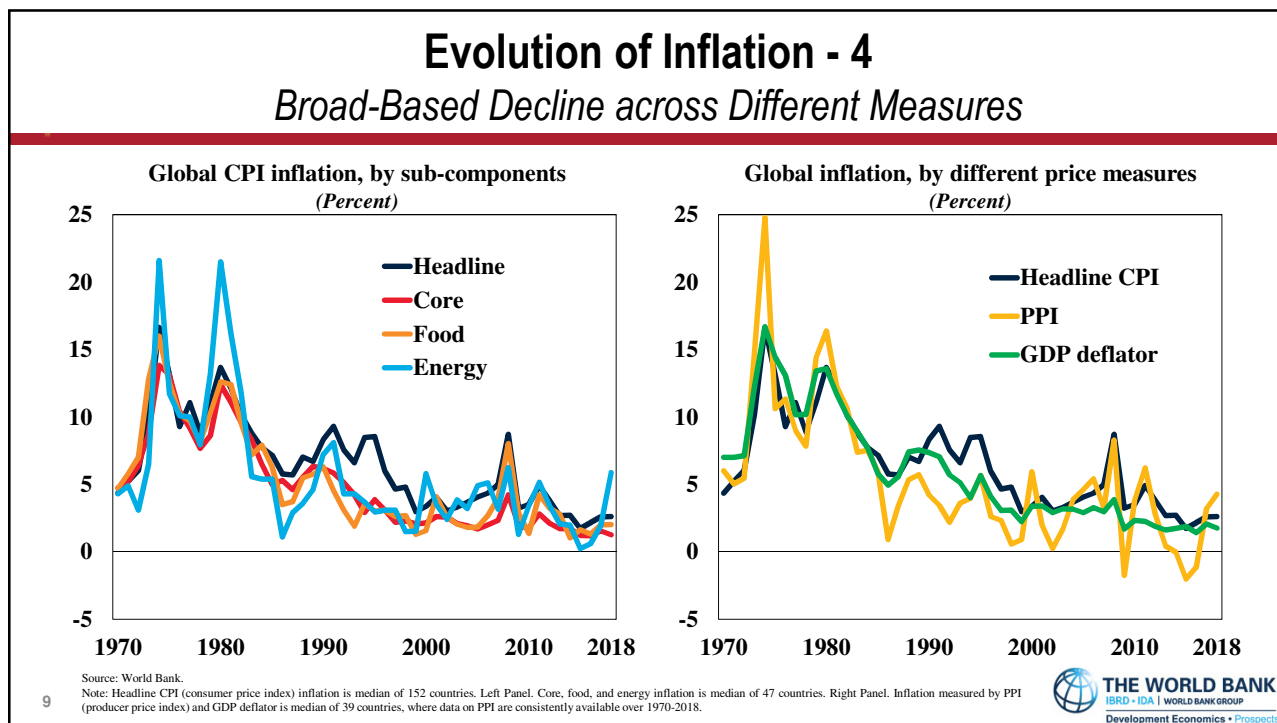
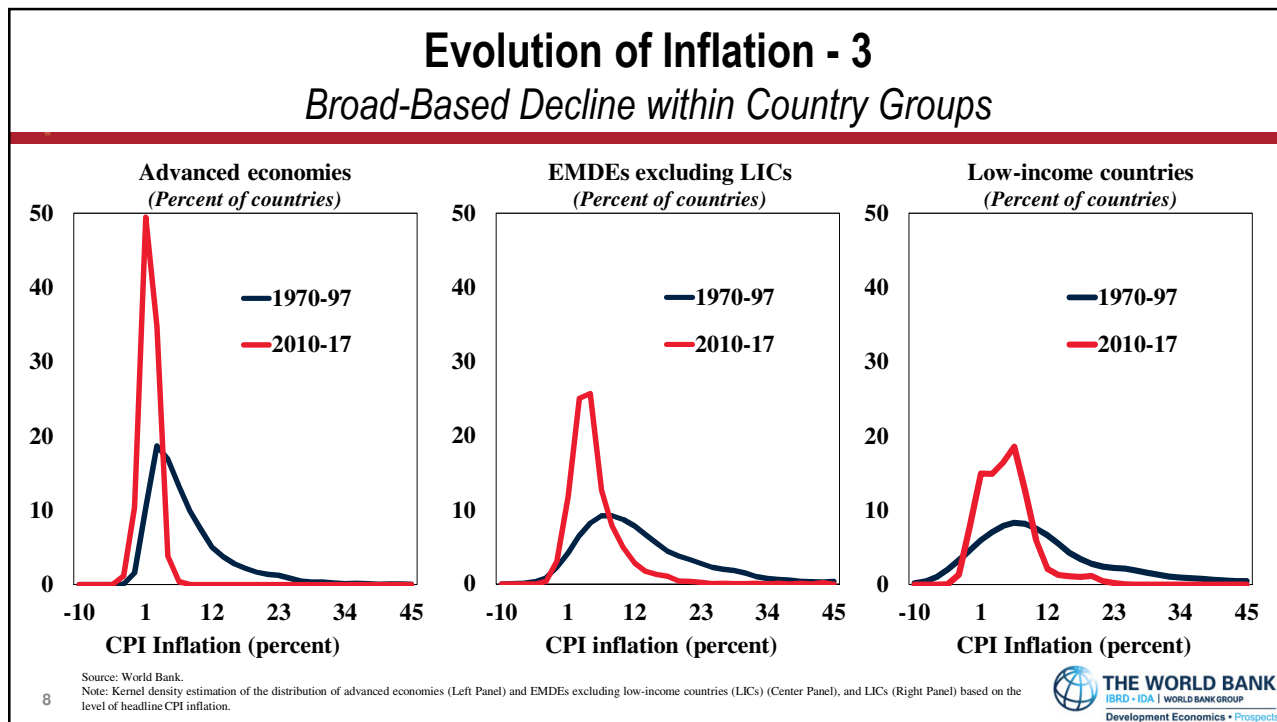
Evolution of Inflation - 2

Synchronized Decline across Country Groups, including LAC



Source: World Bank.
Left Panel. Median headline CPI (consumer price index) inflation of 152 countries. Right Panel. Median headline CPI inflation, based on 29 advanced economies, 123 EMDEs, and 32 Latin American and Caribbean (LAC) countries with available data.

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Factors Associated with Disinflation during 1970-2017

1 Globalization

- Greater trade and global value chain integration can improve competition and productivity growth.
- Greater financial integration can increase central banks' anti-inflation bias.

2 Better policy frameworks

- Move to credible monetary policy frameworks and exchange rate regimes can help anchor inflation expectations.
- Greater central bank independence and transparency can improve anchoring of inflation expectations.
- Better fiscal frameworks can bolster credibility of monetary policy.

3 Other structural factors

- More flexible product and labor markets can increase competition and reduce wage rigidities.
- Population aging can dampen domestic demand growth.
- Digitalization can promote competition and productivity growth.

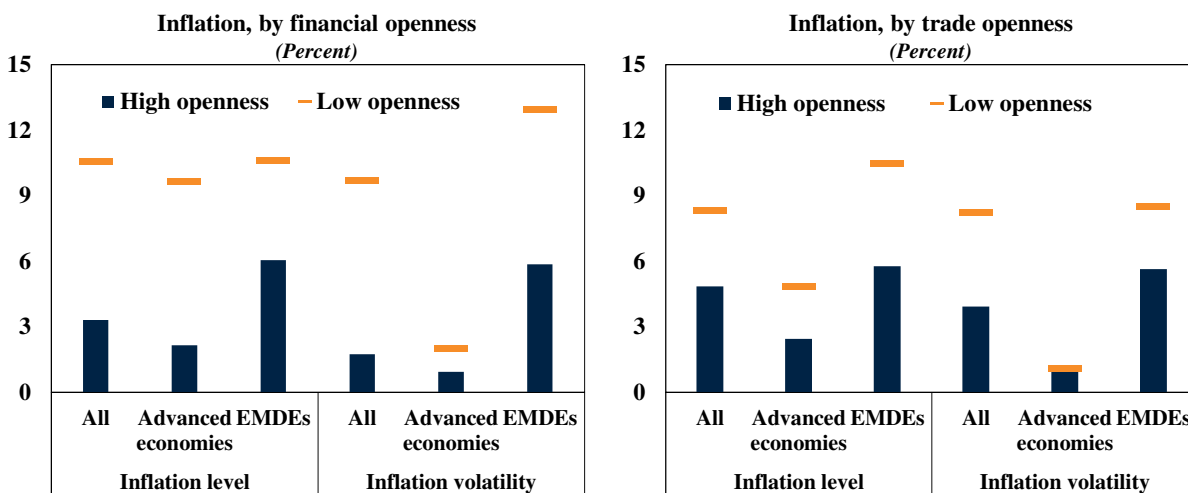
4 Multiple disinflationary shocks over past decade

- Global financial crisis; Euro Area debt crisis
- 2014-16 oil price plunge

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Factors Supporting Disinflation - 1

Globalization of Finance and Trade



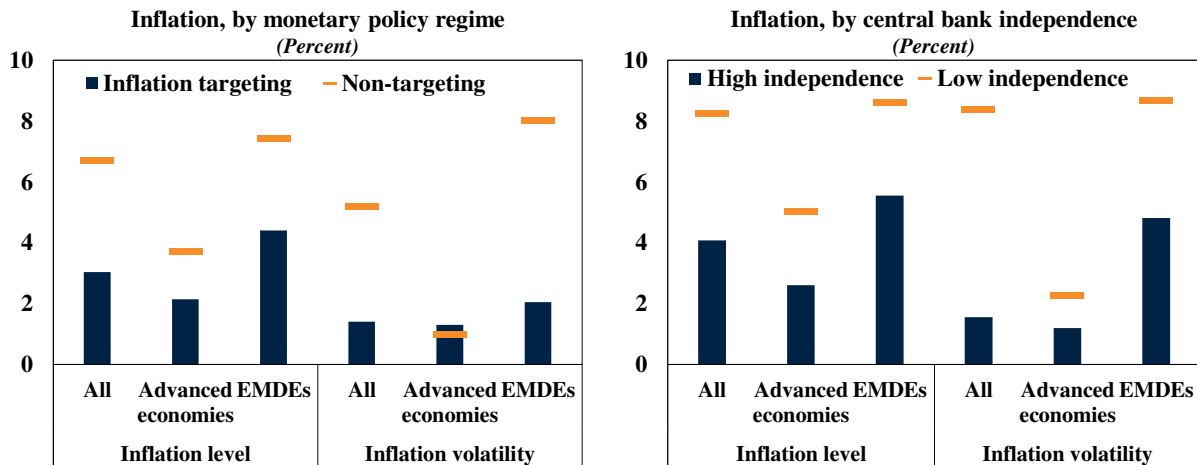
Sources: International Monetary Fund; Lane and Milesi-Ferretti (2007); World Bank.

Note: Blue bars indicate median inflation levels or inflation volatility (defined as standard deviation of inflation) in countries with financial openness (Left Panel) and trade openness (Right Panel) in the top quartile. Orange tickers indicate median inflation levels or inflation volatility in countries in the bottom quartile. Left Panel. Financial openness is measured as the sum of foreign assets and liabilities, as a share of GDP. Right Panel. Trade openness is measured as the sum of exports and imports as a percent of GDP.

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Factors Supporting Disinflation - 2

Resilient Monetary Policy Frameworks; Central Bank Independence



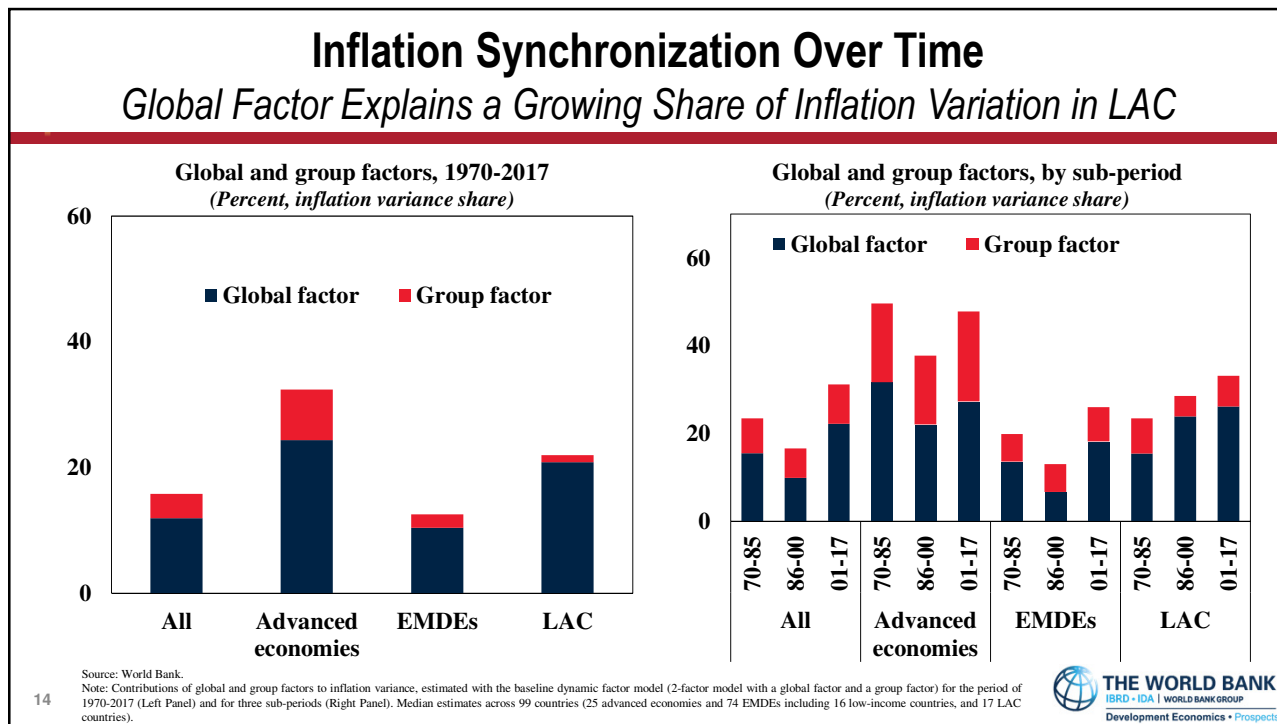
Sources: Caceres, Carrière-Swallow, and Gruss (2016); Dincer and Eichengreen (2014); World Bank.
 Left Panel. Blue bars show median inflation levels or inflation volatility in countries with inflation targeting monetary policy regimes during 1970-2017. Orange tickers indicate median inflation levels or inflation volatility in countries without inflation-targeting monetary policy regimes during the same period. Inflation targeting regimes are defined as in Caceres, Carrière-Swallow, and Gruss (2016) and the IMF Annual Report on Exchange Arrangements and Exchange Restrictions. Right Panel. Blue bars show median inflation levels or inflation volatility in countries with a score of the index of central bank independence in the top quartile of the sample. Orange tickers indicate median inflation levels or inflation volatility in countries in the bottom quartile. Central bank independence is measured by the index of central bank independence and transparency, taken from Dincer and Eichengreen (2014). The index ranges from 0 (least independent and transparent) to 15 (most independent and transparent).

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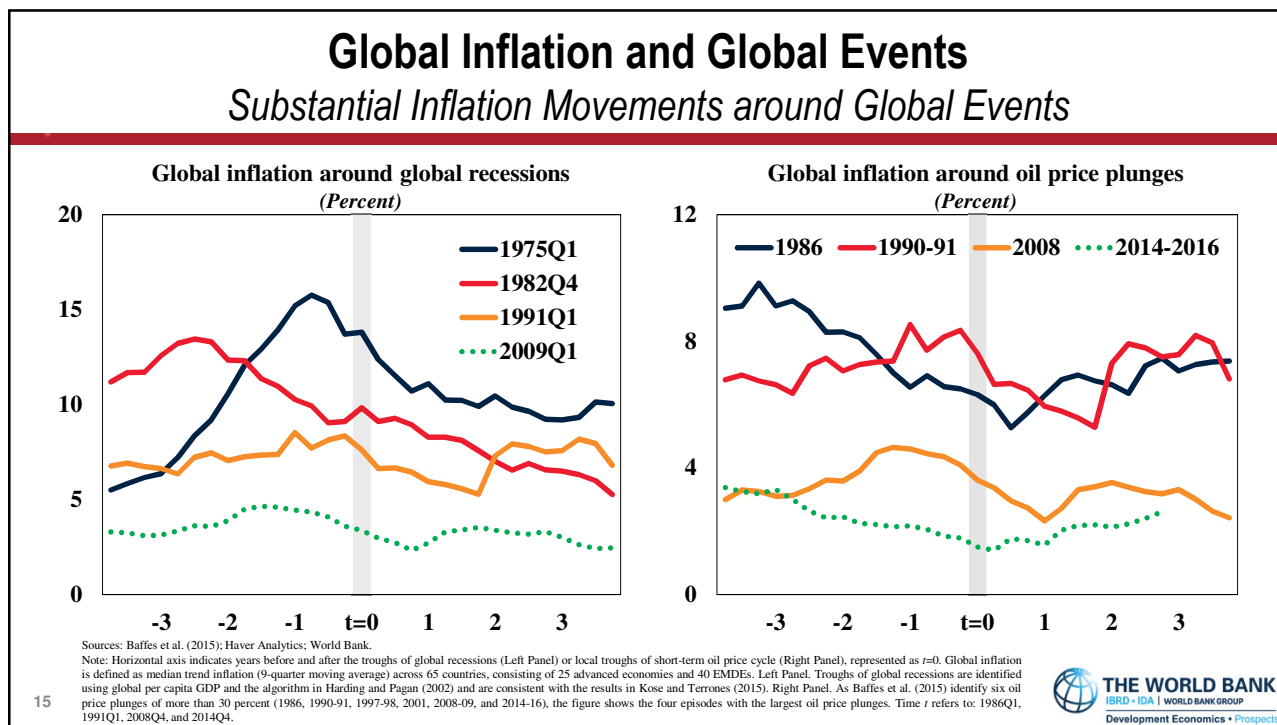
Four Questions

- 2** **What have been the global and domestic drivers of inflation?** *A wide range of shocks... A global inflation cycle has emerged and inflation synchronization has strengthened among EMDEs over time. Global shocks have become more important over time but domestic shocks remain the main source of national inflation variation.*

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Global and Domestic Shocks Driving Inflation

Factor-Augmented Vector Autoregression (FAVAR)

- **Methodology:** Estimate country-specific Factor-Augmented Structural Vector-Autoregression models (Mumtaz and Surico 2009; Charnavoki and Dolado 2014) to identify the impact of global and domestic shocks on domestic inflation

$$B_0 y_t = \alpha + \sum_{i=1} B_i y_{t-i} + \varepsilon_t$$

ε_t : vector of orthogonal structural innovations

y_t : global inflation ($f_t^{\pi, global}$), global output growth ($f_t^{Y, global}$), oil price growth (Δop), domestic inflation (π^i), output growth (Y^i), changes in NEER (XR^i), short-term interest rates (I^i)

Global inflation and output growth proxied by global factors from the dynamic factor model

$$Y^i = \beta_{global} f_t^{Y, global} + e^{Y,i}$$

$$\pi^i = \beta_{global} f_t^{\pi, global} + e^{\pi,i}$$

- **Database:** 29 advanced economies and 26 EMDEs for 1970Q1-2017Q4

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Identification of Global and Domestic Shocks - 2

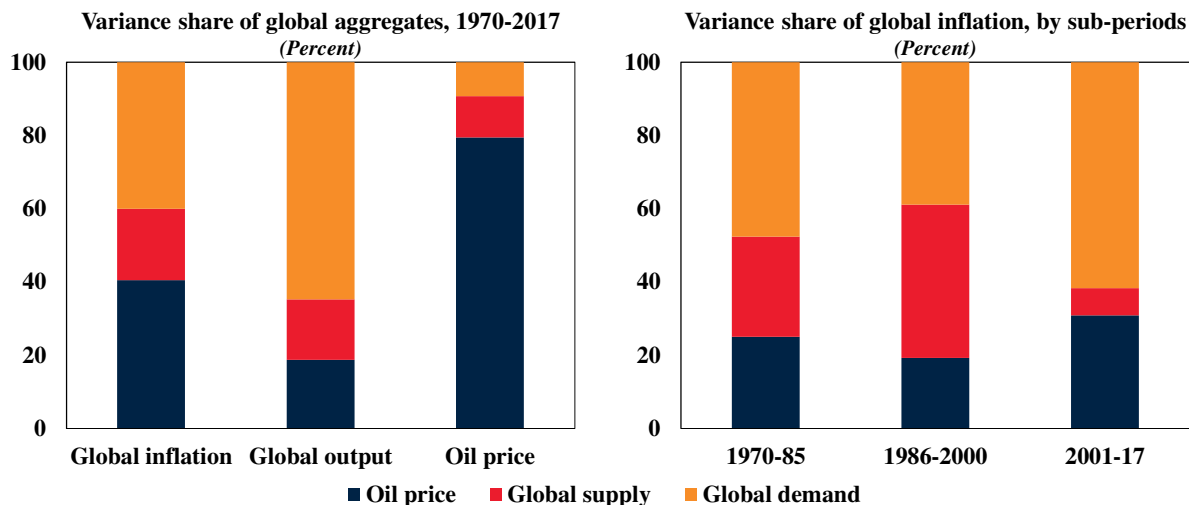
1 Global shocks

- Global demand shocks raise global inflation, global output growth and oil prices.
- Global supply shocks reduce global inflation but raise global output growth and oil prices.
- Oil price shocks raise oil prices and global inflation but reduce global output growth.

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Drivers of Global Inflation

Driven by Global Demand and Oil Price Shocks; Demand Shocks Becoming More Important



Source: World Bank.

Note: Variance decompositions estimated by a global factor-augmented vector autoregressive (FAVAR) model, based on 29 advanced economies and 26 EMDEs over 1970-2017 (Left Panel) and during its sub-periods (Right Panel).

Identification of Global and Domestic Shocks - 3

1 Global shocks

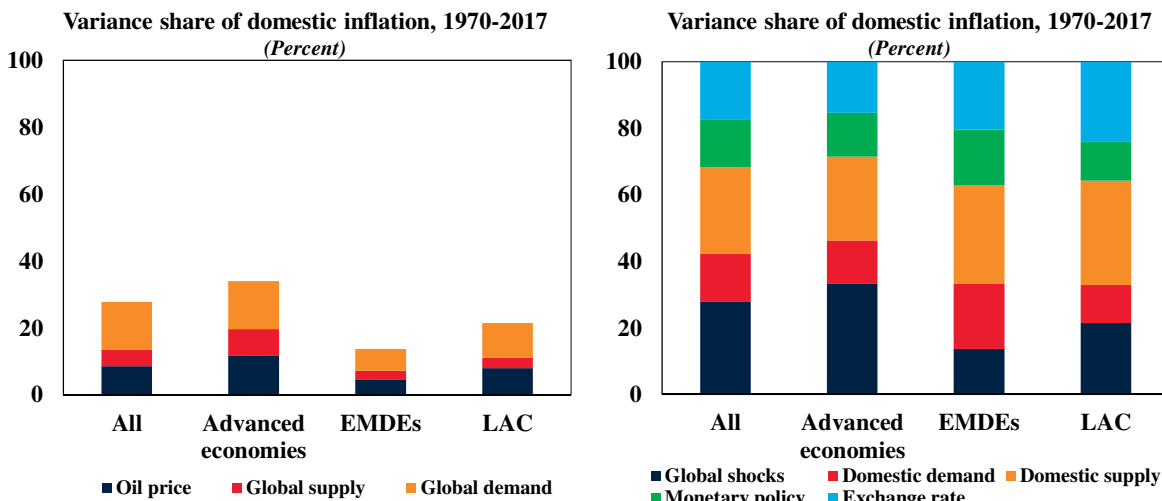
- Global demand shocks raise global inflation, global output growth and oil prices.
- Global supply shocks reduce global inflation but raise global output growth and oil prices.
- Oil price shocks raise oil prices and global inflation but reduce global output growth.

2 Domestic shocks

- Global shocks affect domestic variables contemporaneously, but vice versa only with a one-quarter delay.
- Domestic demand shocks raise inflation and output growth.
- Domestic supply shocks reduce inflation but raise output growth.
- Contractionary monetary policy shocks raise interest rates, reduce inflation and output growth, and appreciate exchange rates.

Contributions of Global Shocks to Domestic Inflation

One-Quarter of Domestic Inflation Variance in LAC



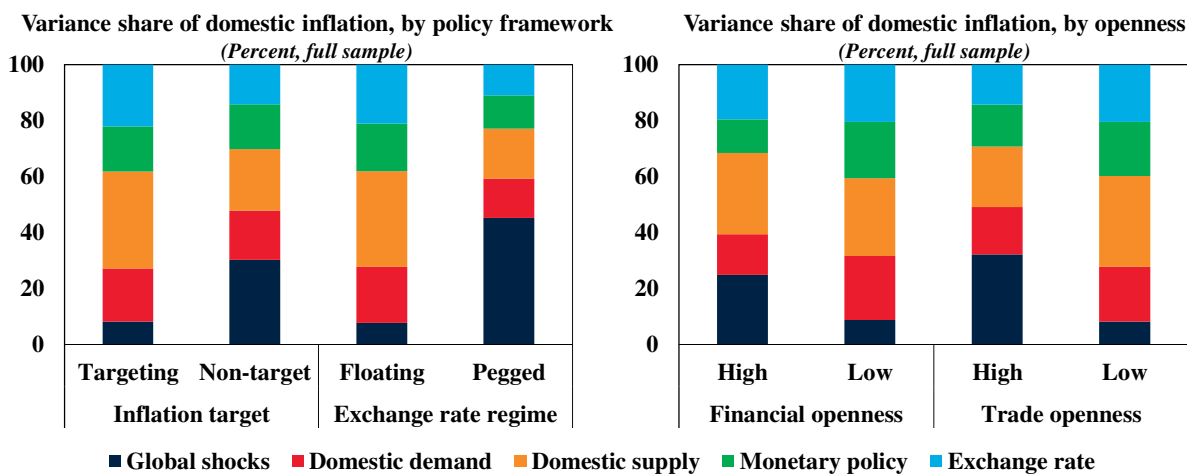
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Source: World Bank.
 Note: Median shares of country-specific inflation variance accounted for by global shocks (i.e., global demand, global supply, and oil prices) based on country-specific factor-augmented vector autoregressive (FAVAR) models for 29 advanced economies and 26 EMDEs, and 7 LAC countries for 1970-2017 (Left Panel) and by global and domestic shocks (Right Panel).



Contributions of Global and Domestic Shocks

Domestic Shocks More Important in Less Open Economies



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Sources: Chinn and Ito (2006); Ilizetki, Reinhart, and Rogoff (2017); IMF (2016); World Bank.
 Note: Median shares of country-specific inflation variance accounted for by global shocks and domestic shocks (i.e., domestic demand, domestic supply, monetary policy (interest rates), and exchange rates) based on country-specific factor-augmented vector autoregressive (FAVAR) models, estimated for 29 advanced economies and 26 EMDEs for 1970-2017. Left Panel. Inflation targeting regimes are defined as in IMF (2016). Flexible exchange rate regimes ("Floating") are defined as freely floating and managed floating exchange rate regimes (Ilizetki, Reinhart, and Rogoff 2017), and all other regimes are defined as pegged exchange rate regimes. Right Panel. Countries with "high" and "low" financial openness are, respectively, those above and below median of the capital account openness index in Chinn and Ito (2006). Countries with "high" and "low" trade openness are defined as those with trade-to-GDP ratios above and below median, respectively.



Four Questions

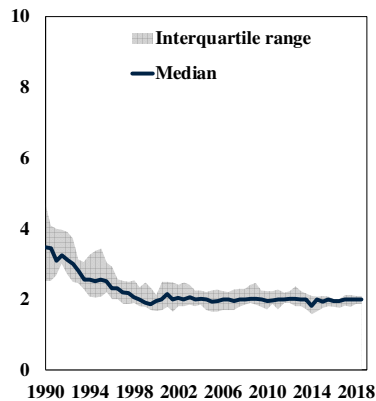
3 **How well-anchored are EMDE inflation expectations?** *Despite becoming better-anchored since the 1990s, inflation expectations remain less well anchored in EMDEs than advanced economies. Stronger monetary frameworks and central bank independence are associated with better anchoring of expectations and lower exchange rate pass-through.*

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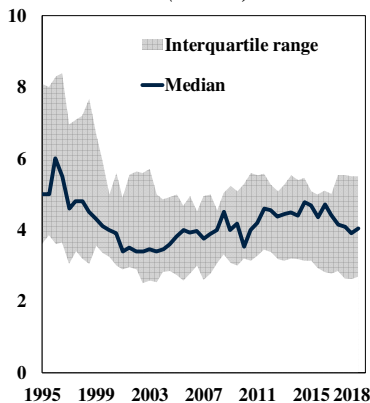
Inflation Expectations

Broad-Based Decline, but Remain Higher in EMDEs

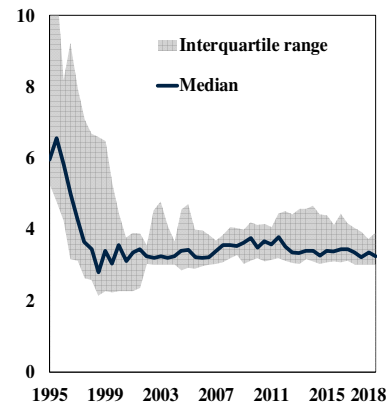
Inflation expectations in advanced economies
(Percent)



Inflation expectations in EMDEs
(Percent)



Inflation expectations in LAC
(Percent)



Sources: Consensus Economics, International Monetary Fund, World Bank.

Note: Inflation expectations refer to 5-year-ahead expectations of annual inflation and measured at a bi-annual frequency. Interquartile range of the country sample. Sample includes 24 advanced economies (over 1990H1-2018H2), 23 EMDEs (over 1995H1-2018H2) and 6 LAC countries of Argentina, Brazil, Chile, Columbia, Mexico, and Peru. (over 1995H1-2018H2).

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Anchoring Inflation Expectations

Methodology and Database

- Methodology**

Degree of anchoring. Regression of changes in five-year-ahead inflation expectations on inflation shocks (fixed-effects panel regression and country-level time-varying models). Inflation shock: difference between inflation and short-term inflation expectations six months prior

Roles of inflation shocks. Same regression above but incorporating

- Global inflation shock: First principal component of inflation shocks for the full sample
- Domestic inflation shock: Residual from a regression of inflation shock on global inflation shock

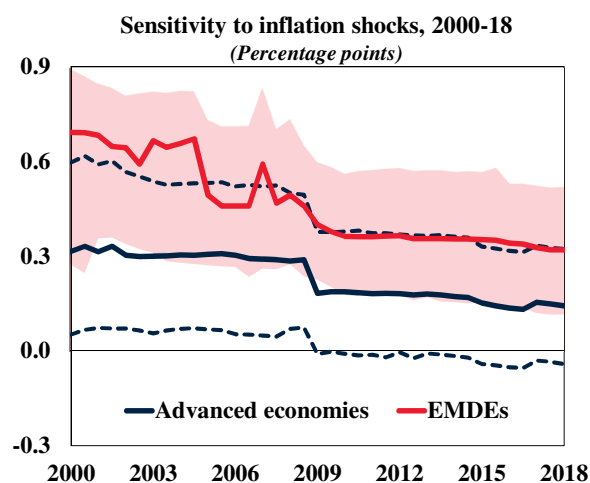
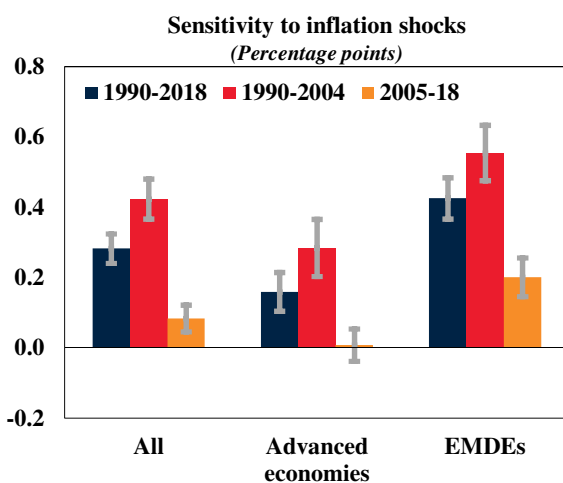
Determinants of the degree of anchoring. Regression of the estimated sensitivity by a time-varying model for each country on different determinants (monetary frameworks, central bank independence, exchange rate regimes, globalization, and fiscal variables)

- Database:** 24 advanced economies and 23 EMDEs
1990H2-2018H1: Analysis of inflation shocks
1995-2016: Analysis of determinants of anchoring

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Anchoring Inflation Expectations in EMDEs - 1

Better Anchored Now; Still Not as Well as in Advanced Economies



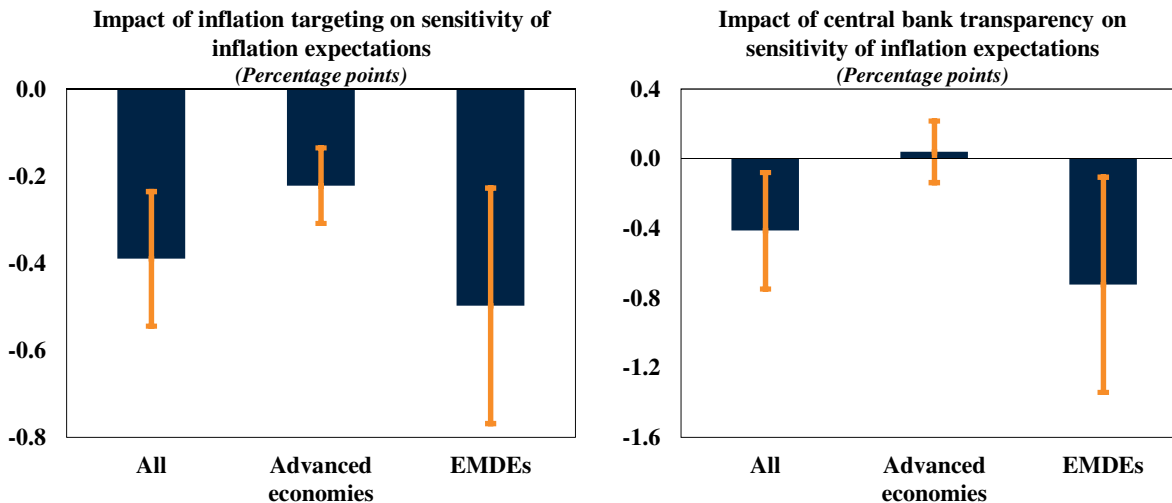
Sources: Consensus Economics, International Monetary Fund, World Bank.

Note: Inflation shocks are defined as the difference between realized inflation and short-term inflation expectations in the previous period. Left Panel. Sensitivity is estimated using a panel regression of changes in 5-year-ahead inflation expectations on inflation shocks. Bars denote median estimates and vertical lines denote 90 percent confidence intervals. Based on 24 advanced economies and 23 EMDEs for 1990H2-2018H1. Right Panel. Time-varying sensitivity is estimated by regressing changes in 5-year-ahead inflation expectations on inflation shocks. Solid lines denote median estimates and areas between two dotted blue lines and shaded in pink indicate, respectively, medians of 68 percent confidence intervals for advanced economies and EMDEs. Sample includes 24 advanced economies (over 1995H1-2018H1) and 23 EMDEs (over 2000H1-2018H1).

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Determinants of Anchoring Inflation Expectations

Lower Sensitivity with Inflation-Targeting Regime and Higher Central Bank Transparency



Sources: Consensus Economics; Dincer and Eichengreen (2014); International Monetary Fund; World Bank.

Note: Bars represent coefficients in panel regressions of 47 countries (including 24 advanced economies and 23 EMDEs), based on annual data over 1995-2016. Vertical lines denote 90 percent confidence intervals. Left Panel: Inflation targeting is a dummy variable taking a value of one in countries with an inflation-targeting framework. Right Panel: Central bank transparency is measured by the index of central bank independence and transparency in Dincer and Eichengreen (2014), which ranges from 0 (least independent and transparent) to 15 (most independent and transparent).



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- 4** **What are the main policy implications?** *Strong monetary policy frameworks, more central bank independence, robust exchange rate regimes and resilient fiscal policy frameworks are all necessary to achieve and maintain low and stable inflation.*

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Is Low Inflation Here to Stay? - 1

Greatest Threat to Low Inflation...

“The greatest threat to today’s low inflation, of course, would be a reversal of the modern trend toward enhanced central bank independence, particularly if trend economic growth were to slow, owing, say, to a retreat in globalization and economic liberalization.”

Kenneth Rogoff (2003)

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Is Low Inflation Here to Stay? – 2

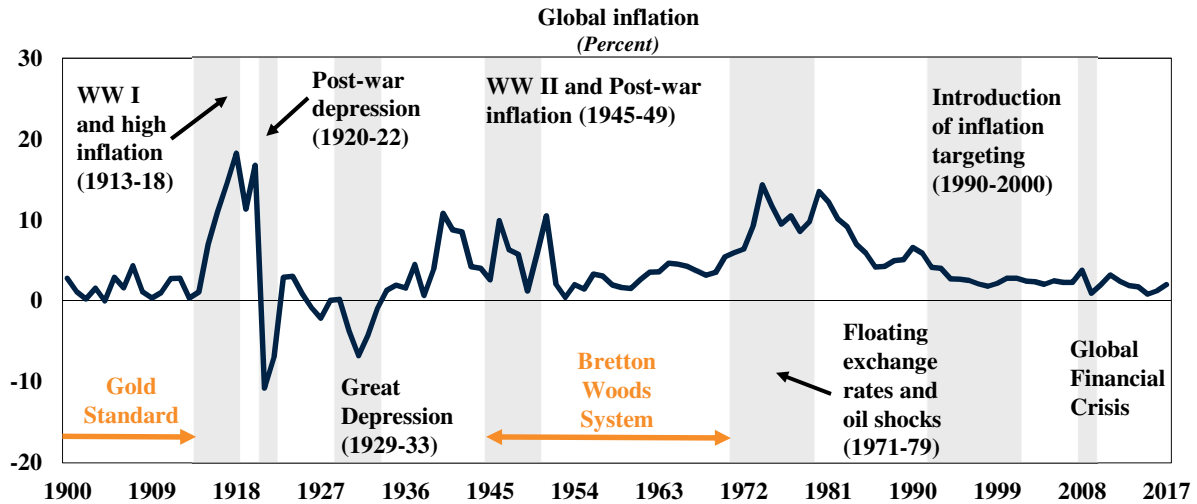
Cyclical and Structural Factors: Turning of the Tide?

- 1 **Dissipating global slack**
 - Rising wage pressures amid tight labor markets in major advanced economies
- 2 **Slowing globalization**
 - Sizeable tariffs between major economies already in place; trade tensions rising
- 3 **Weakening monetary policy frameworks**
 - Threats to central banks independence
- 4 **Deteriorating fiscal policy frameworks and mounting debt levels**
 - Reform fatigue amid growing protectionist sentiment; large public and private debt levels
- 5 **Reintroducing market rigidities**
 - Populist policies accompanied by growing labor market rigidities.

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Low Inflation in EMDEs: Miracle or Mirage?

Past Periods of Low Inflation Did Not Last



31 Source: World Bank.
Note: Median of annual average inflation and inflation volatility in 24 countries where data are available across the full period.

Policy Implications

Learning to Live with the Global Inflation Cycle

1 Establish more resilient monetary policy frameworks

- Greater central bank transparency and independence
- Credible monetary policy frameworks, including inflation targeting
- Robust exchange rate regime

2 Build resilience to changes in global inflation

- Active use of countercyclical policies
- Establishing a fiscal environment resilient enough to effectively contribute to macroeconomic stabilization
- Ensuring stability of financial system
- Considering coordinated monetary policy action to respond to undesirably low or high global inflation

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Thank You!

Questions & Comments

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