# Will the Secular Decline in Exchange Rate & Inflation Volatility Survive Covid-19?

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# Overview

Secular decline in exchange rate volatility in 21st century for core high income countries

See also Ilzetzki, Reinhart & Rogoff (2019, 2020)

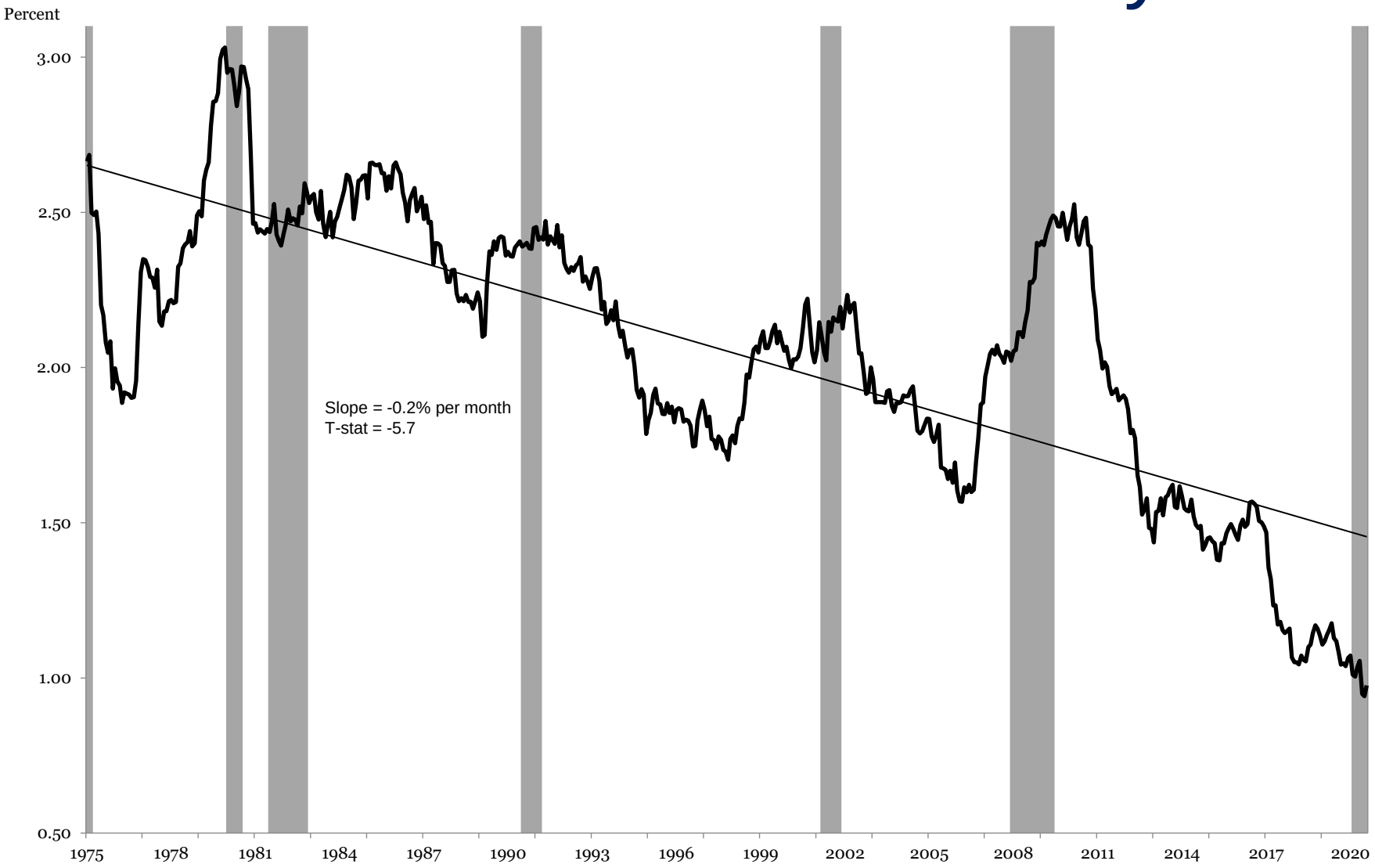
Has surprisingly survived Covid-19 so far

What has caused this trend?

How has it survived the gyrations of the real economy and other asset markets?

What might end this trend?

# US Dollar-Euro Volatility



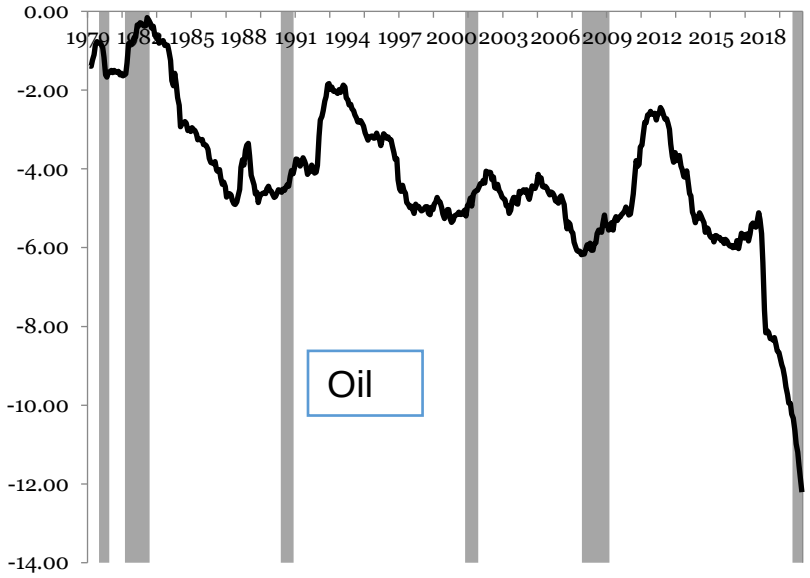

Note: Absolute value of month on month exchange rate change, 4 month moving average. USD-DEM pre-1999
Source: IFS and the Authors

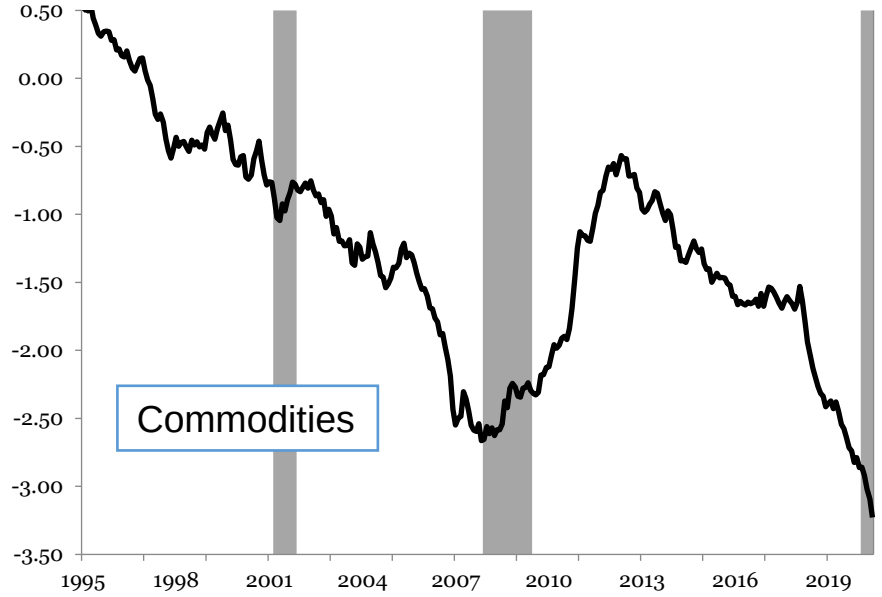
# US Dollar-Yen Volatility

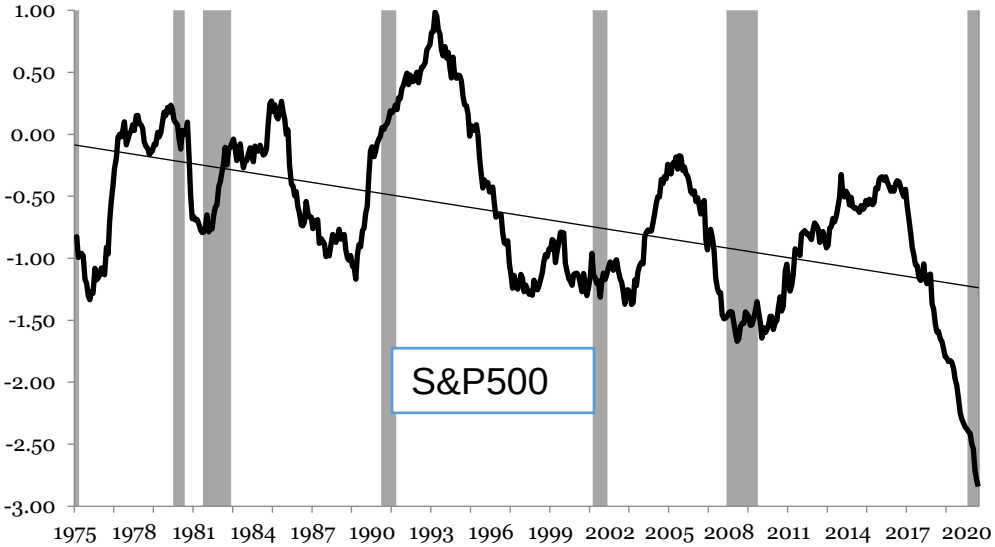

Note: Absolute value of month on month exchange rate change, 4 month moving average.
Source: IFS and the authors

Levels

# EUR Volatility Relative to…



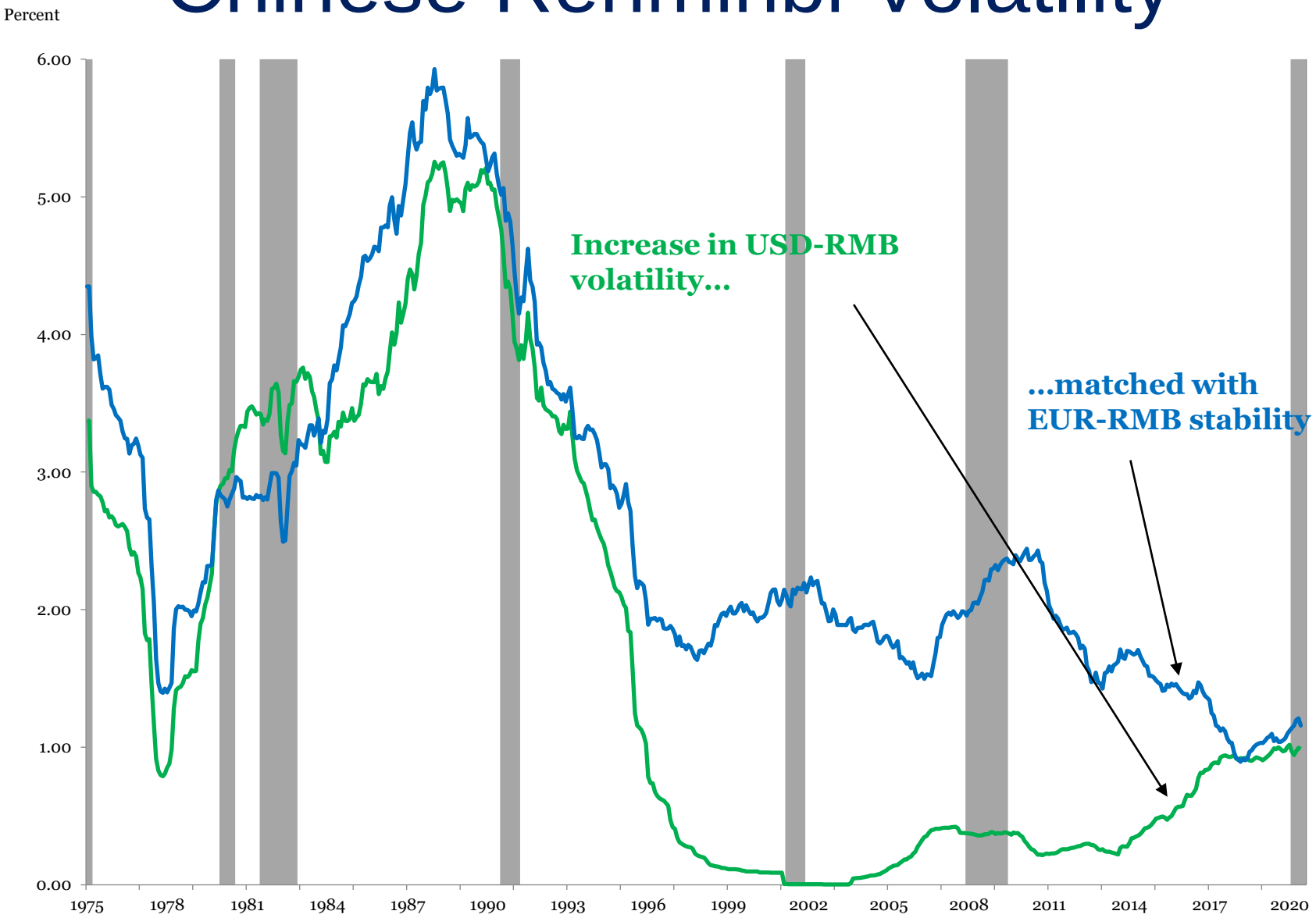




Longer history

Sources: IFS, FRED,
IMF primary commodities database, Shiller (2005) and the authors

# Chinese Renminbi Volatility




Note: Absolute value of month on month exchange rate change, 4 month moving average.
Source: IFS and the authors

# The Technical Details

Downward trend is statistically significant

Breakpoint: trend of exchange rate volatility in Aug 2014

→ For USD vs. GDP weighted EUR/JPY

→ Bai Perron (1998), sequential T vs. T+1 test

→ USD-EUR breakpoint dated in Dec 2014

→ JPY-EUR breakpoint dated in Dec 2012

Additional breakpoint in August 2008

→ Volatility *increase* due to financial crisis

USD-RMB additional breakpoints in 2005, 2015

→ Volatility *increases* due to loosening peg

# Panel Regression: G4 Currency Pairs

| | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| Trend | -.03*** | -.02*** | -.01 | -.02*** | | |
| Trend after Aug 2014 | | -.12*** | -.17*** | -.14*** | -.15*** | -.15*** |
| Abs(Δ%S&P500) | | | .07*** | .05*** | .05*** | .05*** |
| Abs(Δ%Oil Price) | | | .02*** | .01*** | .01*** | .01*** |
| Global Financial Crisis | | | | .74*** | .74*** | .74*** |
| Currency-Pair Fixed Effects | No | No | No | No | Yes | Yes |
| Currency-Pair specific trends | No | No | No | No | No | Yes |
| Including China | No | No | No | No | No | No |

Panel OLS regression. Dependent variable is absolute value of week on week change in G3/4 exchange rate pairs. Trend is linear time trend. Trend after August 2014 is interaction between a linear time trend and a dummy for weeks after August 2014. Coefficients on these two variables are multiplied by 100. Constant and a dummy for weeks after August 2014 were included but not reported. Abs(Δ%S&P500) and Abs(Δ%Commodity Prices) are absolute values of weekly percentage growth in S&P500 stock market index and crude West Texas Intermediate (WTI) oil prices.

# Extended Bretton Woods II

G3 exchange rate volatility trended down in 21st century

→ See also Ilzetzki, Reinhart, Rogoff 2019

Further decline since 2014

→ Previously undocumented

Remarkably low during Covid-19

→ Volatility had increased in past recessions

True when including RMB: G4 currencies

<u>Stability comparable to Bretton Woods I</u>

→ Already endured longer

→ Larger share of world GDP

# Why has Exchange Rate Volatility Declined?

# Why Has ER Volatility Declined?

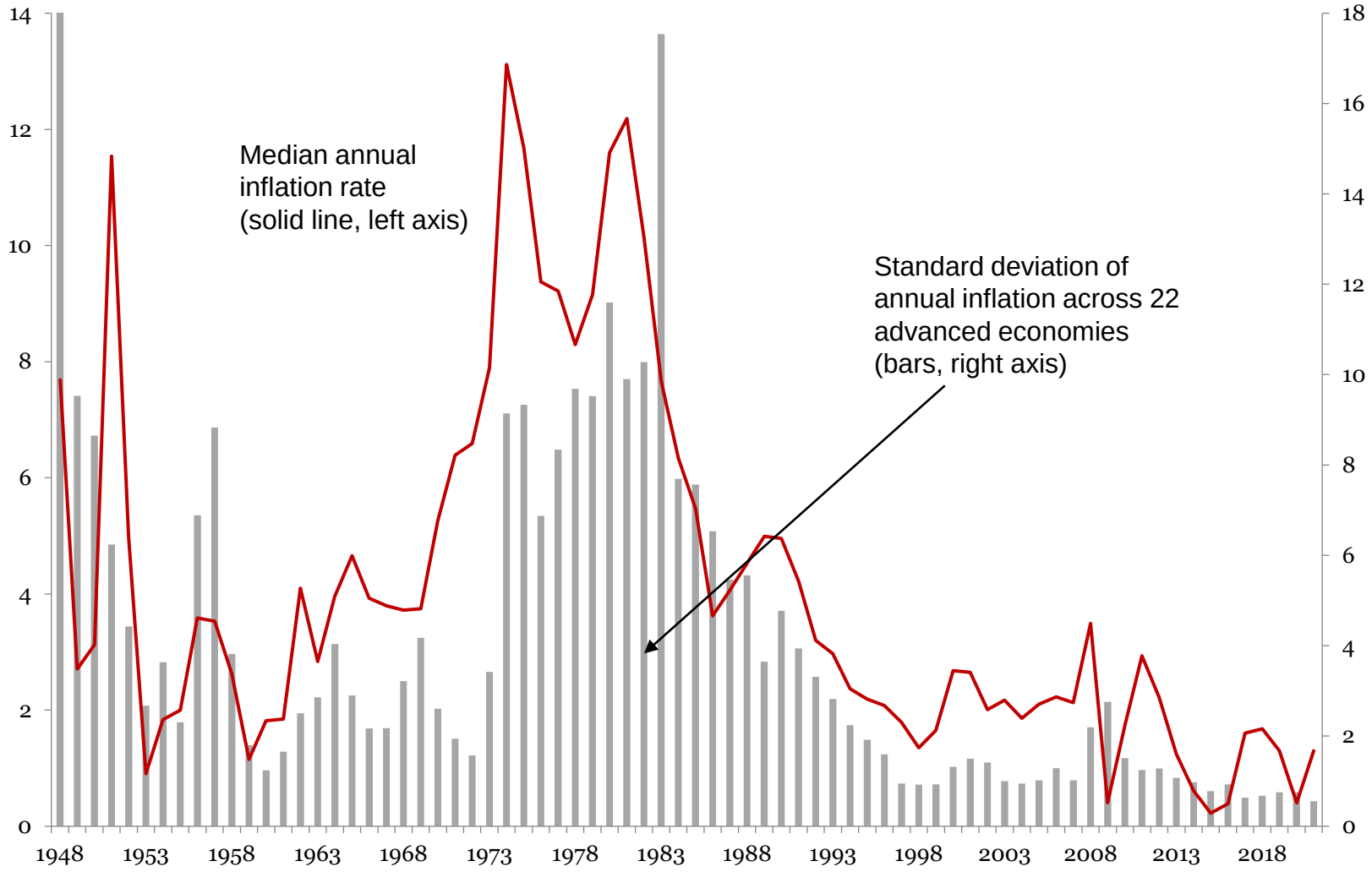
Our main hypothesis

- Inflation volatility has declined
- Short and long term interest rate volatility have declined
- True also of differentials across countries

Casual Evidence

- → Fits the timing
  - ECB goes negative in June 2014
  - Euro and yen yields hit zero in 2014-2015
- → Covid-19: Volatility in everything else went up

# Declining Inflation Differentials

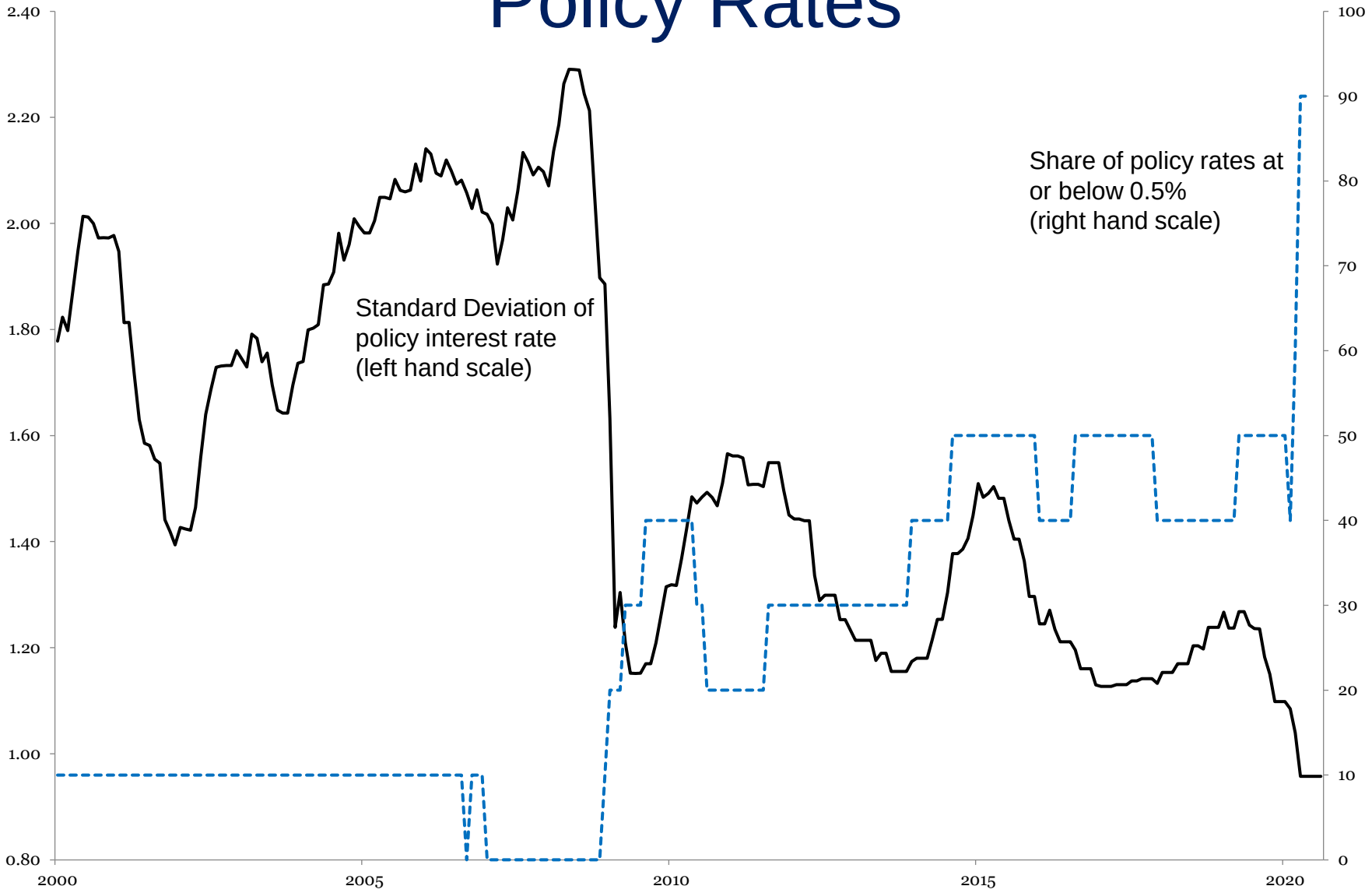



Source: IMF WEO and the authors

[Low inflation and deflation]

[Emerging Markets]

# Declining Interest Rate Differentials: Policy Rates

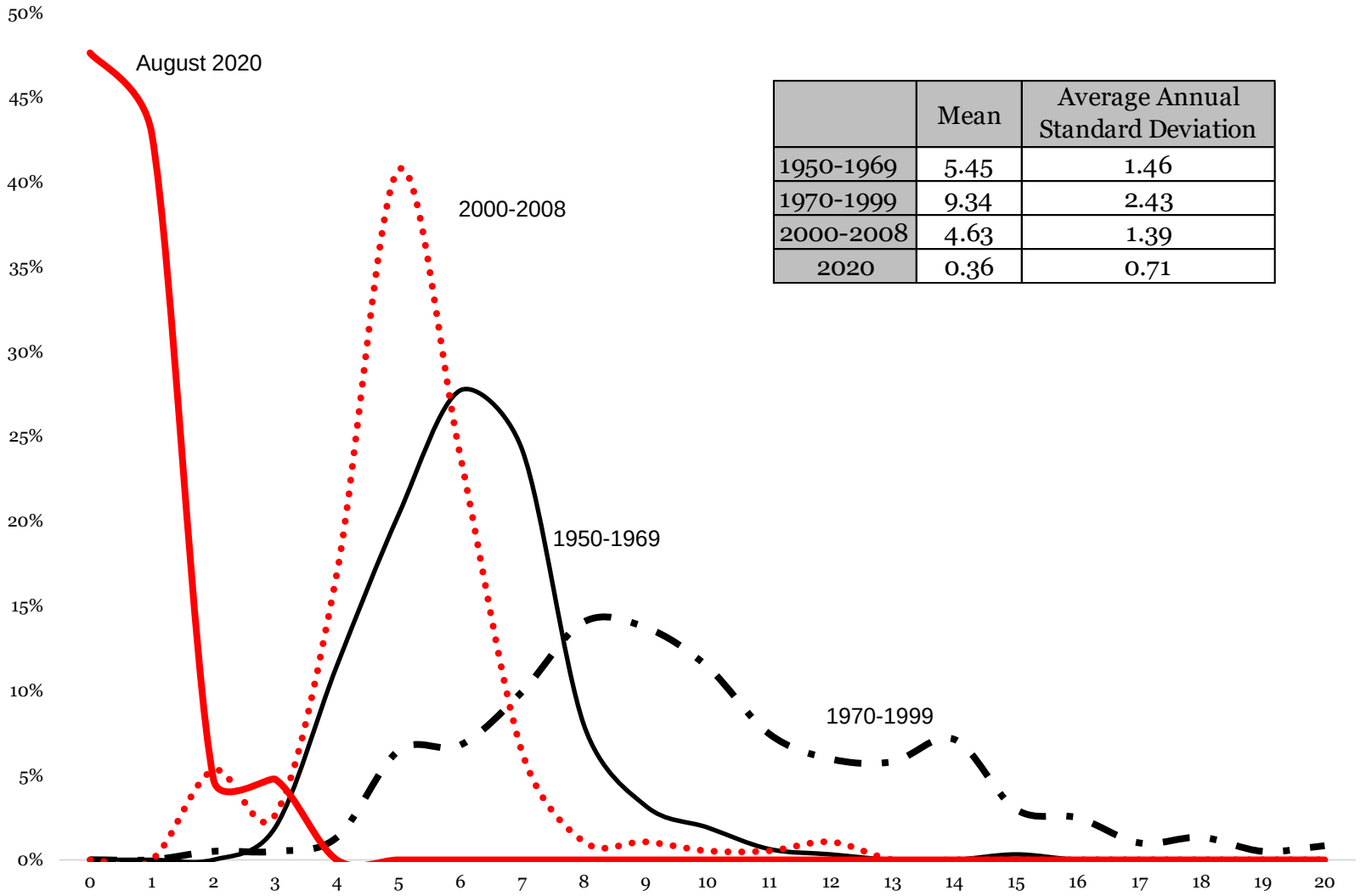



10 top currencies by trading volume. Source: IFS, national central banks, and the authors



Longer history

# Declining Interest Rate Differentials: 10-year Yields




| | Mean | Average Annual Standard Deviation |
|---|---|---|
| 1950-1969 | 5.45 | 1.46 |
| 1970-1999 | 9.34 | 2.43 |
| 2000-2008 | 4.63 | 1.39 |
| 2020 | 0.36 | 0.71 |

Histogram of 10-year yields, high income countries excluding Greece
Source: OECD.stat and the authors

[Real yields]

# Alternative Hypotheses

Generalized decline in financial risks

The dollar's rise as an anchor currency

Swap lines

The real economy

Fiscal policy

**None seem sufficient to explain timing and extent of volatility decline**

See full argument in paper

# Dornbusch's Revenge

Dornbusch (1976): monetary policy important driver of exchange rate volatility

- Hard to verify empirically (e.g. Meese & Rogoff 1983)

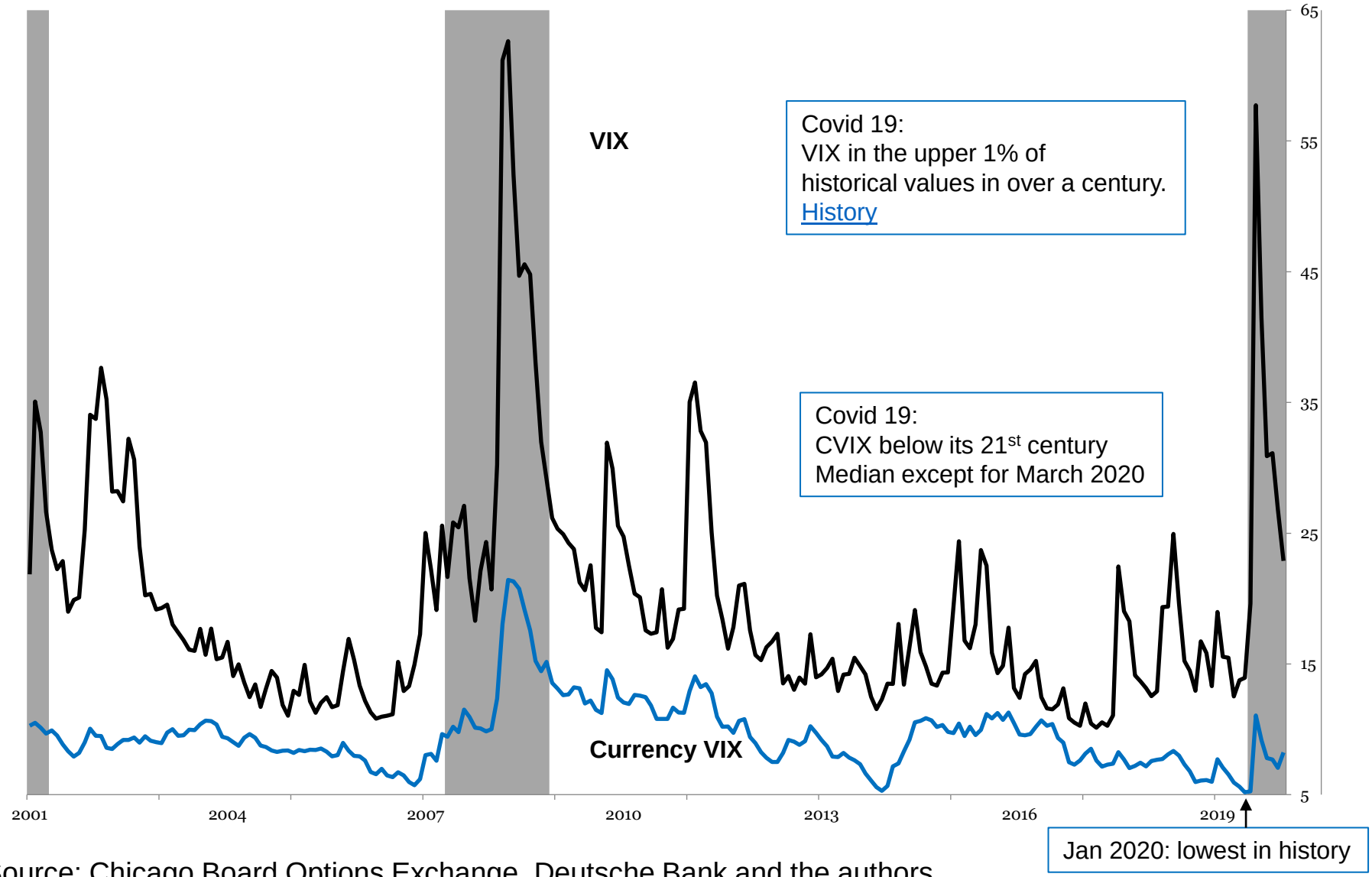
Recent exchange rate theories focus on financial risks driving exchange rate volatility

- Gabaix & Maggiori (2015), Itshoki & Mukhin (2019)

The Covid-19 "natural experiment":

- Enormous financial volatility
- Little interest rate variability
- Exchange rate volatility muted

# Implied Currency and Stock Market Volatility




Source: Chicago Board Options Exchange, Deutsche Bank and the authors

# Risks to Extended Bretton Woods II

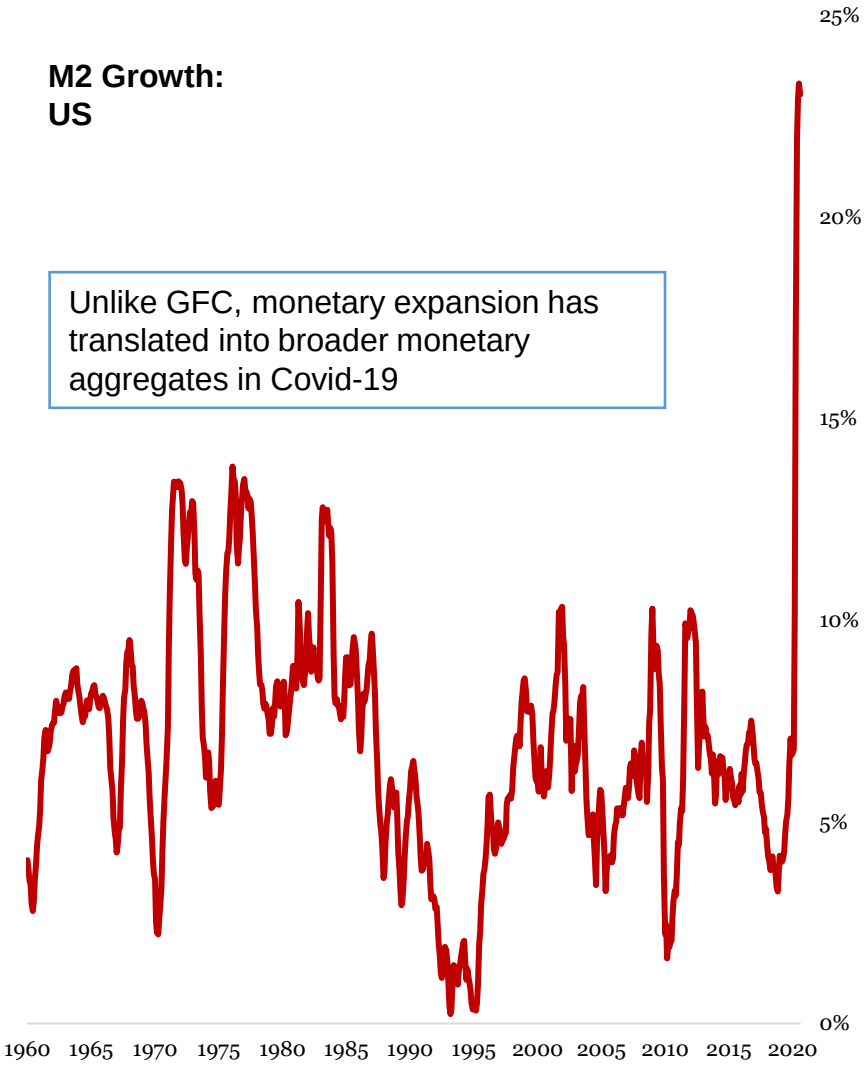
# Surprizing Stability of Bretton Woods II

- Global monetary stability in the 21st century reflects success of monetary policy independence
- Also rides on underlying favorable conditions
  - Downward price pressures
    - Effective global labor force expansion
    - (China, female participation, Eastern Europe)
  - Declining equilibrium real interest rate
- Main risks to the status quo
  - Inflation risks
    - Massive monetary expansion
    - Long term scarring effects of Covid-19 supply shocks
  - Amassing public debt
  - Deglobalization

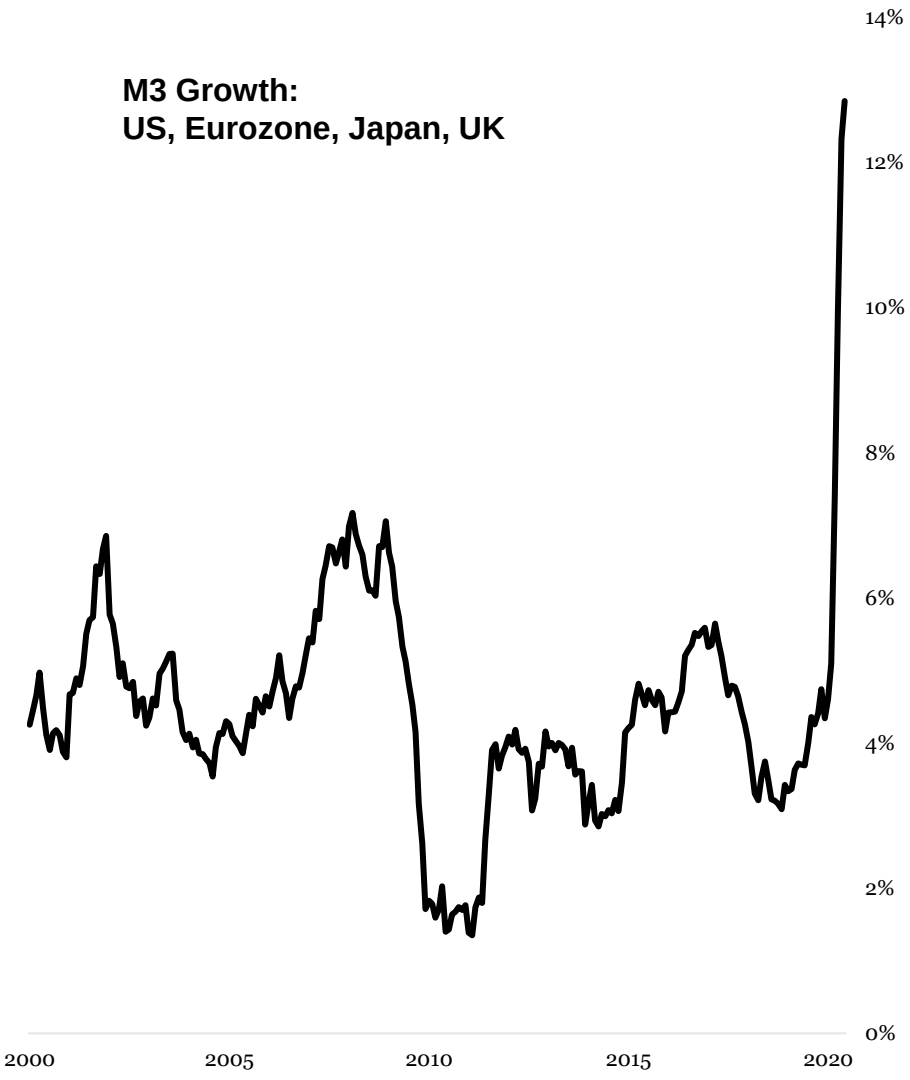
# Monetary Aggregates During Covid-19

**M2 Growth:**
**US**

Unlike GFC, monetary expansion has translated into broader monetary aggregates in Covid-19

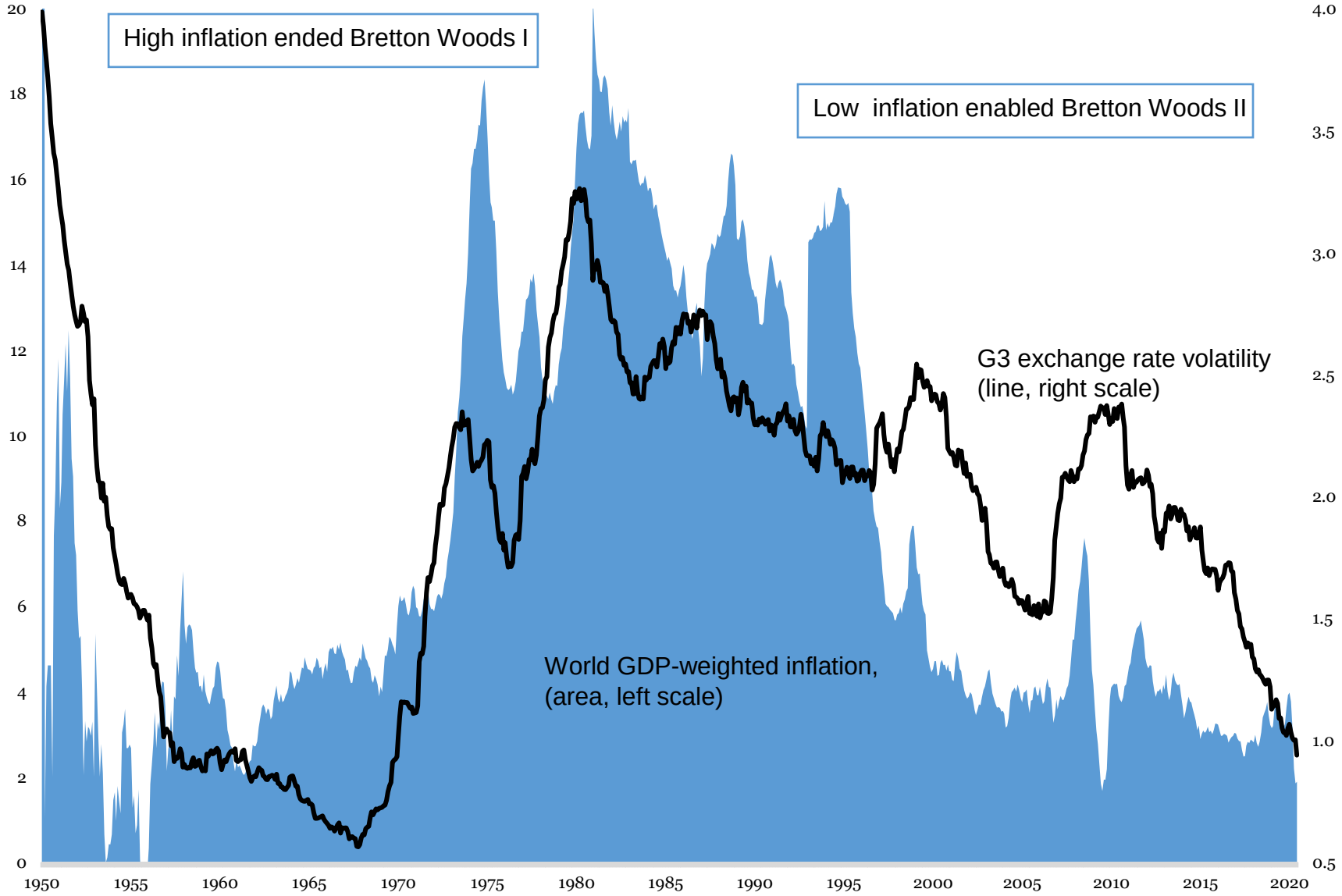



**M3 Growth:**
**US, Eurozone, Japan, UK**

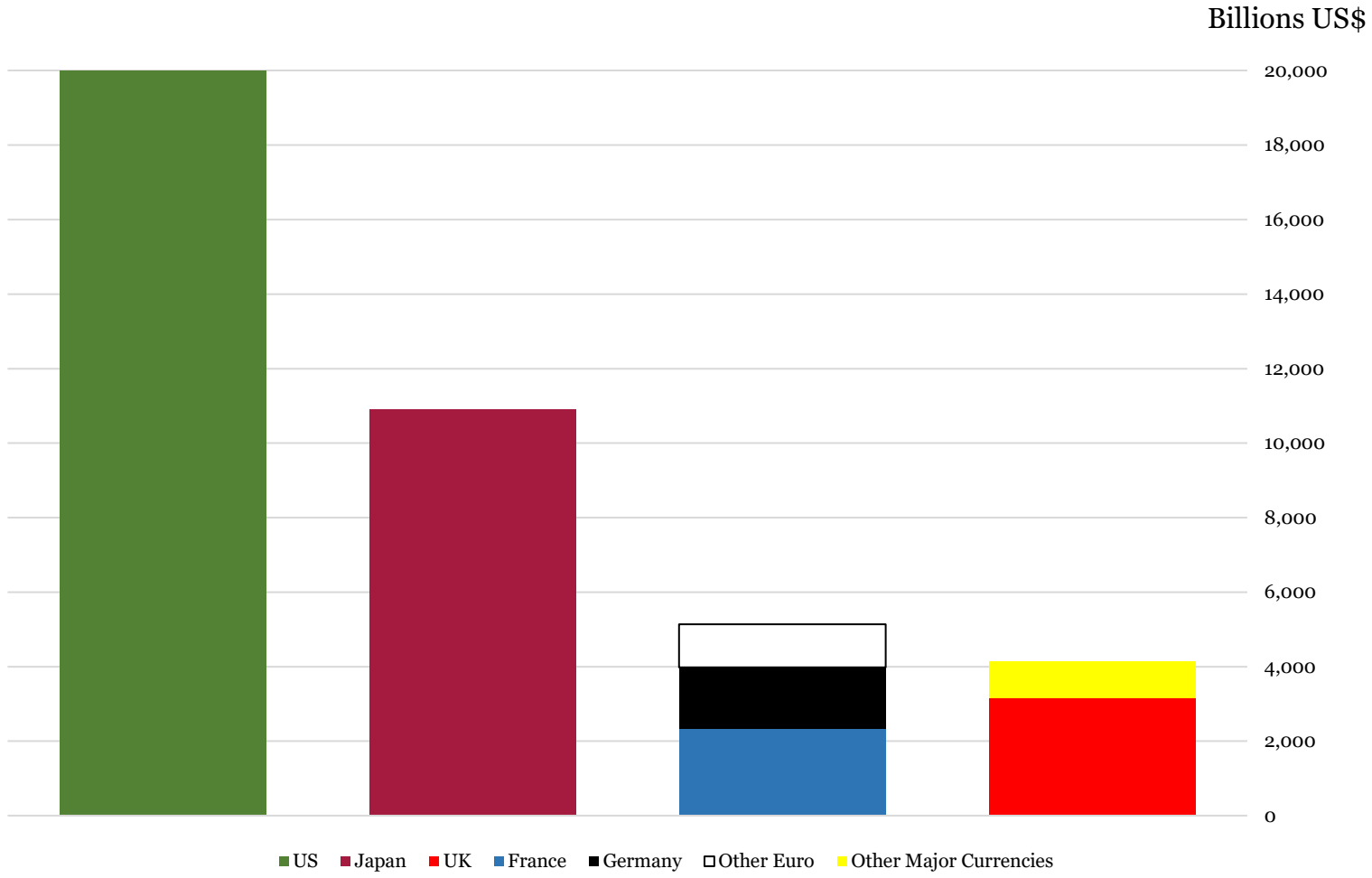



Sources: National central banks and the authors

# Inflation and Exchange Rate Stability



# Fiscal Risks: Outstanding Debt Securities




Early warnings from EMs

August 2020 or latest data available. Converted at market rates of August 2020. Other Eurozone are high-grade Euro denominated debt (Austria, Belgium, Finland, Netherlands). Other major currencies are Australia, Canada, Sweden, Switzerland, and UK.
Source: National finance ministries and the authors.

# Summary

Document a secular decline in volatility of major exchange rates in 21st century, accelerating since 2014.

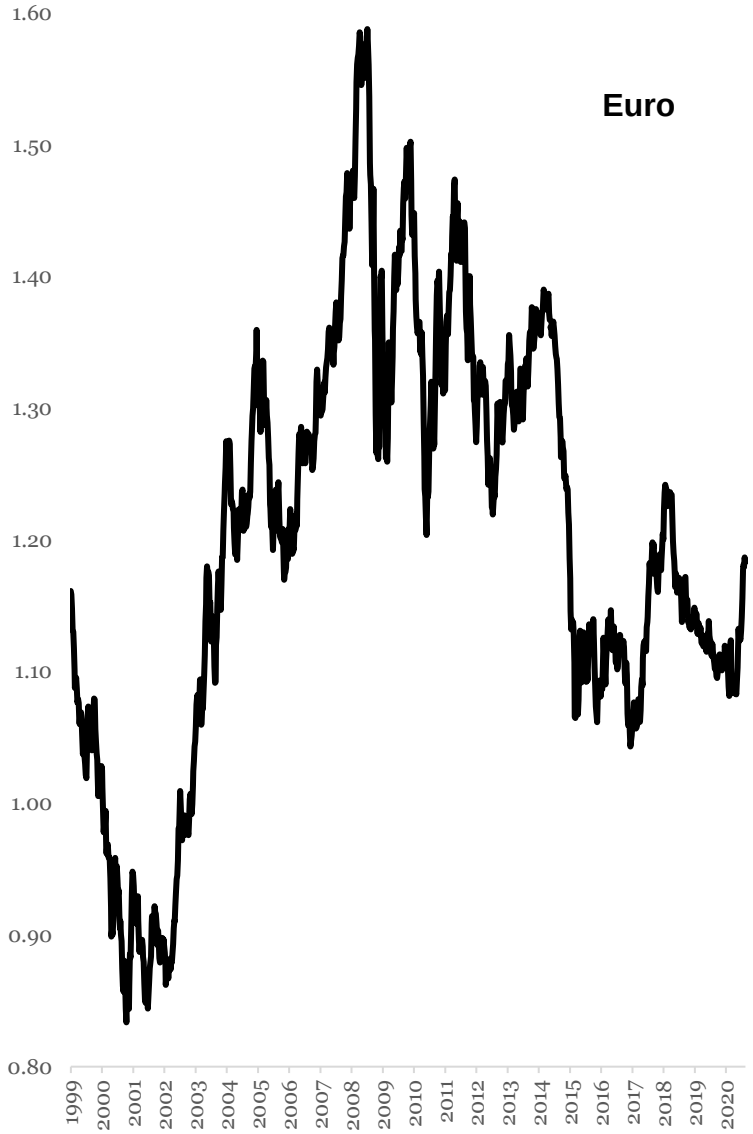
- Has outlived Bretton Woods
- Has so far survived Covid-19

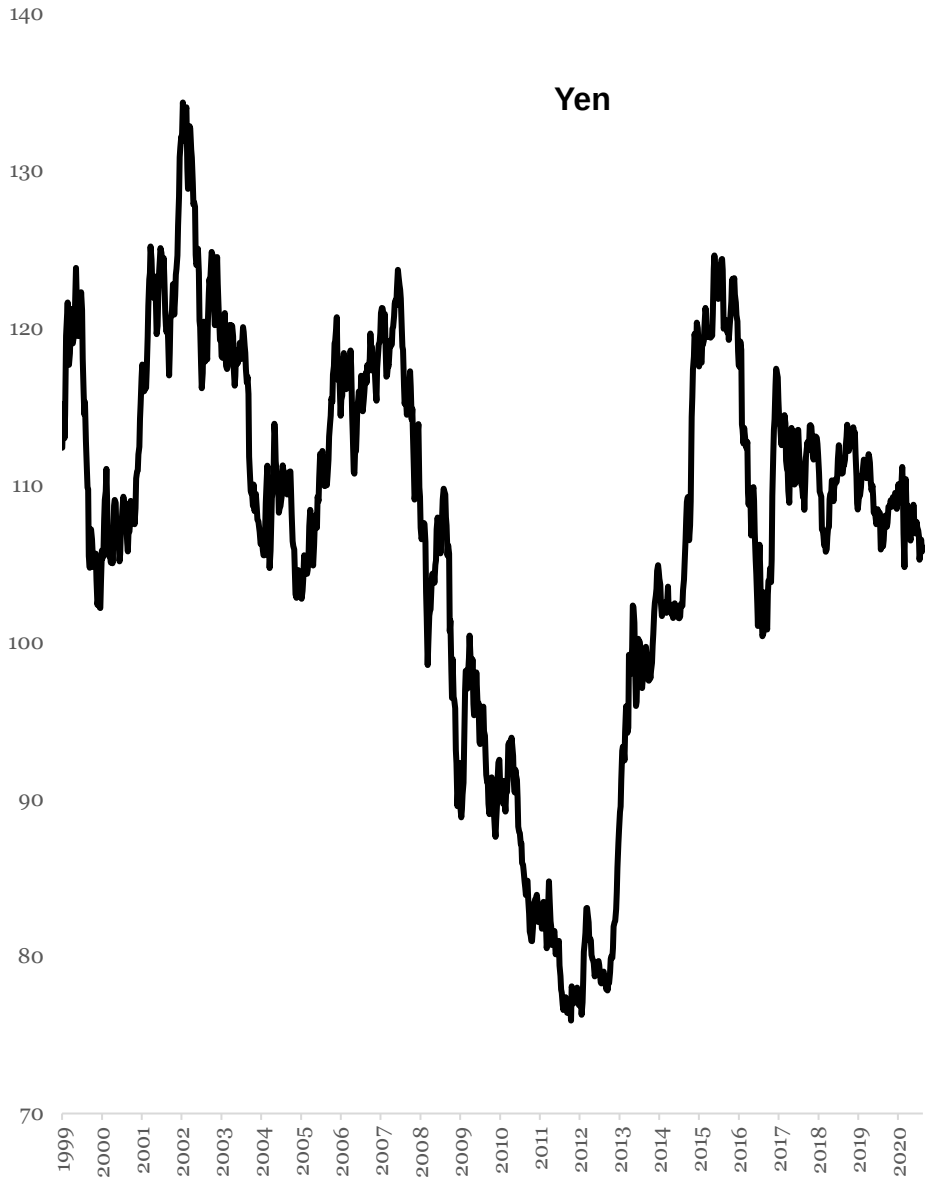
Our hypothesis: caused by decline in inflation, interest rate volatility.

Bretton Woods didn't survive the stagflation of the 70s. Cannot take survival of Extended Bretton Woods II for granted.

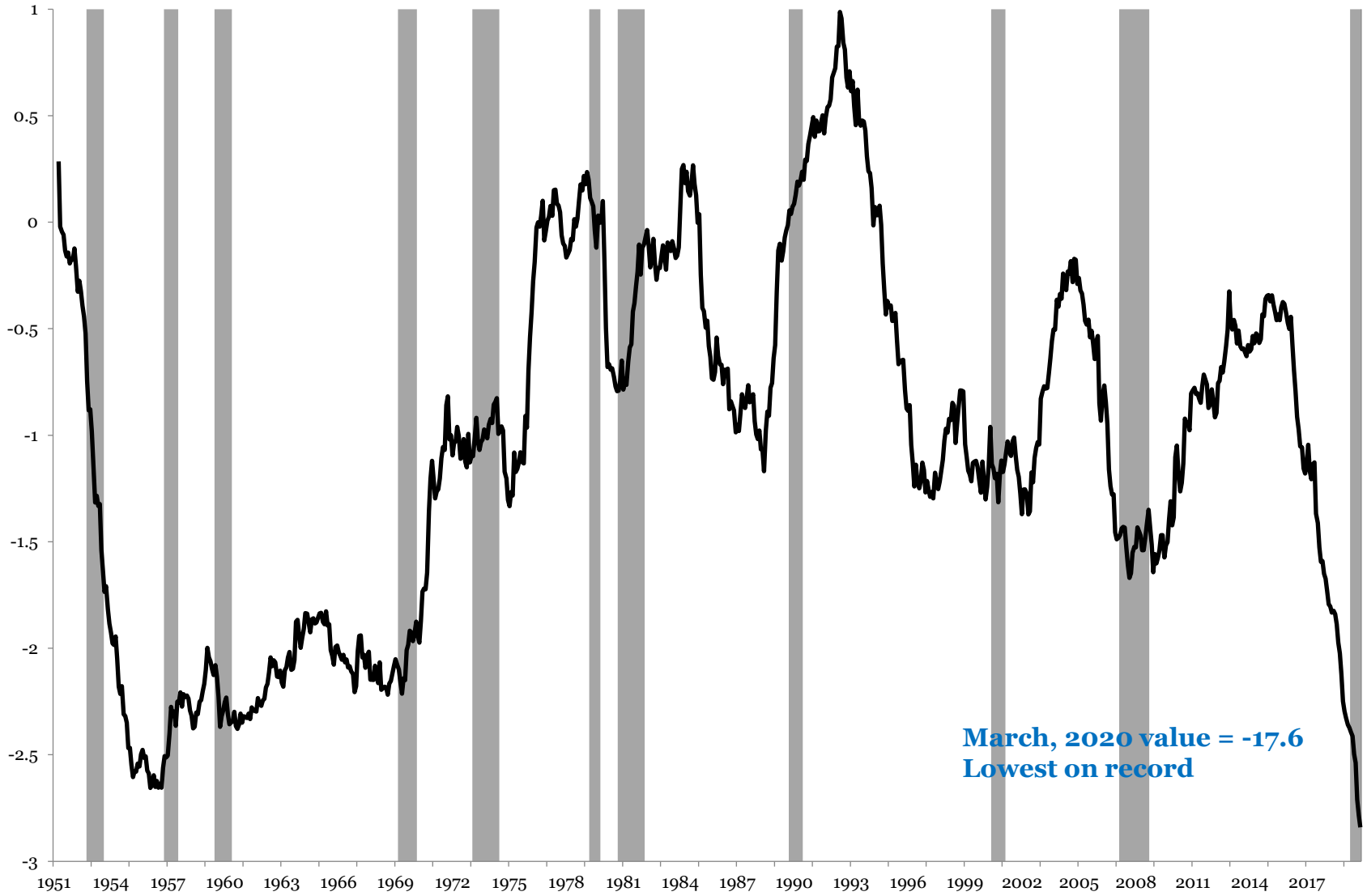
# Additional Materials

# Exchange Rate Levels



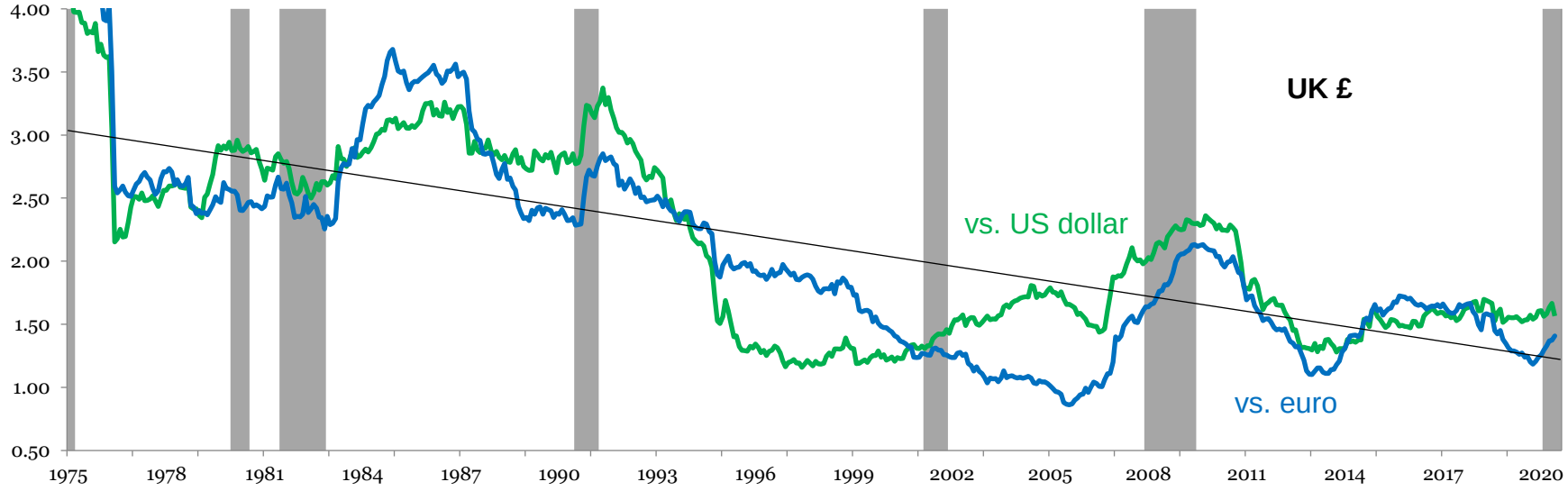



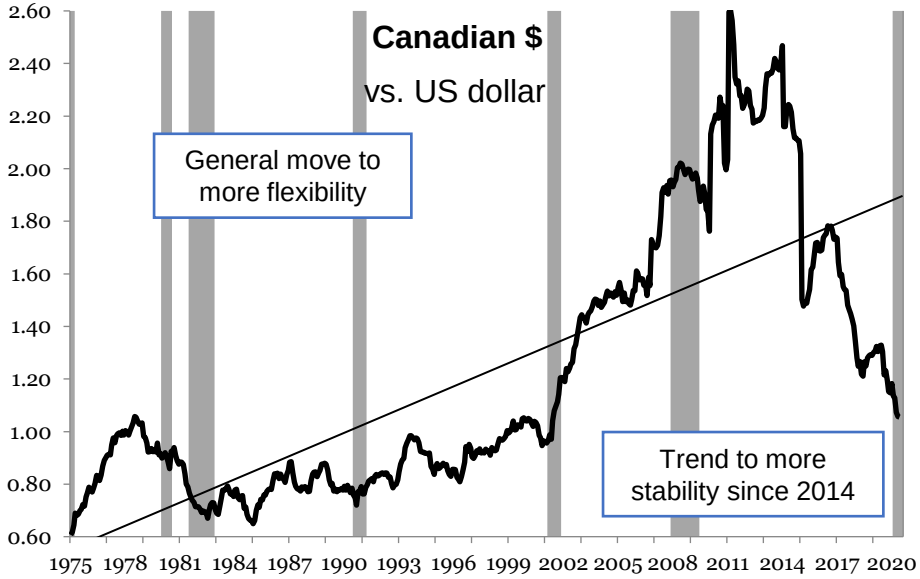
# EUR Volatility Relative to S&P500

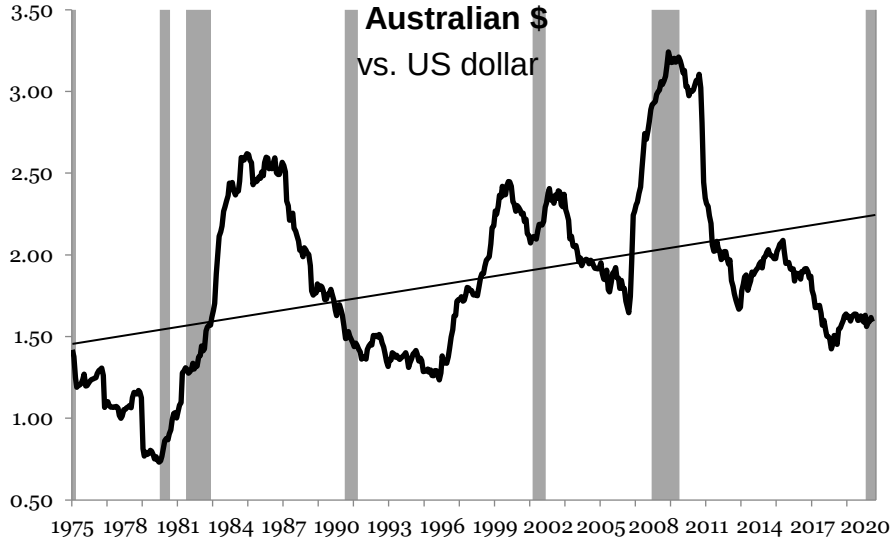



Sources: IFS, Shiller (2005) and the authors

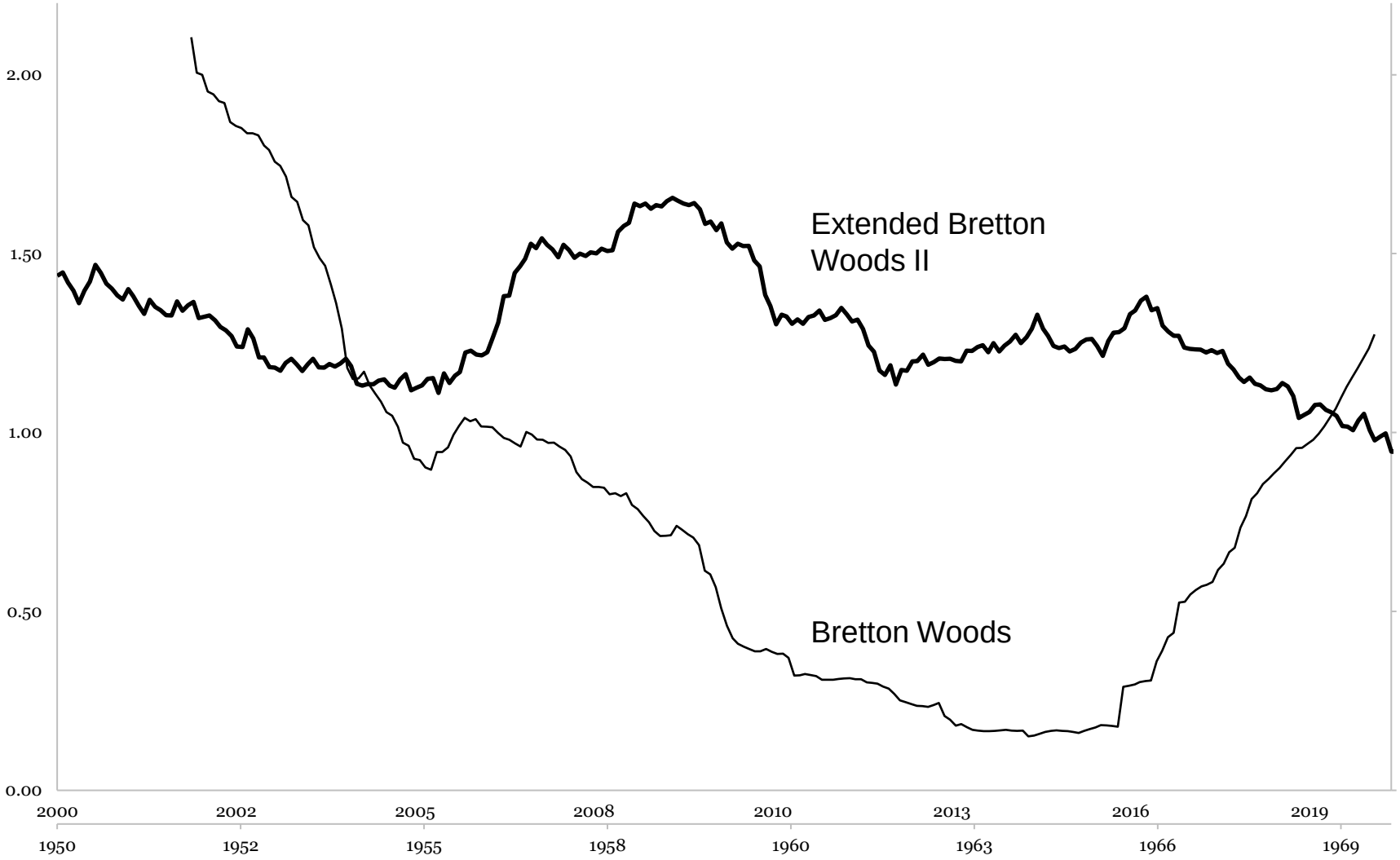
# Exchange Rate Variability: Next 3 Currencies



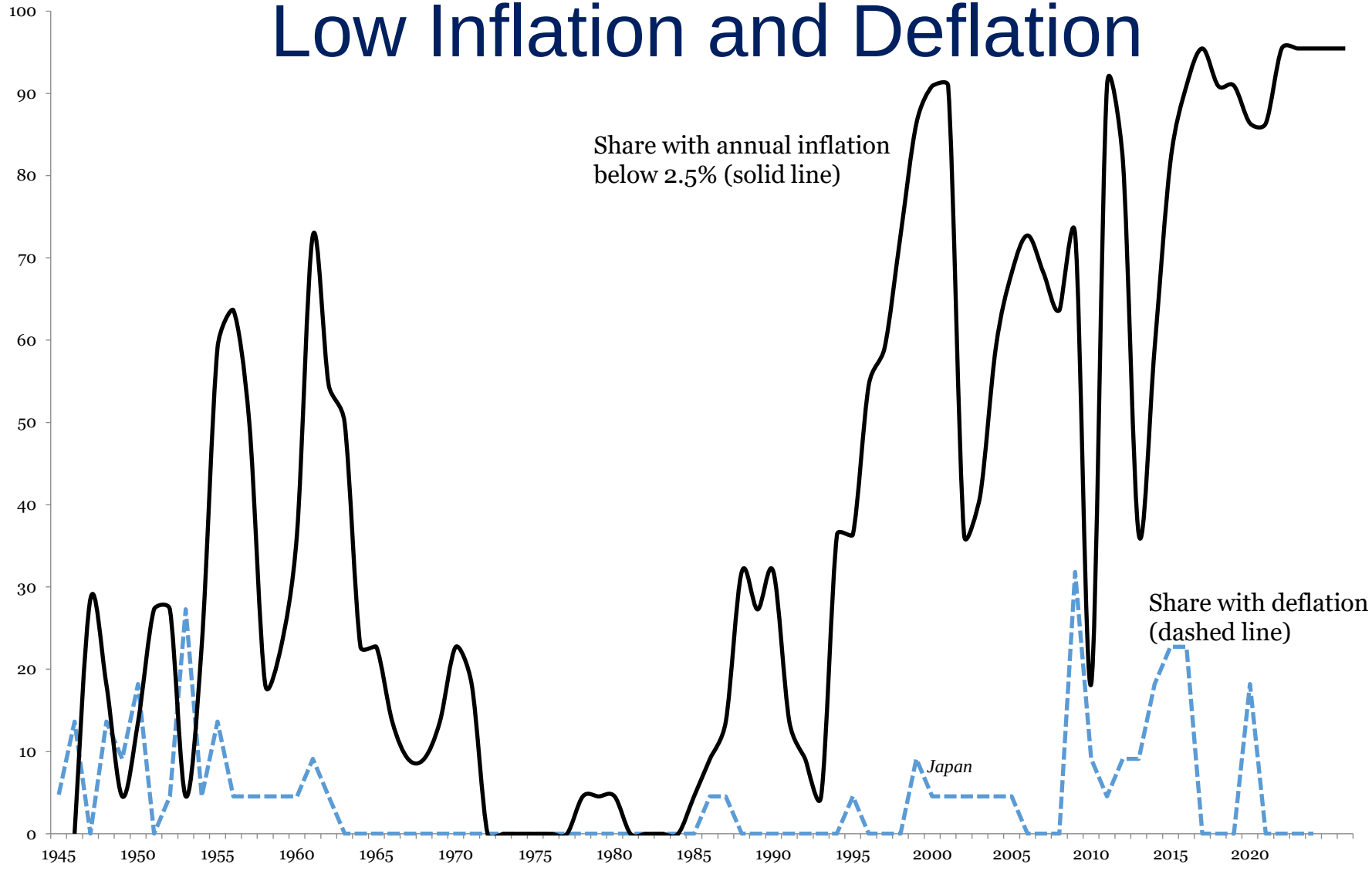



# G4 Currencies in Bretton Woods I and II




Bretton Woods I G4: US, UK, Germany, France. Bretton Woods II G4: US, China, Euro, Japan
Source: IFS and the authors

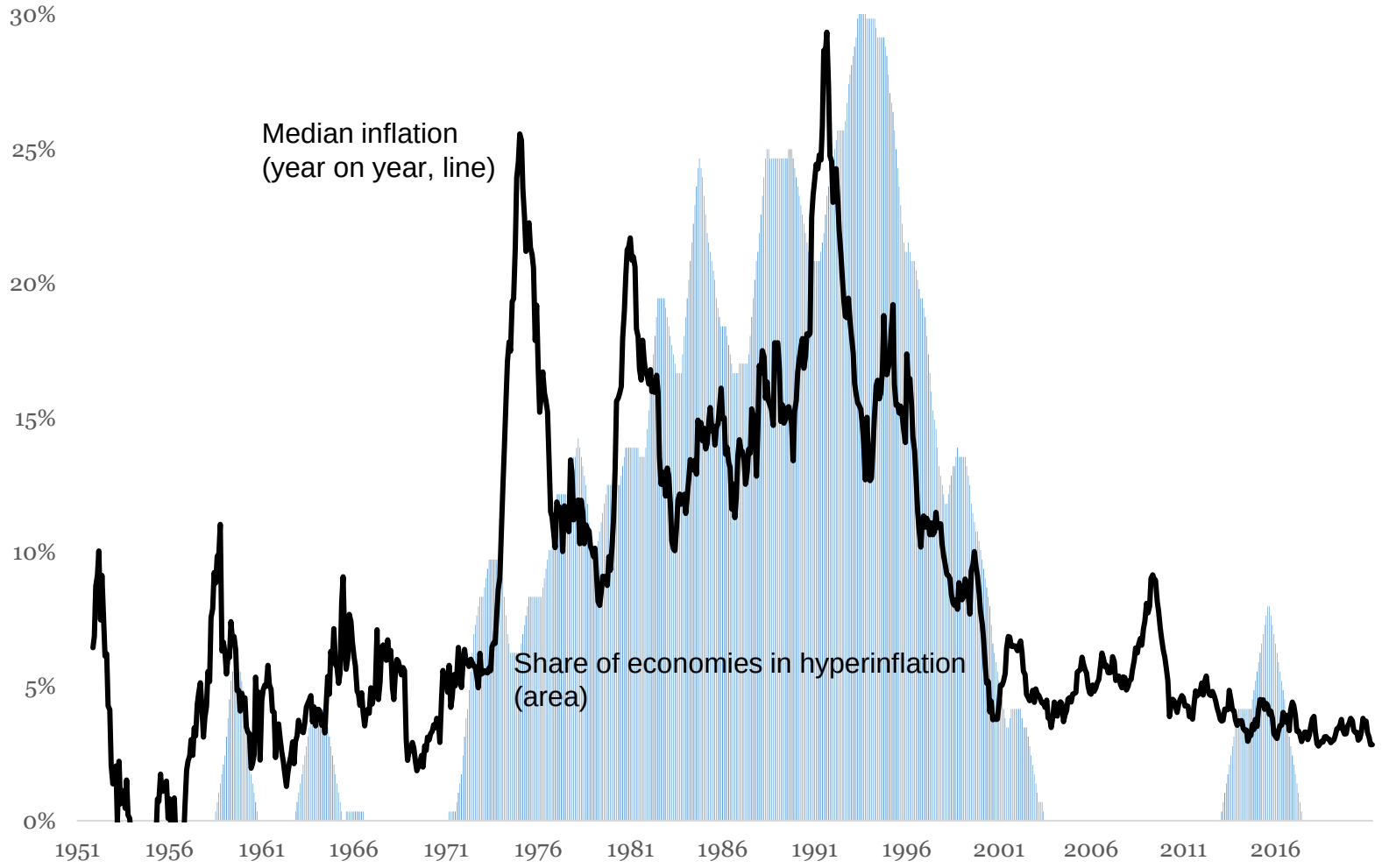
# High Income Countries: Low Inflation and Deflation




High income economies. Source: IMF WEO and the authors

Return

# Inflation and Hyperinflation in Emerging Markets

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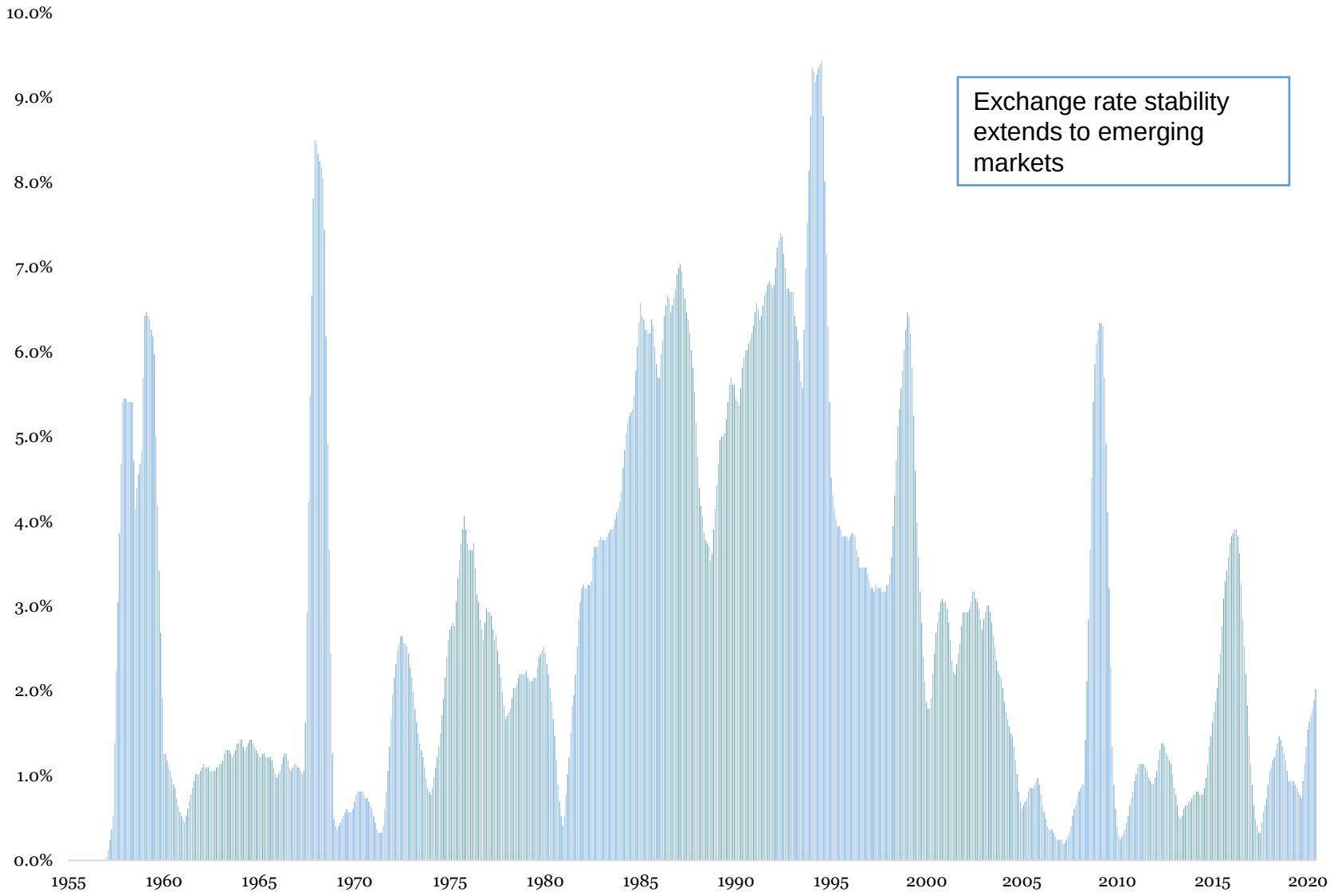
Sample: 24 emerging markets. Hyperinflation = year on year inflation > 40%.
Sources: IFS, Conference Board and the authors

# Share of Countries in Currency Crash




Currency crash = 12.5% depreciation month on month. Source: IFS and the authors.

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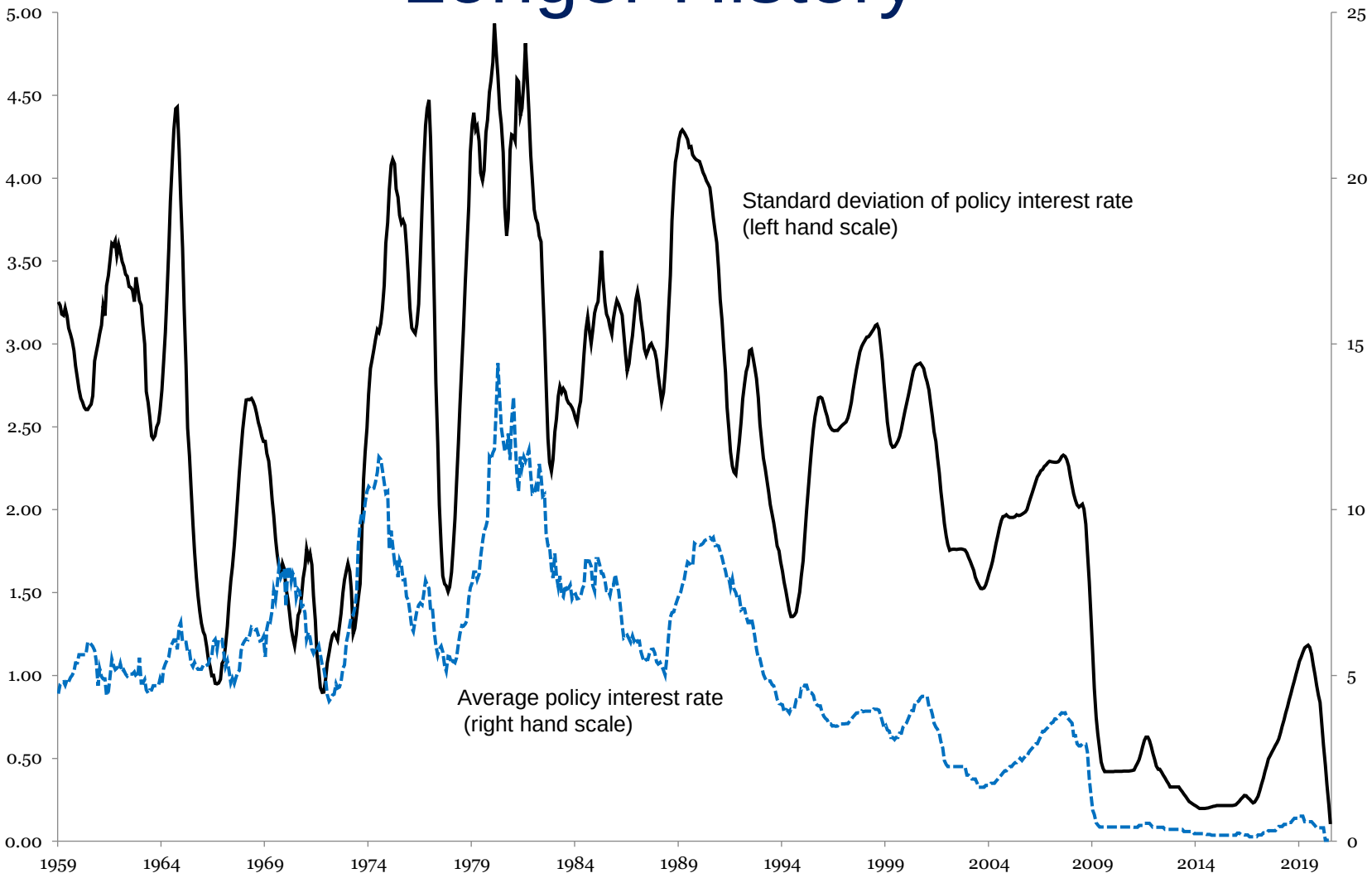
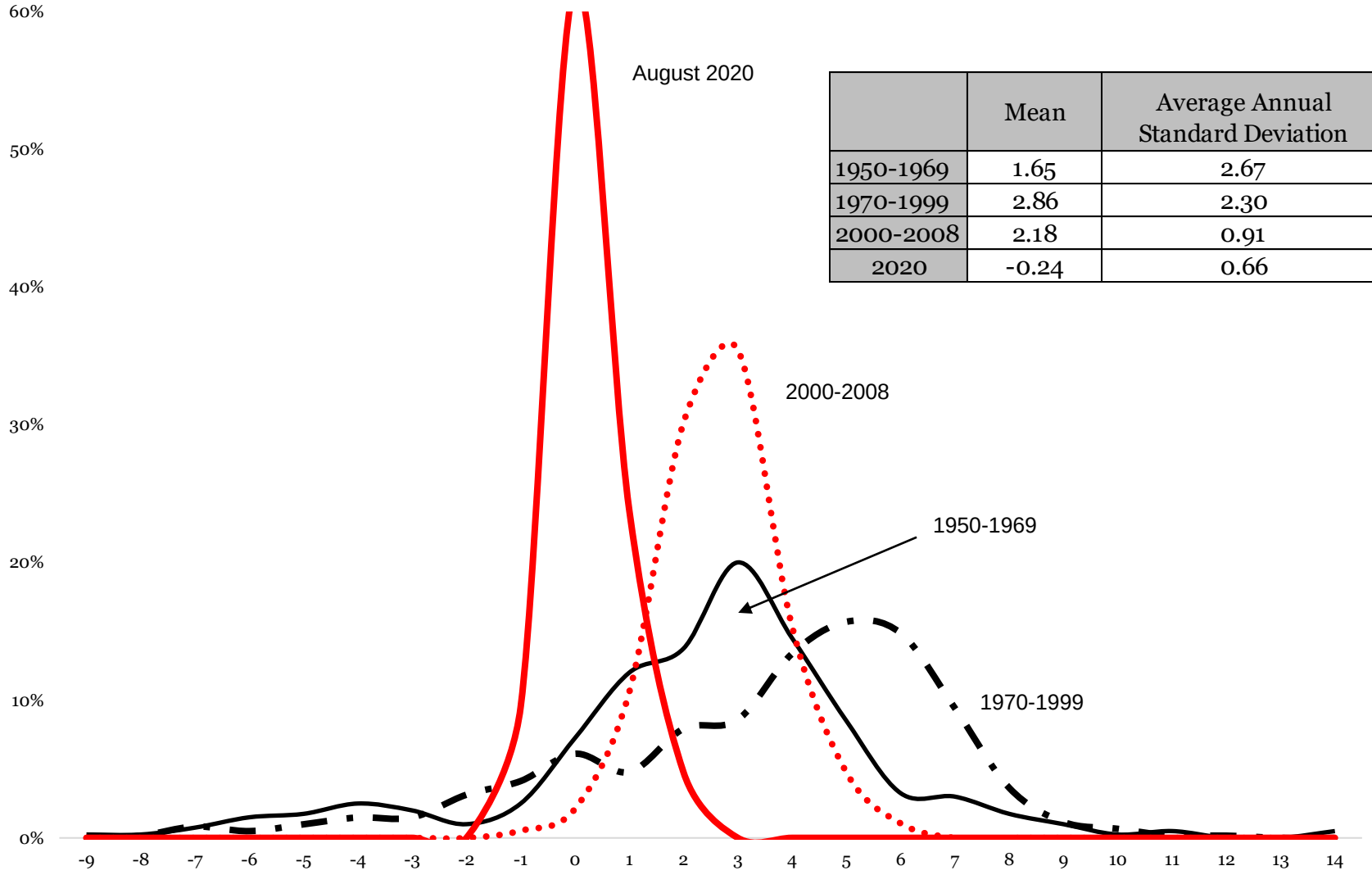
# Policy Interest Rate Differentials: Longer History




US, Germany, Japan, UK. Source: IFS, national central banks, and the authors

Return

# Declining Interest Rate Differentials: 10-year Real yields



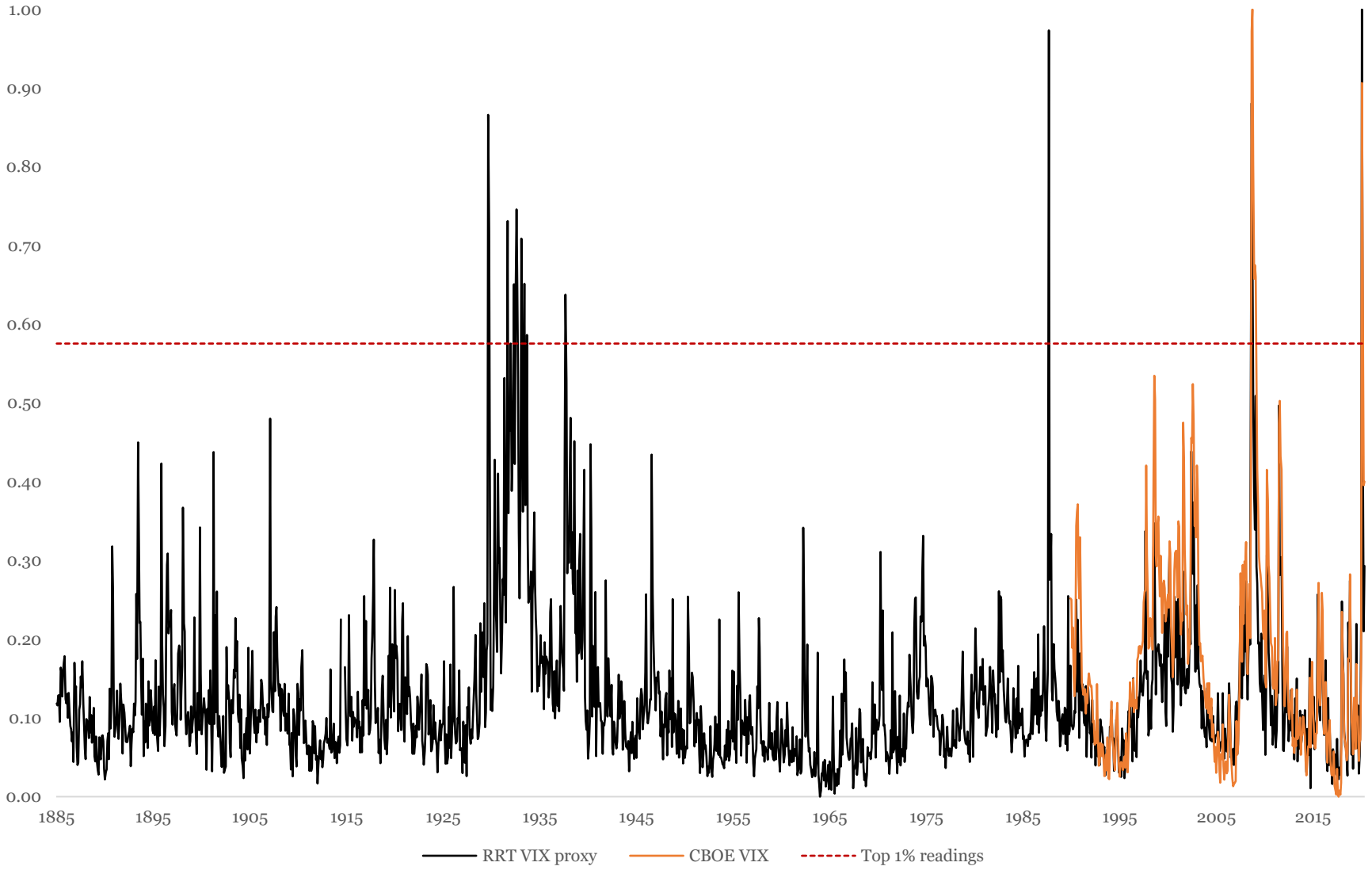

| | Mean | Average Annual Standard Deviation |
|---|---|---|
| 1950-1969 | 1.65 | 2.67 |
| 1970-1999 | 2.86 | 2.30 |
| 2000-2008 | 2.18 | 0.91 |
| 2020 | -0.24 | 0.66 |

Histogram of 10-year yields ex-ante based on previous year's inflation, high income countries excluding Greece
Source: OECD.stat, IFS and the authors



Return

# Historical Implied and Realized Volatility




Source: Reinhart, Reinhart and Trebesch (2020), FRED, Schwert (1990), Thompson Reuters.

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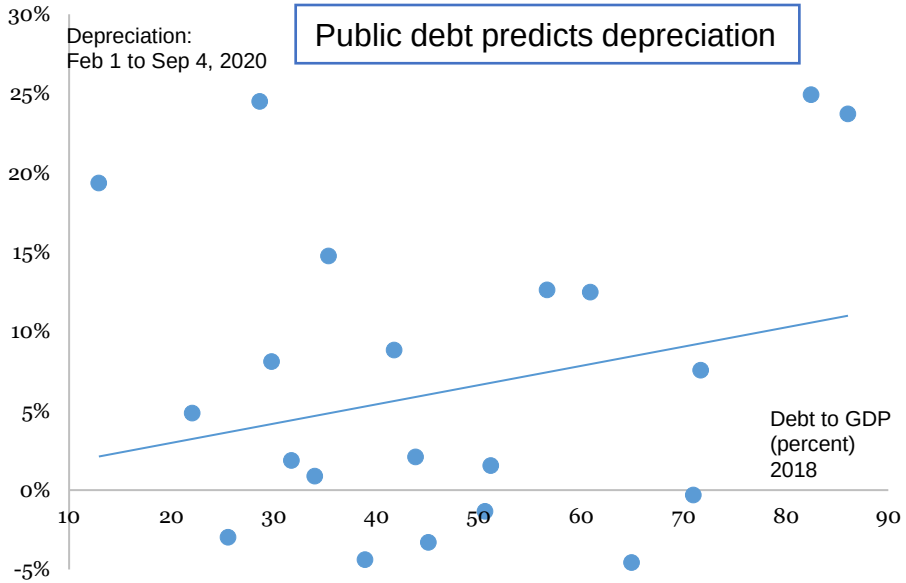
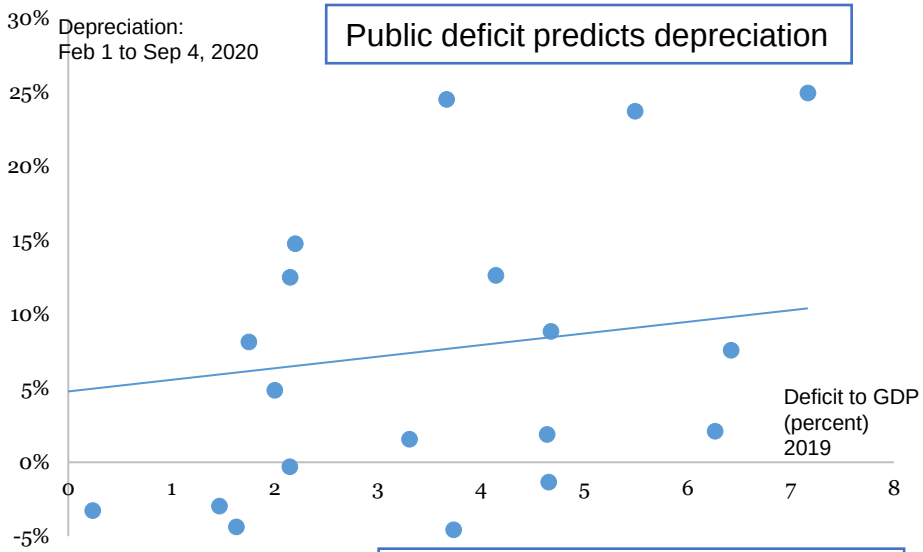
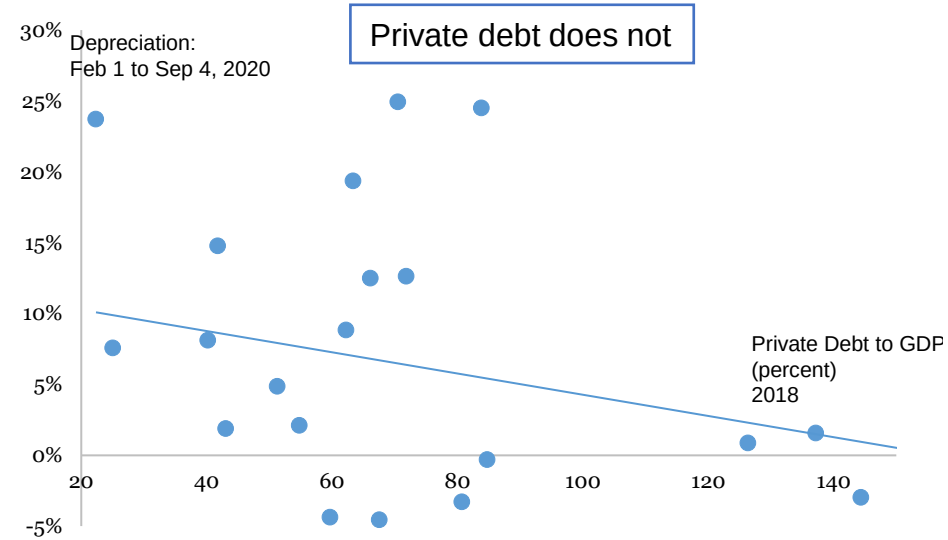
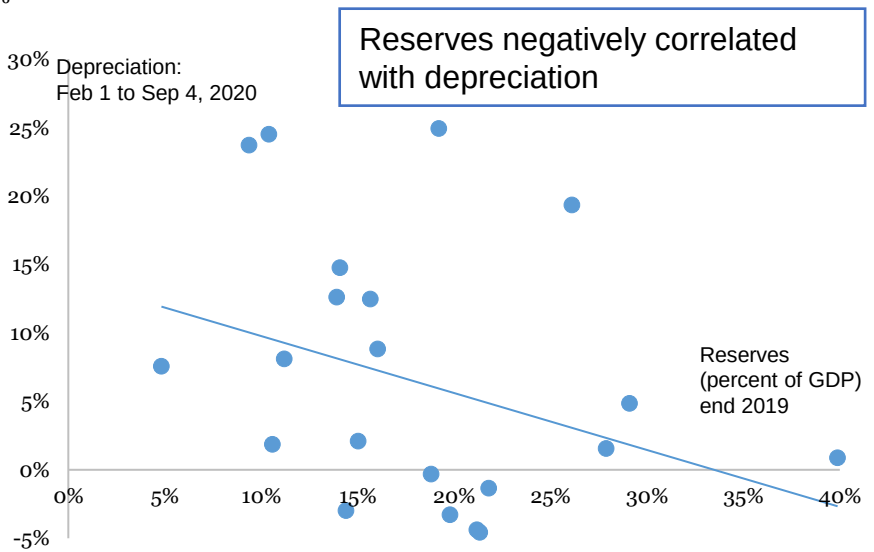
# Early Warnings from Emerging Markets




Source: IMF Global Debt Database and the authors