



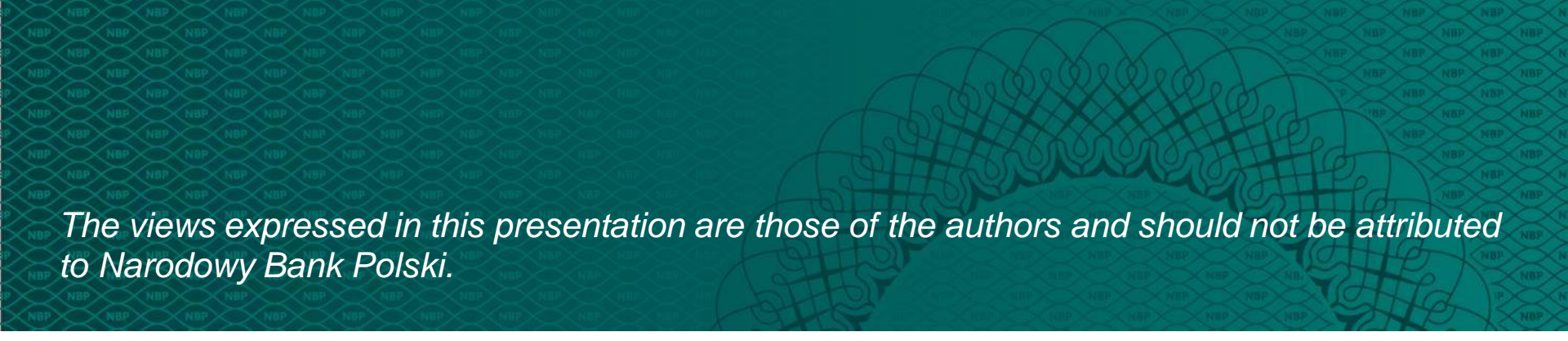
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Narodowy Bank Polski

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Impact of the Fed's monetary policy normalization on emerging market economies

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Agenda

- Literature review, motivation, research objectives
- Empirical analysis
- Conclusions

Literature review, motivation and research objectives

Key insight: yield decomposition

- Any longer-term yield can be decomposed into an average of expected short-term interest rates (risk-neutral yield) and a term premia (Dai and Singleton 2002)

$$tp_n = r_n - \frac{1}{n} \sum_{i=1}^n r_i^{RF}$$

tp_n - n-period term premia

r_n - n-period yield

r_i^{RF} - short-term risk-free interest rate for period i

Impact of Fed's QE on U.S. Treasuries yield

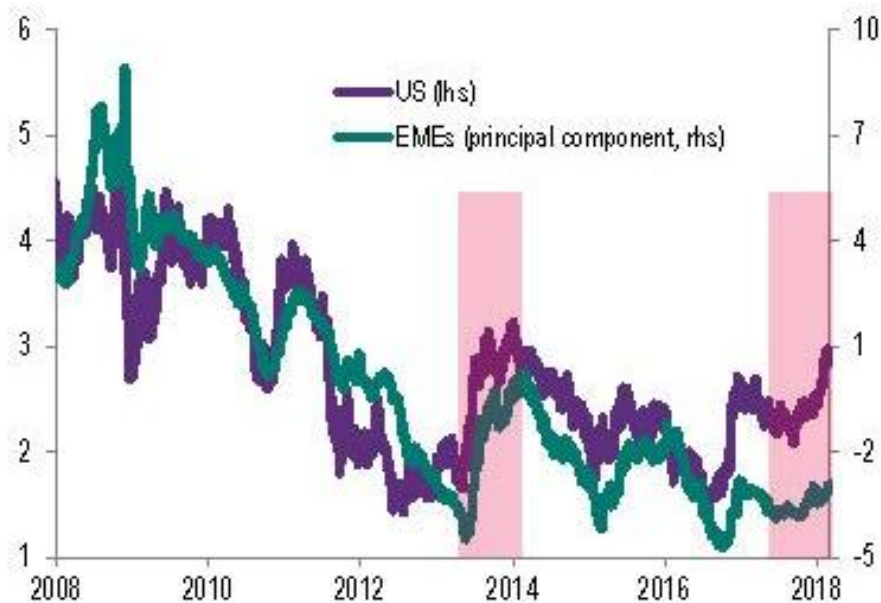
- QE programmes put downward pressure on long term yields, mainly via **signalling** and **portfolio rebalancing channels**.
- Most of the authors argue that decline in longer-term yields **primarily reflects lower risk premia** rather than lower expectations of future short-term interest rates (e.g. Gagnon et al. 2011, Hamilton and Wu 2012, D'Amico and King 2013, Ihring et al. 2018).
- Various estimates put the decrease in the term premia on 10Y U.S. Treasuries following from the Fed's QE programmes at **50-150 basis points** (see e.g. the review of empirical studies in Bonis et al. 2017).

Financial spill-overs of Fed's QE to emerging market economies

- Compressed **risk premia** in the U.S. Treasuries translates into increased demand for different assets, including those in EMs.
- Lower expected short-term interest rate path in the U.S. (**signalling channel**) results in wider expected interest rate differential between the U.S. and EMEs, which attracts capital flows to the latter.
- Various empirical estimates confirm the existence of significant international financial spill-overs of QE (Fratzscher et al. 2017, Lim et al. 2014, Ahmed and Zlate 2014, Alpanda and Kabaca 2015, Bowman et al. 2015).

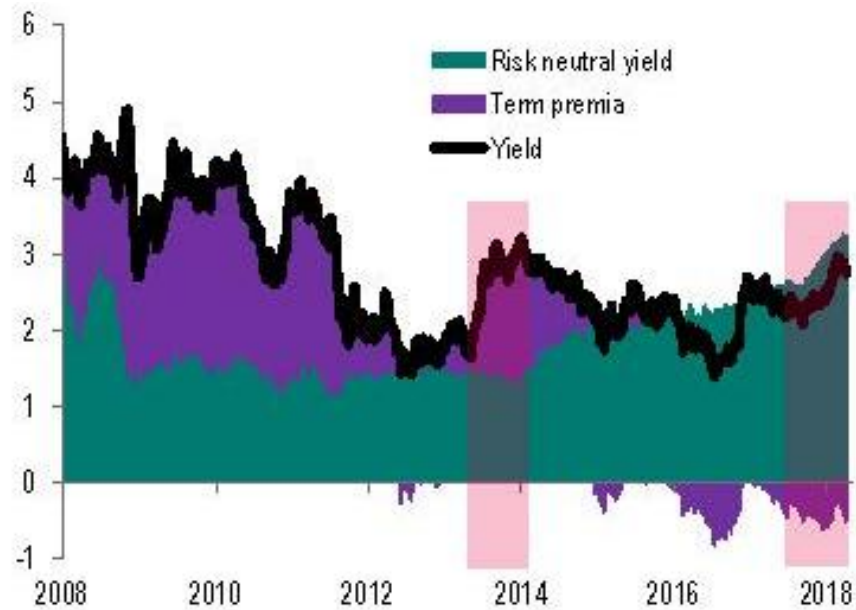
Motivation

10Y government bond yields



Source: Bloomberg data.

Decomposition of 10Y U.S. Treasury yield



Source: New York Fed data.

Research objectives

- Identify financial channels via which Fed's QE effects tend to spill over to EMEs.
- Find determinants of the sensitivity of particular EMEs to those spill-overs.
- Explain why the term premia in the U.S. remains compressed despite the ongoing Fed's balance sheet reduction process.

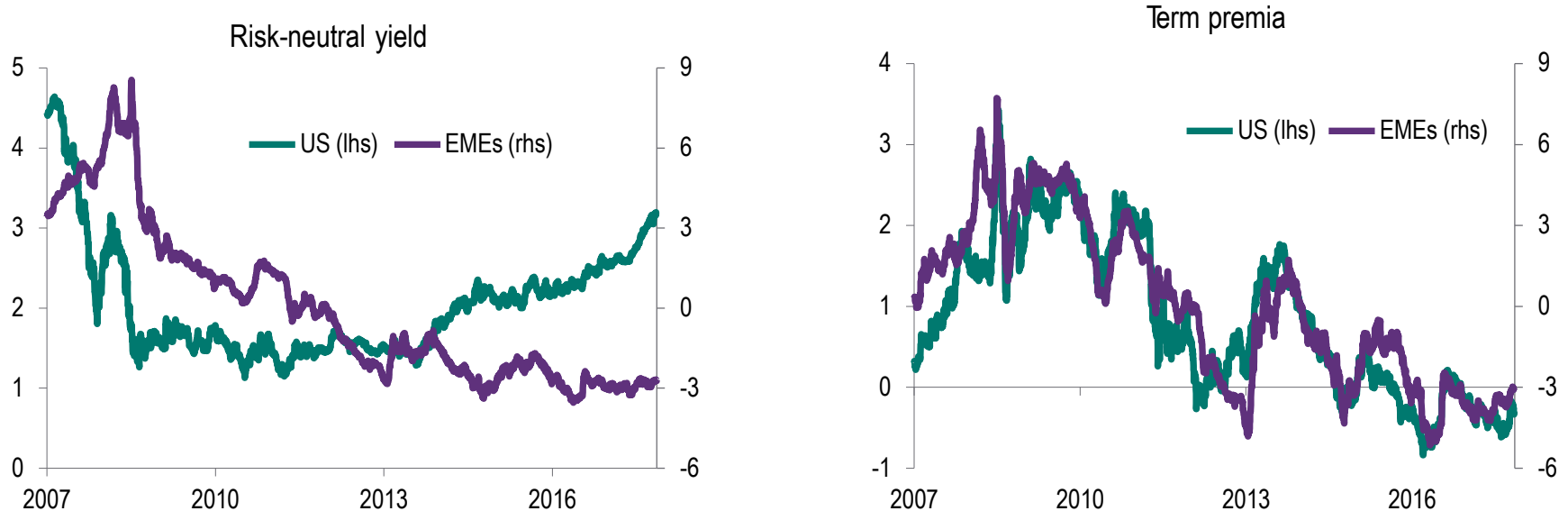
Empirical analysis

Decomposition of yields into term premia and risk-neutral yield

- We employ arbitrage-free **term structure model proposed by Adrian et al. (2013)**.
- **19 important EMEs:**
 - Brazil, Bulgaria, Chile, China, Colombia, Czech Republic, Hungary, India, Indonesia, Mexico, Malaysia, Peru, Philippines, Poland, Russia, South Africa, South Korea, Thailand, and Turkey.
- Zero-coupon yield curve daily data from Bloomberg (interpolated if needed).
- Constrained by data availability for less-developed financial markets in some of the analysed countries, we eventually obtain balanced panel for the period from **May 2007 to February 2018**.
- For some of the further analysis we use a principal component of term premia and also of risk-neutral yields for all the analysed EMEs.

Shocks related to QE in the U.S. tend to spill over to EMEs mainly via term premium adjustments (1)

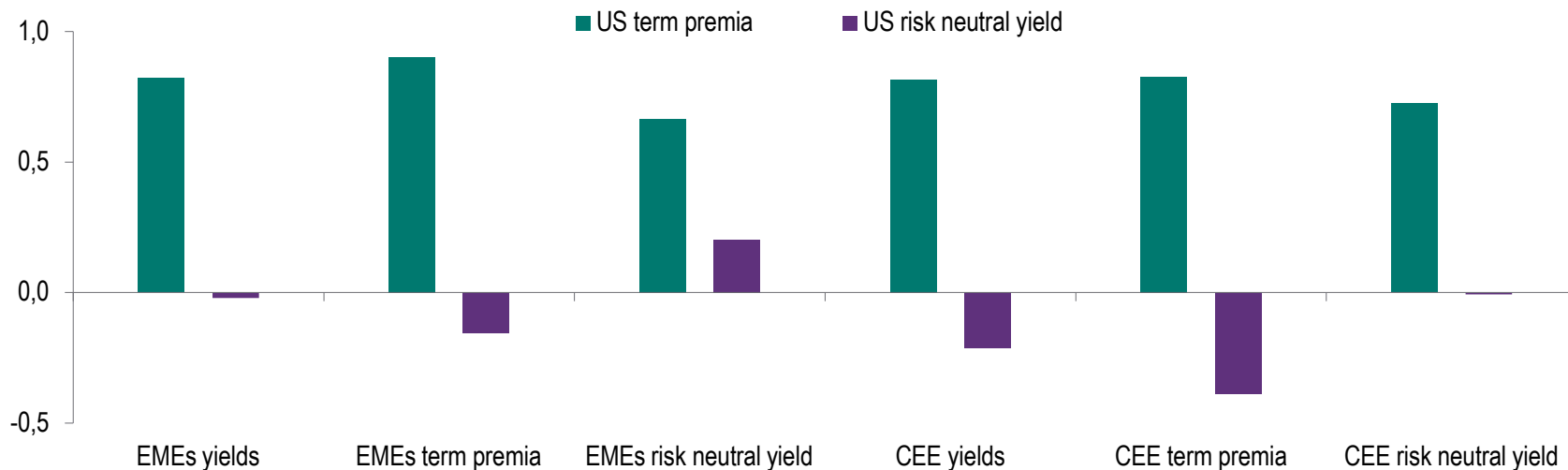
Risk-neutral yield and term premia in 10Y U.S. Treasuries yield and principal components of these variables for EMEs



Source: Bloomberg and New York Fed data, authors' calculations.

Shocks related to QE in the U.S. tend to spill over to EMEs mainly via term premium adjustments (2)

Correlations between the components of 10Y government bond yields



Based on daily data in the period from May 2007 to February 2018.

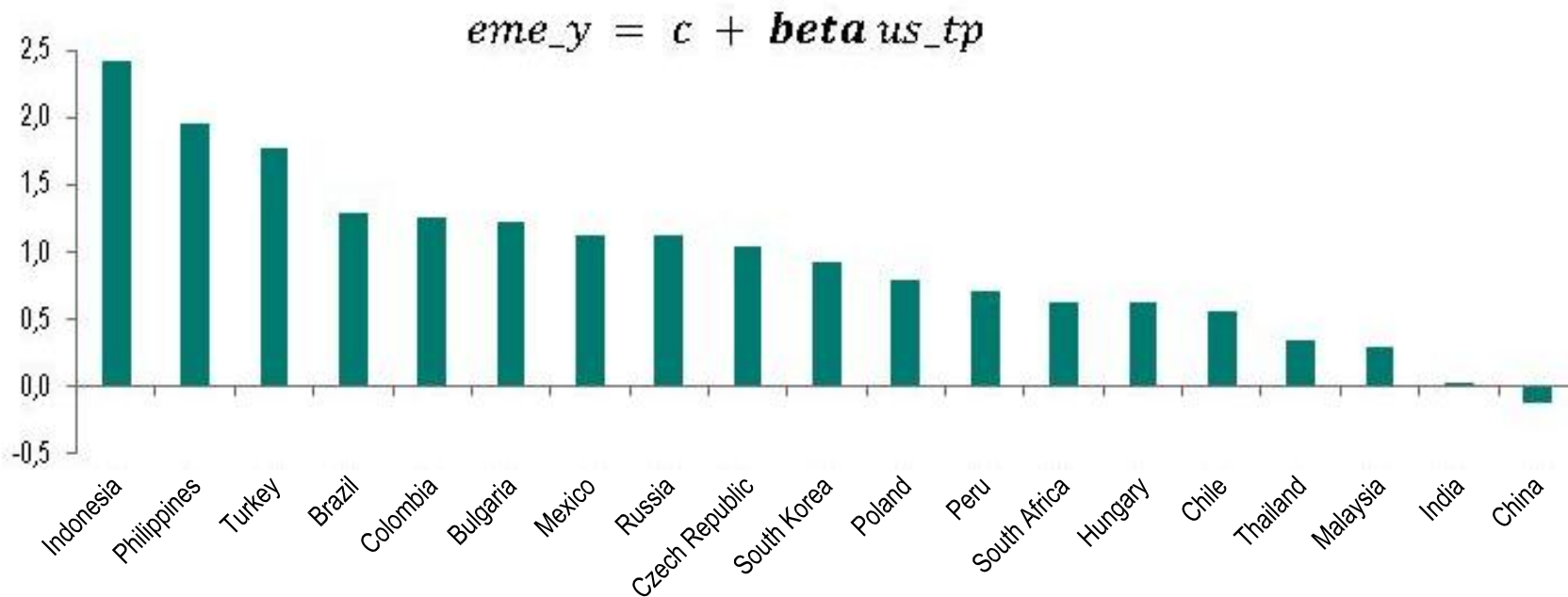
Shocks related to QE in the U.S. tend to spill over to EMEs mainly via term premium adjustments (3)

$$emes_y = c + a_1 us_{tp} + a_2 us_{rny}$$

	c	+ us_tp	y us_rny	R ²
Nov 2008 – Feb 2018	-3.22 (0.14)	2.61 (0.03)	0.28 (0.07)	0.79
Nov 2008 – Nov 2014	-4.28 (0.29)	2.67 (0.04)	0.91 (0.17)	0.68

All the variables significant at 1%. Standard errors in the brackets.

Determinants of the EM yields sensitivity to U.S. term premia shifts (1)



Estimation on daily data by Bloomberg and the New York Fed in a period from November 2008 to November 2014.

Determinants of the EM yields sensitivity to U.S. term premia shifts (2)

$$\beta = a_1 \text{non_resid} + a_2 \text{gdp_defl} + a_3 \text{gdp_pc} + a_4 \text{ca}$$

non_resid	gdp_defl	gdp_pc	ca	R ²
0.02510 *** (0.016)	0.12667 *** (0.014)	0.00003 (0.227)	0.01458 (0.7134)	0.44

P-values in the brackets.

Variables in average levels in 2008-2014. The data for non-residents holdings from the Sovereign Investor Base Dataset for Emerging Markets by the IMF, (no data for the Czech Republic and South Korea, so 17 countries remain in the sample). The rest of variables come from the World Bank statistics.

Fundamental factors keeping the term premia in the U.S. compressed (1)

$$us_tp = c + a_1 move + a_2 cpi_lev + a_3 cpi_f_disp$$

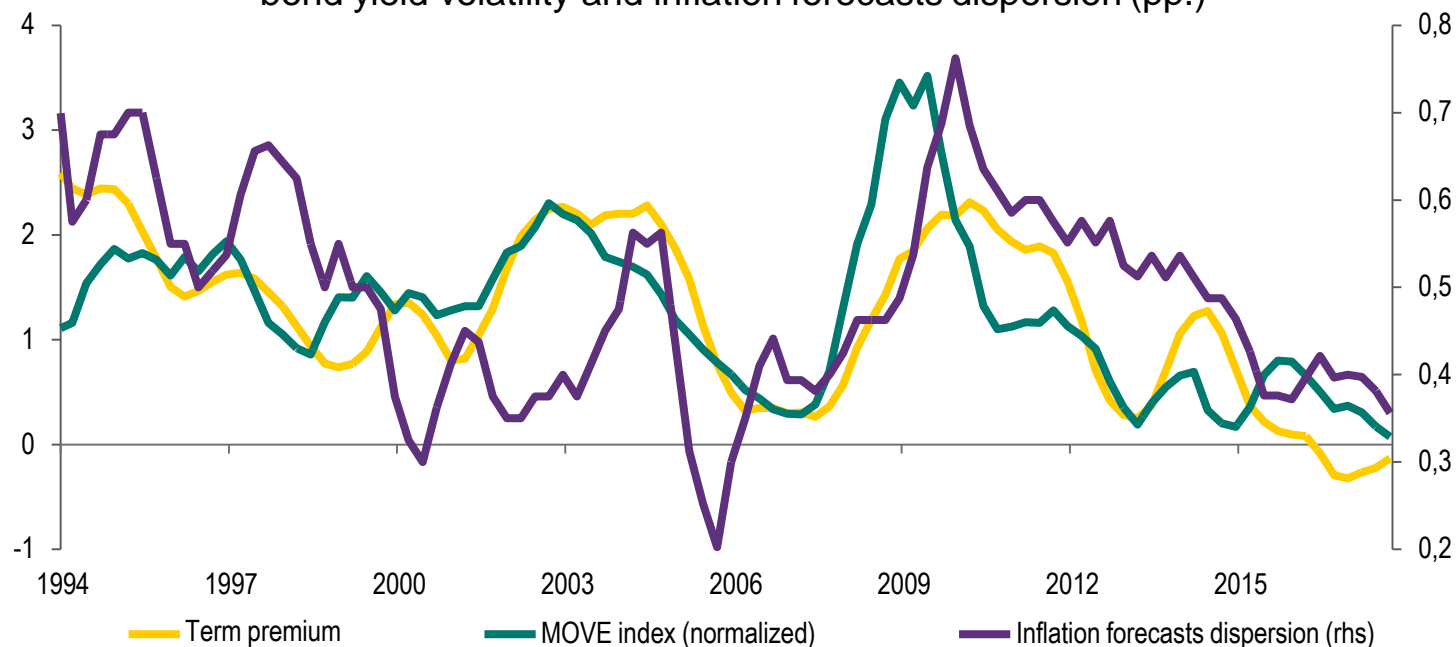
c	move	cpi_lev	cpi_f_disp	R ²
-2.837 (0.430)	0.015 (0.002)	0.835 (0.184)	1.028 (0.432)	0.56

All the variables significant at 2%. Standard errors in the brackets.

Sample: 1993Q1-2017Q3. Data on expected level of inflation in the next 10 years and on inflation forecast dispersion from the Survey of Professional Forecasters by the Philadelphia Fed; MOVE Index from Bloomberg.

Fundamental factors keeping the term premia in the U.S. compressed (2)

Term premia in the U.S. 10Y Treasuries, MOVE index of bond yield volatility and inflation forecasts dispersion (pp.)



Source: Bloomberg, New York Fed, Philadelphia Fed data.

General conclusions

- Bond yields in EMEs are much more strongly associated with changes in U.S. bond risk premia than with changes in risk-neutral yields.
- Sensitivity of yields in a given EME to U.S. term premia shifts is significantly determined by the share of non-residents in the government debt market.
- Behaviour of U.S. bond term premia is well explained by the volatility of long-term interest rates implied from interest rate options, as well as the expected level of future inflation and uncertainty around it.

Policy conclusions

- The behaviour of term premia in U.S. Treasuries (driven to high extent by fundamental factors) seems to explain why EM assets have been so strongly affected during the “taper tantrum” episode and yet have barely moved in October 2017 when the Fed began winding down its massive bond portfolio.
- Tightening of monetary conditions in the U.S. is likely to spill over to EMEs only insofar as it brings about a rise in Treasury risk premia, which would be supported by an increase in expected inflation and its volatility. In that scenario, countries with relatively higher shares of non-residents in their bond markets would be affected the most.



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