Comovement of the Sovereign Yields of Emerging Markets

Pavel Solís

Johns Hopkins University

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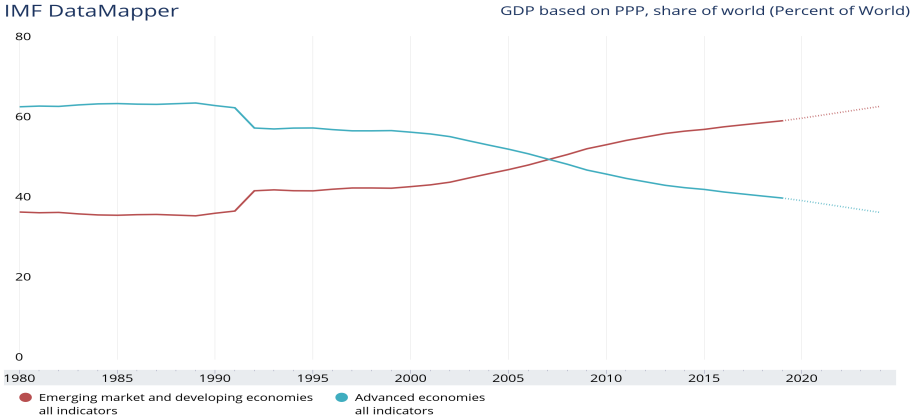
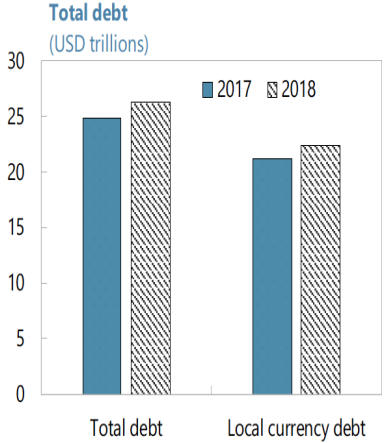
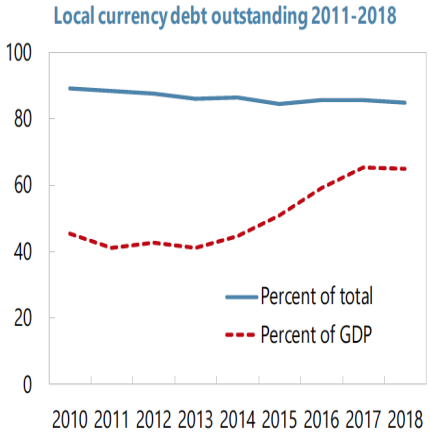
World GDP



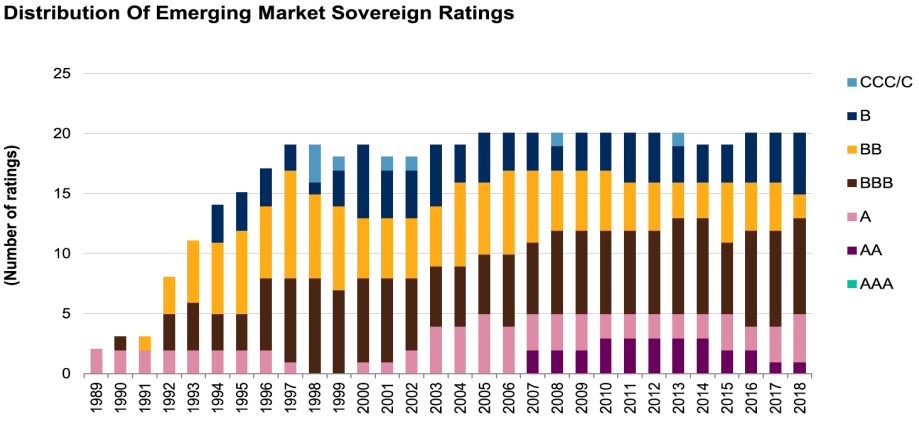
Developments in Emerging Markets Local Currency Debt





Source: IMF-World Bank Note for the G20.

Credit Risk in Local Currency Yields



Source: S&P Global Fixed Income Research.

Research Questions

- Do the sovereign yields of emerging markets (EMs) comove?
- To what extent are yields interconnected?
  - Policy rate expectations vs compensation for risks
- International spillovers of monetary policy in advanced economies (AEs)

Related Literature

- International comparison of bond yields
  - Diebold-Li-Yue 2008, Wright 2011, Dahlquist-Hasseltoft 2016
- Sovereign default in EM local currency
  - Reinhart-Rogoff 2011, Du-Schreger 2016, Erce-Mallucci 2018, Otonello-Pérez 2019
- International spillovers of monetary policy
  - Hofmann-Shim-Shin 2017, Curcuru-Kamin-Li-Rodríguez 2018, Gilchrist-Yue-Zakrajšek 2019, Adrian-Crump-Durham-Moench 2019

Contributions

- **EM perspective** in analysis of international bond yields
- Decomposition of EM sovereign yields acknowledging **credit risk**
- Macroeconomic **determinants** of EM bond yields

Roadmap

- Construction of yield curves
  - Credit risk in EM yields
- Affine term structure model
- Results
  - Comovement, determinants

Nominal Yield Curves

- Nominal yield curves ($y_{t,n}^{LC}$) estimated from:
  - Bloomberg Fair Value (BFV) par yield curves $\rightarrow$ Nelson and Siegel (1987)
- **Problem:** Credit risk embedded in EM nominal yields ($y_{t,n}^{LC}$)
- **Approach:** Synthetic LC yields can be treated as *free of credit risk*
  - Swap U.S. Treasury yields into LC using **currency derivatives**

Why Not CDS (Credit Default Swaps)?

- Credit risk shifts from bond issuer to CDS seller
  - Counterparty credit risk
- Fuzzy triggers for CDS payout
  - Greece 2012
- Insurance without an ‘insurable interest’
  - ‘Naked’ CDS

Construction of **Synthetic** Yield Curves

$$\widetilde{y}_{t,n}^{LC} = y_{t,n}^{US} + \rho_{t,n}$$

- $\widetilde{y}_{t,n}^{LC}$: n-period zero-coupon *synthetic* yield of a country in LC at time t
- $y_{t,n}^{US}$: n-period zero-coupon yield of the U.S. in USD at time t
- $\rho_{t,n}$: n-period **forward premium** from USD to LC at time t

Forward Premium ($\rho_{t,n}$)

- < 1 year: Currency forwards

$$(forward_{t,n} - spot_t)/n$$

- ≥ 1 year: Fixed-for-fixed cross-currency swaps (XCS)
  - Cross-currency basis swaps
  - Interest rate swaps

Deviations from CIP (Covered Interest Parity)

$$\phi_{t,n} = y_{t,n}^{LC} - \widetilde{y}_{t,n}^{LC}$$

- Measure of:
  - Sovereign credit risk for EMs (Du and Schreger, 2016)
  - Convenience yield for AEs (Du, Im, and Schreger, 2018a)
  - Financial market frictions for banks (Du, Tepper, and Verdelhan, 2018b)

Affine Term Structure Model

- A set of pricing factors drives the dynamics of the term structure

$$X_{t+1} = \mu^* + \Phi^* X_t + \Sigma \nu_{t+1}. \tag{1}$$

- No-arbitrage restrictions: Consistency in (cross section/time series) bond yields

$$A_n = A(\delta_0, \delta_1, \mu^*, \Phi^*, \Sigma) \qquad B_n = B(\delta_1, \Phi^*)$$

- Yields are affine functions of the pricing factors

$$y_{t,n} = -\frac{A_n}{n} - \frac{B_n}{n} X_t. \tag{2}$$

ATSM for EMs

- For EMs, $\phi_{t,n} \neq 0$ (Du and Schreger, 2016)
  - ATSM for synthetic ($\widetilde{y}^{LC}_{t,n}$) instead of nominal ($y^{LC}_{t,n}$) yields
- Decomposition of EM nominal yields ($y^{LC}_{t,n}$):
  - Expected short-term interest rate
  - Term premium
  - Credit risk premium ($\phi_{t,n}$)

Identification Problem

- Bond yields are persistent → Small sample bias (Kim and Orphanides, 2012)
  - Overestimates stability of expected path of the short rate
  - Most variability attributed to fluctuations in term premium
- Solutions: parameter restrictions, bias-corrected estimators, survey forecasts
- **Surveys** provide robust decompositions of yields (Guimarães, 2014)

Data

- Countries:
  - **15 EMs**: BRL, COP, HUF, IDR, ILS, KRW, MYR, MXN, PEN, PHP, PLN, RUB, ZAR, THB, TRY
  - **10 AEs**: G-3 (EUR, JPY, GBP), SOE (AUD, CAD, DKK, NOK, NZD, SEK, CHF)
- Monthly data from Jan-2000/Dec-2006 to Jan-2019
- Maturities (in years): 0.25, 0.5, 0.75 1, 2, ..., 10; max. 30
- Sources:
  - $y_{t,n}^{US}$: Gürkaynak, Sack, and Wright (2007)
  - $\rho_{t,n}$: Bloomberg + Datastream
  - Expected short-term rate: Consensus Economics + BIS policy rate statistics

Results

- Decomposition of EM nominal 10-year yields
  - Comparison against AEs
- Assessing EM term premia estimates
  - Comparison against surveys, risk and uncertainty measures
- Comovement of EM sovereign yields
  - Drivers of EM term premia

Nominal Yield Curve Decomposition

	Nominal	Synthetic	Expected	Term Premium	CIP Dev
EM	7.10	6.11	4.29	1.74	0.85
A-SOE	3.48	3.52	1.54	1.97	-0.23
G-3	2.41	2.13	0.52	1.60	0.15

Table: 10-Year Yield Decomposition (%).

- Term premium is on average larger than CIP deviations
- Main component of nominal yields
  - EMs: Expected future short rate
  - AEs: Term premium

Benchmark: U.S. Term Premium

- Stylized facts (Kim and Wright, 2005; Adrian, Crump, and Moench, 2013):
  1. U.S. term premium (USTP) is time-varying
  2. USTP increases in periods of uncertainty
  3. USTP has declined over time
  4. USTP turned negative in recent years
- Estimates for EMs consistent with 1 and 2, some countries with 3 and 4

Dynamics of EM Term Premia

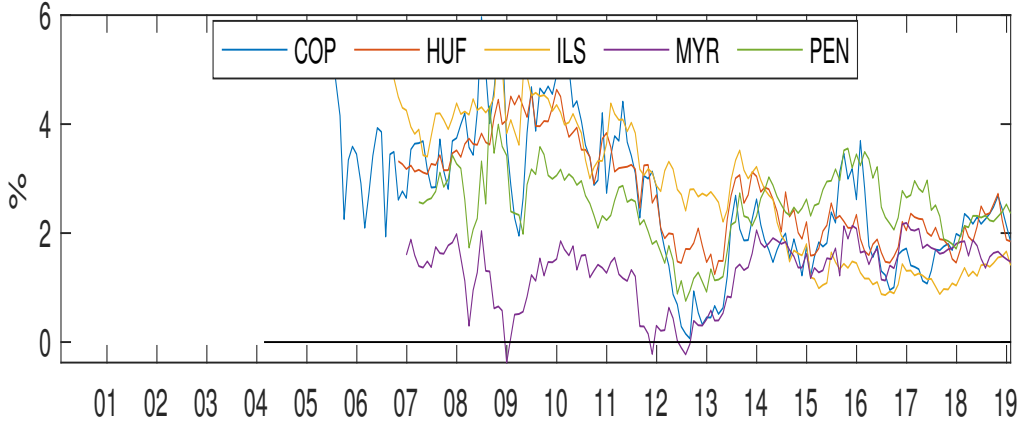


Figure: Estimated 10-Year Term Premia

Survey-Based Term Premium Estimates

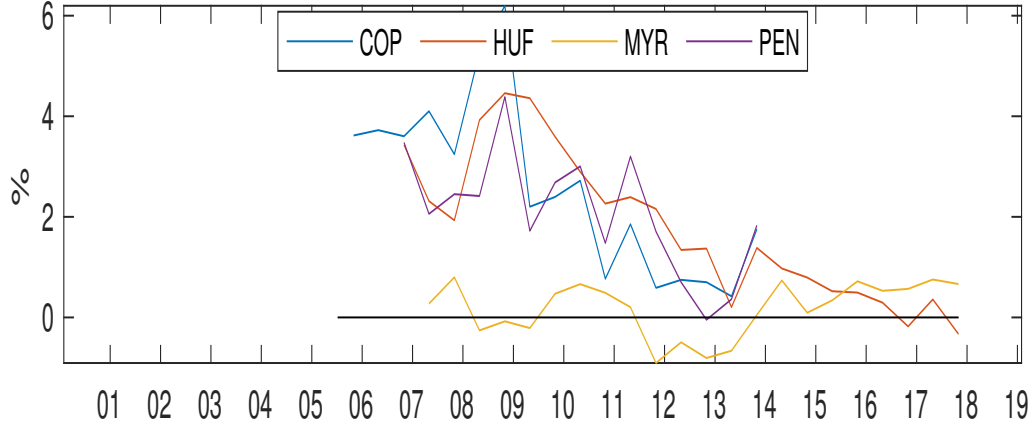


Figure: Survey-Based 10-Year Term Premium Estimates

Term Structure of Term Premia

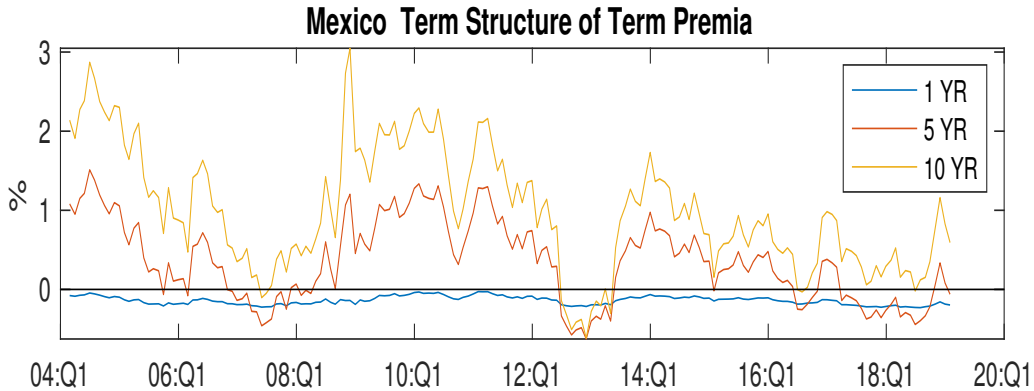


Figure: Estimated 1-, 5- and 10-Year Term Premia.

Term Premia and Uncertainty Measures

	TP-USTP	TP-CIP Dev
EM	0.60	-0.28
A-SOE	0.80	-0.01
G-3	0.71	-0.29

Table: Correlations of 10-Year Term Premia: U.S TP and CIP deviations

	BRL	COP	KRW	MXN	RUB
TP-EPU	0.14	0.46	-0.32	0.40	-0.22

Table: Correlations of 10-Year Term Premia: Economic Policy Uncertainty Index

Do EM Sovereign Yields Comove?

	COP	ILS	KRW	PEN	PHP	PLN	TRY	ZAR
COP	0.60	-	-	-	-	-	-	-
ILS	0.69	0.82	-	-	-	-	-	-
KRW	0.65	0.59	0.82	-	-	-	-	-
PEN	0.56	0.57	1.00	0.57	-	-	-	-
PHP	0.60	0.65	0.85	0.75	0.79	-	-	-
PLN	-0.71	0.49	0.50	0.14	-0.06	0.66	-	-
TRY	2.71	0.93	0.28	1.94	0.28	-2.82	0.77	-
ZAR	0.45	2.27	0.40	0.93	0.30	-1.16	0.75	0.69

Table: Variance-Covariance of 10-Year Yields Explained by Term Premia

Is There A Global Factor in EM Term Premia?

	Jun-2005
EM	65.32
AE	89.17

Table: Variation of 10-Year Term Premium Explained by First PC (%)

- Global financial cycle (Rey, 2013)
- For AEs, a global factor seems more relevant for TP
- For EMs, both domestic and global factors appear relevant for TP

Drivers of EM Term Premia

- Panel regression:

$$tp_{it} = \alpha_i + \beta' z_{it} + u_{it}$$

  - tp_{it}: model-based n-year term premium of country i in month t
  - z_{it}: vector of regressors
  - α_i: country fixed effects

Drivers of EM Term Premia: Regressors

- Global financial variables
  - Vix, fed funds rate (FFR), S&P, oil price
- Domestic variables
  - Macro: Inflation (INF), unemployment rate (UNE), industrial production (IP)
  - Financial: Exchange rate (LC per USD), stock market

10Y EM TP

	(1)	(2)
FFR	0.11	.
	(0.10)	.
USTP10	1.22***	.
	(0.16)	.
INF	0.21***	0.222***
	(0.05)	(0.040)
UNE	0.13**	0.137**
	(0.05)	(0.058)
IP	-0.02*	-0.019**
	(0.01)	(0.008)
RFX	0.01	0.0199*
	(0.01)	(0.0103)
Observations	1,969	1,969
R-squared	0.49	0.547
Country FE	Yes	Yes
Time FE	No	Yes

Robust standard errors in parentheses.

*** p<0.01, ** p<0.05, * p<0.1

Conclusions

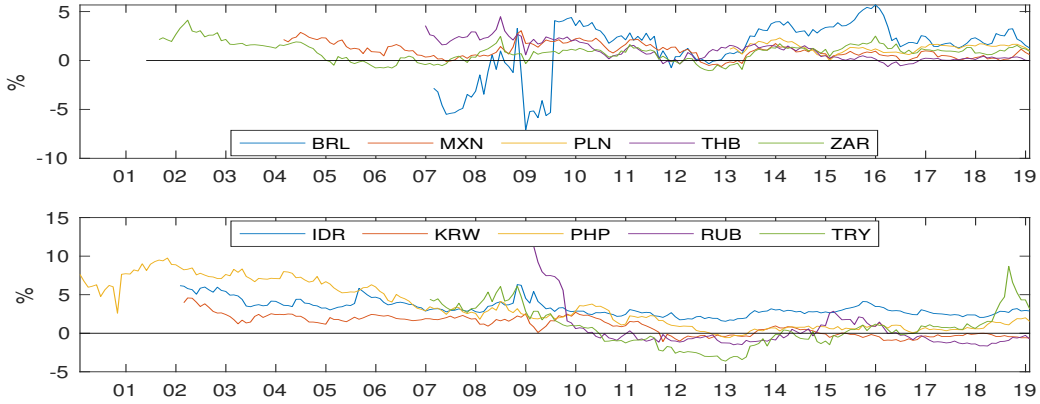
- EM sovereign yields comove
- Decomposition of EM local currency yields
  - Accounts for credit risk
  - Term premium is larger than credit risk premium
  - Term premium drives of EM yield comovement
- EM term premia highly linked to U.S. term premium and countercyclical

Work Ahead

- Supplement ATSM with survey forecasts
- Potential drivers of term premia:
  - Measures of inflation uncertainty (Stock and Watson, 2007)
  - Measures of political uncertainty (Baker et al., 2016)
- Spillovers: How U.S. monetary policy moves EM yields?
  - Curcuru et al. (2018); Adrian et al. (2019)

Appendix

EM Term Premium Estimates: 10Y (cont.)



Survey-Based Term Premium Estimates: 10Y (cont.)