WORLD BANK GROUP
Finance & Markets

Global Liquidity and External Bond Issuance in Emerging Markets and Developing Economies

Erik Feyen (joint with Swati Ghosh, Katie Kibuuka, and Subika Farazi)
Finance & Markets Global Practice

BIS Research Network meeting on
Global Financial Interconnectedness
October 1-2, 2015

Context

In the wake of the GFC, global liquidity conditions loosened as major central banks embarked on extraordinary monetary policies (EMPs)

These EMPs have contributed to unprecedented financial market developments in EMDEs:

– Total gross capital inflows increased from $0.5tn in 2000-07 to $1.1tn in 2010-13

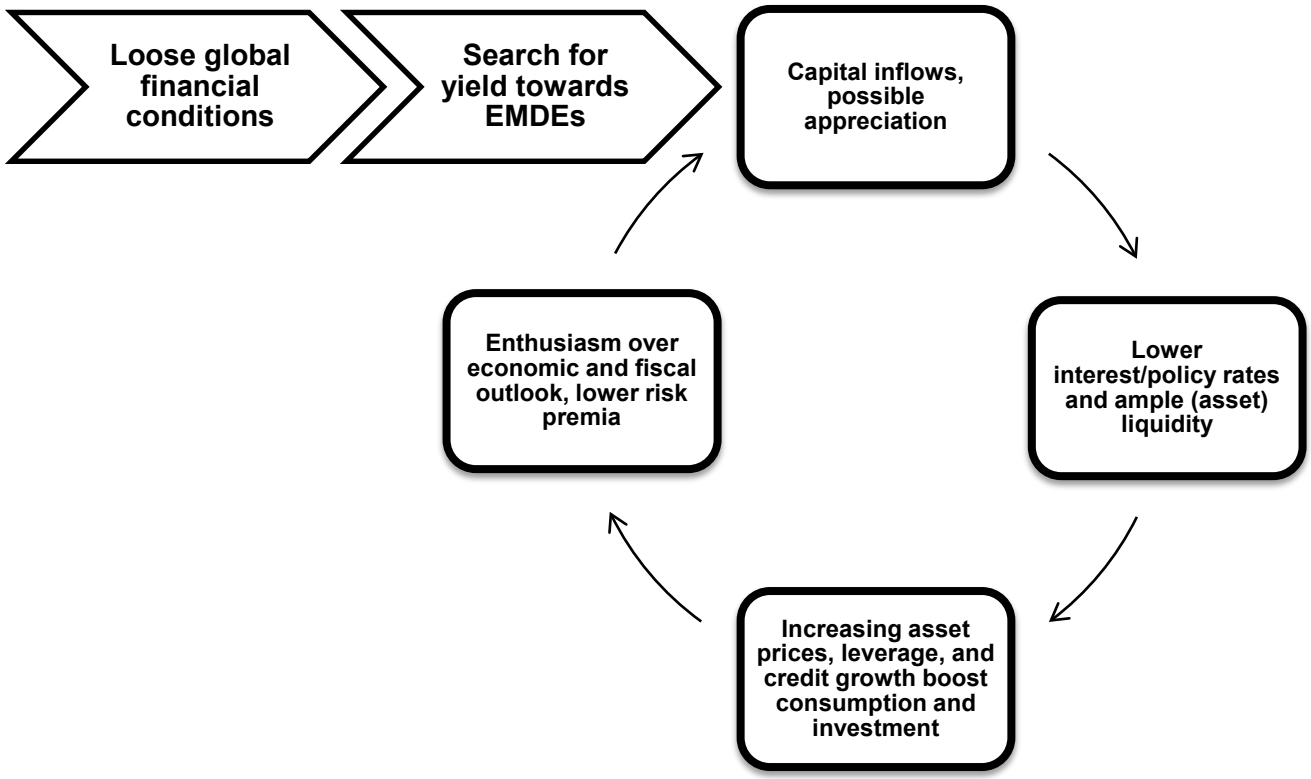
– External bond issuance by EMDEs in 2009-14 increased to $1.5tn, tripling from $520bn in 2002-07 – mostly in foreign currencies

– Bond funds allocations from DMs to EMDEs grew by 375% to $385bn since 2009. Equity funds allocations expanded by 70% to $985bn

– Foreign participation in some local (illiquid) bond markets increased up to 26% of volume outstanding

And also has furthered the build-up of imbalances and vulnerabilities in some countries raising challenges for policy makers

Impact of search for yield on EMDEs



Research questions

Question 1: What are the main *trends* in external issuance by EMDE entities during the 2000-14 period?

Question 2: What is the impact of global factors on the *propensity* to issue external bonds by EMDE entities compared to their historical issuance average?

Question 3: What is the impact of global factors on two important bond characteristics at the time of issuance: *yields* and *maturities*?

Question 4: Do *country characteristics* interact and amplify or dampen the impact of global factors?

Question 5: Does the *risk-taking channel through exchange rate appreciation* as described and tested in Bruno and Shin (2015a, 2015b) also operate in a similar fashion for EMDE external bond issuance?

Literature

Importance of global push factors for capital flows to EMDEs

Calvo et al. 1993	Real interest rates and growth in DEs
Bekaert et al. 2013	Federal funds rate
Forbes and Warnock 2012 and Rey 2013	VIX (Index for market volatility)
Bruno and Shin (2015)	Risk-taking through (local) currency appreciation (banks as transmission channel) Higher USD bond issuance by EMDEs due to (local) currency appreciation, high interest rate differential vis-à-vis USD, and low exchange rate volatility

Effects of Extraordinary Monetary Policies (EMPs) on capital flows to EMDEs

Fratzscher et al. 2013	QE1 triggered reversal of funds back to US while QE2 & QE3 induced portfolio adjustment in favor of EMDEs
Burns et al. 2014	Financial conditions in the US account for 60% of total variation in capital flows to EMDEs from DEs
Koepke 2014	Expectations regarding EMPs (Federal funds rate) in the US matter for flows to EMDEs

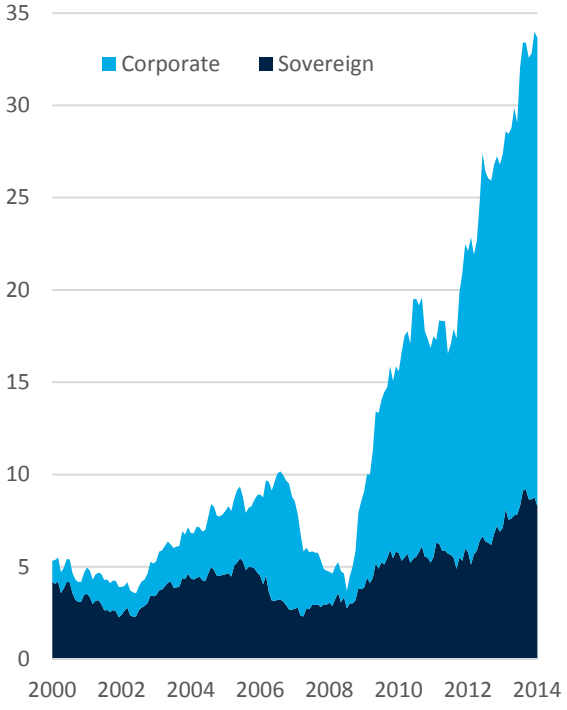
Domestic pull factors also do matter for capital flows to EMDEs

Ghosh et al. 2010	Macroeconomic and institutional factors play a role in capital flows to EMDEs
Fratzscher 2011	Quality of institutions, country risk, and the strength of domestic fundamentals are important

External bond issuance in EMDEs has soared across the board

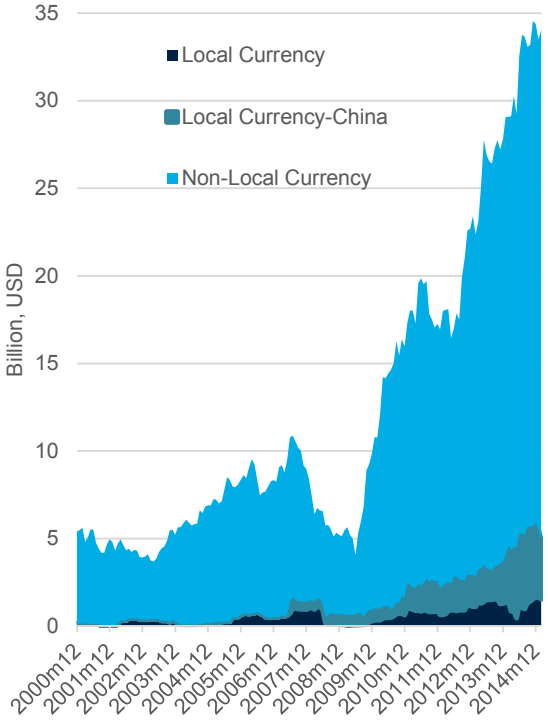
Rapid increase in issuance driven by corporates…

External issuance:
Corporate vs. sovereign
(billions USD)



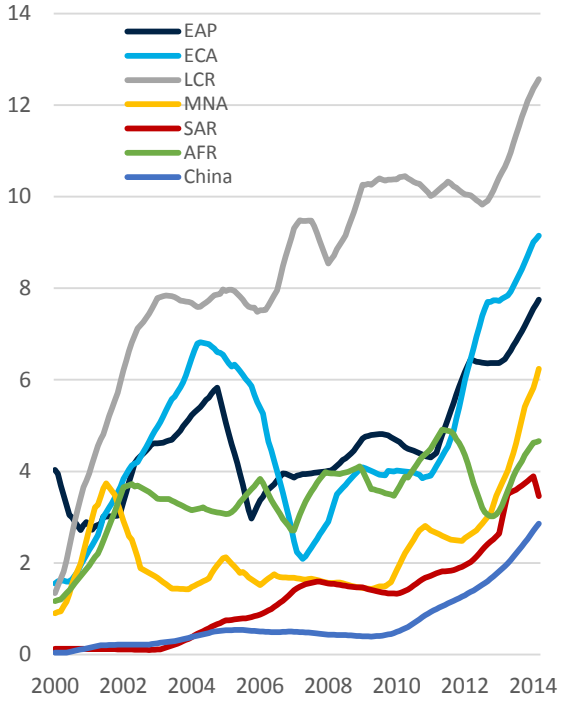
…mostly denominated in foreign currencies…

External issuance:
Foreign vs. local currencies
(billions USD)



..resulting in sizeable (FX) exposures relative to GDP across most regions

Outstanding external bond stock
(Country median % of GDP)



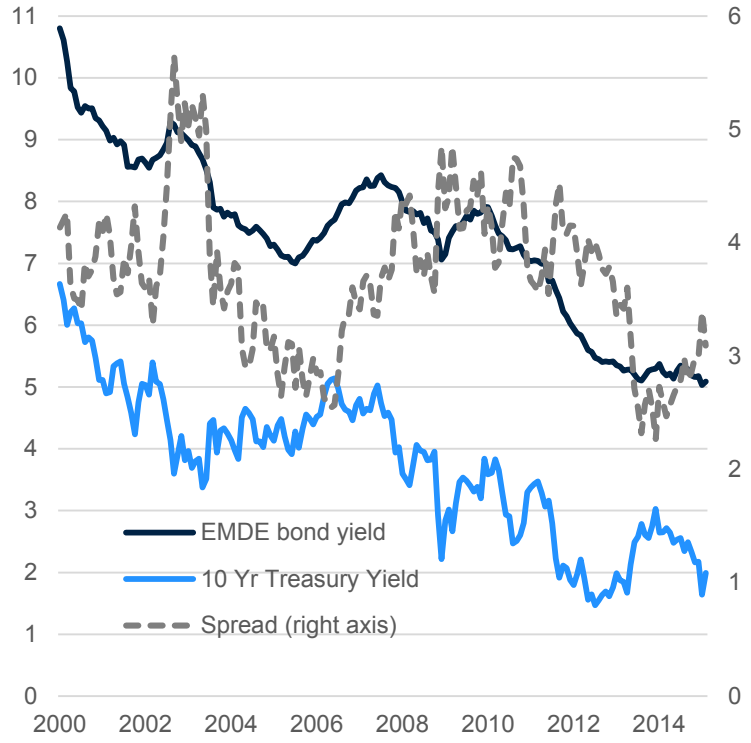
Source: World Bank FinDebt Database; Dealogic; IMF World Economic Outlook; F&M staff analysis.

WORLD BANK GROUP

Trends in bond yields and maturities at time of issuance

Yields and spreads have fallen to all-time lows…

Yield-to-maturity at issuance
(weighted by deal size, %)



…but maturities largely remain below pre-crisis levels

Maturities at issuance
(weighted by deal size, years)

Source: World Bank FinDebt Database; Dealogic; Bloomberg; F&M staff analysis.

DM mutual fund and ETF allocations to EMDEs have grown significantly

Since 2009, bond fund allocations grew by 375% to $385bn…

Bonds Funds Assets Allocations
(billions USD)

…while equity fund allocations expanded by 70% to $985bn

Equities Funds Assets Allocations
(billions USD)

Source: EPFR; F&M staff analysis

WORLD BANK GROUP

Data

Dealogic bond-tranche level data: info on borrowers, bond yields, and non-pricing terms at origination

Our data sets combine three types of data:

- Bond issuance data (i.e. industry or bond deal/tranche level)
- Global push factors
- Country pull factors

Global push factors are from Bloomberg/Federal Reserve:

- VIX, MOVE, Libor-OIS spread, BBB corporate credit spread, and Federal Reserve balance sheet

Country pull factors from IMF's WEO:

- Real GDP per capita, real GDP growth rate, current account balance, external debt, and dom bank credit to the private sector

Data (cont.)

Country-industry panel dataset:

- To analyze propensity to issue external bonds and test the risk taking channel of exchange rate appreciation
- Balanced panel data set of monthly total external bond issuance at industry level in 71 EMDEs from 2000 to 2014
- Around 84,000 country-industry-month observations
- Dependent variable: Dummy variable, equal to 1 if in a given month a particular country-industry issued above its historical average over the period 2000-07

Bond-tranche panel dataset:

- To study individual bond yields and maturities
- Around 6,925 bond tranches (~6,300 deals) in 71 EMDEs issued by companies in 210 country-industries from 2000 to 2014

Two dependent variables:

- Yield to maturity (rate of return assuming bond is held until maturity at the time of issuance)
- Maturity (number of years for which the bond remains outstanding at the time of issuance)

Descriptive stats – Country-industry data

Variable	Obs.	Mean	Std. Dev.	Min	Max
BOND VARIABLES					
Above Average Issuance	89957	0.03	0.17	0	1
GLOBAL PUSH FACTORS					
VIX Index	89957	2.99	0.33	2.42	3.95
BBB Corp Risk Spread	89957	0.73	0.41	0.15	1.97
FED Balance Sheet	72065	14.00	0.68	13.08	15.24
LIBOR-OIS	78029	2.91	0.75	1.92	5.08
MOVE Index	89957	4.54	0.27	4.04	5.20
Real Effective Exchange Rate	89957	-0.003	0.034	-0.074	0.098
Real Exchange Rate	84707	-0.007	0.084	-0.570	1.503
10Y US Treasury Maturity Rate	89957	3.88	1.17	1.66	6.36
DOMESTIC PULL FACTORS					
GDP per Capita	87696	7.79	0.99	4.69	9.64
GDP Growth	87780	4.82	4.41	-14.80	59.74
External Debt	88452	49.74	35.39	1.30	282.90
Current Account Balance	88788	-3.82	9.17	-49.80	35.50
Private Credit	83328	38.00	26.29	1.97	135.76

Descriptive stats – bond-tranche level data

Variable	Obs.	Mean	Std. Dev.	Min	Max
BOND VARIABLES					
Fixed Yield-to-Maturity	5962	5.06	3.25	0.20	12.31
Maturity of Bond issued	6804	6.00	7.31	0.10	100.08
Log of Size of Bond Issued	6925	18.63	1.49	11.51	22.63
GLOBAL PUSH FACTORS					
VIX Index	6925	2.86	0.28	2.41	3.95
BBB Corp Risk Spread	6925	0.69	0.29	0.15	1.97
FED Balance Sheet	6925	14.44	0.67	13.08	15.23
LIBOR-OIS	6573	2.84	0.49	1.92	5.09
MOVE Index	6925	4.38	0.24	4.03	5.22
Real Effective Exchange Rate	6925	-0.002	0.026	-0.074	0.098
Real Exchange Rate	6883	-0.015	0.057	-0.319	1.449
10Y US Treasury Maturity Rate	6925	3.08	1.14	1.66	6.36
DOMESTIC PULL FACTORS					
GDP per Capita	6894	8.62	0.59	6.10	9.63
GDP Growth	6897	6.02	3.06	-14.80	34.50
External Debt	6918	27.63	29.28	1.30	203.70
Current Account Balance	6922	-0.15	4.48	-39.50	35.50
Private Credit	6905	84.56	48.16	2.23	135.76

Methodology

Modeling the Propensity to Issue Externally and Risk-taking Channel

$$(Above\ Ave\ Issuance_{ist} = 1) = \mathrm{F}(\beta_0 + \boldsymbol{\beta_1} X_{it}^{INT} + \boldsymbol{\beta_2} X_{it}^{DOM} + \boldsymbol{\beta_3} Industry\ fixed\ effects + \boldsymbol{\beta_4} Country\ fixed\ effects + \boldsymbol{\beta_5} Year\ fixed\ effects)$$

$Above\ Ave\ Issuance_{ist}$ = 1 if total issuance volume in industry *s* in country *i* during month *t* is above the pre-crisis historical monthly average of industry *s* during 2000-07 and 0 otherwise.

X_{it} = Vectors of time-varying explanatory variables containing global push factors (INT) and domestic pull factors (DOM)

- Logistic regressions
- For each month the average value of each global push factor for the 6 preceding months is used
- Control for country-industry level issuance trends by comparing monthly issuance of a country-industry to its own historical average issuance volume
- Cluster standard errors on the country-industry level to allow for within industry correlation

Methodology (cont.)

Modeling Yields and Maturities on Bond Tranche Level

$$BF_b\ (\text{maturity or yield}) = \beta_0 + \boldsymbol{\beta_1} X_b^{INT} + \boldsymbol{\beta_2} X_b^{DOM} + \boldsymbol{\beta_3} X_b^{BOND} + \boldsymbol{\beta_4} Year\ of\ issuance\ fixed\ effects_b + \boldsymbol{\beta_5} Country\ of\ issuance\ fixed\ effects_b + \varepsilon_b$$

BF_b denotes the yield to maturity or the maturity of bond tranche *b*

X_b denotes vectors capturing global push factors (INT) and domestic pull factors (DOM) around the time bond *b* was issued

X_b^{BOND} is vector of bond-specific characteristics: Size of bond, currency, investment grade, borrower industry, and deal type

- Pooled OLS regressions
- Controlling for bond specific factors helps to isolate the impact of issuance composition and bias effects (e.g. differences in risk, size or industry)
- For each individual bond the average value for each global push factor 6 months prior to the issuance date is used
- Cluster standard errors on the country-industry level to allow for within industry correlation

Impact of global factors on propensity to issue on the country-industry level

Independent variable: Issuance above monthly country-industry average dummy				
	(1)	(2)	(3)	(4)
VIX	-0.603***			
	(0.185)			
BBB CORP CREDIT SPEAD		-0.789***		
		(0.199)		
FED BALANCE SHEET			0.728***	
			(0.193)	
LIBOR-OIS				-0.494***
				(0.0833)
Country pull factors	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Observations	79,464	79,464	61,824	69,048
No. of Countries	64	64	62	64
No. of Country-Industries	448	448	434	448
Pseudo R-squared	0.359	0.360	0.352	0.356

Logit regressions with robust clustered standard errors at the country level, 2000 – 2014
Country pull factors: GDP per capita, GDP growth, External debt/GDP, Current Account/GDP, Private credit/GDP
Robust standard errors clustered on the country-industry level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Impact of global factors on yields/spreads at time of issuance

Dependent Variable: Fixed yield-to-maturity of Bond Tranche				
	(1)	(2)	(3)	(4)
VIX	0.550*			
	(0.297)			
BBB CORP CREDIT SPEAD		1.219***		
		(0.299)		
FED BALANCE SHEET			-1.125***	
			(0.295)	
LIBOR-OIS				0.335**
				(0.146)
Country pull factors	Yes	Yes	Yes	Yes
Bond Tranche fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Country-period fixed effects	No	No	No	No
Observations	5,881	5,881	5,881	5,593
R-squared	0.805	0.805	0.805	0.795
No. of Countries	63	63	63	63
No. of Industries	187	187	187	187
No. of Bonds	5437	5437	5437	5176

OLS regressions with robust clustered standard errors at the country level, 2000 - 2014
Country pull factors: GDP per capita, GDP growth, External debt/GDP, Current Account/GDP, Private credit/GDP
Robust standard errors clustered on the country-industry level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Impact of global factors on maturities at time of issuance

Dependent Variable: Maturity of Bond Tranche				
	(1)	(2)	(3)	(4)
VIX	-2.951**			
	(1.245)			
BBB CORP CREDIT SPEAD		-3.301***		
		(0.983)		
FED BALANCE SHEET			1.186	
			(1.824)	
LIBOR-OIS				-1.364*
				(0.738)
Country pull factors	Yes	Yes	Yes	Yes
Bond Tranche fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Country-period fixed effects	No	No	No	No
Includes China issuance	Yes	Yes	Yes	Yes
Observations	6,749	6,749	6,749	6,406
R-squared	0.393	0.393	0.391	0.401
No. of Countries	64	64	64	64
No. of Industries	198	198	198	197
No. of Bonds	6144	6144	6144	5840

OLS regressions with robust clustered standard errors at the country level, 2000 - 2014

Country pull factors: GDP per capita, GDP growth, External debt/GDP, Current Account/GDP, Private credit/GDP

Robust standard errors clustered on the country-industry level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

WORLD BANK GROUP

Risk-taking channel of exchange rate appreciation

Dependent variable: Country-industry monthly issuance above 2000-07 average (1=Yes, 0=No)		
	(1)	(2)
REAL EFFECTIVE EXCHANGE RATE	-4.474***	
	(0.840)	
REAL EXCHANGE RATE		-2.399***
		(0.478)
Observations	79,464	76,664
No. of Countries	64	63
No. of Country-Industries	448	441
Pseudo R-squared	0.360	0.361

Logit regressions with robust clustered standard errors at the country level, 2000 – 2014
Regressions include remaining global push factors (VIX, Corp risk spread, Fed balance sheet, and LIBOR-OIS) and country pull factors (GDP per capita, GDP growth, External debt to GDP, Current Account to GDP, Private credit to GDP)
Robust standard errors clustered on the country-industry level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Robustness and additional analysis

Various robustness exercises:

Use MOVE index and US Economic Policy Uncertainty index

Use high-yield corporate debt spread instead of BBB corporate credit spread

For yields and maturities regressions, two additional robustness checks

- Substitute domestic pull factors and country fixed effects with *country-period* fixed effects and
- Exclude Chinese issuance to avoid a possible “China bias”

Interaction of country characteristics with global factors

Broader messages and policy implications

- EMDE external financial exposures expanded significantly and ties with DM markets strengthened, including through asset managers
- Paper finds global factors are a key driver of external bond issuance
- Both DM and EMDE secondary bond markets have become less liquid
- Pro-cyclical, synchronized foreign investor behavior can therefore have important implications for EMDEs
- Fragility in some EMDEs is compounded by weaker growth outlook, commodity prices, currency mismatches, shallow fin markets, weak supervisory and surveillance capacity, and little technical expertise
- Going forward, need to i) create vibrant local currency (corporate) bond markets and an active, diverse domestic investor base, ii) build comprehensive macro prudential tools and monitor financial markets closely, iii) build resilient macro-economic frameworks, iv) strengthen banking sector to safeguard against spillovers

Thank you!