Foreign Currency Borrowing of Corporations as Carry Trades: Evidence from India

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Increasing Importance of EM Corporate Debt

- EM non-financial corporate debt quadrupled between 2004 and 2014 (IMF GFSR, 2015)
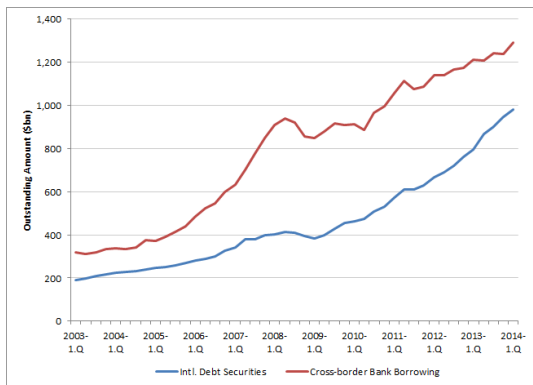- Increased reliance on foreign currency (mainly USD) borrowing


Figure: EME private foreign currency debt (Source: BIS)

Questions

- What has caused this surge in foreign currency borrowing by EME corporates?
- How do firms use these funds?
- What risks does this phenomenon pose?

This paper: Use detailed borrowing, accounting and market data on Indian firms to answer these questions

Preview of Findings

- Firm issuance propensity is higher when the difference in short-term interest rates between India and the US are higher i.e. when the dollar 'carry trade' is more profitable
  - Result driven by period after financial crisis
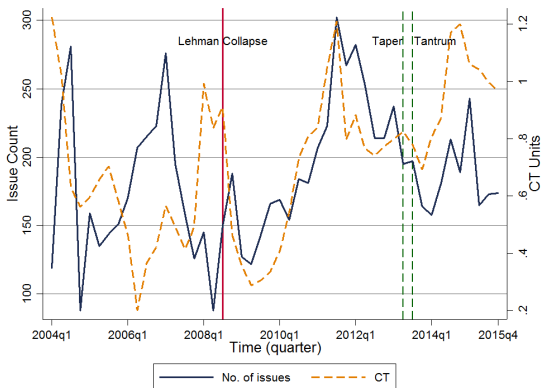
Preview of Findings

- ▶ ECB funding is a substitute for other sources of funding though the substitutability is lower after the crisis
- ▶ ECB funds used more for investment but also held as cash, compared to other sources

- ▶ FX exposure rises post issuance suggesting borrowing risks not completely hedged
- ▶ During the 'taper tantrum' episode of 2013, firms that issue when the carry trade is more profitable do worse, especially when their FX exposure is high
- ▶ Suggestive evidence of transmission to local banks with which borrowers have relationships

Relation to Literature

- ▶ 'Carry trade' incentives for non-financial EME firms
  - ▶ Bruno and Shin (2016), Caballero, Panizza and Powell (2016), Frank and Shen (2016)
- ▶ External Debt of EM Corporates: risks for local growth and financial stability from balance sheet impairment
  - ▶ Acharya et al (2015), Du and Schreger (2015), Chui, Fender and Sushko (2014)
- ▶ Centrality of dollar funding and US monetary policy
  - ▶ Bruno and Shin (2016), Rey(2013), Miranda-Agrippino and Rey (2014), McCauley et al (2015)
- ▶ Taper tantrum and emerging markets
  - ▶ Eichengreen and Gupta (2014), Sahay et al (2014), Feroli, Kashyap, Schoenholtz and Shin (2014)

Overview

Institutional Background

- ▶ Two modes of foreign borrowing: External Commercial Borrowings (ECB) and Trade Credit
- ▶ ECB issuance regulated by RBI through automatic or approval route; all issuances above $750mn require approval
- ▶ Restrictions on maturity, cost and use of funds
  - ▶ Maturity > 3 years
  - ▶ All-in-cost ceiling of 6m LIBOR+350 bps for maturity of 3-5 years and 6m LIBOR+500 bps for maturity>5 years
  - ▶ Generally, use of funds for repaying rupee loans, investment in capital markets, real estate etc. are not permitted
- ▶ Guarantees from local lenders discouraged

Data

- ▶ **ECB Data**: Publicly available on RBI website; includes name of issuer, month of issue, amount, maturity, purpose

- ▶ **CMIE Prowess**: Accounting and stock market data
  - ▶ Match issuers in RBI data to Prowess by name
  - ▶ 1403 firms matched; covers 81.2% of issued volume
  - ▶ This is our final sample (for tests involving stock market data, number of firms drops to 523)

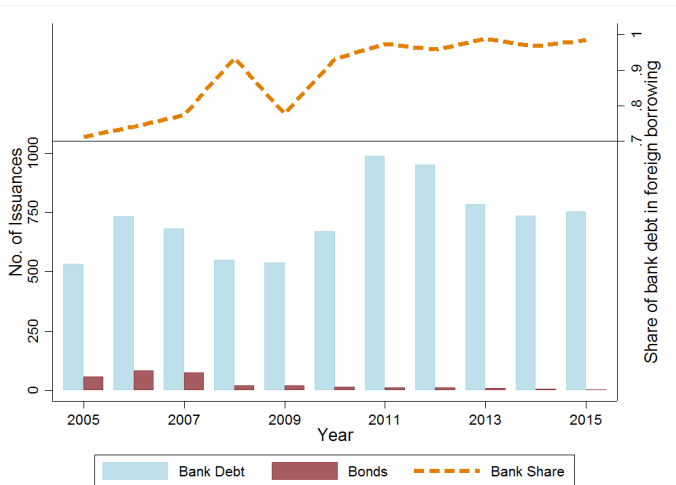- ▶ Sample period is from 2004 to 2015

Bank Debt Dominates

Figure: Bank vs. Bond Debt in Foreign Currency Borrowing
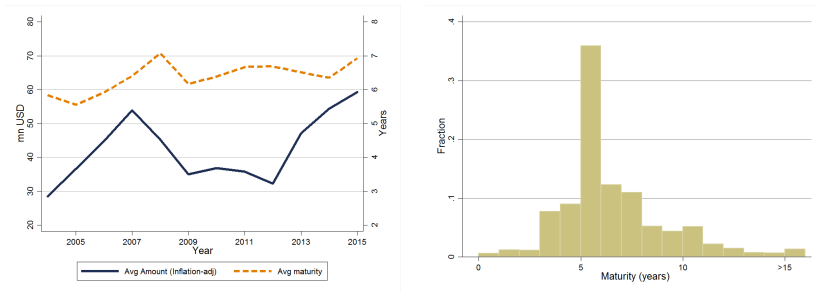
Issue Characteristics

Figure: (L) Average amount and maturity of ECB issuance (2004-2015) ; (R) Distribution of maturity of ECB Issuances

Summary Statistics

Panel A: ECB Facilities

	N	Mean	Median	St. Dev.	P5	P95
Amount (mn USD)	4,124	60.408	15.000	140.948	1.100	280.000
Maturity (Years)	4,124	6.410	5.500	2.969	3.000	11.583
No. of facilities (per firm)	1,403	2.939	2	3.987	1	9

Panel B: Firm Balance Sheets

	N	Mean	Median	St. Dev.	P5	P95
Assets						
Total Assets (bn INR)	23,362	13.96	1.82	42.32	0.01	64.75
Cash/Assets	22,814	0.074	0.02	0.15	0.00	0.32
Fixed/Total Assets	21,694	0.329	0.303	0.234	0.006	0.776
Current/Total Assets	23,052	0.390	0.370	0.257	0.014	0.862
Liabilities						
Total Debt (bn INR)	20,754	5.79	0.690	17.744	0.002	27.159
Foreign Currency Debt (bn INR)	6,233	3.88	0.622	10.496	0.000	18.063
Long-Term/Total Debt	20,371	0.683	0.766	0.318	0.019	1.000
Foreign Currency/Total Debt	6,207	0.341	0.270	0.282	0.001	0.947
Debt/Assets	20,713	0.466	0.361	0.668	0.010	0.997
Other Ratios						
Dividends/Total Assets	8,545	0.015	0.008	0.022	0.000	0.051
Return on Assets	20,144	0.128	0.118	0.158	-0.049	0.375
Exports/Sales (%)	10,706	17.892	4.692	26.209	0.000	81.837

Determinants: Empirical Model

H1: Indian firms issue more ECB when the carry trade is more profitable

$$Issue_{it} = \alpha_i + \beta_{CT} CT_{t-1} + \beta_i r_{i,t-1} + \beta_M r_{M,t-1} + \beta_{FX} r_{FX,t-1} \\ + \gamma X_{i,y-1} + \delta_y + \varepsilon_{it} \quad (1)$$

- $Issue$ takes the value 1 if firm i issues ECB in month t.
- CT is a measure of the profitability of the carry trade defined as $CT = \frac{3M \ rate(IND) - 3M \ rate(US)}{IV \ of \ 3M \ FX \ options}$ (Bruno and Shin, 2016)
- Include firm-level controls, year and firm fixed effects

Results

	Issue (0/1)			
CT	0.439***	0.172	0.448***	0.168
	(0.155)	(0.192)	(0.160)	(0.198)
CT*post-crisis		0.432**		0.454**
		(0.185)		(0.191)
Controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	No	No	Yes	Yes
Observations	92705	92705	85701	85701
PseudoR^2	0.037	0.037	0.097	0.097

- ▶ A one SD increase in the *CT* index would increase a firm's probability of issuing ECBs by 12.6% (column 3)
- ▶ Effect driven by post-crisis period
- ▶ Low leverage, low liquidity and more profitable firms more likely to issue in high CT environment post crisis
- ▶ Most firm characteristics, on their own, don't explain issuance

Uses: Empirical Model

To test how ECB funds are used, we estimate the following model of Kim and Weisbach (2008):

$$
Log\left(1 + \frac{Use_{it}}{TA_{i,t-1}}\right) = \alpha_i + \beta_1 Log\left(1 + \frac{ECBAmount_{it}}{TA_{i,t-1}}\right)
$$
$$
+ \beta_2 Log\left(1 + \frac{OtherSources_{it}}{TA_{i,t-1}}\right) + \gamma Log(TA)_{i,t-1} + \delta_t + \varepsilon_{it} \quad (2)
$$

- Use_{it} can be (i) change in cash holdings, (ii) gross investment in year t, (iii) dividends, and (iv) long-term debt reduction.
- *Other Sources* is the difference between total sources and *ECB Amount*. Total sources is the sum of funds from operations, sale of fixed assets, long-term debt issuances, and sale of stock.

Results

	Cash		Investment		Dividends		LTD Reduction	
	All	Post Crisis	All	Post Crisis	All	Post Crisis	All	Post Crisis
Log(1+ECB Amt/Total Assets)$[\beta_1]$	0.327***	0.257***	0.200***	0.124**	0.017***	0.022***	0.082***	0.068*
	(0.032)	(0.045)	(0.034)	(0.058)	(0.004)	(0.007)	(0.027)	(0.039)
Log(1+Other Amt/Total Assets)$[\beta_2]$	0.200***	0.153***	0.100***	0.049*	0.019***	0.018***	0.153***	0.163***
	(0.016)	(0.026)	(0.017)	(0.026)	(0.003)	(0.006)	(0.021)	(0.029)
Log(1+Other Amt/Total Assets)*IssueYr	-0.062**	-0.011	-0.013	-0.015	-0.005	-0.008	-0.010	-0.039
	(0.024)	(0.034)	(0.029)	(0.043)	(0.003)	(0.005)	(0.026)	(0.031)
Lag Log(Assets)	-0.028***	-0.027***	-0.021***	-0.019**	-0.005***	-0.006***	-0.010	-0.006
	(0.004)	(0.007)	(0.004)	(0.009)	(0.002)	(0.002)	(0.007)	(0.018)
$Pr(\beta_1 = \beta_2)$	0	.0156	.0018	.1586	.7265	.4837	.0033	.0082
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	10296	6288	10209	6216	6274	3789	4825	3176
R^2	0.374	0.380	0.315	0.366	0.631	0.688	0.483	0.568

- Both cash and investment are more sensitive to a dollar of ECB funding compared to other sources
- In years of ECB issuance, the sensitivity of cash to other sources is lower, but only before the crisis

Substitutability

	Log(1+ECB Amt/Total Sources)			
	All firm-years		Issue firm-years only	
	(1)	(2)	(3)	(4)
Log(1+Other Amt/Total Sources)	-0.082***	-0.105***	-0.159***	-0.201***
	(0.011)	(0.013)	(0.033)	(0.042)
Log(1+Other Amt/Total Sources)*Postcrisis		0.049***		0.093*
		(0.019)		(0.051)
Lag Log(Assets)	-0.009***	-0.010***	-0.129***	-0.127***
	(0.002)	(0.002)	(0.013)	(0.012)
Constant	0.107***	0.109***	1.346***	1.321***
	(0.022)	(0.022)	(0.122)	(0.119)
YearFE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Observations	10339	10339	1949	1949
R^2	0.062	0.066	0.329	0.334

▶ Substitutability between ECB funding and other sources is not large (5% reduction in ECB amount raised for 20% positive shock to other sources). It is even lower post crisis.

FX β as market measure

- ► Regulators concerned that firms leave their FX exposure through borrowing unhedged (Ministry of Finance, 2015)
  - ► Illiquid onshore derivatives market is a potential reason
  - ► Another is an imagined implicit guarantee that the RBI will let the currency move in a narrow band only
- ► To measure market-implied FX exposure, we estimate the following market model for publicly traded firms in our sample:

$$r_{it} = \alpha + \beta_M r_{Mt} + \beta_{FX} r_{FX,t} + \varepsilon_{it} \tag{3}$$

- ► β_{FX} is the market-implied exposure to FX risk.

Post issuance FX β

H2: Firm FX $\beta's$ increase following ECB issuance

To test this hypothesis, we estimate the following equation:

$$FXbeta_{it} = \alpha + \beta_1 Issue_{i,t-1} + \nu_t + \eta_i + \varepsilon_{it} \qquad (4)$$

	β (forward looking)			
	FX		NIFTY	
Issue	0.058**	0.033	0.021	-0.015
	(0.027)	(0.026)	(0.018)	(0.011)
Time FE	Yes	Yes	Yes	Yes
Firm FE	No	Yes	No	Yes
R^2	0.137	0.173	0.164	0.384
Obs.	60,685	60,685	60,685	60,685

Taper Tantrum: Event Study Analysis

- ▶ Taper tantrum episode of Summer 2013 led to a surge of foreign capital outflows from emerging markets, creating turmoil and a sharp decline in asset prices including in equities (Sahay et al, 2014)
- ▶ We conduct an event study analysis to see how different foreign currency borrowers were affected
- ▶ Focus on three specific events
    - ▶ May 22, 2013: Bernanke statement to Congress (Tapering up)
    - ▶ June 19, 2013: Bernanke press conference (Tapering up)
    - ▶ September 18, 2013: Post-FOMC meeting, announcement of delay to tapering (Tapering down)
- ▶ Calculate abnormal return for 5 days post each event
- ▶ Sort firms into terciles based on (i) weighted average CT measure at time of issuance, (ii) pre-event FX β, (iii) Balance sheet measures like leverage, size etc.
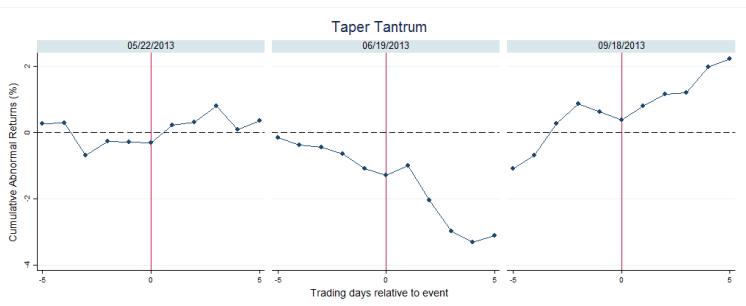
Taper Tantrum Results

Figure: CAR of high CT issuer (top tercile) relative to low FX CT issuer (bottom tercile)

- ▶ High CT issuers fare worse than low CT issuers
- ▶ No difference in performance when sorted along balance sheet dimensions
- ▶ Low FX β firms actually do worse than high FX β firms

Double Sorting

	CAR[1,5]		
	05/22/13	06/19/13	09/18/13
L FXβ-L *CT Issuer*	-1.483	-2.614**	2.974*
	(0.959)	(1.122)	(1.713)
L FXβ-M *CT Issuer*	0.366	-4.252***	1.127
	(0.956)	(0.871)	(1.318)
L FXβ-H *CT Issuer*	-0.338	-4.445***	3.366**
	(2.221)	(0.585)	(1.664)
M FXβ-L *CT Issuer*	-0.804	-4.129***	-0.312
	(0.807)	(1.193)	(0.779)
M FXβ-M *CT Issuer*	-1.837**	-1.458	2.224
	(0.717)	(0.942)	(1.389)
M FXβ-H *CT Issuer*	0.518	-5.120*	-0.281
	(1.031)	(3.063)	(1.062)
H FXβ-L *CT Issuer*	-0.457	0.040	-2.152
	(1.070)	(2.763)	(1.346)
H FXβ-M *CT Issuer*	1.598	-1.136	0.138
	(1.607)	(1.773)	(1.064)
H FXβ-H *CT Issuer*	-0.034	-2.439**	1.195
	(0.675)	(1.066)	(1.651)
Pr(HH-HL==0)	.7374	.3903	.1283
Observations	170	170	167
R^2	0.050	0.164	0.098

▶ Among high FX β firms, those that issue when the carry trade is more profitable react more negatively to taper news

Risks to Local Banks

- The domestic banking system is susceptible through both asset and liability side exposures to risks from ECB borrowing.

  - Banks might be relying on wholesale deposits for funding
  - Firm losses on foreign liabilities would reduce their creditworthiness, and push the more highly levered firms towards defaulting on their domestic obligations
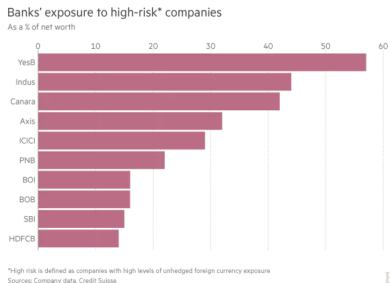

Figure: Source: Financial Times

Risks to Local Banks

- A bank FX β can be calculated for publicly traded banks in the same vein as for non-financials.
- Does bank exposure to FX risk increase as FX exposure of related firms increases?
- We use relationship data in Prowess to relate bank FX β to that of related firms as per following model:

$$BankFXbeta_{jt} = \alpha_j + \gamma_1 WtdFirmFXbeta_{jt} + \nu_t + \varepsilon_{jt} \qquad (5)$$

Bank Results

	Bank β (forward looking)			
	FX		NIFTY	
Wtd Firm FX Beta	0.049***	0.036***	0.009***	0.008***
	(0.007)	(0.007)	(0.002)	(0.001)
Wtd Firm Nifty Beta	-0.106***	-0.158***	0.116***	0.020***
	(0.012)	(0.014)	(0.005)	(0.004)
Time FE	Yes	Yes	Yes	Yes
Bank FE	No	Yes	No	Yes
R^2	0.354	0.380	0.366	0.555
Obs.	71,446	71,446	71,446	71,446

Conclusion

- Macro factors ('carry trade') explain rise in foreign currency borrowing more than standard firm-level characteristics
- These funds are used primarily for investment as well as building up cash
- Firms do not completely hedge their exposure, and are susceptible to adverse movements in foreign exchange rates
- Risks might spill over to the domestic banking system

Thank You