

Foreign borrowing by Indian firms

Ila Patnaik Ajay Shah Nirvikar Singh

March 12, 2014

Motivation

Foreign borrowing by Indian firms

- ▶ India does not have an open capital account and there are multiple restrictions on foreign currency borrowing of firms, ranging from sectoral policies of who can borrow to price and quantitative limits on borrowings.
- ▶ Given high and persistent interest rate differentials between Indian interest rates and global interest rates, foreign borrowing can often be quite attractive.

Selection by foreign investors

At the same time, through the finance literature, we know that there is home bias in selection of firms by foreign investors for investment:

1. Information asymmetry
2. Lack of strong institutions protecting property rights of foreign residents. Ideally this should be reflected in the pricing of the debt through country risk but there may be variations in pricing

Questions

- ▶ Who are the firms that borrow abroad?
- ▶ Are firms going abroad in response to financing constraints at home?
- ▶ Do we see evidence of home bias?
- ▶ Are modes of firm internationalisation interlinked?
- ▶ Does exporting and the consequent natural hedge matter greatly?
- ▶ Do the firms that obtain foreign borrowing fare better? What is the causal impact of borrowing abroad?

Data Description

What do we observe

- ▶ Non-financial firms from 2001-2013
- ▶ External commercial borrowings and various financial variables from CMIE Prowess database
- ▶ Variables constructed from raw data:
 - ▶ Size is proxied by the average of income and total assets for latest three years
 - ▶ Asset tangibility is calculated as gross fixed assets divided by total assets
 - ▶ Return on capital is calculated as net profit divided by capital employed
 - ▶ Liquidity is calculated difference between current assets and current liabilities divided by total assets.

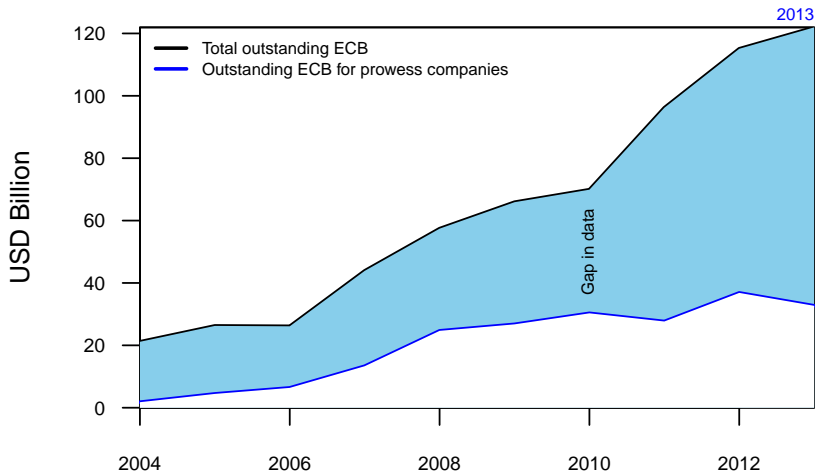
Criteria used for classifying companies

- ▶ Total Companies: Number of companies with total assets greater than zero
- ▶ ECB Companies: Number of companies with ECB greater than 0.01 percent of their total borrowings
- ▶ Exporting Companies: Number of companies with exports greater than 0.01 percent of their total sales
- ▶ Domestic Borrowings: Number of companies with borrowings net of ECB greater than 0.01 percent of their total borrowings

Count of firms

Year	Total companies	ECB companies	Exporting companies	Domestic borrowers
2004	9097	88	3768	7882
2005	9647	118	3793	8293
2006	9823	147	3920	8415
2007	9916	205	3970	8455
2008	10040	296	4015	8497
2009	10249	373	4117	8548
2010	9769	392	3856	8021
2011	6892	300	3053	5756
2012	5778	341	2650	4858
2013	4471	286	2178	3734

Amount of external commercial borrowings



Reason for gap in data

- ▶ Sample excludes financial services firms like Banks, Financial institutions and NBFCs
- ▶ Limited coverage of ECB companies in process
 - ▶ Financial information for lot of ECB companies is not available in public domain
 - ▶ Inconsistency in financial disclosure

What kind of firms borrow abroad?

Size distribution (No. of ECB firms)

Year	Q1	Q2	Q3	Q4
2004	1	7	26	54
2005	2	9	27	80
2006	2	9	26	110
2007	4	9	27	165
2008	4	16	30	246
2009	2	14	54	303
2010	1	14	51	326
2011	1	16	53	230
2012	5	23	65	248
2013	1	16	55	214

Large firms are doing external commercial borrowings

Calculation of natural hedge coverage ratio

We calculate annuity payable for an ECB borrowing firm at the end of a financial year on the basis of below given formula:

$$\text{Annual repayment} = \frac{P}{\frac{(1 - \frac{1}{(1+i)^n})}{i}} \quad (1)$$

- ▶ P : ECB outstanding
- ▶ i : LIBOR + 350 basis point
- ▶ n : 5 (Average maturity period of ECB)
- ▶ We divide ECB companies by hedge coverage ratio into three groups as follows:
 1. High: Net exports for the year is more than 80 percent of the annual repayment of ECB for the year
 2. Low : Net exports for the year is less than 80 percent but more than 20 percent of the annual repayment of ECB for the year
 3. None: Net exports for the year is less than 20 percent of the annual repayment of ECB for the year

Hedge coverage

Most firms have low natural hedge coverage

	High	Low	None
2004	26	3	59
2005	45	4	69
2006	50	4	93
2007	75	14	116
2008	103	23	170
2009	130	21	222
2010	140	18	234
2011	113	8	179
2012	128	12	201
2013	105	13	168

What kinds of firms borrow abroad?

Tobit results

ECB to total borrowings

	Model-1	Model-2	Model-3	Model-4
Intercept	-1.44 (0.00)	-1.53 (0.00)	-2.74 (0.00)	-3.3 (0.00)
Financial Constraint				
Asset tangibility	-0.13 (0.00)	0.00 (0.07)	0.01 (0.00)	0.11 (0.00)
Liquidity	-0.03	-0.02 (0.06)	-0.04 (0.4)	0.03 (0.64)
Internationalisation				
Exports to sales		0.23 (0.00)	0.20 (0.00)	0.19 (0.00)
FII		2.00 (0.00)	0.74 (0.00)	0.81 (0.00)
OFDI to total assets		2.72 (0.00)	1.79 (0.00)	1.78 (0.00)
Foreign promoters		0.00 (0.00)	0.00 (0.00)	0.00 (0.00)
Firm profile				
Log(Size)			0.18 (0.00)	0.36 (0.00)
Log(Size) ²				-0.10 (0.00)
Age			0.00 (0.04)	-0.00 (0.05)

Impact of ECB on firm's performance

Methodology : Propensity score matching

- ▶ Identification of treatment and control group
 - ▶ To study the impact of external commercial borrowings, we define our treatment group as those firms which did not borrow abroad for three consecutive years and then borrowed in the next year.
 - ▶ The control group is a set of firms that did not borrow during the sample period.
- ▶ We assign a dummy variable for all years to the borrowers and non-borrowers.

Construction of treatment

- ▶ Trajectory used for treatment group is 0,0,0,1 i.e company that didn't borrow for three consecutive years and then borrowed in the next year.
- ▶ Reason for constructing trajectory for treatment:

- ▶ Inconsistent disclosure of ECB field, for example :

Shipping corp of India	2007	2008	2009	2010	2011
ECB	0	0	21798.1	19366.1	0

- ▶ ECB appears in the books of shipping corporation of India in the year 2009 but didn't appear in year 2011 which is highly impossible because of minimum maturity (3 years) requirement of ECB.
- ▶ Trajectory for treatment helps us in getting rid of inconsistent disclosure and provides cleaner data for analysis.

Logit regression and propensity score matching

- ▶ We run a logit regression of the dummy variables on the determinants of foreign borrowing to arrive at probability of firms to borrow abroad.
- ▶ We match firms in the treatment and control group on the basis of their propensity score.
- ▶ We get 272 matched pairs using this technique.
- ▶ We check the standardised difference and K-S test to see if we achieve a good match balance.

Goodness of matched pairs: Standardised difference

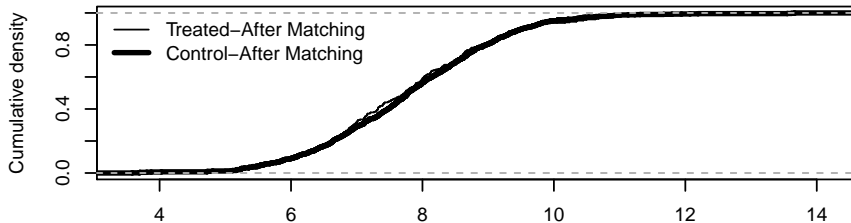
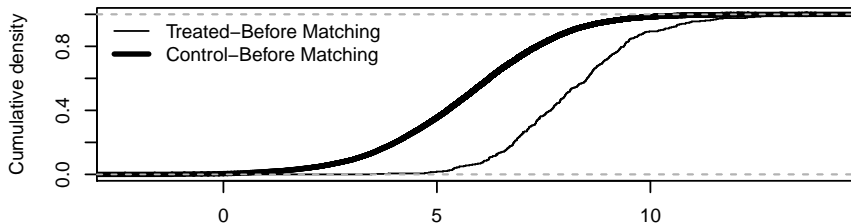
	Before Matching	After Matching
Propensity score	0.73	0.01
Asset tangibility $_{i,t-1}$	-0.19	-0.02
Liquidity $_{i,t-1}$	0.19	0.01
Export to sales $_{i,t-1}$	0.31	-0.07
Fill $_{i,t-1}$	0.57	0.06
OFDI to total assets $_{i,t-1}$	0.28	0.06
Foreign promoter $_{i,t-1}$	0.18	0.09
Log(Size) $_{i,t-1}$	1.52	-0.03
Log(Size) $^2_{i,t-1}$	1.17	-0.02
Age	0.06	-0.21

Goodness of matched pairs: KS test

	Before Matching	After Matching
Propensity score	0.5523 (0)	0.0365 (0.9417)
Asset tangibility $_{i,t-1}$	0.0969 (0.0037)	0.0723 (0.2199)
Liquidity $_{i,t-1}$	0.1037 (0.0015)	0.0535 (0.581)
Export to sales $_{i,t-1}$	0.3358 (0)	0.0732 (0.2082)
FII $_{i,t-1}$	0.428 (0)	0.1403 (5e-04)
OFDI to total assets $_{i,t-1}$	0.2402 (0)	0.0603 (0.4263)
Foreign promoter $_{i,t-1}$	0.1109 (5e-04)	0.0552 (0.5402)
Log(Size) $_{i,t-1}$	0.5313 (0)	0.0544 (0.5588)
Log(Size) $_{i,t-1}^2$	0.5313 (0)	0.0544 (0.5588)
Age	0.0668 (0.1007)	0.0975 (0.0361)

Number in parentheses is P value

Cumulative density of Log(Size)



Results

Growth of gross fixed assets			Growth of total assets		
	OLS	Robust		OLS	Robust
-3	0.04 (0.045)	0.03 (0.032)	-3	0.05 (0.036)	0.07 (0.032) *
-2	0.07 (0.064)	0.06 (0.057)	-2	0.16 (0.064) *	0.17 (0.061) **
-1	0.15 (0.083) .	0.16 (0.076) *	-1	0.19 (0.086) *	0.19 (0.083) *
0	0.26 (0.098) **	0.28 (0.094) **	0	0.26 (0.103) *	0.22 (0.097) *
1	0.24 (0.116) *	0.27 (0.111) *	1	0.27 (0.111) *	0.21 (0.108) .
2	0.22 (0.123) .	0.25 (0.119) *	2	0.25 (0.116) *	0.19 (0.113) .
3	0.27 (0.125) *	0.3 (0.121) *	3	0.3 (0.123) *	0.24 (0.122) .

Employee growth			Productivity growth		
	OLS	Robust		OLS	Robust
-3	-0.01 (0.072)	-0.06 (0.055)	-3	-0.02 (0.056)	0.02 (0.04)
-2	-0.06 (0.072)	-0.06 (0.062)	-2	0.06 (0.065)	0.07 (0.06)
-1	-0.03 (0.092)	-0.08 (0.09)	-1	-0.02 (0.075)	-0.01 (0.073)
0	0 (0.105)	-0.07 (0.095)	0	-0.12 (0.083)	-0.14 (0.079) .
1	0.03 (0.111)	-0.03 (0.107)	1	-0.11 (0.083)	-0.11 (0.078)
2	-0.01 (0.12)	-0.05 (0.115)	2	-0.12 (0.086)	-0.1 (0.088)
3	-0.01 (0.143)	-0.11 (0.128)	3	-0.16 (0.089) .	-0.13 (0.092)

Results

Return on capital			Sales growth		
	OLS	Robust		OLS	Robust
-3	0 (0.026)	0.01 (0.01)	-3	0.01 (0.052)	0.05 (0.035)
-2	0 (0.036)	0.02 (0.022)	-2	0.11 (0.066)	0.11 (0.055) *
-1	-0.03 (0.052)	0.02 (0.032)	-1	0.12 (0.083)	0.1 (0.081)
0	-0.04 (0.082)	0.02 (0.045)	0	0.14 (0.098)	0.08 (0.093)
1	-0.05 (0.094)	0.01 (0.053)	1	0.14 (0.108)	0.1 (0.101)
2	-0.1 (0.11)	0.03 (0.063)	2	0.11 (0.115)	0.08 (0.108)
3	-0.08 (0.117)	0.04 (0.072)	3	0.11 (0.119)	0.09 (0.113)

Growth of exports		
	OLS	Robust
-3	-0.01 (0.072)	-0.06 (0.055)
-2	-0.06 (0.072)	-0.06 (0.062)
-1	-0.03 (0.092)	-0.08 (0.09)
0	0 (0.105)	-0.07 (0.095)
1	0.03 (0.111)	-0.03 (0.107)
2	-0.01 (0.12)	-0.05 (0.115)
3	-0.01 (0.143)	-0.11 (0.128)

Conclusion

- ▶ Selection of borrowers: Large, less financially constrained, and internationalised firms borrow abroad
- ▶ Borrowing abroad has an impact on a firm's assets growth, but maps weakly to output.
- ▶ There may be poor security selection by foreign lenders.

Thank you.