Bank Ownership, Monetary Policy and Exports: Evidence from a Firm-Bank Matched Dataset

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Overview

- How does a bank's ownership matter for a firm's performance to which it is connected?
  - Especially, in the event of a crisis?
- In particular, I look at the effect of the interaction between an expansionary monetary policy shock (as a result of the crisis) and bank ownership on firm-level trade
- Utilize a firm-bank matched dataset and use information from banks' balance sheet (e.g., health of the banks) to estimate the desired effect
- Find:
  - significant evidence of differential effect of the expansionary monetary policy on firm-level export earnings (intensive margin)
    - **firms client to the public-sector (or state-owned) banks do not experience any decline in their domestic and international sales due to the disruption in credit supply in the post-2008 period**
  - limited effect of the monetary policy on extensive margin

Motivation: Credit Market – India

- India, like Brazil, China, etc. was relatively immune to the slowdown of the international credit flows
  - Primary Reason: **Indian banking system did not have any direct exposure to subprime mortgage assets**
- Witnessed a heavy sell-off by Foreign Institutional Investors (FIIs) to provide the much-needed liquidity to their parents in the US or Europe
  - result: **a net expulsion of around $13.3 billion in 2008 through equity disinvestment**
  - capital inflows under external commercial borrowings, short-term trade credit and external borrowing by banks also declined

Motivation: India's Capital Account, 2008-09

	2007-08	2008-09	H1 2008-09	H2 2008-09
Foreign Direct Investment	15401	17496	13867	3629
Portfolio Investment	29556	-14034	-5521	-8513
External Commercial Borrowings	22633	8158	3157	5001
Short-term Trade Credit	17183	-5795	3689	-9484
Other Banking Capital	11578	-7687	3747	-11434
Other Flows	10554	4671	-1849	6520

Notes: Figures are in INR million. Source: Reserve Bank of India.

Motivation: Credit Market – India

- Withdrawal of significant amount of capital led to
    - fall in Stock Exchange (BSE) Index
    - loss of access to funds (by banks) from abroad, as inter-bank borrowing seized up in the US and Europe
    - call money rate rose by nearly 20% (in October and early November 2008)
    - decline in the outstanding amount of certificate of deposit (CD) issued by the commercial banks
        - **all these happened despite the fact that a majority (60%) of the Indian banking system is owned by the public-sector**
- Could not escape a liquidity crisis and a credit crunch
    - Central Bank of India (popularly know as the Reserve Bank of India) intervened proactively with **policy measures** to mitigate the adverse impact on the Indian economy

Policy Response(s) – India

- Reserve Bank of India (RBI, hereinafter) took several policy measures to ease both the rupee and the liquidity conditions in the financial system

    - **Expansionary Monetary Policy** has been the principle tool to counter the after effects of the financial meltdown

- With regard to the domestic liquidity, the RBI reduced the key policy rates–the repo and the reverse repo–via the LAF

    - **Repo rate:** reduced by 350 basis points to 5.5% and then further to 4.75%
    - **Reverse repo rate:** cut by a cumulative 200 basis points from 6 to 4 percentage point then again to 3.25%
    - **CRR:** reduced from 9% to 5%

- Mohan (2009) estimates the actual amount of liquidity that has been injected into the system to be around 9% of GDP
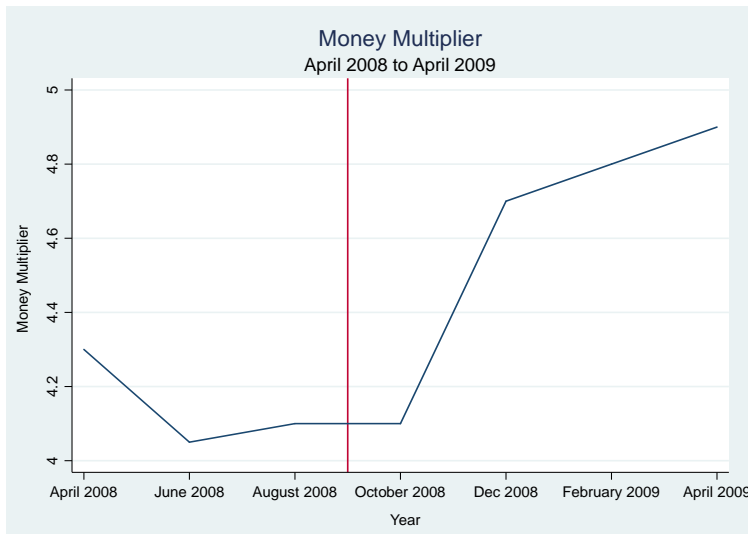
Policy Response(s) – India

Policy Changes by Reserve Bank of India
Indian Domestic Market, 2006-2010
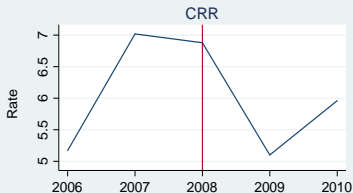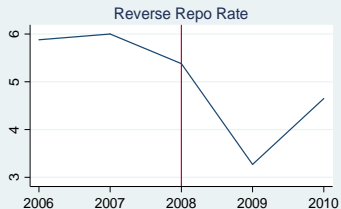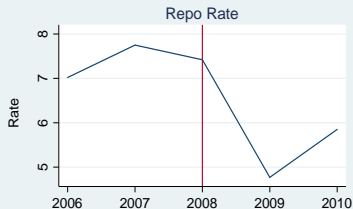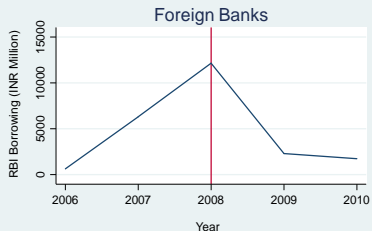
Policy Response(s) – India: Money Multiplier

Money Multiplier
April 2008 to April 2009
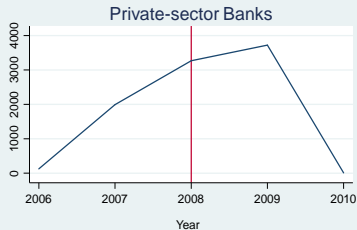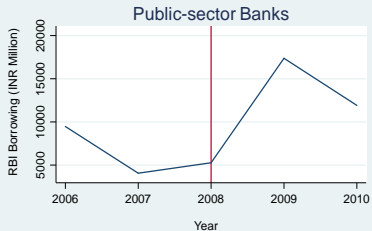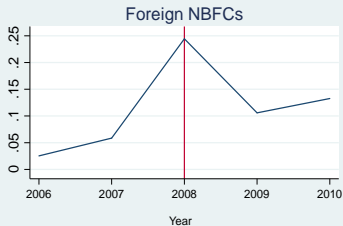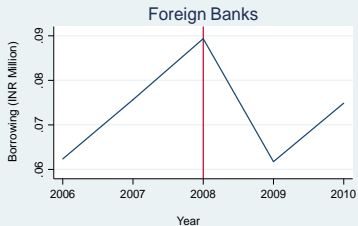
Effect of the Policy Response(s) - Borrowing by Banks

RBI Borrowing

Indian Financial Services Firms (Banks), 2006-2010

Effect of the Policy Response(s) - Borrowing by Firms

Firm-level Borrowing
Indian Manufacturing Firms, 2006-2010
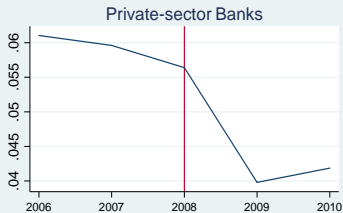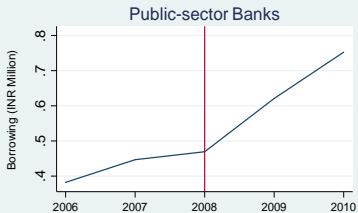
Borrowing by Firms (Exporters and Non-Exporters)

Firm-level Borrowing
Indian Manufacturing Firms, 2006-2010
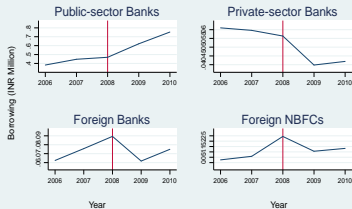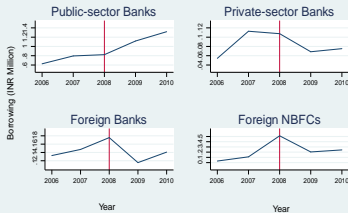
Public-sector vs. Other Banks
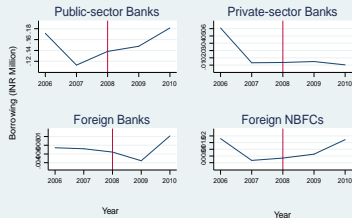
How does borrowing from public-sector banks or sources can help a firm (when the firm is a client to the public-sector bank) to mitigate the partial effects of the crisis?

Primarily, 3 reasons

- **public-sector banks themselves are differentially affected (by the crisis) as compared to other banks**
  - credit-lending by public-sector banks tend to be less responsive to macroeconomic shocks than by private banks (Micco and Panizza, 2006; Bertray et al., 2012; Cull and Martinez-Peria, 2012; Acharya and Kulkarni, 2012; Coleman and Feler, 2015)

Loans and Advances by Banks

Total Loans and Advances

Indian Financial Services Firms (Banks), 2006-2010
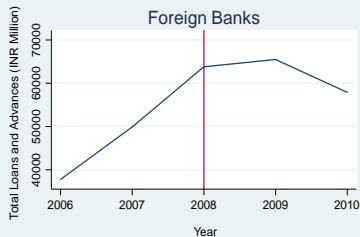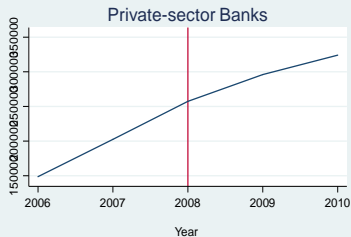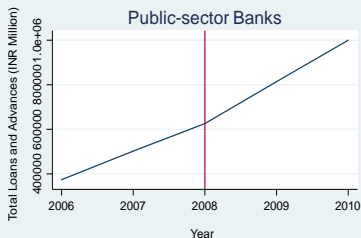
Public-sector vs. Other Banks (Credit Growth)

	4 January 2008	28 March 2008	4 January 2009	28 March 2009
Public-Sector Banks	19.8	22.5	28.6	20.4
Private Banks	24.2	19.9	11.8	10.9
Foreign Banks	30.7	28.5	16.9	4.0

Notes: Values are expressed in %, year-on-year changes. Source: Macroeconomic and Monetary Development, Various Issues, Reserve Bank of India.

Public-sector vs. Other Banks

- **differences in investor confidence**
  - e.g., consider the credit default swap (CDS) spreads. Differences between CDS of the major public-sector bank (State Bank of India) and private bank (ICICI) increased significantly after the crisis
- **due to political pressure** (Cole (2009) for India; Khwaja and Mian (2005) for Pakistan; Carvalho (2010) for Brazil; and Sapienza (2004) for Italy)

- **Indian Bank Nationalization Act:** provides an explicit guarantee that all obligations of public-sector banks will be fulfilled by the Indian govt. in the event of a failure

Public-sector vs. Other Banks (Deposits Growth)

Deposits Growth in Different Types of Banks
Public-Sector, Private, and Foreign: 2008 and 2009
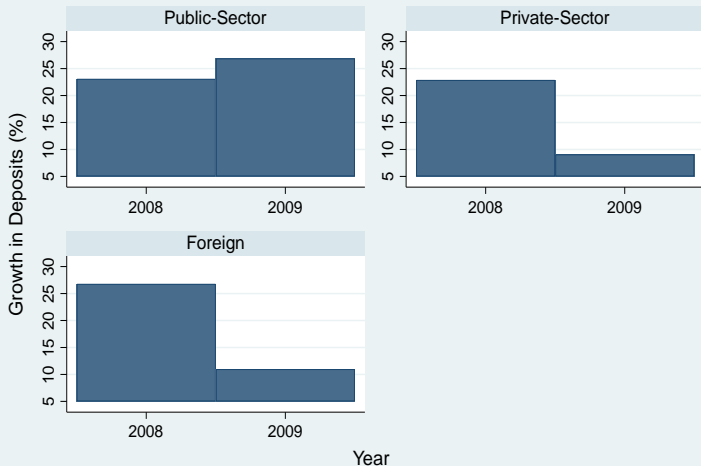
Evidence from Banks of Other Countries (Brazil)

Literature Review
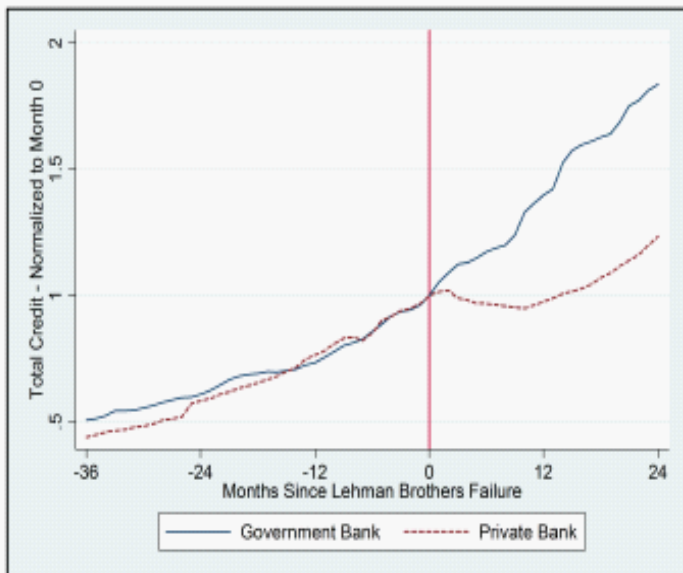
- Role of Banks
  - Iyer et al. (2013) - Portugese banks; Coleman and Feler (2015) - Brazilian private and govt-owned banks; Onegna et al. (2015) - bank funding of 14 East European countries

- Monetary Policy and Financial Crisis
  - Moreno (2010), Crowley and Luo (2011) and Kline et al. (2017): Evidence of monetary policy
  - Mihaljek (2010) and Acharya and Kulkarni (2012): differential impact of the 2008-09 crisis on the domestic or publicly-owned banks and foreign banks, especially in case of emerging market economies

- Trade and Finance
  - Amiti and Weinstein (2011, 2017) - Japanese firm-bank data; Paravisini et al. (2014) - Peruvian firm-bank data; Buono and Formai (2018) - Italian firm-bank data

- Bank Lending channel as an instrument for credit shocks
  - Carvalho et al. (2015); Chodorow-Reich (2014); Jimenez et al. (2011); Kalemli-Ozcan et al. (2010); Muûls (2015)

Dataset

- PROWESS Database (CMIE), contains information primarily from the income statements and balance sheets
    - of all the listed companies and publicly traded firms
- Comprises of more than 70% of the economic activity in the "registered" industrial sector, encompasses 75% of the corporate taxes and 95% of excise duty collected by the Govt. of India
- Advantages
    - panel of firms
    - records almost all the information at the firm-level, even at the product-level as well
        - provides information on important variables such as sales, exports, and imports apart from other specific firm and industry indicators
    - suits our period of concern, 1999/00-2009/10

Dataset

- PROWESS also gives detailed information on the banking relationships of each firm
  - provides the names and the details (balance sheets) of all the bankers for each individual firm over time
    - e.g, if a firm is a client of multiple banks or a single bank for every year and how much a bank has given loans and advances or how much a bank has borrowed from Central Bank of India or other sources along with information on financial health of the banks
- It also provides information on credit situation at the firm-level
  - provides a firm's borrowings according to sources and the type of borrowings
    - e.g., it gives how much a firm has borrowed from domestic banks (divided into public-sector and others), foreign banks, etc

Monetary Policy and Bank Lending/Health - Empirical Strategy

- Key point: 'transmission mechanism' where the banks and their lending decisions play the most important part
- Use the following equation:

$$\ln(H_{bt}) = \beta_1(RR_t^{Dom} \times D_{crisis}) + \beta_2 RR_t^{Dom} + \beta_3 D_{crisis} + bankcontrols_{t-2} + \theta_b + \gamma_t + \epsilon_{bt}$$

- H_{bt} represents an indicator for a bank b's health at time t - total amount of loans and advances as an indicator for bank health
- D_{crisis} is a dummy variable that takes a value 1 if year is ≥ 2009
- RR_t^{Dom} is the average of the dominant repo-rate as given by the RBI
- $bankcontrols$ includes age and age-squared of a bank, assets (as a size indicator)
- θ_b, γ_t are bank and year fixed effects

Monetary Policy and Bank Lending/Health - Results

	Loans and Advances			
	All Banks	Public-sector Banks	Private Banks	Foreign Banks
$D_{crisis} \times RR_t^{Dom}$	0.536 (2.907)	2.733*** (0.647)	0.557 (1.585)	4.420 (3.999)
RR_t^{Dom}	−0.357 (0.789)	−0.783*** (0.183)	−0.087 (0.446)	−1.717 (1.188)
D_{crisis}	−1.135 (4.776)	−4.504*** (1.069)	−2.620** (0.925)	−7.868** (3.705)
Bank Controls$_{t-2}$	Yes	Yes	Yes	Yes
R-Square	0.98	0.99	0.98	0.94
N	680	266	170	244
Bank FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Bank FE*Trend	Yes	Yes	Yes	Yes
Industry FE(5-digit)*Trend	Yes	Yes	Yes	Yes

*, **, *** denotes 10%, 5% and 1% level of significance

Bank Health and Exports - Empirical Strategy

I now utilize the firm-bank relations to estimate the causal effect of financial health of different types of banks during the crisis on firm-level exports using the following equation:

$$x_{ijt} = \gamma_1(D_{crisis} \times FinHealth_{b,00-01}) + \gamma_2(D_{crisis} \times FinHealth_{b,00-01} \times PSB_{fb,00}) + \alpha_{jt} + \delta_{ib} + \epsilon_{bt}$$

- $FinHealth_{b,00-01}$ is the financial health of a bank b - Borrowings from RBI/Loans and Advances; average for the years 1999-00 and 2000-01
- $PSB_{fb,00}$ is an indicator for public-sector bank. It takes a value 1 if a firm is client to a public-sector bank either in 1999-00 or 2000-01
- δ_{ib} - firm-bank fixed effects
- α_{jt} - industry-year fixed effects

Bank Health and Exports - Results (RBI Borrowing)

	Ln(Exports)		Exporter $= 1$	
		High Fin Dependent		High Fin Dependent
$D_{crisis} \times RBIBorr_b$	-0.073^* (0.041)	-0.078^* (0.042)	-0.008 (0.006)	-0.008 (0.006)
$D_{crisis} \times RBIBorr_b \times PSB_{fb}$	0.043^{***} (0.015)	0.048^{***} (0.015)	0.005^{**} (0.002)	0.006^{**} (0.002)
Bank Controls$_{t-2}$	Yes	Yes	Yes	Yes
R-Square	0.13	0.13	0.08	0.08
N	64,797	60,357	64,797	60,357
Bank-Firm FE	Yes	Yes	Yes	Yes
Industry FE*Year FE	Yes	Yes	Yes	Yes

$^*,^{**},^{***}$ denotes 10%, 5% and 1% level of significance

Bank Health and Exports - Results (RBI Borrowing)

	Ln(Dom Sales)	
	Exporters	Non-Exporters
$D_{crisis} \times RBIBorr_b$	-0.054^{**}	-0.011
	(0.022)	(0.089)
$D_{crisis} \times RBIBorr_b \times PSB_{fb}$	0.027^{***}	0.002
	(0.009)	(0.029)
Bank Controls$_{t-2}$	Yes	Yes
R-Square	0.23	0.10
N	44,346	20,319
Bank-Firm FE	Yes	Yes
Industry FE*Year FE	Yes	Yes

$*$,$**$,$***$ denotes 10%, 5% and 1% level of significance

Bank Health and Exports - Results (Loans and Advances)

	Ln(Exports)		Exporter = 1	
		High Fin Dependent		High Fin Dependent
$D_{crisis} \times FH_b$	-0.203^{**}	-0.209^{**}	-0.018^{*}	-0.020^{**}
	(0.080)	(0.081)	(0.010)	(0.010)
$D_{crisis} \times FH_b \times PSB_{fb}$	0.166^{*}	0.195^{*}	0.008	0.013
	(0.105)	(0.132)	(0.017)	(0.019)
Bank Controls$_{t-2}$	Yes	Yes	Yes	Yes
R-Square	0.13	0.13	0.08	0.08
N	77,408	74,006	77,408	74,006
Bank-Firm FE	Yes	Yes	Yes	Yes
Industry FE*Year FE	Yes	Yes	Yes	Yes

$^{*},^{**},^{***}$ denotes 10%, 5% and 1% level of significance

	Ln(Exports)		Exporter $= 1$	
		High Fin Dependent		High Fin Dependent
$D_{crisis} \times FH_b$	-0.138^{***} (0.027)	-0.173^{***} (0.048)	0.009 (0.015)	0.006 (0.012)
$D_{crisis} \times FH_b \times DB_{fb}$	-0.014 (0.017)	-0.003 (0.013)	-0.006 (0.016)	-0.007 (0.013)
Bank Controls$_{t-2}$	Yes	Yes	Yes	Yes
R-Square	0.46	0.46	0.46	0.46
N	68,452	64,409	68,452	64,409
Bank-Firm FE	Yes	Yes	Yes	Yes
Industry FE*Year FE	Yes	Yes	Yes	Yes

$^{*},^{**},^{***}$ denotes 10%, 5% and 1% level of significance

	Ln(Exports)			
	US Banks		EU Banks	
		High Fin Dependent		High Fin Dependent
$D_{crisis} \times FH_b$	−0.121 (0.093)	−0.094 (0.101)	−0.190 (0.118)	−0.201 (0.127)
$D_{crisis} \times FH_b \times FB_{fb}$	−0.214*** (0.073)	−0.306*** (0.090)	0.055 (0.141)	0.093 (0.113)
Bank Controls$_{t-2}$	Yes	Yes	Yes	Yes
R-Square	0.15	0.15	0.15	0.15
N	34,061	31,958	34,061	31,958
Bank FE	Yes	Yes	Yes	Yes
Industry FE*Year FE	Yes	Yes	Yes	Yes

*,**,*** denotes 10%, 5% and 1% level of significance

Concluding Remarks

- Significant evidence of differential effect of the expansionary monetary policy on firm-level export earnings (intensive margin) due to differences in bank ownership

    - **firms client to the domestic public-sector banks or borrowing from domestic sources, do not experience any decline in their domestic and international sales due to the disruption in credit supply in the post-2008 period**
    - effect disappears when domestic public-sector bank is combined with private-sector

- Limited effect of the monetary policy on extensive margin
- Firms client to US banks suffered significantly more than firms client to all other banks

Thank you for your kind attention

Firm Borrowing and Exports - Empirical Strategy

Exploit the following reduced form using OLS fixed effects type of estimation a la. Chor and Manova (2012)

$$x_{ijt} = \beta_1(RR_{Dom} \times D_{crisis}) + \beta_2(D_{crisis} \times RR_{Dom} \times Borr^D_{00,01}) + firmcontrols_{t-2} + \theta_i + \alpha_{jt} + \epsilon_{ijt}$$

- x_{ijt} = intensive (natural logarithim of value of exports) or extensive (dummy variable indicating whether a firm is a exporter or not) margin of trade
- $firmcontrols_{t-2}$ = age, age squared, size (assets) and technology expenditure/GVA of a firm
- θ_i = firm fixed effects
- α_{jt} = interaction of industry and year fixed effects
    - standard errors are clustered at the firm-level

Firm Borrowing and Exports - Empirical Strategy

- Borrowing is endogenous to the performance of a firm
- To potentially subvert those problems, I create a 'Financial Fragility' index by using the values for the pre-crisis years (in particular, 2000 and 2001):

$$Borr_{00,01}^{D} = \sum_{2000-2001} \left(\frac{Borr_{00,01}^{D}}{Borr_{00,01}} \right)$$

- I do the same for borrowings from other source (e.g., foreign)

Firm Borrowing and Exports - Empirical Strategy

- $D_{crisis} \times RR_{Dom} \times Borr^{D}_{00,01}$ tests the effect of monetary policy during the crisis, given that a firm is borrowing from public-sector banks or domestic sources (D)

    - $\beta_2 \rangle 0$

- $RR_{Dom} \times D_{crisis}$ measures the effect of the expansionary monetary policy when a firm is not borrowing from other sources (in our case, foreign) and not domestic

    - $\beta_1 \langle 0$

        - in other words, it serves as a control group to our main variable of interest

Firm-level Borrowing and Exports - Results (Intensive Margin)

	Ln(Exports)			
	Domestic Public-sector Banks		Foreign Banks	
		High Fin Dependent		High Fin Dependent
$D_{crisis} \times RR_t^{Dom}$	-0.207 (0.284)	-0.433^* (0.261)	0.427^* (0.245)	0.571^{**} (0.238)
$D_{crisis} \times RR_t^{Dom} \times Borr_{i,00}$	1.038^{***} (0.190)	1.105^{***} (0.206)	-0.285^{**} (0.113)	-0.295^{**} (0.118)
D_{crisis}	-0.428^{***} (0.055)	-0.410^{***} (0.057)	-0.164^{***} (0.049)	-0.965^{***} (0.236)
Firm Controls$_{t-2}$	Yes	Yes	Yes	Yes
R-Square	0.89	0.89	0.89	0.89
N	27,199	24,643	27,199	24,643
Firm FE	Yes	Yes	Yes	Yes
Industry FE*Year FE	Yes	Yes	Yes	Yes

*,**,*** denotes 10%, 5% and 1% level of significance

Firm-level Borrowing and Exports - Results (Extensive Margin)

	Exporter = 1			
	Domestic Public-sector Banks		Foreign Banks	
		High Fin Dependent		High Fin Dependent
$D_{crisis} \times RR_t^{Dom}$	-0.187^{**} (0.075)	-0.182^{**} (0.072)	0.447 (0.365)	0.131 (0.090)
$D_{crisis} \times RR_t^{Dom} \times Borr_{i,00}$	0.253^{**} (0.093)	0.260^{***} (0.096)	-0.211 (0.200)	-0.200 (0.195)
D_{crisis}	-0.789^{***} (0.067)	-0.247^{***} (0.020)	-0.234^{***} (0.044)	-0.069^{***} (0.014)
Firm Controls$_{t-2}$	Yes	Yes	Yes	Yes
R-Square	0.25	0.24	0.23	0.23
N	27,199	24,643	27,199	24,643
Firm FE	Yes	Yes	Yes	Yes
Industry FE*Year FE	Yes	Yes	Yes	Yes

$^{*},^{**},^{***}$ denotes 10%, 5% and 1% level of significance