The rise of regional financial cycle and domestic credit markets in Asia

Chiara Banti
University of Essex

Udichibarna Bose
University of Essex

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Background & motivation

- Retrenchment of global (euro area) banks (McCauley, Benetrix, McGuire, and von Peter 2019) and emergence of regional lenders, including from EMs in post-GFC period (Cerutti and Zhou 2017)
- In Asia, banks from Japan and China have become key regional lenders (IMF GFSR 2015, Koch and Remolona 2018, Cerutti, Koch and Pradhan 2018)
- Cross border claims on developing Asia and the Pacific from selected main lenders:

Cross-border claims, all sectors, all instruments, 2023-Q2

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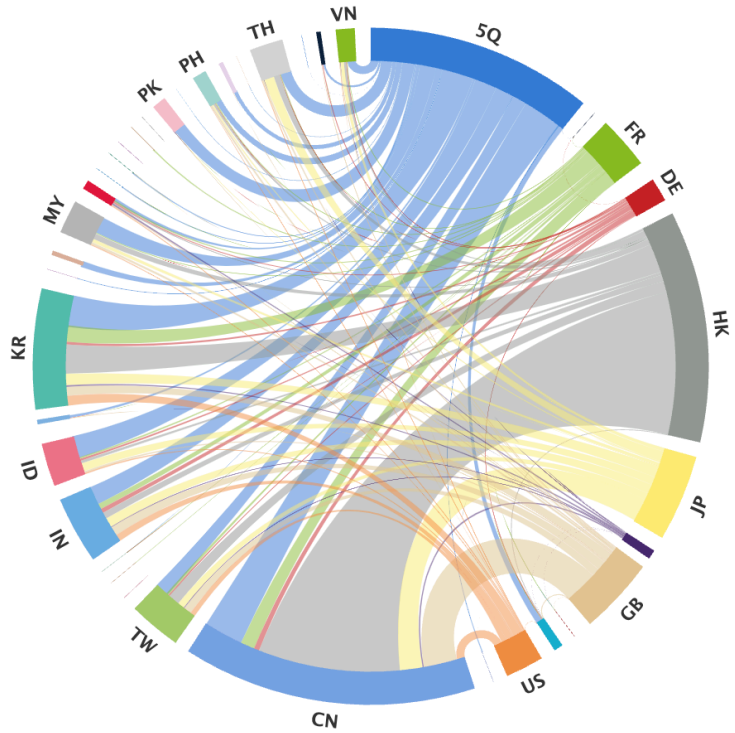
Interactive graph

Chart shows only those bilateral positions for which data are public (Table A6.2)



Background & motivation

- Reflecting largely US-based factors, a global financial cycle (GFCy) drives financing conditions and risky asset prices globally (Calvo et al. 1993, 1996, Rey 2013, Miranda-Agrippino and Rey 2020), but its explanatory power for bank flows towards EMs may be limited (Cerutti, Claessens and Rose 2019)
- Evidence of a stronger EM-specific financial cycle (Aldasoro, Avdjiev, Borio and Disyatat 2020) and strong commonality in financial factors regionally (Adarov 2020)
- A large literature documenting the impact of drivers of GFCy on bank flows and domestic credit (Bruno and Shin 2015, Buch et al 2019)
- Less is known about regional factors

$\rightarrow$ We ask whether the emergence of a regional financial cycle in Asia is relevant for domestic credit markets

Channels for exposure to external factors - banks

- Global banks transmit US financial conditions abroad via international bank lending channel (Cetorelli and Goldberg 2011, Bruno and Shin 2015, Ivashina, Scharfstein, Stein 2015, Avdjiev and Hale 2019)
  - Empirical evidence of foreign banks as transmission channels of their own country monetary policy abroad (Giannetti and Laeven 2012, Morais et al 2019, Correa et al 2021), although US policy may still dominate (Brauning and Ivashina 2020)
  - Exposure to wholesale FX funding markets by domestic banks also important (Schnabl 2012, di Giovanni et al 2022)
  - Relevance of the currency dimension (Avdjiev and Takats 2019, Takats and Temesvary 2020)
  - These effects may be relatively small in magnitude (Buch et al 2019)
- In the region, international banks from Japan fund their cross-border lending domestically and in wholesale FX funding markets (Aldasoro, Ehlers, and Eren 2022)
- EM regional banks in Asia provide over half FX credit to nonbank regional borrowers (Cerutti, Koch, and Pradhan 2018)

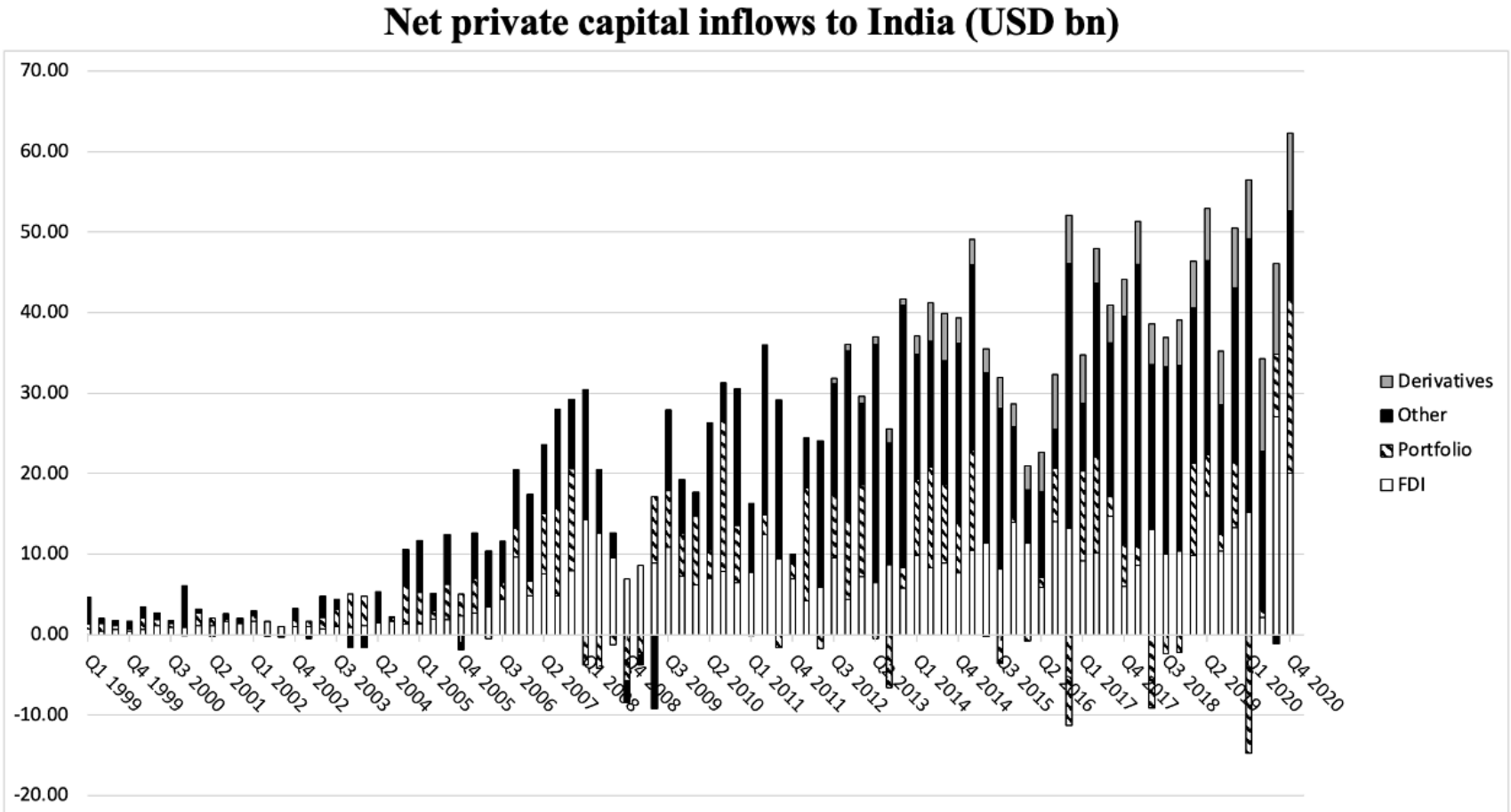
$\rightarrow$ We contribute by documenting the transmission channels for the regional cycle (interbank markets and monetary policy)

$\rightarrow$ We also study whether the emergence of this regional cycle reduces the exposure of domestic credit markets to global factors, focusing on the domestic vs FX segments

Other channels

- Also, domestic monetary policy may respond to external shocks
  - To reduce pressure on exchange rate, CBs may alter domestic rates and thus corporations' cost of financing $\rightarrow$ bond issuances abroad & encourage global asset managers in search for yields (Shin 2013)
- Finally, economic performance of major countries in the region may also influence corporate borrowings via demand for exports, given strong trade linkages in Asia

The case of India

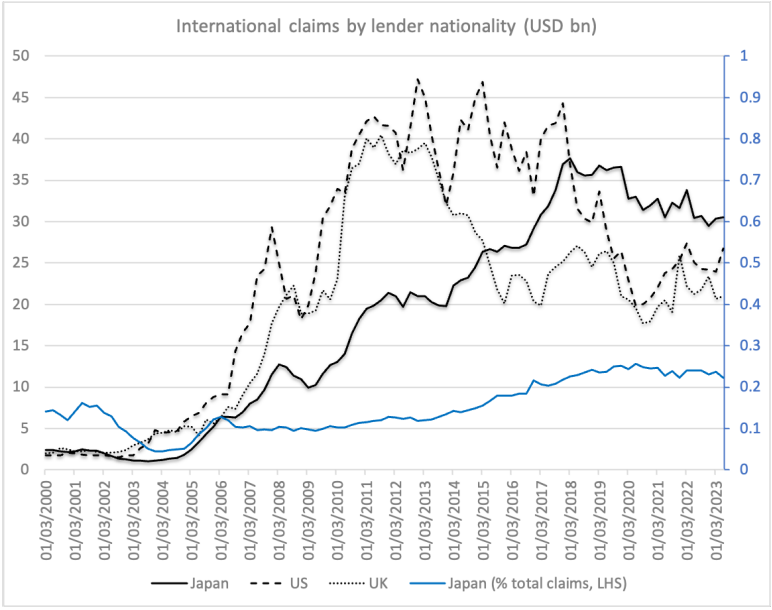


Notes: The figure shows the composition of quarterly net private capital inflows to India in USD billions. Net private capital inflows are annual net incurrence of liabilities by component (FDI, equity and debt portfolio, derivatives, and other including banks) from the financial account of the balance of payments. Data is from the IMF.

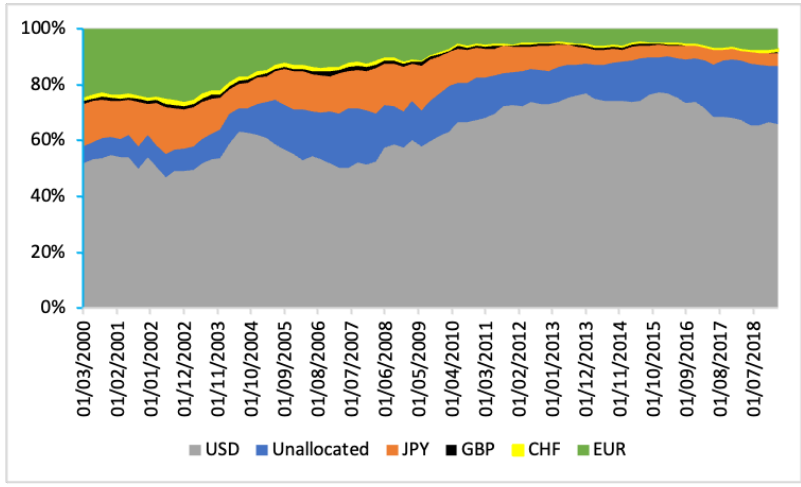
The case of India - banks

- Banks are the largest source of domestic credit to corporations ($1.53tn, BIS data)
- External commercial borrowings (ECBs) are main source of FX loans, and 90% are bank loans (Acharya and Vij 2022)
- Direct cross-border bank credit to Indian corporations amounts to $57bn (BIS data)
- External liabilities of Indian domestic banks at over $250bn
- Regional banks account for 30% of bank flows to India, up from 23% in 2014
- Japan is the largest single lender followed by the UK and Hong Kong
- Similarities in the structure of the Indian economy with other economies in the region: corporate bond and FX hedging markets relatively underdeveloped, domestic credit market frictions and the dual structure of formal-informal finance (Allen et al. 2012, Banerjee and Mohanty 2021)
- India is one of the largest economies in the world and its interconnection to global markets is reflected by the particularly large capital outflows and currency depreciation during the 2013 taper tantrum episode (Azis and Shin 2015, Banti and Bose 2021)

The case of India - bank flows



Notes: The figure shows the international claims on all sectors by nationality of the reporting banks in USD billions. International claims include cross border claims and local FX loans. On the secondary axis is the share of Japanese claims on India as % of total claims. Data is from BIS CBS.



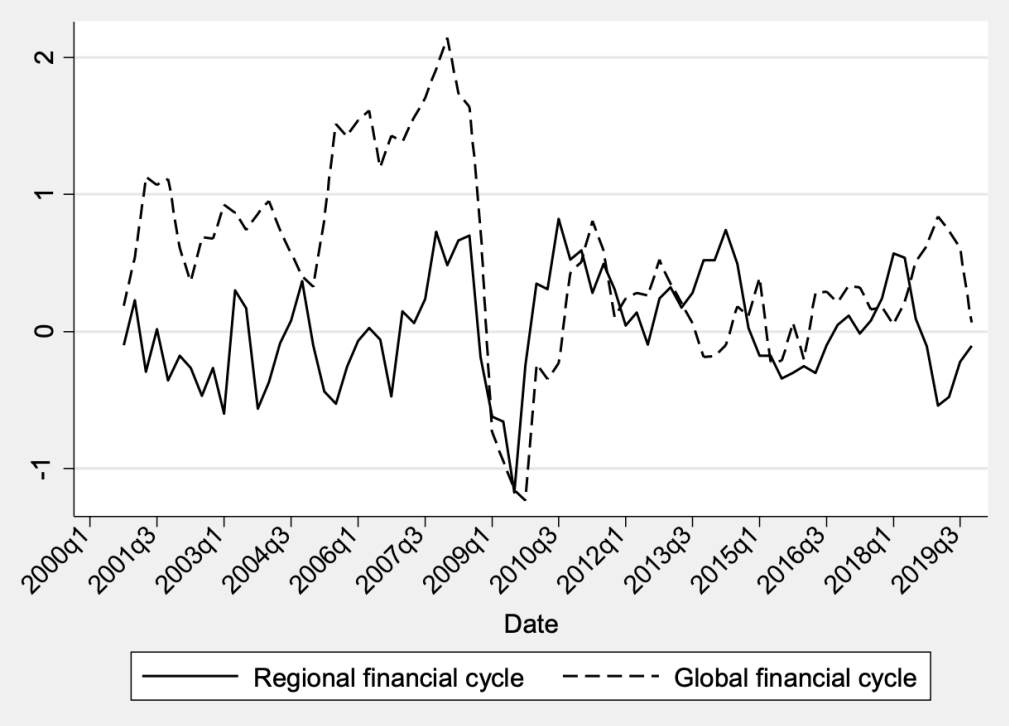
Notes: The figure shows the currency composition of claims on all sectors. International claims include cross border claims and local FX loans. Data is from BIS CBS.

Firm-level dataset

- Dataset covering P&L and BS data by Centre for Monitoring Indian Economy (CMIE) from the Prowess database
- Annual data from 2001 to 2019 for an unbalanced panel of 24,169 non-financial firms
- At the firm level, we can trace the impact of regional and global factors on the total credit of firms
- With details of debt in domestic and FX currency, we can differentiate this impact on the domestic and external credit markets
- Focus on the availability of credit to Indian firms as *domestic debt* and *FX debt*

Regional financial cycle

- Regional financial cycle extracted from a dynamic factor model of bank flows to the countries in the region, and a global factor common to a representative set of countries (Miranda-Agrippino and Rey 2020)
- Our regional sample includes China, Hong Kong, Indonesia, Korea, Malaysia, Philippines, Singapore, Taiwan, Thailand, and Vietnam
- Bank flows are the FX and break adjusted changes to cross-border claims for all reporting banks to all sectors from BIS LBS (quarterly)



Baseline model

- We exploit the detailed dataset and investigate the impact of the regional financial cycle (RFCy) on domestic (DC) and FX corporate debt separately:

$$ln(DCdebt_{i,t}) = a_0 + a_1 RFCy_{t-1} + a_2 GFCy_{t-1} + a_3 FF_{i,t-1} + a_4 DF_{t-1} + f_i + \epsilon_{i,t}$$

$$ln(FXdebt_{i,t}) = b_0 + b_1 RFCy_{t-1} + b_2 GFCy_{t-1} + b_3 FF_{i,t-1} + b_4 DF_{t-1} + f_i + \epsilon_{i,t}$$

- We control for the global financial cycle, firm-level characteristics (size, liquidity, tangibility, export status) and domestic factors (real GDP growth, stock performance, interbank rates)
- Firm FE are included and all controls lagged

Debt & the regional cycle

	(1)	(2)	(3)	(4)
Dependent variable=	**ln (Domestic debt)**		**ln (FX debt)**	
Regional financial cycle	0.046***	0.045***	0.113***	0.073
	(0.009)	(0.009)	(0.042)	(0.046)
Global financial cycle	-	0.006	-	0.080***
		(0.005)		(0.025)
Size	0.758***	0.759***	0.314***	0.327***
	(0.008)	(0.008)	(0.042)	(0.043)
Liquidity	-0.015***	-0.015***	0.013*	0.013*
	(0.002)	(0.002)	(0.007)	(0.007)
Tangibility	0.145***	0.145***	-0.047	-0.045
	(0.036)	(0.036)	(0.121)	(0.121)
Export firm	0.114***	0.114***	0.096*	0.097*
	(0.014)	(0.014)	(0.050)	(0.050)
GDP growth	0.011***	0.012***	-0.026***	-0.013
	(0.002)	(0.002)	(0.008)	(0.008)
Stock returns	0.059***	0.048**	0.025	-0.165*
	(0.020)	(0.019)	(0.099)	(0.093)
Interbank rate	0.014***	0.014***	0.035**	0.041***
	(0.004)	(0.003)	(0.014)	(0.014)
Constant	-0.562***	-0.577***	3.417***	3.150***
	(0.058)	(0.058)	(0.385)	(0.393)
Observations	170,356	170,356	6,496	6,496
R-squared	0.840	0.840	0.894	0.894
Number of firms	22,356	22,356	1,472	1,472

Regional drivers

- We focus on key supply-side factors originating from the main lenders in the region - Australia, Hong Kong, Japan, South Korea, Taiwan, and Singapore (Koch and Remolona 2018)
- Banks as transmission channels for funding conditions and monetary policy from global financial centers to domestic economies (Giannetti and Laeven 2012; Bruno and Shin 2015; Cerutti, Claessens, and Ratnovski 2017)
- Short term *interbank rates* measure funding constraints in the regional banking sectors (OECD)
- *Policy rates* of lender countries capture the role of regional monetary policy (IMF IFS)
- Yield spreads for robustness

$\rightarrow$ Do these factors affect domestic credit markets? And, are they related to firms' exposure to the regional cycle?

Regional interbank markets & monetary policy

$$ln(DCdebt_{i,t}) = a_0 + a_1(RFCy_{t-1} \times Driver_{t-1}) + a_2 RFCy_{t-1} + a_3 Driver_{t-1} + a_4 GFCy_{t-1} + a_5 FF_{i,t-1} + a_6 DF_{t-1} + f_i + \epsilon_{i,t}$$

$$ln(FXdebt_{i,t}) = b_0 + b_1(RFCy_{t-1} \times Driver_{t-1}) + b_2 RFCy_{t-1} + b_3 Driver_{t-1} + b_4 GFCy_{t-1} + b_5 FF_{i,t-1} + b_6 DF_{t-1} + f_i + \epsilon_{i,t}$$

Dependent variable=	(1)	(2)	(3)	(4)
	ln (Domestic debt)		**ln (FX debt)**	
Drivers =	*Regional interbank rates*	*Regional policy rates*	*Regional interbank rates*	*Regional policy rates*
Regional financial cycle*Driver	-0.238***	-0.419***	0.002	-0.101
	(0.037)	(0.042)	(0.185)	(0.239)
Driver (See column)	-0.122***	-0.183***	0.044	-0.015
	(0.014)	(0.015)	(0.064)	(0.074)
Regional financial cycle	0.063***	0.100***	0.071	0.083
	(0.009)	(0.011)	(0.045)	(0.053)
Global financial cycle	0.028***	-0.001	0.064*	0.073**
	(0.008)	(0.006)	(0.033)	(0.029)
Controls	yes	yes	yes	yes
Observations	170,356	170,356	6,496	6,496
R-squared	0.840	0.841	0.894	0.894
Number of firms	22,356	1,472	22,356	1,472

Japan as main lender

- Japanese policy rates have been around zero in our sample period, and BoJ has adopted unconventional policy since 2001
  - We focus on the first difference of the *shadow rate* by Krippner (2016) and the size of the *BoJ balance sheet* (following Buch et al 2019)
- Japanese banks use cross-currency swaps to fund banks' lending abroad (Lam 2013)
  - We employ the *dollar yen cross-currency basis* to measure funding costs in USD money markets (Avdjiev et al. 2019; International Monetary Fund 2019; Ivashina, Scharfstein, and Stein 2015)
- Finally, monetary policy convergence is associated with stronger sensitivities of bank flows and corporate borrowing to global shocks (Avdjiev et al 2020, Banti and Bose 2021)
  - We study the role of *monetary policy divergence* between Japan and the US with the difference between the 3-month euroyen and eurodollar futures

Japanese monetary policy & USD funding

$$ln(DCdebt_{i,t}) = a_0 + a_1(RFCy_{t-1} \times Driver_{t-1}) + a_2 RFCy_{t-1} + a_3 Driver_{t-1} + a_4 GFCy_{t-1} + a_5 FF_{i,t-1} + a_6 DF_{t-1} + f_i + \epsilon_{i,t}$$

$$ln(FXdebt_{i,t}) = b_0 + b_1(RFCy_{t-1} \times Driver_{t-1}) + b_2 RFCy_{t-1} + b_3 Driver_{t-1} + b_4 GFCy_{t-1} + b_5 FF_{i,t-1} + b_6 DF_{t-1} + f_i + \epsilon_{i,t}$$

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable=			**ln (Domestic debt)**				**ln (FX debt)**	
Drivers =	*JP shadow rates*	*BoJ balance sheet*	*Dollar yen cross-currency basis*	*Monetary policy divergence*	*JP shadow rates*	*BoJ balance sheet*	*Dollar yen cross-currency basis*	*Monetary policy divergence*
Regional financial cycle* Driver	-0.043***	0.014***	0.018***	-0.014***	-0.087	0.012	-0.015	-0.045**
	(0.014)	(0.002)	(0.003)	(0.004)	(0.065)	(0.009)	(0.017)	(0.019)
Driver (See column)	-0.017***	-0.016***	0.014***	0.033***	0.008	-0.002	0.019**	0.015
	(0.005)	(0.001)	(0.002)	(0.003)	(0.021)	(0.005)	(0.009)	(0.021)
Regional financial cycle	0.048***	0.009	0.133***	0.104***	0.100*	0.047	-0.024	0.181***
	(0.012)	(0.009)	(0.016)	(0.013)	(0.059)	(0.051)	(0.113)	(0.069)
Global financial cycle	0.001	-0.003	0.001	-0.047***	0.069**	0.086***	0.095***	0.074**
	(0.005)	(0.005)	(0.005)	(0.007)	(0.027)	(0.026)	(0.028)	(0.037)
Controls	yes	yes	yes	yes	yes	yes	yes	yes
Observations	170,356	170,356	170,356	170,356	6,496	6,496	6,496	6,496
R-squared	0.840	0.841	0.840	0.840	0.894	0.894	0.895	0.894
Number of firms	22,356	22,356	22,356	22,356	1,472	1,472	1,472	1,472

Emerging role of China

- Chinese banks are expanding abroad and China is now a key node for the intermediation of USD in Asia (Lane and Milesi-Ferretti, 2018, Committee on the Global Financial System, 2020)
- Given the magnitude of the Chinese economy and economic linkages in the region, spillovers from China may arise due to its economic performance (IMF 2016)
- *Driver* is the 7-day pledged repo rate in the interbank market, available since 2006 from the People's Bank of China (Kim and Chen 2022)

	(1)	(2)	(3)	(4)
	ln (Domestic debt)		**ln (FX debt)**	
Regional financial cycle* CHN interbank rate	0.092***	-	0.197***	-
	(0.013)		(0.051)	
CHN interbank rate	-0.026***	-0.012***	-0.051***	-0.015
	(0.004)	(0.003)	(0.017)	(0.011)
Regional financial cycle	0.203***	0.119***	0.431***	0.217**
	(0.029)	(0.022)	(0.130)	(0.095)
Global financial cycle	-0.042***	-0.014**	-0.019	0.052*
	(0.009)	(0.007)	(0.038)	(0.029)
Controls	yes	yes	yes	yes
Observations	131,031	131,031	5,851	5,851
R-squared	0.865	0.865	0.903	0.903
Number of firms	20,447	20,447	1,397	1,397

Transmission channel of foreign vs domestic banks

- Indian banking sector comprises domestic banks, and offices of foreign banks operating as branches (Berger et al. 2008, Gormley 2010)
- To disentangle the transmission channel of foreign vs domestic banks, we classify firms into two groups based on the nationality of their bankers, *domestic banking* or *foreign banking*, and estimate the main equations for these two groups separately

$$ln(DCdebt_{i,t}) = a_0 + a_1 RFCy_{t-1} + a_2 GFCy_{t-1} + a_3 FF_{i,t-1} + a_4 DF_{t-1} + f_i + \epsilon_{i,t}$$

$$ln(FXdebt_{i,t}) = b_0 + b_1 RFCy_{t-1} + b_2 GFCy_{t-1} + b_3 FF_{i,t-1} + b_4 DF_{t-1} + f_i + \epsilon_{i,t}$$

Dependent variable=	**ln (Domestic debt)**		**ln (FX debt)**	
	Foreign banking	*Domestic banking*	*Foreign banking*	*Domestic banking*
Regional financial cycle	0.044**	0.041***	0.061	0.085
	(0.021)	(0.010)	(0.060)	(0.072)
Global financial cycle	0.042***	-0.002	0.078**	0.086**
	(0.011)	(0.006)	(0.033)	(0.038)
Controls	yes	yes	yes	yes
Observations	32,067	138,289	3,088	3,408
R-squared	0.816	0.840	0.851	0.917
Number of firms	3,109	19,247	601	871

Policy responses

Finally, we study the effectiveness of various policies to manage the exposure of credit markets to the regional financial cycle:

1. Macroprudential policy (MP)
   - Measures oriented towards systemic financial stability, where targets can be banking sector, borrowers, or FX operations
   - Most common instruments in India are capital requirements and reserve requirements, 4 actions with FX-based measures
   - IMF integrated Macroprudential Policy (iMaPP) database, originally constructed by Alam et al. (2019)
2. Capital controls
   - Traditional measures are not time-varying for India (Ito-Chinn, Fernandez)
   - We build a sector-level measure to identify those sectors in the economy that are restricted to foreign investors (World Bank report)
   - Sectors with higher restrictions in India are agriculture and forestry, media, telecommunication, and transportation
3. FX regime
   - Market-based indicator by Shambaugh (2004)
   - Currency regime classified as pegged if the exchange rate fluctuates within a narrow band of +/-2% in a year

Effectiveness of policy responses

$$ln(DCdebt)_{i,t} = a_0 + a_1(RFCy_{t-1} \times policy_{t-1}) + a_2 RFCy_{t-1} + a_3 policy_{t-1} + a_4 GFCy_{t-1} + a_5 FF_{i,t-1} + a_6 DF_{t-1} + f_i + \epsilon_{i,t}$$

$$ln(FXdebt)_{i,t} = b_0 + b_1(RFCy_{t-1} \times policy_{t-1}) + b_2 RFCy_{t-1} + b_3 policy_{t-1} + b_4 GFCy_{t-1} + b_5 FF_{i,t-1} + b_6 DF_{t-1} + f_i + \epsilon_{i,t}$$

	(1)	(2)	(3)
Dependent variable=		**ln (Domestic debt)**	
Policy =	*Macroprudential policy*	*Sectoral openness*	*Exchange rate regime*
Regional financial cycle*Policy	-0.017***	0.001*	-0.122***
	(0.003)	(0.000)	(0.025)
Policy (See column)	-0.007***	-	-0.089***
	(0.002)		(0.007)
Regional financial cycle	0.104***	-0.024	0.029**
	(0.014)	(0.040)	(0.013)
Global financial cycle	0.009*	0.006	0.004
	(0.005)	(0.005)	(0.005)
Controls	yes	yes	yes
Observations	170,356	170,356	170,356
R-squared	0.840	0.840	0.840
Number of firms	22,356	22,356	22,356

Additional analysis

- Is the effect of the regional cycle stronger in the post-GFC period?
- Does credit availability have real effects?
- Is the effect limited to exporters?

	(1) **ln (Domestic debt)**	(2) **ln (FX debt)**	(3) **Ln (Investments)**	(4) **ln (Domestic debt)**	(5) **ln (FX debt)**
				Non-exporter firms	
Regional financial cycle*Post 2010	0.094***	0.119	-	-	-
	(0.019)	(0.100)			
Post 2010	-0.136***	-0.001	-	-	-
	(0.016)	(0.072)			
Regional financial cycle	0.068***	0.030	0.028***	0.031***	-0.003
	(0.010)	(0.064)	(0.005)	(0.012)	(0.098)
Global financial cycle	-0.003	0.088***	0.018***	-0.004	0.095**
	(0.005)	(0.027)	(0.003)	(0.007)	(0.046)
Controls	yes	yes	yes	yes	yes
Observations	170,356	6,496	255,185	106,843	2,266
R-squared	0.840	0.894	0.936	0.855	0.924
Number of firms	22,356	1,472	29,592	18,258	671

Conclusions

- We document a significant exposure of domestic credit markets to the regional financial cycle in Asia
- This exposure is different from that to the global financial cycle, mainly operating via FX credit markets
- We find the exposure to the regional cycle via regional interbank markets and monetary policy
- We highlight the relevance of Japan - not only relative USD shortage, and Japan-US monetary policy divergence, but also its own monetary policy
- Regional cycle is channeled by both domestic and foreign banks
- Foreign banks operating in India via local affiliates play a key role as transmission channels of the global cycle to domestic credit markets
- Overall, we find that countries can manage their exposure to external factors originating in the region via MP, selective capital controls and FX management
- The exposure to the regional cycle is stronger post-GFC, has real effects, and applies to non-exporting firms as well
- Our findings also signal that regional financial integration in Asia is already relevant for domestic credit dynamics