International Spillovers and Local Credit Cycles

Discussion by Cory Baird

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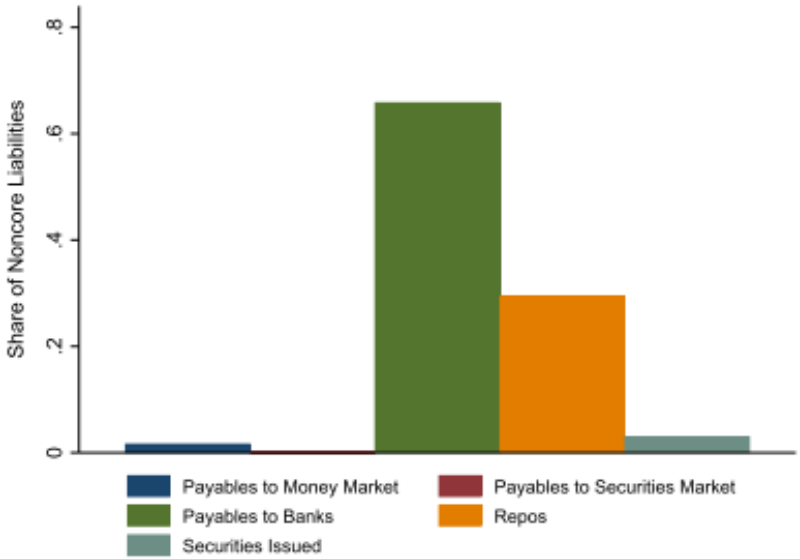
Overview

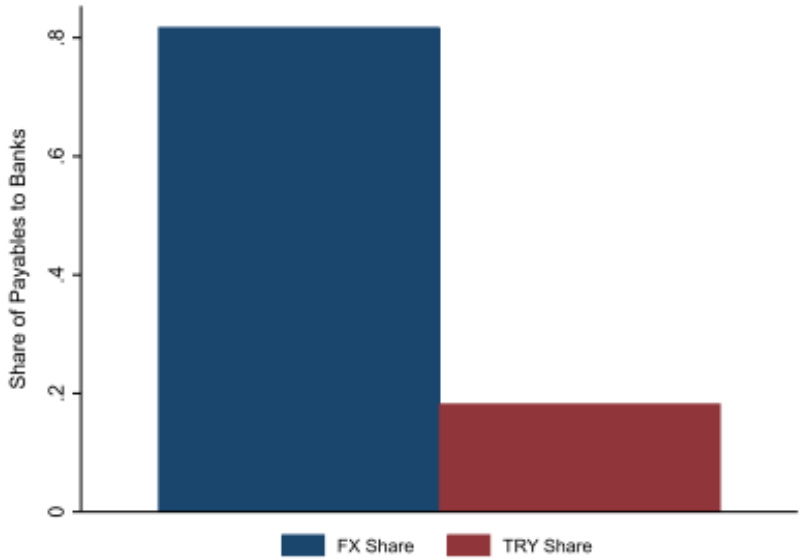
Introduction

- Micro-level regressions show economically significant relationships between the Global Financial Cycle (GFC) and domestic credit market.
- Median banks' non-core liabilities co-moves with the GFC, showing that international capital markets play an important role in transmitting GFC locally.
- High non-core banks lend more at lower rates during the boom phase compared to low non-core banks, and vice versa.
    - "The fall in borrowing costs is driven by a failure in uncovered interest rate parity (UIP), where the UIP risk premium comoves with the GFC over time, making local currency borrowing cheaper relative to foreign currency borrowing during boom phases."

Introduction (cont.)



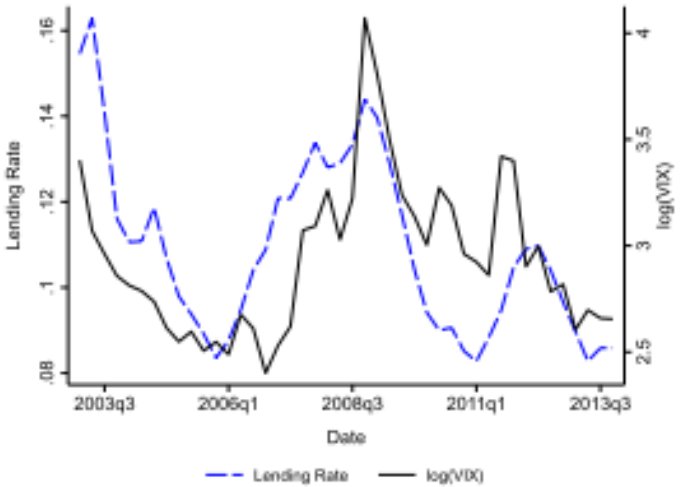
(a) Non-core Liabilities Breakdown



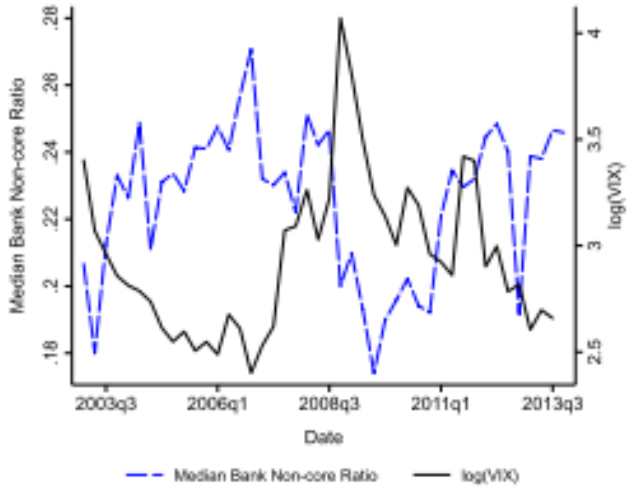
(b) Currency Breakdown of Payables

Introduction (cont.)

Figure 1. The Global Financial Cycle and the Local Credit Market: Motivating Evidence



(a) GFC and Lending Rates
$\rho = 0.52$



(b) GFC and Non-Core Liabilities
$\rho = -0.51$

Data

- Unit of analysis: Turkish banks and firms
- Panel: 2003-2013, quarterly
- Massive sample: 18 MN
- Balance sheet information containing local and foreign funding
- Micro data: "identify causal mechanisms that cannot be measured using macro data."

Model

- Fixed-effects regressions
- DID regressions
  - Khwaja and Mian [1]; Jiménez, Ongena, Peydró, *et al.* [2]; Chodorow-Reich [3]

$$\begin{aligned}\log \mathrm{Y}_{f,b,d,q} = \alpha_{f,b} + \lambda \mathrm{Trend}_q + \beta \log \mathrm{VIX}_{q-1} + \delta \mathrm{FX}_{f,b,d,q} + \Theta_1 i_{q-1} + \Theta_2 \Delta \log(\mathrm{GDP}_{q-1}) \\ + \Theta_3 \mathrm{Inflation}_{q-1} + \Theta_4 \Delta \log(\mathrm{XR}_{q-1}) + \Theta_5 \mathbf{Bank}_{b,q-1} + \varepsilon_{f,b,d,q},\end{aligned} \tag{1}$$

Figure 1: Macro regression

$$\log \mathrm{Y}_{f,b,d,q} = \alpha_{f,b} + \alpha_{f,q} + \zeta(\text{Non-core}_b \times \log \mathrm{VIX}_{q-1}) + \delta_1 \mathrm{FX}_{f,b,d,q} + \epsilon_{f,b,d,q}, \tag{2}$$

Figure 2: Non-core regression

Baseline results

Table 8. The Global Financial Cycle, Borrowing Costs and Loan Volumes

	Panel A. Nominal Interest Rate *Bank Sample*			**Panel B.** Loan Volume *Bank Sample*		
	All	Domestic	Foreign	All	Domestic	Foreign
	(1)	(2)	(3)	(4)	(5)	(6)
log(VIX)	0.019***	0.022***	0.012***	-0.067**	-0.073***	0.0366
	(0.003)	(0.003)	(0.003)	(0.027)	(0.024)	(0.040)
FX	-0.069***	-0.066***	-0.065***	0.576***	0.612***	0.367***
	(0.003)	(0.003)	(0.003)	(0.010)	(0.013)	(0.025)
Domestic policy rate	0.214***	0.255***	0.145***	0.117	0.165	-0.506
	(0.026)	(0.031)	(0.028)	(0.301)	(0.297)	(0.319)
GDP growth	-0.063*	-0.059	-0.117***	0.199	0.197	0.703
	(0.035)	(0.042)	(0.041)	(0.321)	(0.318)	(0.488)
XR change	-0.046***	-0.056***	-0.014	0.037	0.061	-0.275
	(0.010)	(0.013)	(0.016)	(0.124)	(0.130)	(0.141)
Inflation	-0.015	-0.019	-0.012	0.037	0.066	-0.072*
	(0.017)	(0.022)	(0.008)	(0.121)	(0.122)	(0.071)
Observations	18,345,853	13,490,892	905,024	18,345,853	13,490,892	905,024
R-squared	0.781	0.720	0.831	0.831	0.810	0.825
Macro controls & trend	Yes	Yes	Yes	Yes	Yes	Yes
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank×firm F.E.	Yes	Yes	Yes	Yes	Yes	Yes

(a) Macro regression

Table 9. The Global Financial Cycle, Borrowing Costs and Loan Volumes: The Role of Banks' Non-Core Liabilities in Transmitting the GFC

	Panel A. Nominal Interest Rate			**Panel B.** Loan Volume		
	(1)	(2)	(3)	(4)	(5)	(6)
log(VIX)	0.014***	0.015***		-0.050*	-0.085***	
	(0.003)	(0.002)		(0.026)	(0.024)	
NonCore×log(VIX)	0.019***	0.015***	0.014***	-0.068***	-0.041***	-0.038**
	(0.004)	(0.004)	(0.003)	(0.016)	(0.014)	(0.017)
FX	-0.069***	-0.070***	-0.069***	0.576***	0.577***	0.601***
	(0.003)	(0.003)	(0.003)	(0.010)	(0.011)	(0.012)
Observations	18,345,853	8,573,782	8,573,782	18,345,853	8,573,782	8,573,782
R-squared	0.782	0.759	0.856	0.831	0.806	0.870
Macro controls & trend	Yes	Yes	No	Yes	Yes	No
Bank controls	Yes	Yes	No	Yes	Yes	No
Bank×firm F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Firm×quarter F.E.	No	No	Yes	No	No	Yes

(b) Non-core regression

Baseline results (cont.)

- Macro regression: fall in VIX is associated with an improvement in global financial conditions, allowing Turkish banks to access foreign capital at cheaper rates
- Non-core regression: banks with higher non-core liabilities respond more to movements in VIX
    - Estimated IR-VIX elasticity for high non-core banks is double ($0.015+0.015 = 0.03$) that of low non-core banks (0.015)

UIP

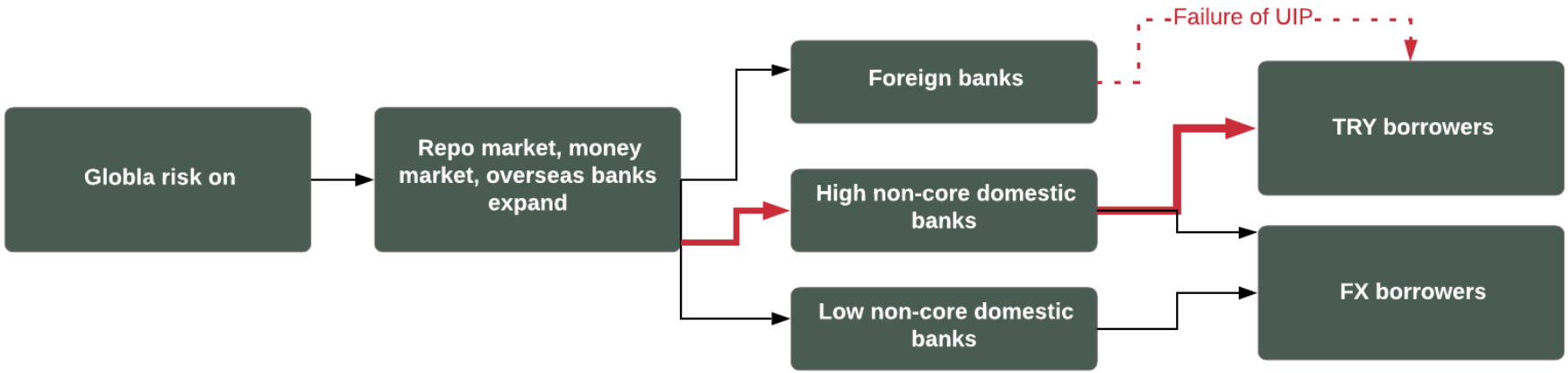
- The premium paid to investors when UIP fails would be expected to increase during market turmoil
- The cyclical nature of the UIP premium means that loans denominated in Turkish lira are cheaper when the VIX increases
- The author's claim their findings back this up: banks more reliant on non-core FX liabilities provide more Turkish Lira denominated loans than FX loans during boom.

UIP (cont.)

Table 11. The Global Financial Cycle, Borrowing Costs and Loan Volumes: The Failure of UIP at the Loan Level and the Role of Banks' Non-Core Liabilities in Transmitting the GFC

	Panel A. Nominal Interest Rate			**Panel B.** Loan Volume		
	(1)	(2)	(3)	(4)	(5)	(6)
log(VIX)	0.015***			-0.049*		
	(0.003)			(0.027)		
FX×NonCore×log(VIX)	-0.017***	-0.012***	-0.009*	0.037**	-0.022	-0.073**
	(0.004)	(0.003)	(0.004)	(0.015)	(0.017)	(0.032)
FX×log(VIX)	-0.009**	-0.009	-0.010	-0.017	0.007	0.021
	(0.004)	(0.006)	(0.007)	(0.020)	(0.026)	(0.031)
NonCore×log(VIX)	0.021***	0.016***		-0.071***	-0.035*	
	(0.004)	(0.004)		(0.016)	(0.019)	
FX×NonCore	0.049***	0.032***	0.018	-0.144***	0.038	0.195**
	(0.013)	(0.011)	(0.014)	(0.048)	(0.053)	(0.095)
FX	-0.043***	-0.040**	-0.038*	0.638***	0.587***	0.569***
	(0.012)	(0.018)	(0.022)	(0.062)	(0.080)	(0.097)
Observations	18,345,853	8,573,782	832,138	18,345,853	8,573,782	832,138
R-squared	0.783	0.856	0.750	0.831	0.870	0.714
Macro controls & trend	Yes	No	No	Yes	No	No
Bank controls	Yes	Yes	No	Yes	Yes	No
Bank×firm F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Firm×quarter F.E.	No	Yes	No	No	Yes	No
Bank×firm×quarter F.E.	No	No	Yes	No	No	Yes

UIP (cont.)


Failure of UIP
Globla risk on
Repo market, money market, overseas banks expand
Foreign banks
High non-core domestic banks
Low non-core domestic banks
TRY borrowers
FX borrowers

Risk taking channels

- Maturity transformation
  - High non-core banks may increase risk by increasing long-term loans during booms
- Leverage and size
  - Differences in banks' risk-taking behavior are captured by levels of non-core liabilities, and not just solely leverage or size.
- Exchange rate
  - The exchange rate risk-taking channel cannot explain the reduction in borrowing costs and increased lending

Risk taking channels (cont.)

Table 12. The Global Financial Cycle, Borrowing Costs and Loan Volumes: The Role of Banks' Non-Core Liabilities in Transmitting the GFC via Maturity Transformation

	Panel A. Nominal Interest Rate		**Panel B.** Loan Volume	
	(1)	(2)	(3)	(4)
log(VIX)	0.021***		-0.148***	
	(0.006)		(0.024)	
NonCore×log(VIX)	0.035***	0.012*	-0.090***	-0.245***
	(0.005)	(0.006)	(0.033)	(0.043)
NonCore×ST×log(VIX)	-0.0003	0.005	0.137***	0.265
	(0.008)	(0.008)	(0.051)	(0.063)
ST×log(VIX)	-0.007	0.004	0.030	-0.014
	(0.009)	(0.011)	(0.025)	(0.038)
NonCore×ST	0.011	-0.007	-0.284*	-0.690***
	(0.025)	(0.025)	(0.166)	(0.206)
ST	0.058*	0.021	-0.322***	-0.195
	(0.031)	(0.035)	(0.078)	(0.117)
FX	-0.079***	-0.076***	0.553***	0.522***
	(0.004)	(0.004)	(0.013)	(0.016)
Observations	7,246,294	3,452,343	7,246,294	3,452,343
R-squared	0.641	0.777	0.719	0.817
Bank×firm F.E.	Yes	Yes	Yes	Yes
Macro controls & trend	Yes	No	Yes	No
Bank controls	Yes	No	Yes	No
Firm×quarter F.E.	No	Yes	No	Yes

Figure 4: Maturity

Risk taking channels (cont.)

Table 13. The Global Financial Cycle, Borrowing Costs and Loan Volumes: The Role of Banks' Non-Core Liabilities in Transmitting the GFC, a Horse Race with Bank Leverage and Size

	Panel A. Nominal Interest Rate			**Panel B.** Loan Volume		
	(1)	(2)	(3)	(4)	(5)	(6)
NonCore×log(VIX)	0.014***	0.015***	0.016***	-0.038**	-0.040**	-0.042**
	(0.003)	(0.004)	(0.004)	(0.018)	(0.017)	(0.017)
Leverage×log(VIX)	-0.003		-0.011***	0.020		0.040
	(0.002)		(0.003)	(0.029)		(0.026)
Size×log(VIX)		0.014***	0.015***		-0.034*	-0.036**
		(0.004)	(0.004)		(0.018)	(0.017)
FX	-0.069***	-0.069***	-0.069***	0.601***	0.602***	0.602***
	(0.003)	(0.003)	(0.003)	(0.012)	(0.012)	(0.012)
Observations	8,573,782	8,573,782	8,573,782	8,573,782	8,573,782	8,573,782
R-squared	0.856	0.856	0.856	0.870	0.870	0.870
Macro controls & trend	No	No	No	No	No	No
Bank controls	Yes	Yes	Yes	Yes	Yes	Yes
Bank×firm F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Firm×quarter F.E.	Yes	Yes	Yes	Yes	Yes	Yes

Figure 5: Leverage and size

Risk taking channels (cont.)

Table 14. The Global Financial Cycle, Borrowing Costs and Loan Volumes: Exchange Rates and Risk Taking

	Panel A. Nominal Interest Rate			**Panel B.** Loan Volume		
	(1)	(2)	(3)	(4)	(5)	(6)
$\text{Leverage}_b \times \text{FXshare}_f \times \Delta\log(\text{XR})$	-0.009			-0.054		
	(0.008)			(0.099)		
$\text{Leverage}_b \times \text{FXshare}_f \times \text{Depreciation}$		-0.002			-0.025	
		(0.001)			(0.019)	
$\text{Leverage}_b \times \text{FXshare}_f \times \text{Appreciation}$			-0.001			-0.018
			(0.001)			(0.021)
FX	-0.070 ***	-0.070 ***	-0.070 ***	0.603 ***	0.603 ***	0.603 ***
	(0.003)	(0.003)	(0.003)	(0.012)	(0.012)	(0.012)
Observations	8,573,712	8,573,712	8,573,712	8,573,712	8,573,712	8,573,712
R-squared	0.883	0.883	0.883	0.872	0.872	0.872
Bank×firm F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Firm×quarter F.E.	Yes	Yes	Yes	Yes	Yes	Yes
Bank×quarter F.E.	Yes	Yes	Yes	Yes	Yes	Yes

Figure 6: FX risk

Collateral regressions

- Estimate a loan-level version using monthly data on new loan
- No significant relationship: collateral-to-loan ratio and loan volumes in all columns
- No significant relationship: collateral ratio and credit volumes during high and low VIX episodes
  - credit growth during low VIX episodes is driven by low interest rates, regardless of collateral values

Collateral regressions (cont.)

Table 16. The Global Financial Cycle and Loan Volumes: Loan-Level Borrowing Constraints vs. Borrowing Costs for New Loan Issuances

	(1)	(2)	(3)	(4)
log(1+i)	-1.936***	-2.350***	-2.512***	-2.453***
	(0.076)	(0.074)	(0.121)	(0.136)
Collateral/Loan	0.003	-0.035***	-0.024	-0.011
	(0.010)	(0.012)	(0.019)	(0.018)
FX	0.262***	0.219***	0.229***	0.285***
	(0.013)	(0.013)	(0.020)	(0.022)
Observations	10,016,550	10,016,368	6,383,626	5,358,324
R-squared	0.684	0.690	0.801	0.809
Bank×firm F.E.	Yes	Yes	Yes	No
Bank×month F.E.	No	Yes	No	No
Firm×month F.E.	No	No	Yes	No
Bank×firm×month F.E.	No	No	No	Yes

Figure 7: Leverage and size

Conclusion

- Lower borrowing costs globally fuel local currency borrowing if domestic banks can tap international markets
- Lower borrowing costs drive a credit boom despite collateral constraints
  - External shocks are propagated by risk premia not collateral constraints, the latter of which is favored in macro-finance modeling

Discussion

- Adds micro evidence that the GFC has a strong effect on the Turkish economy
- Are these findings externally valid?
  - Local bank lending in FX limits the impact of domestic monetary policy in Hungary. (Ongena, Schindele, and Vonnák [4])
- The authors' findings on FX tangentially clash with other existing literature which stresses its importance (Bruno and Shin [5])
  - Turkish banks are legally required to hedge FX exposure, thus it should not be surprising that FX market moves do not impact lending.

Discussion (cont.)

- How does central bank reserve accumulation during this period impact lending in FX?
  - Yun [6] suggests that sterilization reduces bank loans to firms in the case of Korea.

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