

Macroprudential Policy and Bank Systemic Risk: Does Inflation Targeting Matter?

Belkhir, M.¹ Ben Naceur, S.¹ Candelon, B.² Choi, WG.¹
Mugrabi, F.³

¹ International Monetary Fund

² Université catholique de Louvain

³ Central Bank of Ireland

IWFSAS
October 2023

Table of Contents

1 Introduction

2 Methodology

3 Results

4 Conclusion

5 Appendix

Proposal

Research Question

Does inflation targeting (IT) reinforce or dilute the effectiveness of macroprudential policies in reducing systemic risk?

Proposal

Research Question

Does inflation targeting (IT) reinforce or dilute the effectiveness of macroprudential policies in reducing systemic risk?

- Bank-level data from 45 countries | AE and EME | various monetary policy regimes.

What do we expect?

- The credibility of IT regimes is expected to enhance the effectiveness of most MMP,
- 1° transmission channel $i \rightarrow$ enhance coordination MP - MMP,
- Prudential measures directly controlling loan supply may not be effective.

Coordination Matters: MMP \rightarrow MP

- Credit growth [AD, GDP, π],
 - Cost of funding \rightarrow interest rates.
- } Optimal MP

Complementarities

- Restrict lending during booms: less need of \uparrow MP, [Cozzi et al., 2020],
- \downarrow Endogenous macroeconomic risks: \downarrow risk-free premium + \downarrow precautionary savings \rightarrow \uparrow real interest rates + liquidity traps,
 - Inflation below target, [Van der Ghote, 2020].

Conflicts

- Weaker monetary transmission: less leveraged banks \rightarrow less responsive to i , [Cozzi et al., 2020],
- Inflation volatility: investment efficiency shock \rightarrow \uparrow CCyB | \downarrow MP, [Revelo and Leveuge, 2022].

IT regimes: Enhancing or Constraining Effectiveness?

Potential Effectiveness

- Tinbergen rule: One goal - one policy, [Louati and Boujelbene, 2020],
- Transparency and Accountability, [Papadamou et al., 2015],
- Synergy: \uparrow Output gap + \uparrow inflation \rightarrow MP supplement MMP by curbing credit growth, [Choi and Cook, 2018].

Potential Challenges

- $1^\circ i \rightarrow$ endogenous credit extensions \rightarrow loan restrictions less effective (\downarrow MP).

Table of Contents

- 1 Introduction
- 2 Methodology**
- 3 Results
- 4 Conclusion
- 5 Appendix

Sample and Data Selection

Banking Systemic Risk

- SRISK [Acharya et al., 2017],

Identifying Policy Regimes

- AREAER → Exchange rate anchor
 - C1: no separate legal tender → C3.5: conventional peg.
- Bank's monetary policy statement: → IT, MA, etc.

MMP

- iMaPP [+1,-1,0], [Alam et al., 2019],
- 22 tools [15 + 7 subcategories].

Controls

- MEC:
 - Global: VIX, FFR, Global GDP,
 - Country (i): GDP, Savings, FX, INT, CPI, FD, kaopen,
- BSC:
 - Bank (j): SIZE, DEP, ROA, NPL, CAP, LTA.
- 539 banks | 45 countries | 2000 to 2018.

Regime Dependent Dynamic Panel Model

$$SRISK_{i,j,t} = \alpha SRISK_{i,j,t-1} + \beta MEC_{j,t-1} + \rho BSC_{i,j,t-1} + \delta_1 MPI_{j,t} + \delta_2 MPI_{j,t-1} + \gamma_1 \mathbb{1}_{IT,t} MPI_{j,t} + \gamma_2 \mathbb{1}_{IT,t-1} MPI_{j,t-1} + \psi_j + \epsilon_{i,j,t},$$

- $\mathbb{1}_{IT,t}$ IT country | year,
- If IT reinforces $\rightarrow \delta$ and γ negative,
- ψ_j country fixed effect,
- GMM estimation | instruments: lag 2...T,
- Hansen test | Arellano-Bond.

Table of Contents

- 1 Introduction
- 2 Methodology
- 3 Results**
- 4 Conclusion
- 5 Appendix

Demand-based Measures

Objective:

Regulate lending by influencing the demand side of credit markets.

Table: Demand-based measures

	MPI_t	MPI_{t-1}	$1_{IT} MPI_t$	$1_{IT} MPI_{t-1}$
DSTI	85.71	-53.28	-387.86**	\emptyset
LTV	-22.97	92.44**	-173.86	-198.80**

- Real estate bubbles, when inflation on target, [Crowe et al., 2013],
- Bank's asset growth, [Claessens et al., 2013],
 - Only effective under IT.

Capital Requirements

Objective:

Ensure that banks maintain sufficient capital buffers to absorb losses.

Table: Capital Requirements

	MPI_t	MPI_{t-1}	$1_{IT} MPI_t$	$1_{IT} MPI_{t-1}$
Capital	40.23	46.36	-182.09**	30.22
Capital.HH	30.46	-1.18	-220.97**	-314.55**
Conservation	-78.60	418.34**	36.94	-556.46**
LVR	-11.68	198.44**	346.42**	-61.29

- Absorb bank losses in times of stress and maintain credit flow during a downturn [Mendicino et al., 2020],
 - Only effective under IT.
- Containing excessive leverage → off-balance-sheet sources of funding.

Loan-supply-based Measures

Objective:

Regulate the volume and growth of lending.

Table: Loan-supply-based measures

	MPI_t	MPI_{t-1}	$1_{IT} MPI_t$	$1_{IT} MPI_{t-1}$
LCG	1,065.89	1,279.23*	-908.73	\emptyset
LoanR	-850.19*	-174.58	793.18*	505.87
LoanR.HH	-1,110.31*	-463.18	918.25*	768.23
LoanR.Corp	295.67*	-53.87	\emptyset	\emptyset

- \uparrow LCG \rightarrow +complex-riskier financial products, [Altavilla et al., 2020]
 - IT (only loose).
- LoanR \rightarrow regulate maturity and interest types,
 - Corporate sector \rightarrow other sources of borrowing,
 - IT \rightarrow \downarrow MP + Δ LoanR \rightarrow endogenous credit extensions.

Liquidity Requirements and Other Supply-based Measures

Table: Liquidity requirements and other supply-based measures

	MPI_t	MPI_{t-1}	$1_{IT}MPI_t$	$1_{IT}MPI_{t-1}$
Liquidity	-7.76	60.73	-17.35	168.85***
RR	176.23	260.60***	3.36	-220.37**
LFX	-254.24*	-182.35***	∅	∅

- Liquidity requirements (NSFR, LCR) help mitigate financial stability risks, [Adrian and Boyarchenko, 2018],
 - Not significant: 2010-2018.
- RR → adverse effects on banks' cost of funding and profitability, [Tovar Mora et al., 2012],
 - Always coordinated with MP for IT → control inflationary pressures.
- LFX → enhances bank's risk profile, limiting exposures to local currency devaluation risk.

Table of Contents

1 Introduction

2 Methodology

3 Results

4 Conclusion

5 Appendix

Conclusion

- We investigate the effectiveness of macroprudential tools → systemic risk, under IT regimes,
- Except for some loan supply based measures, more effective under IT regimes,
- Transparency and accountability,
- Each policy oriented to achieve their own objective,
- Interest rates → primary monetary policy transmission channel,
 - ✓ Coordination | Complementarities,
 - ✗ Endogenous credit creation.
- Further research: transmissions channels.

Thanks for your attention.

Table of Contents

1 Introduction

2 Methodology

3 Results

4 Conclusion

5 Appendix

Summary of Results

Table: Significant MMI $p \leq 1\%$

	MPI_t	MPI_{t-1}	$1_{IT}MPI_t$	$1_{IT}MPI_{t-1}$
DSTI			-	\emptyset
LTV		+		-
Capital			-	
Capital.HH			-	-
Conservation		+	-	
LVR		+	+	
LCG		+		\emptyset
LoanR	-		+	
LoanR.HH	-		+	
LoanR.Corp	+		\emptyset	\emptyset
Liquidity				+
RR		+		-
LFX	-	-	\emptyset	\emptyset

Control Variables - Description

Table: Data Source and Variable Description

Variable Description		Sources	Coverage	Unit
Macroeconomic controls at country level				
GDP	GDP, constant currency	WEO ¹	45	y-y%
Savings	Gross domestic savings (%GDP)	WEO ¹	45	%
FX	Exchange rates with respect to US\$	Bloomberg	45	y-y%
INT	Central Bank target interest rate	BIS ²	45	y-y%
CPI	Consumer Price Index	WEO	45	y-y%
FD	Index of Financial Development	IMF	45	Index
kaopen	Chinn-Ito index	Chinn-Ito	45	Index
Global Macroeconomic Controls				
VIX	CBOE Volatility Index,	FRED		y-avg
FFR	US central bank policy rate SSR adj.	Haver		y-y%
Global.GDP	Global GDP, constant prices	WEO		y-y%
Bank specific characteristics				
SIZE	Total assets	Orbis	539	US\$bn
DEP	Total customer deposits	Orbis	539	US\$bn
ROA	Pre-tax income to total assets	Orbis	539	%
NPL	Non-performing loans in total loans	Orbis	539	%
CAP	Equity to total assets	Orbis	539	%
LTA	Net loans to total assets	Orbis	539	%

Notes: [1] Bloomberg for Korea and Taiwan.

[2] Corresponding central banks for Romania, Malta and Nigeria. Bloomberg for Taiwan, Ukraine and United Arab Emirates. IMF for Kuwait, Morocco, Peru, Saudi Arabia, Singapore, Turkey and Vietnam. OECD for Indonesia, and Greece. WEO for Japan, Bloomberg for Taiwan, and United Arab Emirates.

Descriptive Statistics

Table: Descriptive Statistics

	Mean	SD	Min	Max
SRISK(US\$bn)	64.074	209.645	0.000	2,015.247
SRISK ₀ (US\$bn)	131.697	285.395	0.001	2,015.247
GDP (%)	2.781	2.509	-9.130	11.110
Savings (%)	25.650	9.746	-6.150	61.290
FX (%)	0.017	0.089	-1.890	1.023
INT (% point)	0.981	0.135	-124.200	113.230
CPI (%)	2.591	3.256	-1.740	42.80
FD	67.643	23.740	0.000	97.671
Global.GDP (%)	3.552	0.507	-0.140	5.420
VIX	16.828	4.080	11.090	32.620
FFR (% point)	-0.169	1.520	-3.150	1.854
SIZE(US\$bn)	172.707	421.412	0.020	3,397.690
DEP(US\$bn)	104.262	255.066	0.010	2,531.200
ROA (%)	1.941	3.914	-85.000	39.000
NPL (%)	4.612	7.786	1.000	100.000
CAP (%)	13.763	14.806	-44.000	100.000
LTA (%)	55.576	20.530	1.000	99.000

Note: [1] Savings are calculated as GDP minus final consumption expenditure (total consumption). Negative values are likely.

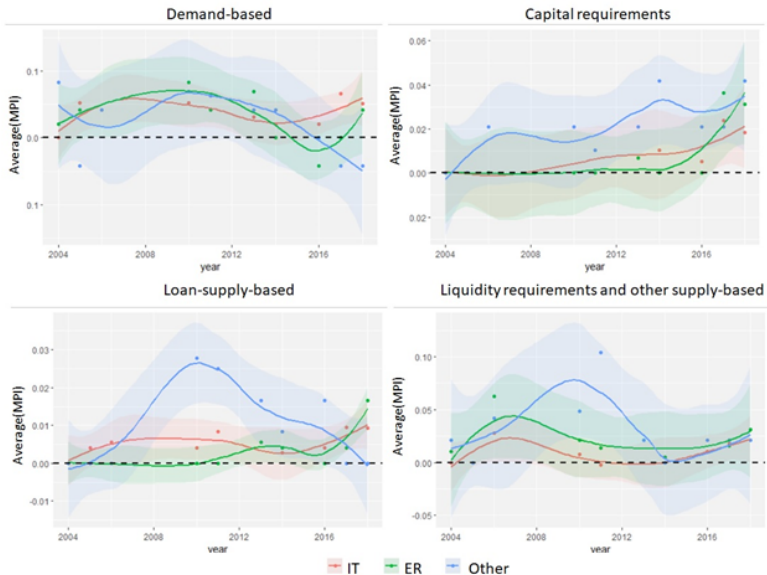


Figure: Average MPI index per Country Group

Control Variables

Significant Control Variables

Control Variables

Significant Control Variables

+ US policy rate: $\rightarrow \uparrow$ cross-border credit flows,

Control Variables

Significant Control Variables

- + US policy rate: $\rightarrow \uparrow$ cross-border credit flows,
- + VIX: \rightarrow risk sentiment \uparrow banks' fragility,

Control Variables

Significant Control Variables

- + US policy rate: $\rightarrow \uparrow$ cross-border credit flows,
- + VIX: \rightarrow risk sentiment \uparrow banks' fragility,
- + Global GDP: $\rightarrow \uparrow \uparrow$ volatility paradox [Brunnermeier, 2014],

Control Variables

Significant Control Variables

- + US policy rate: $\rightarrow \uparrow$ cross-border credit flows,
- + VIX: \rightarrow risk sentiment \uparrow banks' fragility,
- + Global GDP: $\rightarrow \uparrow \uparrow$ volatility paradox [Brunnermeier, 2014],
- + FD: $\rightarrow \uparrow$ capital flows in early development,

Control Variables

Significant Control Variables

- + US policy rate: → ↑ cross-border credit flows,
- + VIX: → risk sentiment ↑ banks' fragility,
- + Global GDP: → ↑ ↑ volatility paradox [Brunnermeier, 2014],
- + FD: → ↑ capital flows in early development,
- INT: → discourage banks from speculative activities,

Control Variables

Significant Control Variables

- + US policy rate: → ↑ cross-border credit flows,
- + VIX: → risk sentiment ↑ banks' fragility,
- + Global GDP: → ↑ ↑ volatility paradox [Brunnermeier, 2014],
- + FD: → ↑ capital flows in early development,
 - INT: → discourage banks from speculative activities,
 - FX: → ↑ foreign currency assets, ↑ competitiveness of borrowers,

Control Variables

Significant Control Variables

- + US policy rate: → ↑ cross-border credit flows,
- + VIX: → risk sentiment ↑ banks' fragility,
- + Global GDP: → ↑ ↑ volatility paradox [Brunnermeier, 2014],
- + FD: → ↑ capital flows in early development,
 - INT: → discourage banks from speculative activities,
 - FX: → ↑ foreign currency assets, ↑ competitiveness of borrowers,
 - Capital account openness: → diversification capital risks,

Control Variables

Significant Control Variables

- + US policy rate: → ↑ cross-border credit flows,
- + VIX: → risk sentiment ↑ banks' fragility,
- + Global GDP: → ↑↑ volatility paradox [Brunnermeier, 2014],
- + FD: → ↑ capital flows in early development,
 - INT: → discourage banks from speculative activities,
 - FX: → ↑ foreign currency assets, ↑ competitiveness of borrowers,
 - Capital account openness: → diversification capital risks,
- + Size: → incentives to take more risk,

Control Variables

Significant Control Variables

- + US policy rate: → ↑ cross-border credit flows,
- + VIX: → risk sentiment ↑ banks' fragility,
- + Global GDP: → ↑ ↑ volatility paradox [Brunnermeier, 2014],
- + FD: → ↑ capital flows in early development,
 - INT: → discourage banks from speculative activities,
 - FX: → ↑ foreign currency assets, ↑ competitiveness of borrowers,
 - Capital account openness: → diversification capital risks,
- + Size: → incentives to take more risk,
 - Total deposits: → core funding is more stable.

Control Variables

Significant Control Variables

- + US policy rate: → ↑ cross-border credit flows,
- + VIX: → risk sentiment ↑ banks' fragility,
- + Global GDP: → ↑↑ volatility paradox [Brunnermeier, 2014],
- + FD: → ↑ capital flows in early development,
 - INT: → discourage banks from speculative activities,
 - FX: → ↑ foreign currency assets, ↑ competitiveness of borrowers,
 - Capital account openness: → diversification capital risks,
- + Size: → incentives to take more risk,
 - Total deposits: → core funding is more stable.

Not significant

- Domestic GDP, savings and CPI,

Control Variables

Significant Control Variables

- + US policy rate: → ↑ cross-border credit flows,
- + VIX: → risk sentiment ↑ banks' fragility,
- + Global GDP: → ↑↑ volatility paradox [Brunnermeier, 2014],
- + FD: → ↑ capital flows in early development,
 - INT: → discourage banks from speculative activities,
 - FX: → ↑ foreign currency assets, ↑ competitiveness of borrowers,
 - Capital account openness: → diversification capital risks,
- + Size: → incentives to take more risk,
 - Total deposits: → core funding is more stable.

Not significant

- Domestic GDP, savings and CPI,
- Bank's ROA, NPL, CAP and LTA.

References I

 Acharya, V. V., Pedersen, L. H., Philippon, T., and Richardson, M. (2017).

Measuring systemic risk.

The review of financial studies, 30(1):2–47.



Adrian, T. and Boyarchenko, N. (2018).

Liquidity policies and systemic risk.

Journal of Financial Intermediation, 35:45–60.



Alam, Z., Alter, M. A., Eiseman, J., Gelos, M. R., Kang, M. H., Narita, M. M., Nier, E., and Wang, N. (2019).

Digging deeper—Evidence on the effects of macroprudential policies from a new database.

International Monetary Fund.



Altavilla, C., Laeven, L., and Peydró, J.-L. (2020).

Monetary and macroprudential policy complementarities: evidence from european credit registers.



Brunnermeier, M. (2014).

A macroeconomic model with a financial sector.

American Economic Review, 104(2):379–421.



Choi, W. G. and Cook, M. D. (2018).

Policy conflicts and inflation targeting: the role of credit markets.

International Monetary Fund.



Claessens, S., Ghosh, S. R., and Mihet, R. (2013).

Macro-prudential policies to mitigate financial system vulnerabilities.

Journal of International Money and Finance, 39:153–185.

References II



Cozzi, G., Darracq Paries, M., Karadi, P., Körner, J., Kok, C., Mazelis, F., Nikolov, K., Rancoita, E., Van der Ghote, A., and Weber, J. (2020).

Macroprudential policy measures: macroeconomic impact and interaction with monetary policy.



Crowe, C., Dell'Ariccia, G., Igan, D., and Rabanal, P. (2013).

How to deal with real estate booms: Lessons from country experiences.

Journal of Financial Stability, 9(3):300–319.



Louati, S. and Boujelbene, Y. (2020).

Inflation targeting and bank risk: The interacting effect of institutional quality.

Cogent Business & Management, 7(1):1847889.



Mendicino, C., Nikolov, K., Suarez, J., and Supera, D. (2020).

Bank capital in the short and in the long run.

Journal of Monetary Economics, 115:64–79.



Papadamou, S., Sidiropoulos, M., and Spyromitros, E. (2015).

Central bank transparency and the interest rate channel: Evidence from emerging economies.

Economic Modelling, 48:167–174.



Revelo, J. D. G. and Levieuge, G. (2022).

When could macroprudential and monetary policies be in conflict?

Journal of Banking & Finance, 139:106484.



Tovar Mora, C. E., Garcia-Escribano, M., and Vera Martín, M. (2012).

Credit growth and the effectiveness of reserve requirements and other macroprudential instruments in latin america.

References III



[Van der Ghote, A. \(2020\).](#)

Benefits of macro-prudential policy in low interest rate environments.

Temporary page!

\LaTeX was unable to guess the total number of pages correctly. There was some unprocessed data that should have been added to the document, so this extra page has been added to receive it.

If you rerun the document (without altering it) this surplus page will disappear, because \LaTeX now knows how many pages to expect for the document.