Macroprudential Policy, Banks' Profitability and Monetary Policy

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28th June 2019

Structure of presentation

Section 1

Personal resume

- Over 15 years working experience in the commercial and central banking and research environment (BoC, CBTT, BIS, UBS, CIBC).

- Representative on various financial sector and banking statistics policy committees in Canada and at international organisations (IMF & BIS).

- M.Sc. Financial Economics (Brunel University).

- B.Sc. Economics (University of the West Indies, St Augustine).

- International Certificate in Banking Risk and Regulation (GARP).

Ph.D. research

THE EVOLUTION AND EFFECTIVENESS OF MACROPRUDENTIAL POLICY

A study of its objectives and effects on the financial sector, specifically focusing on the differences between advanced countries and emerging market economies.

Chapters

1. The effectiveness of macroprudential policy
2. Financial stability and cross-border effects
3. **Macroprudential policy, banks' profitability and monetary policy**

Supervisors

Primary: Prof. E. Philip Davis

Secondary: Dr. Dilruba Karim

Theory of macroprudential policy and tools (1)

- IMF-FSB-BIS (2016) defined macro-prudential policy as the use of primarily prudential tools to limit systemic risk. A key aspect of the definition is the concept of systemic risk, which is the widespread disruption of the provision of financial services that is caused by an impairment of all or parts of the financial system and this disruption can cause serious negative consequences for the real economy.

- Two dimensions of systemic risk:
  - ➢ Time dimension.
  - ➢ Cross-sectional or structural dimension.

Theory of macroprudential policy and tools (2)

- What is the rationale for macro-prudential policy?
  - ➤ Financial stability.
  - ➤ Complement to other policies such as monetary policy.
  - ➤ Cost of financial crises.

- What are the tools?

Loan-to-Value Ratio (LTV)	Debt-to-Income Ratio (DTI)	Time-Varying/Dynamic Loan-Loss Provisioning (DP)
General Countercyclical Capital Buffer/Requirement (CTC)	Leverage Ratio (LEV)	Capital Surcharges on SIFIs (SIFI)
Limits on Interbank Exposures (INTER)	Concentration Limits (CONC)	Limits on Foreign Currency Loans (FC)
Reserve Requirement Ratios (RR)	Limits on Domestic Currency Loans (CG)	Levy/Tax on Financial Institutions (TAX)

Source: Cerutti et al (2017).

Theory of macroprudential policy and tools (3)

Type of instruments	Time dimension	Cross-sectional dimension
Capital	- Time-Varying/Dynamic Loan-Loss Provisioning - General Countercyclical Capital Buffer/Requirement - Sectoral capital requirements - Sectoral risk weights	- Capital Surcharges on SIFIs - Leverage Ratio - Systemic risk buffer
Assets	- Loan-to-Value Ratio - Debt-to-Income Ratio - Loan-to-Value Ratio Caps	- Limits on Interbank Exposures - Concentration Limits - Levy/Tax on Financial Institutions
Liquidity	- Limits on Foreign Currency Loans - Limits on Domestic Currency Loans - FX and/or Countercyclical Reserve Requirements - Liquidity ratios (time-varying) - Margin requirements (time-varying)	- Reserve Requirement Ratios - Systemic liquidity surcharge - Liquidity coverage ratio (LCR) - Net stable funding ratio (NSFR) - Minimum haircuts/ margin floors

Source: Bennani et al (2014), Carreras et al (2018) and author's calculations

A recap of prior thesis chapters

- **Chapter 1**, we examine the effectiveness of macroprudential policy and its instruments in reducing the build-up of financial imbalances in the wider economy, as measured by the aggregate credit-to-GDP gap. This approach has not been done elsewhere. We find a number of tools to be effective including loan-to-value and debt-to-income ratio regulations, notably when the credit gap is positive.

- **Chapter 2**, we extend the research to look at the cross-border spill over effects of macroprudential policies via international banks' claims (lending activities). Our approach is unique because the panel-VAR approach has not been used so far to investigate potential spill over effects of prudential instruments between countries. Our results show some spill over effects of prudential measures, notably in emerging market economics, but the impact is negligible in term of affecting a country's financial stability or the build-up of financial imbalances.

Chapter 3 research objectives

- The **first purpose** is to study the costs that are incurred when macroprudential policy are employed in the financial sector. We contend that although the aim of macroprudential policy is to prevent or limit financial instability across the broad financial system, the currently-suggested macroprudential tools and new regulations target the banking sector narrowly. This can be seen as an added cost to banks which in turn can affect banks' profitability and hence their ability to lend and potential economic growth.

- The **second purpose** is to look at macroprudential policy's relationship with monetary policy in the context of the specific profitability measure, namely the net interest margin. (**Not presented today**)

Chapter 3 research hypothesis

- **Hypothesis 1:** Whereas macroprudential policy has been employed to address financial system imbalances or to prevent the build-up of these imbalances, if the macroprudential policy is to be effective, there should also be a significant and negative effect on banks' profitability.

- **Hypothesis 2**: Whereas there may be a significant (positive/ negative) relationship between the interest rate (monetary policy) and bank profitability, and macroprudential policy is expected to have a significant and negative effect on bank profitability (Hypothesis 1), then macroprudential policy also has a significant effect on the bank interest rate margin when interest rates are allowed for, thus offsetting or complementing monetary policy. **(Not presented today)**

Hypothesis 1 result expectation

- **Hypothesis 1**: We expect that prudential measures which target banks assets (credit activities) to have the greatest effect on banks' profitability.

- Measures such as debt-to-income ratio (DTI), loans-to-value measures (LTV and LTVCAP), concentration limits (CONC) and levy/ taxes, interbank exposures (INTER), etc.

Why hypothesis 1 and result expectation? (1)

- Empirical literature on the effectiveness of macroprudential policy

    ➢ Many of these studies have specifically focused on the effectiveness of macroprudential policy in the area of the financial sector where there is the most potential for systemic risk to develop, that is the credit and housing markets and the banking sector.

- Credit-to-GDP gap effect

    ➢ First, the effectiveness of MPP in reducing the credit-to-GDP gap (Thesis Chapter 1). We find a number of tools to be effective including loan-to-value and debt-to-income ratio regulations, notably when the credit gap is positive. Banks credit make up a large portion of credit-to-GDP ratio. (*"Macroprudential Policy and the Credit-to-GDP Gap"*, Submission to the European Journal of Finance)

Why hypothesis 1 and result expectation? (2)

- Credit and housing markets effect
  - ➤ Second, Lim et al (2011), Dell'Ariccia et al (2012), Jiménez et al (2012), Vandenbussche et al (2012), Akinci and Olmstead-Rumsey (2015), Cerutti et al (2017), Carreras et al (2018) using macro data. They found various MPP tools to be effective in reducing the financial system imbalances (credit and house price growth).

- Bank assets
  - ➤ Third, Claessens et al (2014) using bank-by-bank data. Similarly, they found that policies aimed at borrowers are effective in (indirectly) reducing the build-up of banking system vulnerabilities. They suggested that measures aimed at banks' assets and liabilities are also very effective.

Why hypothesis 1 and result expectation? (3)

- Empirical literature of the cost of regulation to the banking sector.

  ➢ Van den Heuvel (2008) found, using US banking data, that the welfare cost of current capital adequacy (Basel Accords) of 8%, reduces consumption by between 0.1% and 1% because it reduces the ability of banks to create liquidity.

  ➢ Tchana (2012) found, using US banks data for the period 1993 to 2010, that higher capital adequacy requirements hamper economic growth by shifting banks' portfolios from more productive, risky investment projects toward less productive and safer investment projects.

  ➢ Aiyar et al (2014) indicated that regulated banks (UK-owned banks and resident foreign subsidiaries) reduce lending in response to tighter capital requirement but unregulated banks (resident foreign branches) increase lending in response to tighter capital requirements, suggesting competitive advantages.

  ➢ Roulet (2017) and Naceur et al (2018), using banking data for 23 countries in the US and Europe following the financial crisis for the period 2008-2015, looked at the effects of capital and liquidity regulations (Basel III) on bank lending. They found that capital ratios have significant and negative impacts on large European banks' retail and other lending growth in the context of deleveraging and the "credit crunch" in Europe during the post 2007-2008 financial crisis.

Why hypothesis 1 and result expectation? (4)

Variable	Credit-to-GDP gap	Credit and housing markets	Bank assets
LTV	_***	_***	_***
DTI	_***	_**	
FC		_*	_*
TAX		_***	
INTER		_***	
CONC	_***		
LTVCAP	_***	_*	
SIFI			
DP	_**	_***	
CTC			_***
LEV			
CG			_**
RR			
RRREV			
MPI	_***	_***	
MPIB	_***		
MPIF	_***	_***	

Section 2

Determinants of Banks' Profitability (1)

- We look at the issue using the theory on the determinants of banks' profitability.

- We collected annual financial statements banking data on 92 countries, 34 advanced countries and 58 emerging markets economies, 6,010 banks (3,095 banks from advanced countries and 2,915 banks from emerging market economies) and 84,140 observations. The types of banks included are universal commercial banks, retail and consumer banks, banks, wholesale banks, and Islamic banks. Investment banks and private banks are excluded due to different balance sheet and income structure as are bank holding companies, to avoid double counting.

- The data are collected from Fitch Connect for the period 2000-2013.

Determinants of Banks' Profitability (2)

North America
Canada
USA

Central America
Costa Rica
El Salvador
Guatemala
Honduras
Mexico
Nicaragua
Panama

South America
Argentina
Bolivia
Brazil
Chile
Colombia
Ecuador
Paraguay
Peru
Uruguay

Caribbean
Bahamas
Barbados
Belize
Guyana
Jamaica
Suriname
Trinidad and Tobago

Africa
Algeria
Angola
Cote D'Ivoire
Egypt
Ghana
Kenya
Morocco
Mozambique
Nigeria
South Africa
Tanzania

Europe
Austria
Belgium
Bulgaria
Croatia
Cyprus
Czech Republic
Denmark
Estonia
Finland
France
Germany
Greece
Hungary
Iceland
Ireland
Israel
Italy
Latvia
Lithuania
Luxembourg
Malta
Netherlands
Norway

Poland
Portugal
Romania
Russia
Serbia
Slovak Republic
Slovenia
Spain
Sweden
Switzerland
Turkey
UK
Ukraine

Oceania
Australia
New Zealand

Eurozone
Austria
Belgium
Cyprus
Estonia
Finland
France
Germany
Greece
Ireland
Italy
Latvia
Lithuania
Luxembourg
Malta
Netherlands
Portugal
Slovakia
Slovenia
Spain

Asia
China
Hong Kong
India
Indonesia
Japan
Korea
Malaysia
Mongolia
Philippines
Singapore
Thailand

Middle East
Bahrain
Jordan
Kuwait
Oman
Qatar
Saudi Arabia
United Arab Emirates

Determinants of Banks' Profitability (3)

Variables	Symbol	Proxy	Literature expected relation (+/-)	Our expected relation (+/-)
Dependent variables				
Return on Average Assets	ROAA	Net Income/ Average Total Assets		
Return on Average Equity	ROAE	Net Income/ Average Total Equity		
Independent variables				
Bank specific factors (internal)				
Bank Size	LNSIZE	Logarithm of Total Assets	+/-	+
Leverage	LEV	Equity/ Total Assets	+/-	-
Credit Risk	CRISK	Non-performing loans/ Gross Loans	-	-
Liquidity Risk	LRISK	Gross Loans/ Deposits	+/-	-
Management Efficiency	COSTINC	Total Operating Expenses/ Total Income	+/-	-
Diversification*	DIVSIF	Non-Interest Income/ Gross Revenue	+/-	+
Banking system specific factor (external)				
Competition	LINDEX	Lerner Index	+	+
Banking Crisis	BCRISIS	Laeven and Valencia (2018)	+/-	-
Macroeconomic factors (external)				
Economic growth	RGDPGWR	Real GDP growth rate (annual %)	+/-	+
Inflation	INFLAT	Inflation rate (annual %)	+/-	+

Model Specifications ROAA and ROAE (1)

We stipulate the following ordinary least squares (OLS) model of the determinants of banks' profitability

$$Y_{it} = \alpha_{it} + \beta Internal_{it-1} + \textthorn Macro_{ijt-1} + \theta Industryi_{ijt-1} + \eth BCrisis_{ijt-1} + \varepsilon_{it}$$

where i denotes the individual bank, j refers to the country in which bank i operates t indicates time period. The dependant variable, Yit denotes the banks' profitability (ROAA or ROAE). The variable denoted by Internal is the vector of bank internal factors. The Macro variable is the vector of macroeconomic variables. The industry competition variable we use is the Lerner Index. BCRISIS variable is a vector capturing the presence of a banking crisis during the period a country experienced a banking crisis as defined by Laeven and Valencia (2018).

Model Specifications ROAA and ROAE (2)

- We estimated OLS with lagged independent variables. Lagging the variables by a year is to avoid the potential issues of endogeneity (see Beck et al (2013), Davis et al (2019), de-Ramon et al (2018)). All variables are winsorised at 99% to avoid an impact of outliers.

- The results of the Hausman test suggested that fixed effects model is appropriate. (ROAA - Hausman test, X^2: 170.62, p-value:0.00; ROAE - Hausman test, X^2: 103.95, p-value: 0.00).

- We further examine the joint significance of the fixed effects (banks and/ with time effects), the fixed effect models are tested using the Likelihood Ratio test. The results are supported by the highly statistical significance of the Likelihood Ratio test at 1%, 5% and 10%, which suggest banks and/ time fixed effected are significant in the models.

- The models were estimated with bank level fixed effects with White's cross-sectional standard errors and covariance (corrected for degrees of freedom) as in Davis and Karim (2018).

Model Specifications ROAA and ROAE (3)

- Models were estimated for the following periods and country groups.
  - ➢ All countries (92) for the period 2000 to 2013
  - ➢ All countries (92) for the 2000 to 2006
  - ➢ All countries (92) for the period 2007 to 2013
  - ➢ Advanced countries (34) for the period 2000 to 2013
  - ➢ Advanced countries (34) for the 2000 to 2006
  - ➢ Advanced countries (34) for the period 2007 to 2013
  - ➢ Emerging countries (58) for the period 2000 to 2013
  - ➢ Emerging countries (58) for the 2000 to 2006
  - ➢ Emerging countries (58) for the period 2007 to 2013

Modelling results ROAA and ROAE (1)

- Independent variables coefficient values are reported and the t-statistics are reported in parenthesis below each estimated coefficient. Variables are winsorised at 99%. *** significant at 1%, ** significant at 5%, * significant at 10%. The interest rate factors were tested and highly insignificant in the models as a result they were dropped from the models.

ROAA and ROAE regression results for the period 2000-2013 (All countries)

Dependent variable: ROAA and ROAE			
		ROAA	ROAE
	Our expected relation (+/-)	Panel OLS with bank level fixed effects	Panel OLS with bank level fixed effects
Constant		3.786***	38.227***
		(2.913)	(4.310)
LNSIZE(-1)	+	-0.119**	-1.187***
		(-2.060)	(-3.019)
LEV(-1)	-	0.261	-4.053*
		(0.600)	(-1.700)
CRISK(-1)	-	-1.041***	-10.237***
		(-4.075)	(-6.056)
LRISK(-1)	-	0.004	-0.038
		(1.222)	(-1.149)
COSTINC(-1)	-	-0.747***	-6.297***
		(-4.206)	(-3.515)
DIVSIF(-1)	+	0.004***	0.040***
		(3.982)	(5.405)
LINDEX(-1)	+	0.206*	-0.433
		(1.637)	(-0.503)
BCRISIS(-1)	-	-0.187*	-1.638**
		(-1.859)	(-2.243)
RGDPGWR(-1)	+	0.014**	0.123*
		(2.488)	(1.904)
INFLAT(-1)	+	0.014*	0.102*
		(1.861)	(1.805)
R-squared		0.542	0.487
R-squared (adj.)		0.414	0.341
F-statistic		4.222	3.350
Prob(F-statistic)		0.000	0.00
Periods included		13	13
Banks included		2,471	2,453
Observations		11,308	11,159

Modelling results ROAA and ROAE (2)

- Results for the period 2000-2013 (All Countries).

- The macroprudential instruments coefficient values are reported and the t-statistics are reported in parenthesis below each estimated coefficient. *** significant at 1%, ** significant at 5%, * significant at 10%.

Dependent variable: ROAA and ROAE		
	ROAA	**ROAE**
	Panel OLS with bank level fixed effects	**Panel OLS with bank level fixed effects**
Macroprudential instruments		
Loan-to-Value Ratio (LTV(-1))	-0.129**	-2.441***
	(-2.001)	(-3.573)
Debt-to-Income Ratio (DTI(-1))	-0.355***	-3.744***
	(-5.255)	(-4.777)
Capital Surcharges on SIFIs (SIFI(-1))	-0.150	0.690
	(-0.724)	(0.612)
General Countercyclical Capital Buffer/Requirement (CTC(-1))	-2.628**	-15.000*
	(-2.257)	(-1.601)
Time-Varying/Dynamic Loan-Loss Provisioning (DP(-1))	-0.414	-0.495
	(-1.373)	(-0.279)
Leverage Ratio (LEV(-1))	-0.131	-0.685
	(-1.079)	(-0.602)
Limits on Interbank Exposures (INTER(-1))	-0.130	-0.762
	(-1.372)	(-0.737)
Concentration Limits (CONC(-1))	0.083	0.233
	(0.685)	(0.145)
Limits on Domestic Currency Loans (CG(-1))	-0.994*	-9.373***
	(-1.790)	(-3.157)
Levy/Tax on Financial Institutions (TAX(-1))	-0.030	0.777
	(-0.370)	(1.177)
Reserve Requirement Ratios (RR(-1))	-0.494	-3.630
	(-0.800)	(-0.766)
Limits on Foreign Currency Loans (FC(-1))	-0.140	-1.714
	(-0.561)	(-0.830)
Loan-to-value ratio caps (LTVCAP(-1))	-0.195**	-3.060**
	(-2.050)	(-3.472)
FX and/or Countercyclical Reserve Requirements (RRREV(-1))	-0.220	-2.538
	(-0.316)	(-0.461)
Total macroprudential instruments (MPI(-1))	-0.100**	-0.862*
	(-1.862)	(-1.790)
Macroprudential instruments focused on the borrower (MPIB(-1))	-0.072*	-0.535*
	(-1.547)	(-1.275)
Macroprudential instruments focused on the financial institution (MPIF(-1))	-0.100	-0.644
	(-1.192)	(-0.866)

Modelling results ROAA and ROAE (3)

- Overall in the period 2000-2013 (**all countries**), the model results suggest that a policy limiting borrowings (asset measures) such as loan-to-value ratios (LTV and LTVCAP) and debt-to-income ratios (DTI), liquidity measure, domestic currency loans limits (CG) as well as the capital measure, general countercyclical capital buffer (CTC) had the most consistent effect on banks' profitability. These instruments are statistically significant and negatively related to ROAA and ROAE.

- The results are fully in line with our expectation since credit measures are the most effective in reducing credit activities in an economic upswing and thus banks' profitability.

- **Therefore, we accept that Hypothesis 1 is true, that is, banks' profitability is negatively affected when macroprudential policy are effective in reducing financial system imbalances.**

Modelling results ROAA and ROAE (4)

- **Advanced countries**: LTV and LTV CAP have significant and negative effect on ROAA and ROAE, while DTI, SIFI and FC have negative and significant on ROAE only over the period 2000-2013.

- **Emerging market economies**: DTI, CG, TAX have significant and negative effect on ROAA and ROAE, while CTC has a negative and significant on ROAA only over the period 2000-2013.

Summary results

- The effect of MPP over the period 2000-2013 (all countries)
- *** significant at 1%, ** significant at 5%, * significant at 10%.

Variable	Credit and housing markets measures	ROAA	ROAE
LTV	-***	-***	-***
DTI	-***	-***	-***
FC	-*		
TAX	-***		
INTER	-***		
CONC	-***		
LTVCAP	-***	-**	-**
SIFI			
DP	-**		
CTC		-**	-*
LEV			
CG		-*	-***
RR			
RRREV			
MPI	-***	-**	-*
MPIB	-***	-*	-*
MPIF	-***		

Section 3

Robustness checks of the results (1)

Independent variables coefficient values are reported and the t-statistics are reported in parenthesis below each estimated coefficient. Variables are winsorised at 99%. *** significant at 1%, ** significant at 5%, * significant at 10%. The interest rate factors were tested and highly insignificant in the models as a result they were dropped from the models.

Dependent variable: ROAA and ROAE		
	ROAA	**ROAE**
	Panel OLS with country fixed effects	**Panel OLS with country fixed effects**
Macroprudential instruments		
Loan-to-Value Ratio (LTV (-1))	-0.042	-1.940**
	(-0.406)	(-2.078)
Debt-to-Income Ratio (DTI(-1))	-0.303***	-3.603***
	(-4.775)	(-5.797)
Capital Surcharges on SIFIs (SIFI(-1))	-0.272	-1.482
	(-0.980)	(-1.343)
General Countercyclical Capital Buffer/Requirement (CTC(-1))	-1.339*	-4.841
	(-1.748)	(-0.962)
Time-Varying/Dynamic Loan-Loss Provisioning (DP(-1))	-0.561**	-1.776
	(-1.976)	(-1.388)
Leverage Ratio (LEV(-1))	-0.120	-1.649*
	(-0.828)	(-1.881)
Limits on Interbank Exposures (INTER(-1))	-0.172	-1.071
	(-1.326)	(-1.051)
Concentration Limits (CONC(-1))	-0.021	-0.801
	(-0.169)	(-0.562)
Limits on Domestic Currency Loans (CG(-1))	-0.553	-6.013
	(-1.232)	(-1.706)
Levy/Tax on Financial Institutions (TAX(-1))	0.075	0.629
	(1.237)	(0.953)
Reserve Requirement Ratios (RR(-1))	-0.057	-1.833
	(-0.103)	(-0.441)
Limits on Foreign Currency Loans (FC(-1))	-0.121	-2.324
	(-0.524)	(-1.160)
Loan-to-value ratio caps (LTVCAP(-1))	-0.055	-2.591***
	(-0.727)	(-2.914)
FX and/or Countercyclical Reserve Requirements (RRREV(-1))	0.225	-0.444
	(0.391)	(-0.094)
Total macroprudential instruments (MPI(-1))	-0.061	-0.862**
	(-1.310)	(-2.025)
Macroprudential instruments focused on the borrower (MPIB(-1))	-0.058	-0.785
	(-1.220)	(-1.876)
Macroprudential instruments focused on the financial institution (MPIF(-1))	-0.056	-0.664
	(-0.762)	(-1.000)

Robustness checks of the results (2)

Independent variables coefficient values are reported and the t-statistics are reported in parenthesis below each estimated coefficient. Variables are winsorised at 99%. *** significant at 1%, ** significant at 5%, * significant at 10%. The interest rate factors were tested and highly insignificant in the models as a result they were dropped from the models.

Dependent variable: ROAA and ROAE				
	Retail and Consumer Banks		Universal Banks	
	ROAA Panel OLS with banks fixed effects	ROAE Panel OLS with banks fixed effects	ROAA Panel OLS with banks fixed effects	ROAE Panel OLS with banks fixed effects
Macroprudential instruments				
Loan-to-Value Ratio (LTV (-1))	-0.318*	-2.019	0.016	-1.670**
	(-1.791)	(-1.431)	(0.150)	(-1.941)
Debt-to-Income Ratio (DTI(-1))	-0.184	-0.007	-0.343***	-4.202***
	(-0.786)	(-0.004)	(-2.778)	(-4.315)
Capital Surcharges on SIFIs (SIFI(-1))	-0.071	-0.867	-0.260	1.168
	(-0.125)	(-0.193)	(-0.654)	(0.373)
General Countercyclical Capital Buffer/Requirement (CTC(-1))	-0.138	-1.385	-5.910***	-44.33***
	(-0.136)	(-0.171)	(-6.560)	(-4.771)
Time-Varying/Dynamic Loan-Loss Provisioning (DP(-1))	-3.073***	-14.308***	0.135	2.349
	(-5.495)	(-3.200)	(0.507)	(1.100)
Leverage Ratio (LEV(-1))	-0.113	1.398	-0.154	-2.491
	(-0.337)	(0.523)	(-0.760)	(-1.560)
Limits on Interbank Exposures (INTER(-1))	-0.185	0.534	-0.083	-2.632
	(-0.895)	(0.318)	(-0.476)	(-1.905)
Concentration Limits (CONC(-1))	-0.015	-2.370	0.158	0.631
	(-0.047)	(0.896)	(1.097)	(0.556)
Limits on Domestic Currency Loans (CG(-1))	0.308	3.710	-1.244***	-12.168***
	(0.461)	(0.700)	(-4.272)	(5.240)
Levy/Tax on Financial Institutions (TAX(-1))	-0.528**	0.135	0.017	0.276
	(-1.964)	(0.062)	(0.118)	(0.245)
Reserve Requirement Ratios (RR(-1))	-0.460	-4.184	-0.582**	-5.605***
	(-0.948)	(-1.085)	(-2.558)	(-3.104)
Limits on Foreign Currency Loans (FC(-1))	-0.313	-2.900	-0.174	-2.773**
	(-1.134)	(-1.321)	(-1.167)	(-2.347)
Loan-to-value ratio caps (LTVCAP(-1))	-0.380*	-2.242	-0.148	-2.759***
	(-1.870)	(-1.390)	(-1.203)	(-2.826)
FX and/or Countercyclical Reserve Requirements (RRREV(-1))	-0.295	-4.046	-0.296	-4.778**
	(-0.536)	(-0.926)	(-1.204)	(-2.457)
Total macroprudential instruments (MPI(-1))	-0.179***	-0.708	-0.085**	-1.156***
	(-2.703)	(-1.327)	(-2.292)	(-3.934)
Macroprudential instruments focused on the borrower (MPIB(-1))	-0.202***	-0.286	-0.034	-0.717**
	(-2.691)	(-0.475)	(-0.778)	(-2.049)
Macroprudential instruments focused on the	-0.218**	-0.557	-0.092*	-1.250***

Conclusion

- The empirical results suggest in the sample period, 2000-2013, a number of measures of macroprudential policy such as assets measures, loan-to-value ratios measures (LTV and LTVCAP) and debt-to-income ratios (DTI), liquidity measure, domestic currency loans limits (CG) as well as the capital measure, general countercyclical capital buffer (CTC) had a negative and significant effect on banks' profitability as measured by return of average assets (ROAA) and return on average equity (ROAE).

- Some macroprudential measure may affect the credit and housing markets but may not necessarily impact banks' profitability such as limits on foreign and domestic currency loans (FC and CG), levy/taxes (TAX), concentration limits (CONC), etc. This may suggest that banks are able to pass on the cost to clients which would require further investigation. Further, there is a weaker effect in more developed and more financially open economies, suggesting some avoidance and/or disintermediation of the policy (Cerutti et al 2017).

Thank you