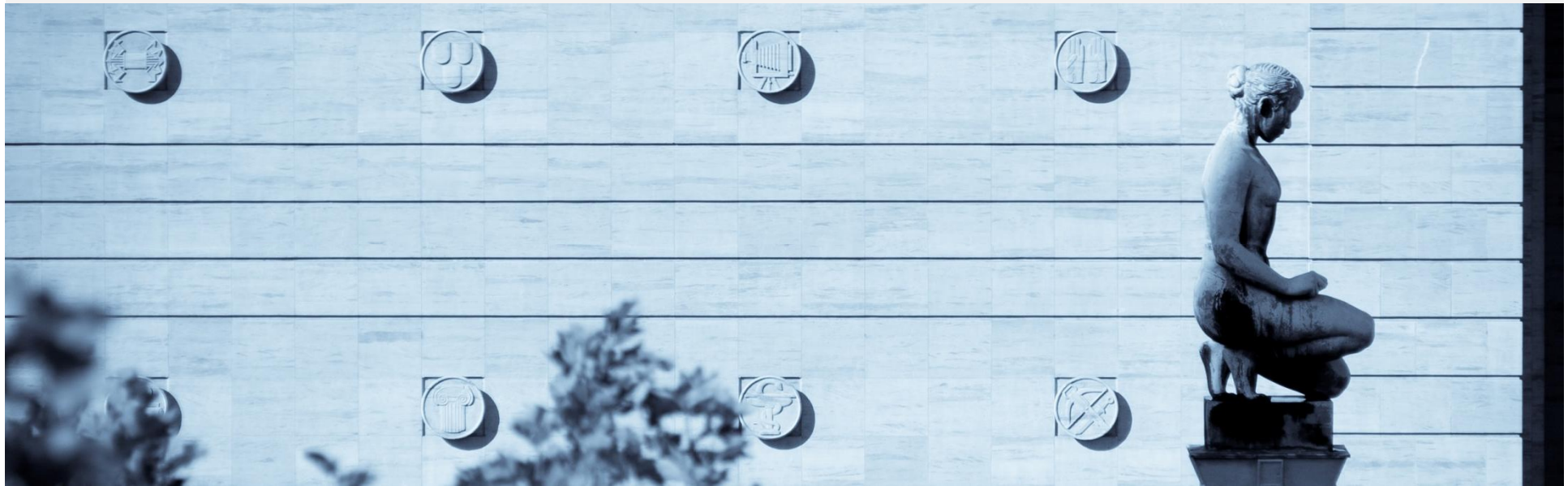# The impact of sectoral macroprudential capital requirements on mortgage loan pricing: Evidence from the Belgian risk weight add-on

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Banque Nationale DE BELGIQUE

Eurosystème

Introduction

► Systemic risks stemming from excessive developments in real estate markets can do great harm to financial stability and economic growth

► Sectoral capital requirements have been increasingly considered as macroprudential instruments to address vulnerabilities related to real estate exposures, for instance in Ireland, Sweden, Switzerland and the UK

► In December 2013 the National Bank of Belgium introduced a sectoral capital requirement aimed at strengthening the resilience of Belgian banks against adverse developments in the real estate market

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Introduction

► Assessing the effectiveness and efficiency of sectoral macroprudential capital requirements:

- While the impact in terms of increased capital to absorb potential losses is readily measurable, the consequences on the supply and pricing of credit, being either intended or unintended, are more difficult to assess

► This paper evaluates the impact of the Belgian macroprudential measure on mortgage loan pricing:

- Affected banks reacted heterogeneously to the introduction of the measure: mortgage-specialised and capital-constrained banks increased mortgage lending spreads by a greater amount

- As expected, the impact of the measure on mortgage loan pricing has been rather modest in economic terms

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Related literature

► Most empirical studies focus on assessing the impact of overall minimum regulatory capital requirements

- Exhaustive overviews of the literature in e.g. Martynova (2015) and BCBS (2016)

► Impact of capital requirements on loan pricing:

- Theoretical: e.g. Anderson et al. (2012), Baker and Wurgler (2015), Mendicino et al. (forthcoming)

- Empirical: e.g. Kashyap et al. (2010), King (2010), Cosimano and Hakura (2011), Slovik and Cournède (2011), De-Ramon et al. (2012), Šutorova and Teply (2013)

Impact of 100 basis point increase in capital ratio requirement on lending spreads is generally estimated to be limited (below 15 basis points)

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Related literature

► Evidence on the impact of sectoral macroprudential capital requirements is scarce:

- Martins and Schechtman (2013) on a macroprudential increase of risk weights targeting auto loans with long maturities and high LTVs in Brazil

- Basten and Koch (2015) on the introduction of a one percent countercyclical capital buffer on mortgage loan exposures in Switzerland

► This paper contributes to this literature on the impact of sectoral capital requirements on bank loan pricing

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Outline

► The Belgian macroprudential measure

► Data:

- Mortgage lending spreads
- Bank-specific control variables

► Empirical specification

► Results

- Full sample
- Robustness

► Conclusion

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The Belgian macroprudential measure

▶ Operationalisation of sectoral macroprudential capital requirements:

$$required\ capital = \\ risk\ weight \times capital\ ratio\ requirement \\ \times targeted\ exposures$$

▶ Sectoral macroprudential capital requirement introduced by the National Bank of Belgium in December 2013 to mitigate vulnerabilities stemming from the Belgian residential real estate market:

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The Belgian macroprudential measure

► Operationalisation of sectoral macroprudential capital requirements:

$$required\ capital =$$
$$\boxed{risk\ weight} \times capital\ ratio\ requirement$$
$$\times \boxed{targeted\ exposures}$$

► Sectoral macroprudential capital requirement introduced by the National Bank of Belgium in December 2013 to mitigate vulnerabilities stemming from the Belgian residential real estate market:

- 5 percentage point add-on to the risk weights on mortgage loans for IRB banks
- The measure increased IRB banks' average risk weights on Belgian mortgage loans from 10% to 15%

The Belgian macroprudential measure

► The main objective of the measure was to increase banks' resilience, not to curb credit supply per se

► Yet, to the extent that banks perceive the higher capital requirements as

- increasing their cost of funding; and/or
- decreasing their voluntary management buffer above minimum requirements below an internal or external target;

they may decide to raise lending spreads on their mortgage loans

► This paper aims at estimating the consequences of the Belgian risk weight add-on on mortgage loan pricing

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Data: mortgage lending spread

► Variable of interest is the spread between the interest rate applied to new mortgage loans over the swap rate:

$$spread_{b,t} = r_{b,t} - s_{b,t}$$

- $r_{b,t}$ is the average mortgage loan rate charged by bank b in period (month) t (source: NBB's MIR statistics)

- $s_{b,t}$ is the average swap rate corresponding to the repricing profile of bank b's new mortgage production (source: Datastream)

► Sample of monthly observations for 13 banks (8 IRB and 5 STA) over the period from January 2003 to December 2015

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Data: mortgage lending spread

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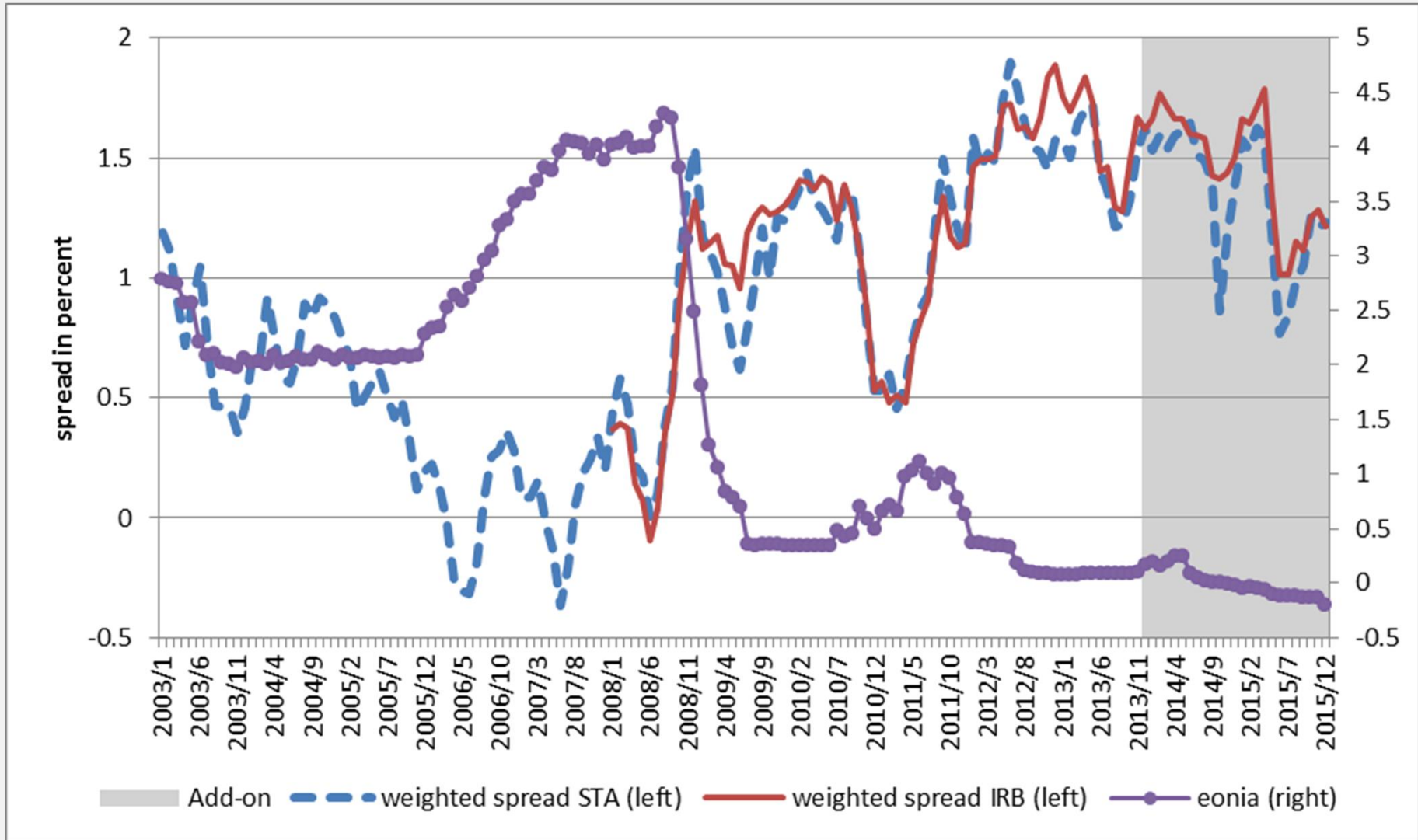
Data: bank-specific control variables

► Supervisory reporting and NBB SREP decision data on a solo basis

- ● allowing the average lending spread across banks to vary according to banks' balance sheet characteristics
- ● allowing IRB banks' response to the macroprudential measure in terms of mortgage loan pricing to differ according to IRB banks' balance sheet characteristics

Variable	IRB banks				STA banks			
	Obs.	Mean	Min.	Max.	Obs.	Mean	Min.	Max.
Total assets (EUR bill)	700	125.00	10.60	610.00	351	5.36	0.48	11.10
Profit / Total assets	700	0.0019	-0.0543	0.0126	351	0.0053	-0.0066	0.0226
Total loans / Deposits	700	0.9079	0.6478	1.5026	351	0.8301	0.0341	1.7863
Cost / Income	700	0.6846	0.3282	1.7596	351	0.6463	0.0861	2.3261
Loan loss / Total loans	700	0.0015	-0.0017	0.0229	351	0.0010	-0.0009	0.0194
BE mortgage loans / Total assets	700	0.1846	0.0183	0.5384	351	0.2809	0.0147	0.6289
Tier 1 capital ratio requirement	199	0.1176	0.0925	0.1830	NA	NA	NA	NA
Additional capital / RWA	199	0.0049	0.0004	0.0145	NA	NA	NA	NA
Additional capital / Total assets	199	0.0013	0.0003	0.0026	NA	NA	NA	NA
Capital buffer / RWA	199	0.0369	-0.0139	0.1217	NA	NA	NA	NA

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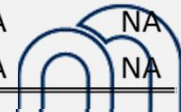
Empirical specification

► We estimate the following regression model:

$$spread_{b,t} = \alpha + \beta_{b,t} \, add\text{-}on_t + \delta \, X_{b,t-1} + FE_b + FE_t + \varepsilon_{b,t}$$

- $add\text{-}on_t$ equal to one for IRB banks when add-on in place, zero otherwise
- $X_{b,t-1}$ is a vector of additional bank-specific control variables
- FE_b and FE_t denote bank and time fixed effects, respectively

► The impact of the risk weight add-on on the mortgage loan spread is captured by the difference-in-differences estimator $\beta_{b,t}$:

$$\beta_{b,t} = \beta_0 + \beta_1 Z_{b,t-1}$$

- $Z_{b,t-1}$ is a vector of bank-specific control variables that we interact with the add-on indicator

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Results: full sample (2003-2015)

Regression of mortgage loan spread - Full sample (2003M1-2015M12)

	Model 1	Model 7	Model 8	Model 9	Model 10
Add-on	0.113**	0.082	0.154	0.168***	0.083
Add-on x (BE mortgage loans / Total assets)		0.632***			
Add-on x Tier 1 capital ratio requirement			0.355		
Add-on x (Additional capital / RWA)				7.126*	
Add-on x (Additional capital / Total assets)					104.947***
Add-on x (Capital buffer / RWA)		-2.422***	-2.225***	-2.384***	-2.438***
IRB	0.163***	0.165***	0.166***	0.167***	0.166***
Log total assets	0.162***	0.133***	0.164***	0.155***	0.133***
Profit / Total assets	-1.687	-1.35	-1.408	-1.352	-1.286
Total loans / Deposits	0.239***	0.213***	0.232***	0.222***	0.209***
Cost / Income	0.029	0.03	0.037	0.036	0.032
Loan loss / Total loans	3.441	2.491	3.289	2.878	2.287
BE mortgage loans / Total assets	0.261*	0.265*	0.293*	0.303*	0.276*
Constant	0.447***	0.502***	0.439***	0.459***	0.503***
Adjusted R-squared	0.835	0.836	0.835	0.835	0.836
Observations	1646	1646	1646	1646	1646

Notes: All specifications include bank and time dummies. Significance: *** 1 percent, ** 5 percent, * 10 percent.

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Results: model implied impact (2003-2015)

►Model implied impact of the Belgian risk weight add-on on IRB banks' mortgage lending spreads:
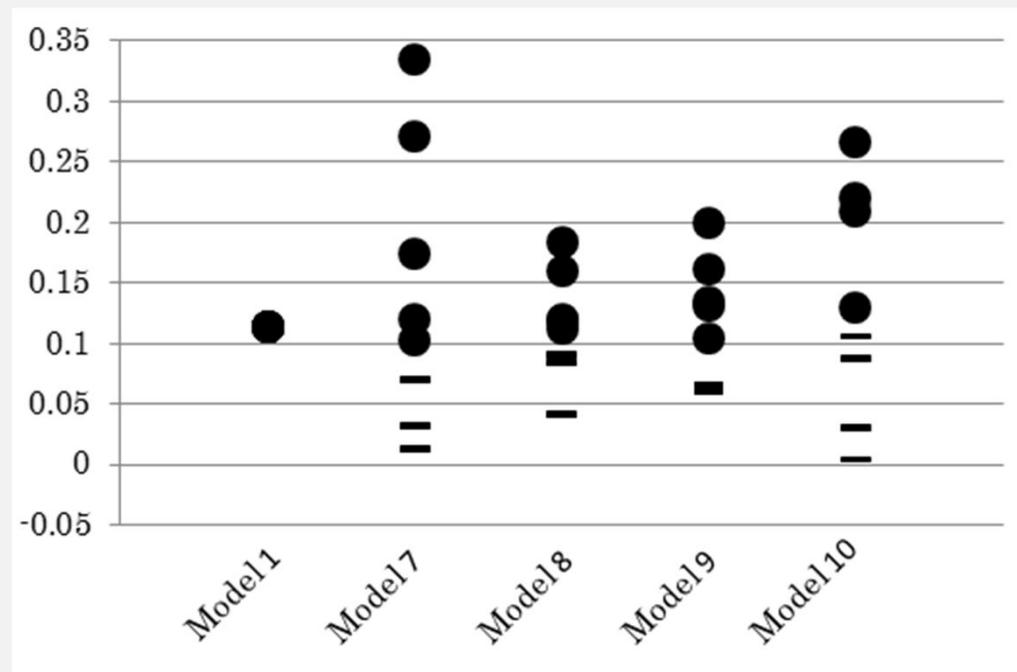
►Significant average impact of 11 basis points, but banks that are affected relatively more by the add-on, increase spreads by a greater amount

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Robustness: Basel II (2008-2015)

Regression of mortgage loan spread (2008M1-2015M12)

	Model 1	Model 7	Model 8	Model 9	Model 10
Add-on	0.076	0.018	0.168	0.125**	0.023
Add-on x (BE mortgage loans / Total assets)		0.689***			
Add-on x Tier 1 capital ratio requirement			-0.183		
Add-on x (Additional capital / RWA)				5.056	
Add-on x (Additional capital / Total assets)					110.510***
Add-on x (Capital buffer / RWA)		-2.006***	-1.879***	-1.938***	-1.994***
IRB	0.878***	0.873***	0.863***	0.877***	0.894***
Log total assets	0.061	0.035	0.066	0.057	0.033
Profit / Total assets	-3.477*	-3.054*	-3.266*	-3.176*	-3.018
Total loans / Deposits	0.165*	0.142	0.169*	0.156*	0.135
Cost / Income	-0.154***	-0.151***	-0.146***	-0.143***	-0.146***
Loan loss / Total loans	-3.172	-4.272	-3.139	-3.62	-4.505
BE mortgage loans / Total assets	0.012	0.035	0.023	0.031	0.031
Constant	1.023***	1.068***	1.004***	1.024***	1.076***
Adjusted R-squared	0.78	0.782	0.78	0.78	0.782
Observations	1045	1045	1045	1045	1045

Notes: All specifications include bank and time dummies. Significance: *** 1 percent, ** 5 percent, * 10 percent.

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Robustness: excl. financial crisis (2011-2015)

| Regression of mortgage loan spread (2011M1-2015M12)					
	Model 1	Model 7	Model 8	Model 9	Model 10
Add-on	0.043	0.155**	-0.089	0.110*	0.112*
Add-on x (BE mortgage loans / Total assets)		-0.085			
Add-on x Tier 1 capital ratio requirement			1.865***		
Add-on x (Additional capital / RWA)				6.805*	
Add-on x (Additional capital / Total assets)					23.591
Add-on x (Capital buffer / RWA)		-2.525***	-2.335***	-2.615***	-2.541***
IRB	1.540***	1.510***	1.563***	1.553***	1.531***
Log total assets	-0.04	-0.011	-0.029	-0.038	-0.032
Profit / Total assets	-0.616	-0.548	-0.271	0.035	-0.134
Total loans / Deposits	0.566***	0.613***	0.605***	0.593***	0.592***
Cost / Income	-0.144***	-0.125***	-0.113***	-0.122***	-0.125***
Loan loss / Total loans	-1.124	-0.974	-2.054	-1.739	-1.335
BE mortgage loans / Total assets	-1.296***	-1.365***	-1.426***	-1.399***	-1.368***
Constant	1.202***	1.121***	1.156***	1.176***	1.166***
Adjusted R-squared	0.843	0.846	0.847	0.846	0.846
Observations	649	649	649	649	649

Notes: All specifications include bank and time dummies. Significance: *** 1 percent, ** 5 percent, * 10 percent.

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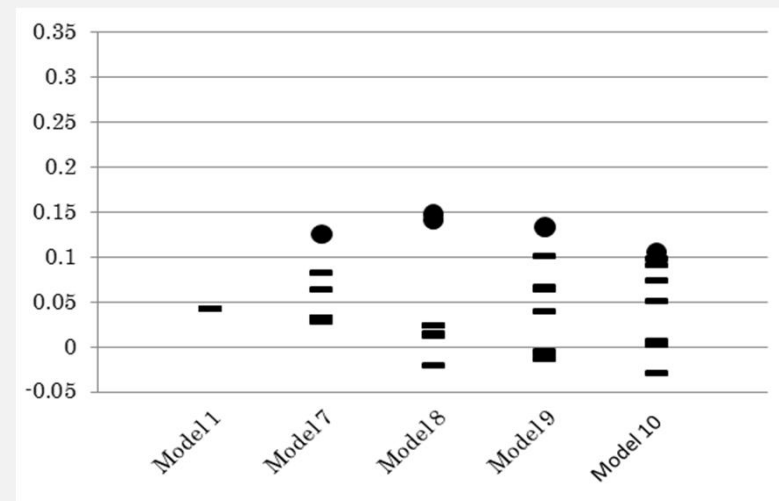# Robustness: model implied impact

►Model implied impact of the Belgian risk weight add-on on IRB banks' mortgage lending spreads:
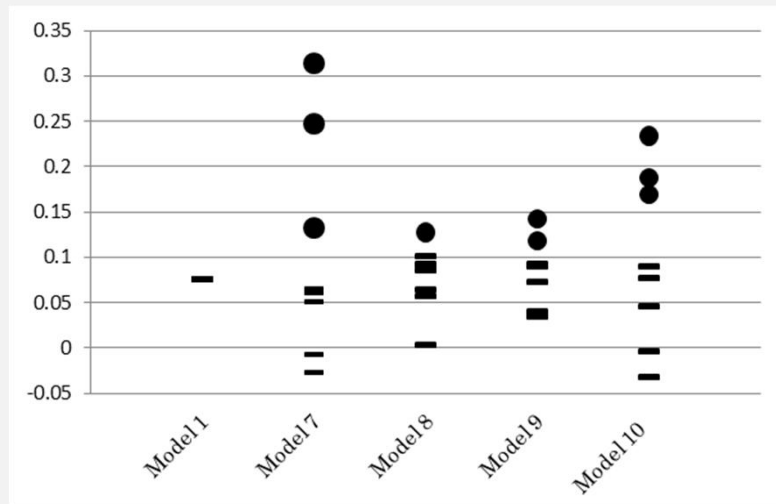
<u>2008-2015</u>   <u>2011-2015</u>

►Reduction of control sample diminishes

- both statistical and economic significance of impact
- heterogeneity in impact across IRB banks

Conclusion

► This paper contributes to the understanding of the potential impact of sectoral macroprudential capital requirements. Such evidence is crucial for improving the effectiveness of macroprudential policies

► Our results suggest that (sectoral) macroprudential capital requirements are likely to have a heterogeneous impact across banks

► In terms of economic significance, the impact of the risk weight add-on on mortgage loan pricing appears to be relatively limited

► This should not be surprising, as the calibration of the measure aimed at increasing resilience while at the same time avoiding an unsettling of the market

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Conclusion

▶ Due to potential non-linearities in banks' reactions to regulatory requirements, our estimates do not allow drawing conclusions on whether a stronger calibration of the measure would have had a much stronger impact on mortgage loan pricing

▶ An interesting avenue for future work is the assessment of whether (sectoral) capital requirements could be effective in curbing credit supply or whether alternative measures would be more suitable for this specific objective

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