

IMPLEMENTING BORROWER-BASED MEASURES IN THE EU: THE ROLE OF INSTITUTIONAL FRAMEWORKS

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- Borrower-based measures (BBMs) widely implemented to address vulnerabilities in the residential real estate markets.
 - 16 (14) EU countries, have legally binding LTV (DTI/LTI/DSTI in place)
- BBMs may entail societal costs and have distributional consequences.
 - Authorities closely related to the election cycle may be reluctant to implement BBMs due to their societal costs or, if they do, they may opt for less stringent limits.
- In 2011, ESRB recommended to “*ensure that the central bank plays a leading role in the macroprudential policy*” (ESRB Recommendation 2011/3).

This study investigates empirically whether the institutional framework governing the implementation of BBMs has influenced their use across EU countries.

Research questions:

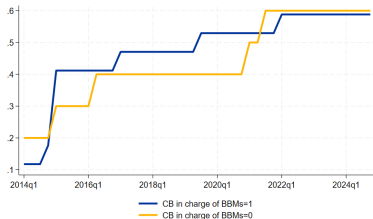
- ⇒ Is the likelihood of introducing BBMs higher if the Central Bank is the sole authority deciding on their implementation?
- ⇒ Is this impact stronger when the Central Bank is also acting as National Macroprudential Authority?
- ⇒ Does the institutional framework affect the calibration of LTV limits?
- ⇒ Does access to granular loan-level data (e.g.credit registry) improve the likelihood of having BBMs in place?

Institutional frameworks and BBMs adoption: a visual inspection

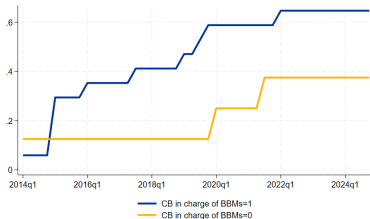
In the EU, governance of BBMs is heterogeneous across EU countries. The power to implement BBMs is entrusted to:

- **Central Bank (17 countries)**, Financial Supervisory authority (6 countries), political authority (3 countries), Committee (1 country)

Share of countries that have introduced borrower-based measures by institutional framework



(a) LTV measures



(b) Income-based measures

Theoretical foundations: regulatory capture, political influence and Central Bank involvement

- Early theories (Jensen and Meckling (1976); Stigler (1971)) highlight risks of regulatory capture due to information asymmetries and industry influence.
- Macroprudential measures - especially BBMs face political pressures, requiring independence for decision-makers.
- Central banks are often favored due to expertise in systemic risk, access to real-time data, and insulation from political pressures (Blanchard et al. (2010); Mishkin (2011))...
- ... However, no universal institutional model exists — national contexts influence governance structures (Borio (2010); Arslan and Upper (2017)).

Empirical evidence: central-bank-led frameworks and the role of institutional quality

- Empirical studies show faster responses under central-bank-led macroprudential frameworks (Claessens et al. (2010); Kim et al. (2025)).
- Institutional quality matters: effectiveness is higher in countries with strong governance indicators (Apergis et al. (2021); Chaurasiya et al. (2025)).
- Central bank-led frameworks exhibit greater transparency and accountability but face potential conflicts with monetary mandates (Tucker (2018); Bengtsson (2021)).
- **Key takeaway:** Institutional design plays a critical role in shaping the effectiveness of macroprudential policy, with central bank involvement providing significant advantages that depend on political and institutional contexts.

Our dataset includes information on **27 EU countries from 2014 to 2024**, at quarterly frequency on:

- **Implementation and calibration of BBMs**: legislation framework regarding the implementation of BBMs, *legally binding* LTV, DSTI, DTI limits (ESRB, national authorities' websites).
- **Institutional frameworks**: Central bank, supervisory authority, committee, political authority (ESRB, national authorities' websites).
- **Economic conditions**:
 - **Cyclical and structural RRE vulnerability indicators** (Household debt/GDP, House price-to-income deviation, RRE price growth, mortgage credit growth)
 - **Macroeconomic variables** (GDP growth, inflation rate)
 - **Banking sector** (NPL rate)

Empirical strategy: Institutional arrangements and the likelihood of implementing BBMs

OLS regression

$$BBM_{c,t} = \alpha_0 + \alpha_1 CB_c + \alpha_2 Z_{c,t-4} + QuarterFE_t + \epsilon_{c,t} \quad (1)$$

Binary logit model:

$$Pr(Y_{c,t} = 1) = \gamma(\beta_0 + \beta_1 CB_c + \beta_2 Z_{c,t-4} + QuarterFE_t) \quad (2)$$






- $BBM_{c,t}$: the sum of active instruments in each quarter (LTV, DSTI, LTI/DTI and maturity limits)
- $Y_{c,t}$: dummy = 1 if LTV or income-based (DSTI/DTI) measures are implemented, 0 otherwise.
- CB_c : dummy = 1 if the Central Bank is the sole authority in charge of implementing BBMs, 0 otherwise.
- $Z_{c,t-4}$: vector of control variables.
- Sample only covers quarters when legislation to introduce BBMs was in place.

Empirical strategy: Institutional arrangements and calibration of LTV limits

OLS regression

$$LTV\text{ calibration}_{c,t} = \theta_0 + \theta_1 CB_c + \theta_2 Z_{c,t-4} + QuarterFE_t + \epsilon_{c,t} \quad (3)$$

Run separate regressions for FTHB and SSB limits. Sample only covers quarters when legally binding LTV limits are in place.

		AT	BE *	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HR	HU
LTV	FTB	90%	90%		80%	90%		95%	85%		95%				90%
	SSB				70%	80%					90%				80%
		IE	IT	LT	LU	LV	MT	NL	PL	PT *	RO	SE	SI *	SK	
	FTB	90%		85%	100%	90%	90%	100%	80%	90%	85%	85%	80%	80%	
	SSB	90%		70%	90%	90%				80%	75%	70%		80%	
DSTI/LTI	FTB	40%	50%		80%	50%		Depends interest rate	50%			35%			50%
	SSB					45%									
		IE (LTI)	IT	LT	LU	LV	MT	NL	PL*	PT *	RO	SE	SI	SK	
	FTB	4		40%		40%	40%	30%	40%-50%	50%	45%		50%	60%	
	SSB	3.5								40%					
		 All types of borrowers  First-Time Buyer (FTB)  Second and Subsequent Buyer (SSB)			 Recommendation 										

Result I - Role of the Central Bank in BBMs implementation

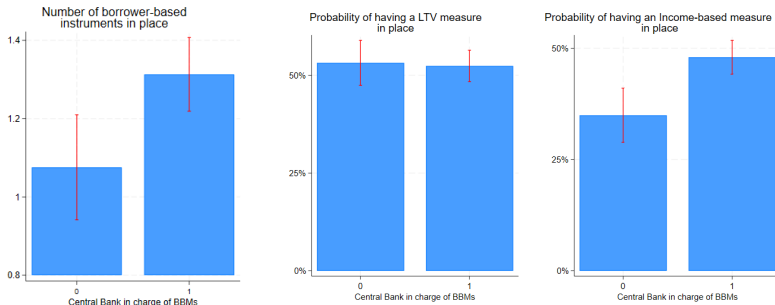
	(1)	(2)	(3)
	Number of BBMs in place	LTV measures in place	Income-based measures in place
Central bank in charge of BBMs = 1	0.22** (0.10)	-0.04 (0.18)	0.66*** (0.20)
L4.GDP growth	3.09** (1.29)	13.80*** (2.74)	9.96*** (2.88)
L4.Inflation rate	3.55* (2.08)	9.46** (4.15)	6.13 (4.49)
L4.RRE price (3-year growth rate)	6.97*** (1.05)	9.05*** (1.99)	15.09*** (2.26)
L4.Mortgage loans (3 year growth rate)	1.75** (0.68)	0.22 (1.23)	2.04 (1.31)
L4.HPI deviation	-0.29 (0.35)	1.90*** (0.66)	-3.22*** (0.74)
L4.Household debt/GDP (demeaned)	0.20 (0.70)	-0.64 (1.28)	1.72 (1.44)
L4.NPL ratio (demeaned)	1.84 (1.25)	1.65 (2.31)	4.38* (2.43)
Observations	1,008	1,008	949
Quarter FE	Yes	Yes	Yes
(Pseudo) R2	15%	7.6%	17.2%
AUROC		67%	77%

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.10

Marginal effects: Role of the Central Bank in BBMs implementation

Compared to other institutional arrangements, Central Bank's power to implement BBMs is associated with:

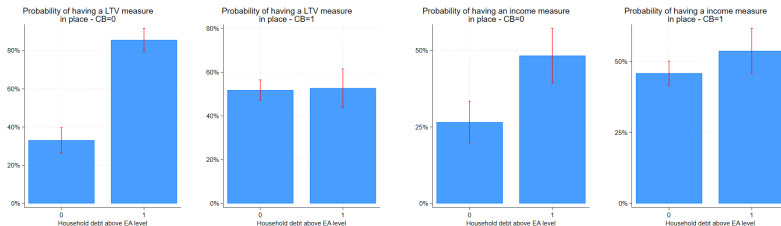
- the implementation of 0.2 more borrower-based measures
- a similar likelihood to have LTV limits in place
- 13 p.p. higher probability to have income-based limits in place



Red bars indicate 95% confidence intervals.

Results II: Interaction with household level of debt

- Other types of institutional arrangements are more likely to introduce BBMs when the level of household debt is high (+ 52 p.p. for LTV measures, + 22 p.p. for income-based measures)
- The likelihood of central banks implementing BBMs is constant, regardless of the level of household debt.

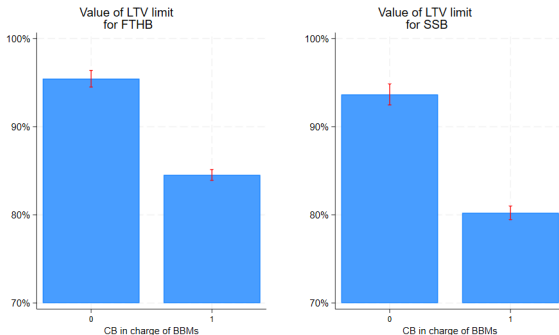


Red bars indicate 95% confidence intervals.

► Results table

Result III: Institutional arrangements and calibration of LTV limits

If the Central Banks is in charge of setting BBMs, implemented LTV limits are, on average, 11 p.p. tighter for First-time Home-buyers, and 13 p.p. stricter for Subsequent Home-buyers.

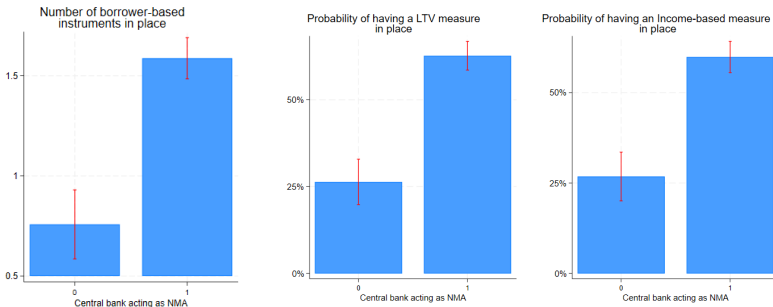


Red bars indicate 95% confidence intervals.

[▶ Results table](#)

Results IV: The role of Central Bank as National Macroprudential Authority

If the Central Bank also acts the NMA, the likelihood of having in place LTV measures increases by 37 p.p and by 33 p.p. for income based measures.

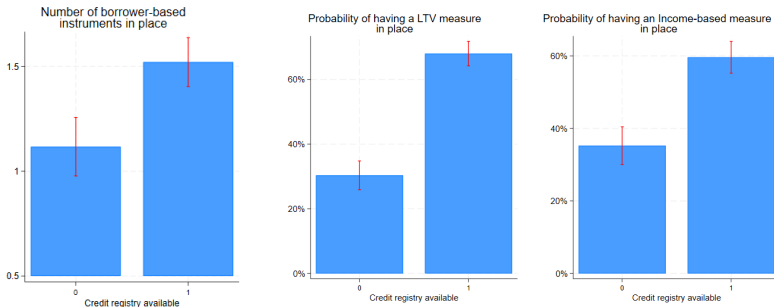


Red bars indicate 95% confidence intervals.

► Results table

Results IV: The role of access to credit registry data

Having access to debtor-level granular data increases the likelihood of having in place LTV measures by 38 p.p and by 24 p.p. for income based measures.



Red bars indicate 95% confidence intervals.

► Results table

Main findings:

- Central Banks use a broader array of BBMs and have a higher likelihood of implementing income-based measures.
- This effect is stronger when the Central Bank is also acting as the National Macroprudential Authority.
- While the likelihood of introducing LTV limits is similar across institutional arrangements, Central Banks implement LTV stricter limits.
- Having access to granular debtor-level data through a credit registry improves the likelihood of introducing BBMs.
- Cyclical, rather than structural, residential real estate indicators have influenced decisions to implement BBMs.

Appendix

List of national macroprudential authorities and national designated authorities in EU Member States

◀ Back

Country	Authority in charge of setting BBMs	Central Bank in charge of BBMs	Central Bank acting as National Macroprudential Authority
Austria	Financial Market Authority	0	0
Belgium	Federal government	0	0
Bulgaria	Bulgarian National Bank	1	1
Croatia	Croatian National Bank	1	0
Cyprus	Central Bank of Cyprus	1	1
Czech Republic	Czech National Bank	1	1
Estonia	Eesti Pank	1	1
Finland	Financial Supervisory Authority	0	0
France	Haut Conseil de stabilité financière	0	0
Germany	Bundesanstalt für Finanzdienstleistungsaufsicht	0	0
Greece	Bank of Greece	1	1
Hungary	Magyar Nemzeti Bank	1	1
Ireland	The Central Bank of Ireland	1	1
Italy	Banca d'Italia	1	0
Latvia	Latvijas Banka	1	1
Lithuania	Lietuvos bankas	1	1
Luxembourg	Commission de Surveillance du Secteur Financier	0	0
Malta	Central Bank of Malta	1	1
Netherlands	Dutch ministry of Finance	0	0
Poland	Polish Financial Supervision Authority	0	0
Romania	National Bank of Romania	1	0
Slovakia	Národná banka Slovenska	1	1
Slovenia	Banka Slovenije	1	0
Spain	Banco de España	1	0
Sweden	Finansinspektionen	0	0
Total		17	12

List of laws regulating the implementation of the BBM framework in EU Member States

◀ Back

Country	Date	Legislation
Austria	Aug-13	Article 23h Austrian Banking Act
Belgium	Apr-14	Art. 36/38 of the NBB's Organic Law
Bulgaria	Jan-14	Law on Credit Institutions
Croatia	Dec-13	Article 144a of the Credit Institutions Act
Cyprus	Dec-13	Directive issued to credit institutions on loan origination processes
Czech Republic	Aug-13	Act No. 6/1993 Coll., on the Czech National Bank
Denmark	Jan-07	
Estonia	May-14	Credit Institutions Act
Finland	Aug-14	Chapter 15, section 11 of the Credit Institutions Act
France	Apr-17	Monetary and Financial Code, Article L631-2-1, paragraph 5
Germany	Jun-17	Section 48u of the German Banking Act
Greece	May-14	Law 4261/2014
Hungary	Sep-13	Act CXXXIX of 2013, on the Magyar Nemzeti Bank
Ireland	Jun-13	Central Bank (Supervision and Enforcement) Act 2013
Italy	Dec-13	Circolare n. 285 del 17 dicembre 2013
Latvia	Dec-07	Consumer Rights Protection Law
Lithuania	Dec-94	Articles 9 and 11 of the Law on the Bank of Lithuania
Luxembourg	Dec-19	Law of 5 April 1993 on the financial sector, Chapter 6, Article 59
Malta	Aug-14	Article 17A of the Central Bank of Malta Act
Netherlands	Oct-06	Decree on the Supervision of Financial Undertakings Wft
Poland	Jul-06	Act of 21 July 2006 on the supervision of the financial market
Portugal	Oct-13	Article 16A of its organic law Banco de Portugal
Romania	Dec-06	Article 235 Emergency Ordinance no. 99 of December 6, 2006
Slovakia	May-13	Národná banka Slovenska Section 2(3)
Slovenia	Dec-13	Macroprudential Supervision of the Financial System Act
Spain	Dec-18	Royal Decree-Law 22/2018
Sweden	May-04	Chapter 6, section 4 of the Banking and Financing Business Act

Descriptive statistics

◀ Back

Variable name	No. of observations	Mean	Median	Standard Deviation
Central bank in charge of BBMs	1,188	63%	100%	48%
Central bank acting as NMA	1,188	44%	0%	50%
Number of borrower-based measures in place	1,188	1.07	1.00	1.21
LTV measures in place	1,188	46%	0%	50%
Income-based measures in place	1,100	39%	0%	49%
Credit registry available	1,144	42%	0%	49%
GDP growth	1,188	2.6%	2.4%	4.4%
Unemployment rate	1,188	7.4%	6.5%	4.0%
Inflation rate	1,188	2.7%	1.6%	3.9%
RRE price (3-year growth rate)	1,188	5.6%	5.6%	5.2%
Mortgage loans (3 year growth rate)	1,188	4.1%	4.3%	5.9%
House Price to Income deviation	1,188	3.0%	1.0%	15.0%
House Price to Income deviation (demeaned)	1,188	0.0%	-0.5%	10.3%
Household debt/GDP	1,188	51.3%	49.5%	26.6%
Household debt/GDP (demeaned)	1,188	0.0%	0.1%	7.5%
NPL ratio	1,152	5.0%	2.5%	7.0%
NPL ratio (demeaned)	1,152	0.0%	-0.1%	4.7%

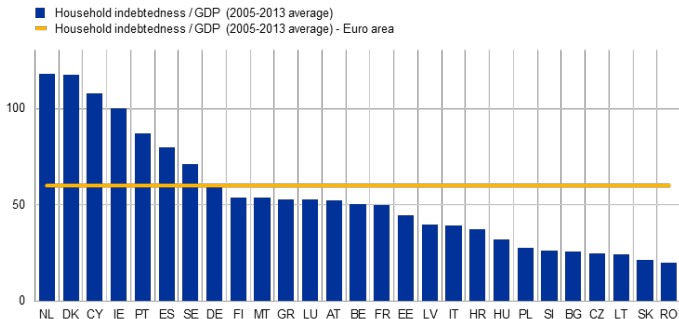
Results II: Interaction with household level of debt

◀ Back

	(1)	(2)
	LTV measures in place	Income-based measures in place
CB BBM=0 # HH debt above EA=1	2.73*** (0.30)	1.18*** (0.30)
CB BBM=1 # HH debt above EA=0	0.87*** (0.21)	1.06*** (0.25)
CB BBM=1 # HH debt above EA=1	0.91*** (0.28)	1.45*** (0.31)
Observations	1,008	949
Quarter FE	Yes	Yes
Pseudo R2	15%	19%
AUROC	77%	78%

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.10

Distribution of countries by level of household debt



▶ Back

Result III: Institutional arrangements and calibration of LTV limits

◀ Back

	(1) FTHB LTV limit	(2) SSB LTV limit
Central bank in charge of BBMs = 1	-0.11*** (0.01)	-0.135*** (0.01)
L4.GDP growth	0.06 (0.07)	-0.07 (0.09)
L4.Inflation rate	-0.11 (0.10)	-0.39*** (0.13)
L4.RRE price (3-year growth rate)	0.17*** (0.06)	0.33*** (0.07)
L4.Mortgage loans (3 year growth rate)	-0.05 (0.04)	0.27*** (0.05)
L4.HPI deviation	-0.11*** (0.02)	-0.12*** (0.02)
L4.Household debt/GDP (demeaned)	-0.00 (0.04)	-0.14*** (0.05)
L4.NPL ratio (demeaned)	0.21** (0.10)	0.35*** (0.12)
Quarter FE	Yes	Yes
Observations	531	531
R-squared	47%	49%

Standard errors in parentheses
 *** p<0.01, ** p<0.05, * p<0.10

Note: The sample only covers the countries and periods where legally binding LTV limits are in place.

Result IV: Role of the Central Bank as National Macroprudential Authority and the impact of access to credit registry data

◀ Margins NMA

◀ Margins Credit registry

	(1)	(2)	(3)	(4)	(5)	(6)
	Number of BBMs in place	LTV measures in place	Income-based measures in place	Number of BBMs in place	LTV measures in place	Income-based measures in place
Central bank acting as NMA = 1	0.85*** (0.11)	2.06*** (0.26)	1.81*** (0.26)			
Credit registry available = 1				0.33*** (0.09)	2.18*** (0.24)	1.06*** (0.20)
Observations	657	657	657	657	672	672
(Pseudo) R2	31%	27%	24%	31%	31%	22%
AUROC		82%	81%		85%	79%
Macro controls	Yes	Yes	Yes	Yes	Yes	Yes
RRE controls	Yes	Yes	Yes	Yes	Yes	Yes
Banking sector controls	Yes	Yes	Yes	Yes	Yes	Yes
Quarter FE	Yes	Yes	Yes	Yes	Yes	Yes

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.10

Note: The sample only covers the countries where Central bank is in charge of implement BBMs and periods when legislative framework to introduce BBMs was in place.

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