

Coping with unsustainable lending

Irina Mihai

Macroprudential Risk Division, Financial Stability Department

I. Motivation (1)

- ❑ Set the ground for new macroprudential instruments that are on international financial regulators agenda regarding the excessive and unsustainable lending
 - ❑ Looking at the ability of instruments to address systemic risk
 - ❑ Better understanding of the triggers for activating macroprudential instruments linked to excessive/ unsustainable lending
 - ❑ Take an analytical look at NBR's experience with prudential regulation and assess the efficiency of macroprudential measures (DSTI, LTV)

I. Motivation (2)

Focused on answering the following questions:

- (i) is the excessive credit growth telling the full story about systemic risk?
- (ii) what are the factors that might signal excessive or/and unsustainable credit growth?
- (iii) how efficient are macroprudential instruments (like DSTI or LTV) in limiting the build-up of risks?

II. Empirical approach: defining excessive and unsustainable lending

Excessive lending - defined based on:

- (i) annual credit growth (Excess1) and
- (ii) deviation of credit to GDP from its previous value (Excess2)

Unsustainable lending - the share of new lending that migrates to non-performance

Both credit events are constructed as binary variables as following:

$$Y_{it} = \begin{cases} 1, & \text{if } x_{it} \geq E(x_{it}) + k * std(x_{it}) \\ 0, & \text{otherwise} \end{cases}$$

where:

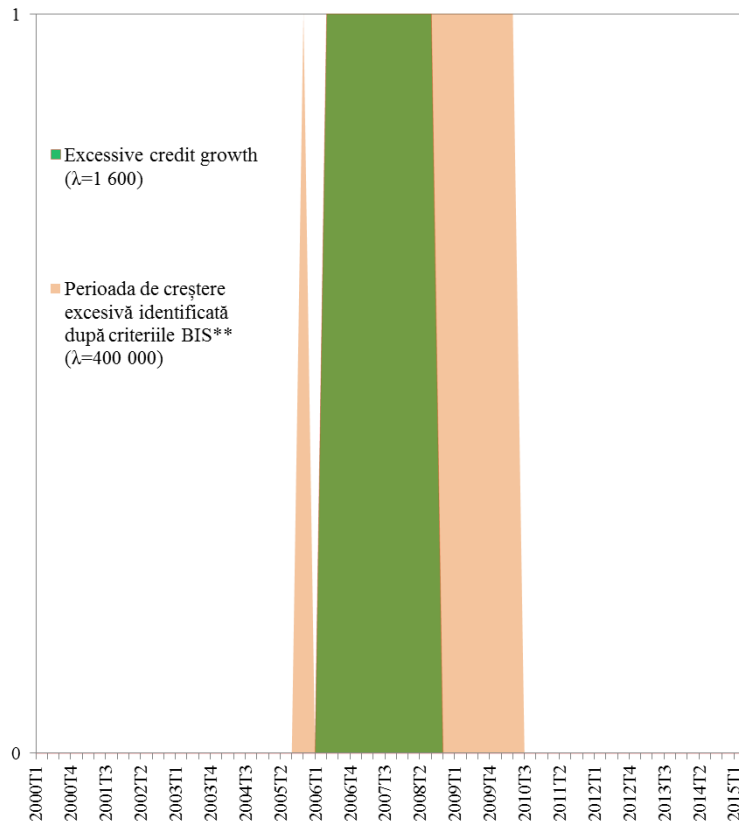
x_{it} = the credit indicator at bank level

$E(x_{it})$ = the average value of the credit indicator

k = multiplying parameter

II. Empirical approach: excessive credit growth

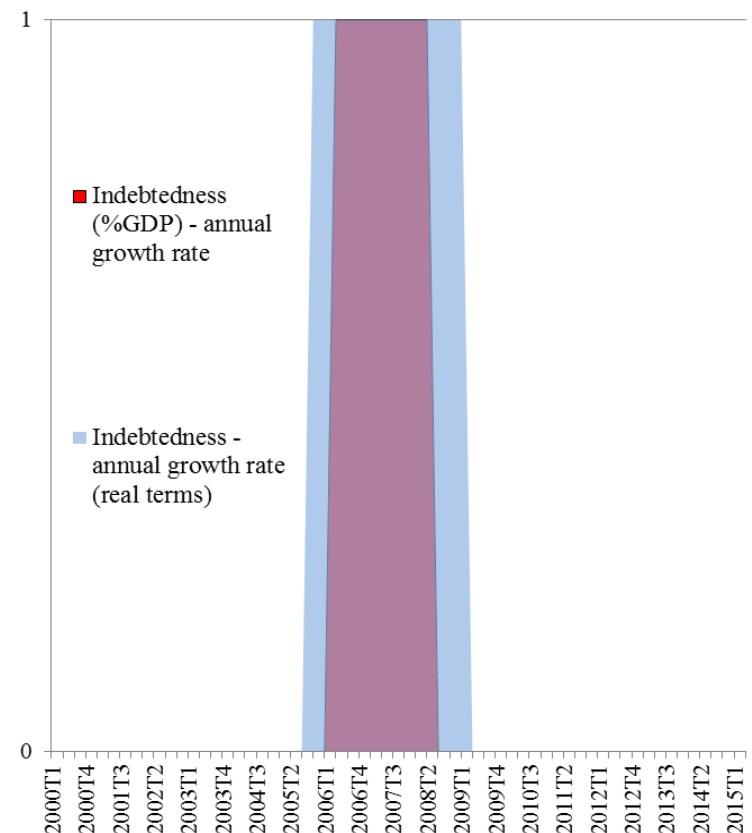
Excessive lending: standardized credit-to-GDP gap



** O creștere excesivă apare dacă deviația de la trend este mai ridicată de 2 puncte procentuale pentru cel puțin 2 ani.

Source: NBR

Excessive lending: additional credit-to-GDP gap



Excessive lending: (i) growth rate >20% and >2 standard deviation for at least one quarter and (ii) growth rate > 10% and above one standard deviation for at least 2 years.

Source: NBR

II. Empirical approach: the specification of the econometric model

$$\ln \frac{P(Y_{it} = 1)}{1 - P(Y_{it} = 1)} = \beta_1 \sum_{l=1}^4 \sum_{i=0}^n X_{it-l} + \beta_2 \sum_{l=1}^4 \sum_{i=0}^n M_{it-l} \\ + \beta_3 \sum_{l=1}^4 \sum_{i=0}^n Z_{it-l} + \beta_4 \sum_{l=1}^4 W_{t-l} + \sum_{i=0}^n M_{it} * R_{it}$$

X_{it} : banks' financial soundness indicators (profitability, solvency, liquidity, share of loans in loss category, loan-loss provisioning, LTD, etc.)

M_{it} : banks' lending standards (captured by DTI, LTI and LTV indicators);

Z_{it} : banks' competition indicators

III. Data and indicators (1)

14 banks, 85% of bank credit to household and firms sectors, data from 2005-2012, quarterly.

Banks' credit policies – DSTI, LTV, LTI:

$$DSTI_{loan} = 100 * \frac{\frac{r}{12} * P}{1 - (1 + \frac{r}{12})^{-n}} I$$

$$LTV_{loan} = 100 * \frac{\textit{Outstanding loan amount}}{\textit{Adjusted collateral value}}$$

$$LTI_{it} = 100 * \frac{\sum_j \textit{Outstanding loan amount}}{\sum_j \textit{Operational income}}$$

III. Data and indicators (2)

Competition indicators: inspired from Gorton and He (2008)

(1) credit as percentage of total assets:

$$Competition_{ca_{it}} = \frac{1}{n-1} \sum_{j \neq i}^n \frac{Credit_{jt}}{Assets_{jt}} - \frac{Credit_{it}}{Assets_{it}}$$

(2) loan loss provisions as percentage of credit portfolio (*information producing intensity*):

$$Competition_{pc_{it}} = \frac{1}{n-1} \sum_{j \neq i}^n \frac{Provisions_{jt}}{Credits_{jt}} - \frac{Provisions_{it}}{Credits_{it}}$$

Prudential regulation: regulatory dummy variables for the prudential measures applied between 2005 – 2012. The variables are set to 1 only for the quarter when the measure was approved and zero for the rest of the period.

Banks' financial stance: banks' profitability and efficiency (ROE, ROA), solvency and leverage, loan-to-deposit ratio and credit quality (non-performing loan ratio and loan loss provision ratio).

Macroeconomic environment and monetary policy stance: variables used in the literature (GDP growth unemployment disposable income)

IV. Does excessive credit growth always tells the full story? (1)

The concordance indicators between excessive and unsustainable lending for system-based credit cycle indicators (2005/Q1–2012/Q4):

	Total portfolio			Households		
	Excess1 vs. Unsustainable	Excess2 vs. Unsustainable	Excess1 vs. Excess2	Excess1 vs. Unsustainable2	Excess2 vs. Unsustainable2	Excess1 vs. Excess2
CI	0.75	0.72	0.91	0.63	0.66	0.91
E(CI)	0.65	0.65	0.63	0.63	0.61	0.58

- signs of financial deepening for the household portfolio.

IV. Does excessive credit growth always tells the full story? (2)

Concordance indicators for individual banks' credit cycles compared to the whole banking sector cycle for total credit portfolio (households and firms)

	Concordance index			Expected Concordance Index		
	Excessive credit		Unsustainable credit	Excessive credit		Unsustainable credit
	% yoy	% GDP		% yoy	% GDP	
Mean	0.82	0.80	0.79	0.59	0.61	0.66
Median	0.81	0.83	0.80	0.59	0.59	0.68
Min	0.69	0.63	0.50	0.50	0.52	0.38
Max	0.97	0.94	0.91	0.72	0.72	0.78
Std. Dev.	0.09	0.09	0.11	0.07	0.07	0.12

- high degree of synchronization for excessive lending between individual banks' credit cycles and the entire banking sector cycle (herding behavior among banks);
- banks with a lower concordance index with the aggregate banking sector display a higher risk profile (unsustainable credit).

V. Excessive lending (1): specification

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Credit_gap	Credit_gap	Credit_gap	Credit_gap	Credit_gap	Credit_gap
Lag regulation	-0.378***	-0.341***	-0.410***	-0.381***	-0.377***	-0.339***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Lag4 disposable income growth rate	0.037***		0.039***	0.037***	0.034***	0.044***
	(0.00)		(0.00)	(0.00)	(0.00)	(0.00)
Lag4 HH Index	0.001***	0.001***	0.000**	0.001***	0.001***	0.001***
	(0.00)	(0.00)	(0.01)	(0.00)	(0.00)	(0.00)
Lag4 economic growth		0.031***				
		(0.00)				
Number of new loans to new clients - total			0.004***			
			(0.00)			
Volume of credit to new clients - total				0.002		
				(0.20)		
Debt service to income					0.007***	
					(0.00)	
Loan to value						0.002**
						(0.04)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared within	0.494	0.577	0.479	0.522	0.499	0.495
Number of observations	416	416	416	416	416	416

V. Excessive lending (1): main findings

- ❑ *Market concentration* (Herfindahl-Hirschman Index) plays a significant role for excessive credit
- ❑ *Competition acts* in both direction: a lower credit to assets indicator leads to a higher lending growth rate (*Competition_ca*), while the evidence of other banks losses triggers a slowdown in the lending activity
- ❑ *LTV* contributes only marginally to the probability of excessive lending
- ❑ *DSTI* prudential measure has a substantial impact on the probability of the excessive credit
- ❑ Stronger impact in pre-crisis period

V. Excessive lending (2): specification

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Credit_growth	Credit_growth	Credit_growth	Credit_growth	Credit_growth	Credit_growth
Lag regulation	0.120***	0.175***	0.150***	0.096***	0.121***	0.118***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Lag4 disposable income growth rate	0.024***	0.035***	0.031***	0.024***	0.024***	0.024***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Lag4 HH Index	0.001***	0.001***	0.000**	0.001***	0.001***	0.001***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Lag4 economic growth		0.017*				
		(0.00)				
Number of new loans to new clients - total			0.005***			
			(0.00)			
Volume of credit to new clients - total				0.005***		
				(0.00)		
Debt service to income					0.002	
					(0.15)	
Loan to value						0.020
						(0.14)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared within	0.589	0.577	0.581	0.636	0.614	0.577
Number of observations	416	416	416	416	416	416

V. Excessive lending (2): main findings

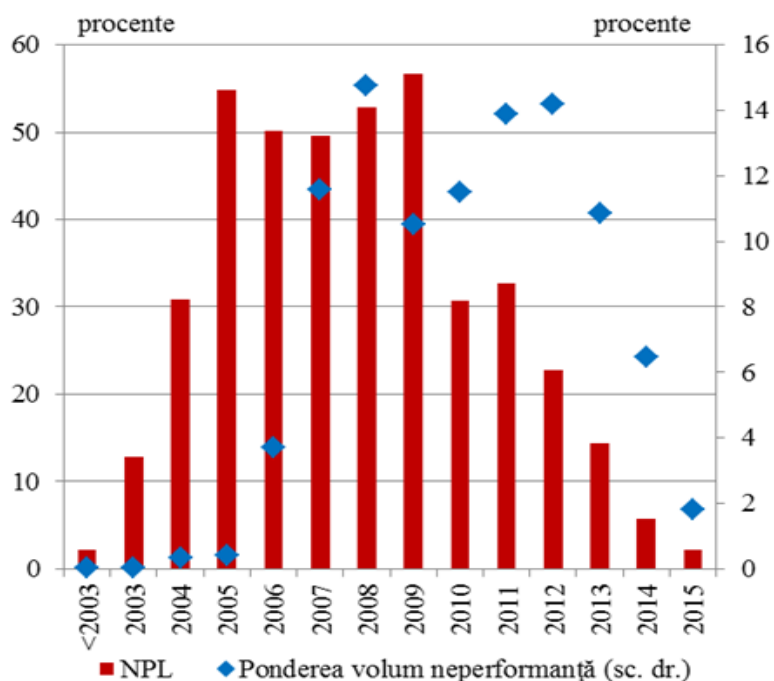
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V. Unsustainable lending: specification

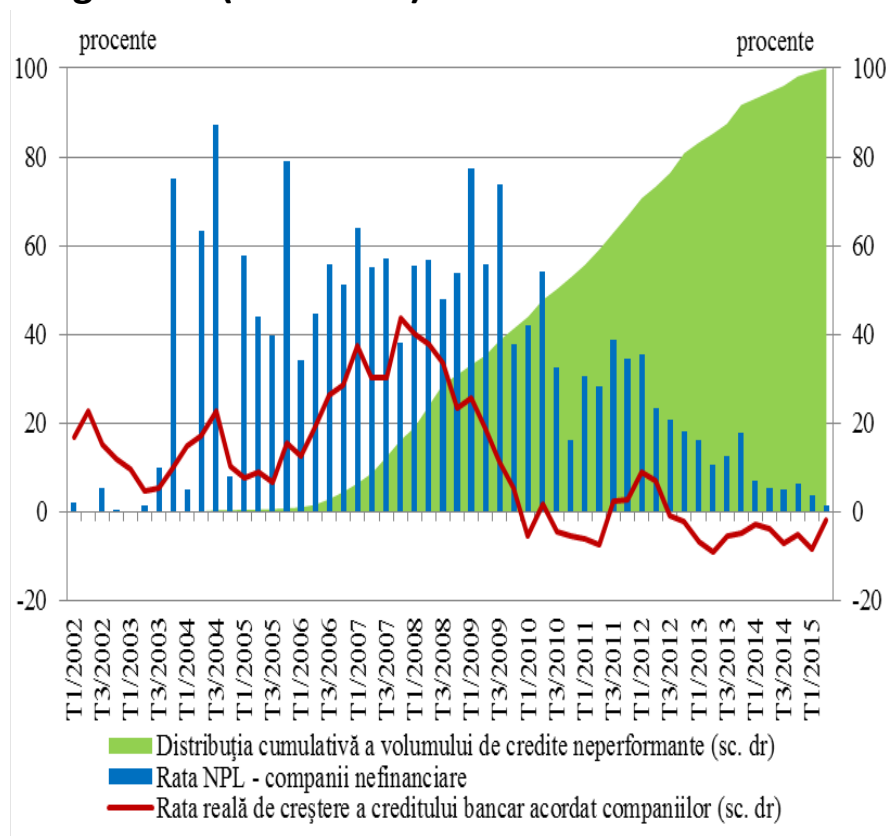
	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Unsustainable	Unsustainable	Unsustainable	Unsustainable	Unsustainable	Unsustainable
Lag regulation	-0.418*** (0.00)	-0.399*** (0.00)	-0.345*** (0.00)	-0.404*** (0.00)	-0.417*** (0.00)	-0.330*** (0.00)
Lag4 disposable income growth rate	0.018** (0.04)		0.016** (0.00)	0.018** (0.04)	0.018 (0.05)	0.020 (0.03)
Lag4 HH Index	0.001*** (0.22)	0.001*** (0.00)	0.001*** (0.49)	0.001*** (0.00)	0.001*** (0.00)	0.001 (0.00)
Lag4 economic growth		0.020** (0.03)				
Number of new loans to new clients - total			0.011*** (0.00)			
Volume of credit to new clients - total				-0.001 (0.56)		
Debt service to income					0.011*** (0.00)	
Loan to value						0.006*** (0.00)
Time fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Bank fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R-squared within	0.468	0.468	0.468	0.468	0.548	0.473
Number of observations	288	288	288	288	288	276

V. Unsustainable lending: overall assessment

Nonperforming rate, by year when was granted (June 2015)



Nonperforming rate - by year when was granted (June 2015)



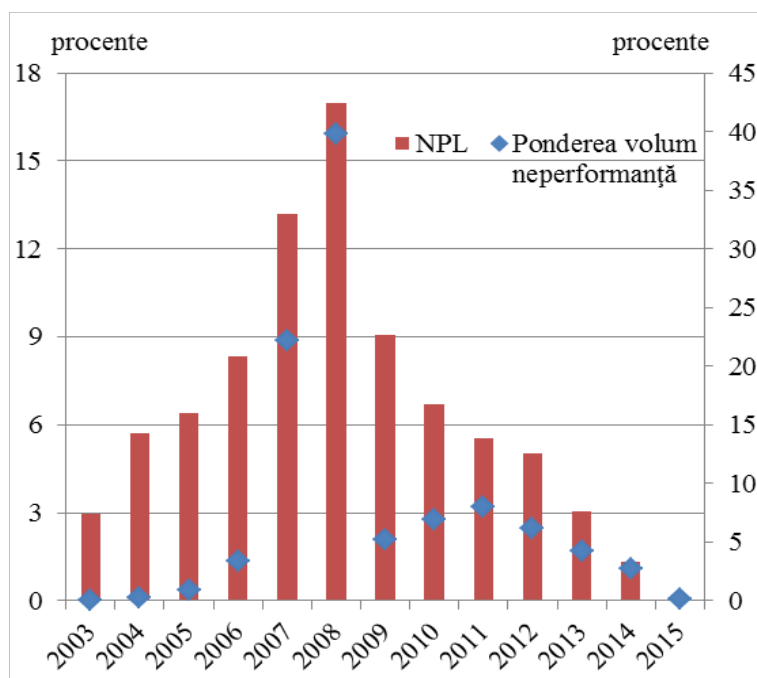
Non-performance rate is calculated at June 2015, the share of the stock of loans granted each year and that is also reflected in the portfolio now over 90 days late, relative to the total stock of loans granted after year.

Source: CRC, BC, NBR

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V. Unsustainable lending - households

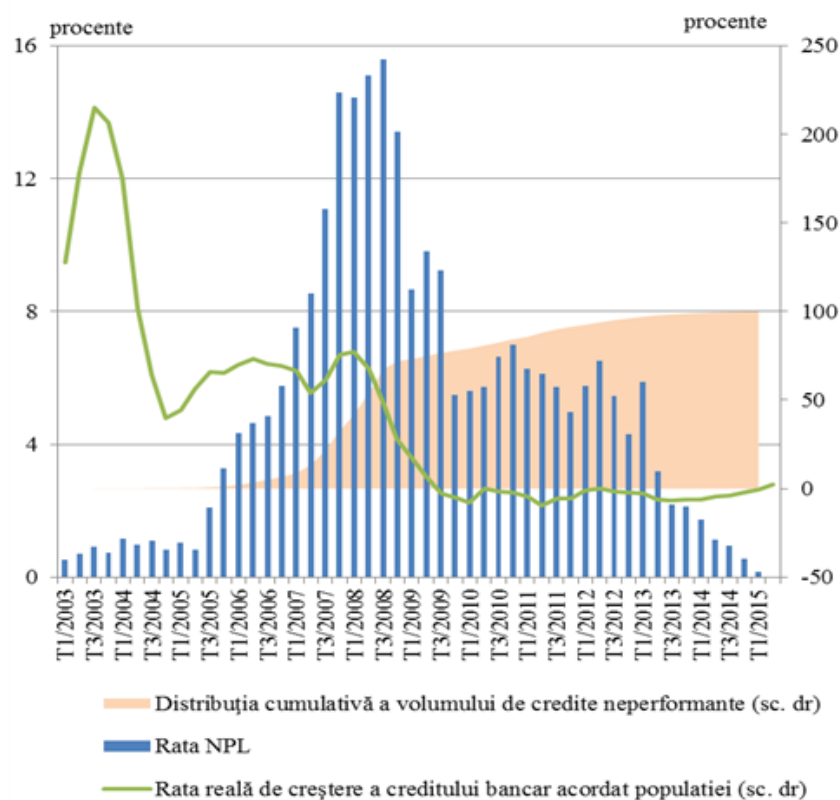
Nonperforming rate, by year when was granted (June 2015)



Non-performance rate is calculated at June 2015, the share of the stock of loans granted each year and that is also reflected in the portfolio now over 90 days late, relative to the total stock of loans granted after year.

Sursa: CRC, BC, calcule BNR

Nonperforming rate - for three years period (June 2015)



Non-performance rate is calculated at June 2015, the share of the stock of loans granted each year and that is also reflected in the portfolio now over 90 days late, relative to the total stock of loans granted after year.

Sursa: CRC, BC, calcule BNR

V. Unsustainable lending: main findings

Prudential regulation: higher contribution in the pre-crisis period and overall a stronger impact compared to excessive lending

Banks' credit standards and strategies: the highest impact is stemming from DSTI (household portfolio) and from LTI (aggregate portfolio)

Competition:

- banks seek higher market share (Competition_ca) in the case of the household sector lending decisions;
- banks are more concerned about information producing intensity (Competition_pc) in the case of the aggregate portfolio.

VI. Conclusions and policy implications (1)

- Excessive credit growth does not always tell the full story, additional measures like unsustainable lending should also be used;
- Banks exhibit a high degree of herding behaviour during periods of excessive lending;
- Macroprudential regulation measures like DSTI and LTV play an important role in smoothing the fluctuation of the credit cycle;

VI. Conclusions and policy implications (2)

- Policy makers should have a good flavour if a macroprudential instrument tailored to cope with credit growth issues should be complemented by additional measures targeting either debtors (like DSTI or LTV) or lenders (like provisions or capital charges).



Thank you!