



CROATIAN NATIONAL BANK

**WHICH FACTORS ARE WEIGHING ON CREDIT
RECOVERY?
EVIDENCE FROM THE CROATIAN BANK LENDING
SURVEY**

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Outline

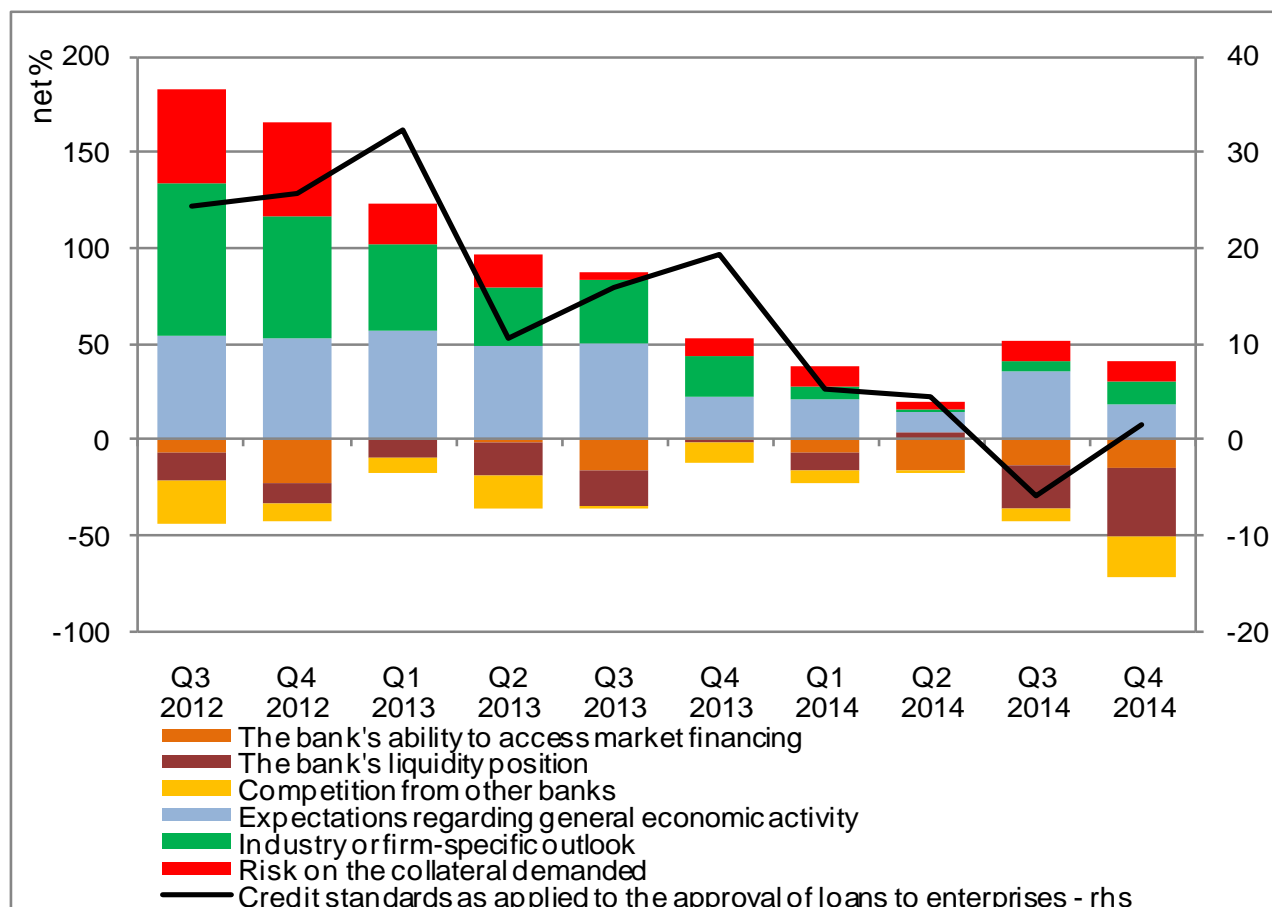
- Motivation and relation to literature
- Descriptive analysis of the results of Croatian BLS
- Microeconomic assessment and data
- Results
- Conclusion

Motivation and relation to literature

- ❑ What are the effects of bank lending standards and credit demand on weak lending activity in Croatia?
- ❑ Bank level analysis: combining qualitative information from the CNB's Bank Lending Survey, carried out since the third quarter of 2012, with micro-data on loan growth, interest rates and capital adequacy of participating banks
- ❑ Similar approach used in Del Giovane *et al* (2010) for Italy, Blaes (2011) for Germany, van der Veer and Hoeberichts (2013) for Netherlands and Kuchler (2012) for Denmark

DESCRIPTIVE RESULTS OF THE BANK LENDING SURVEY

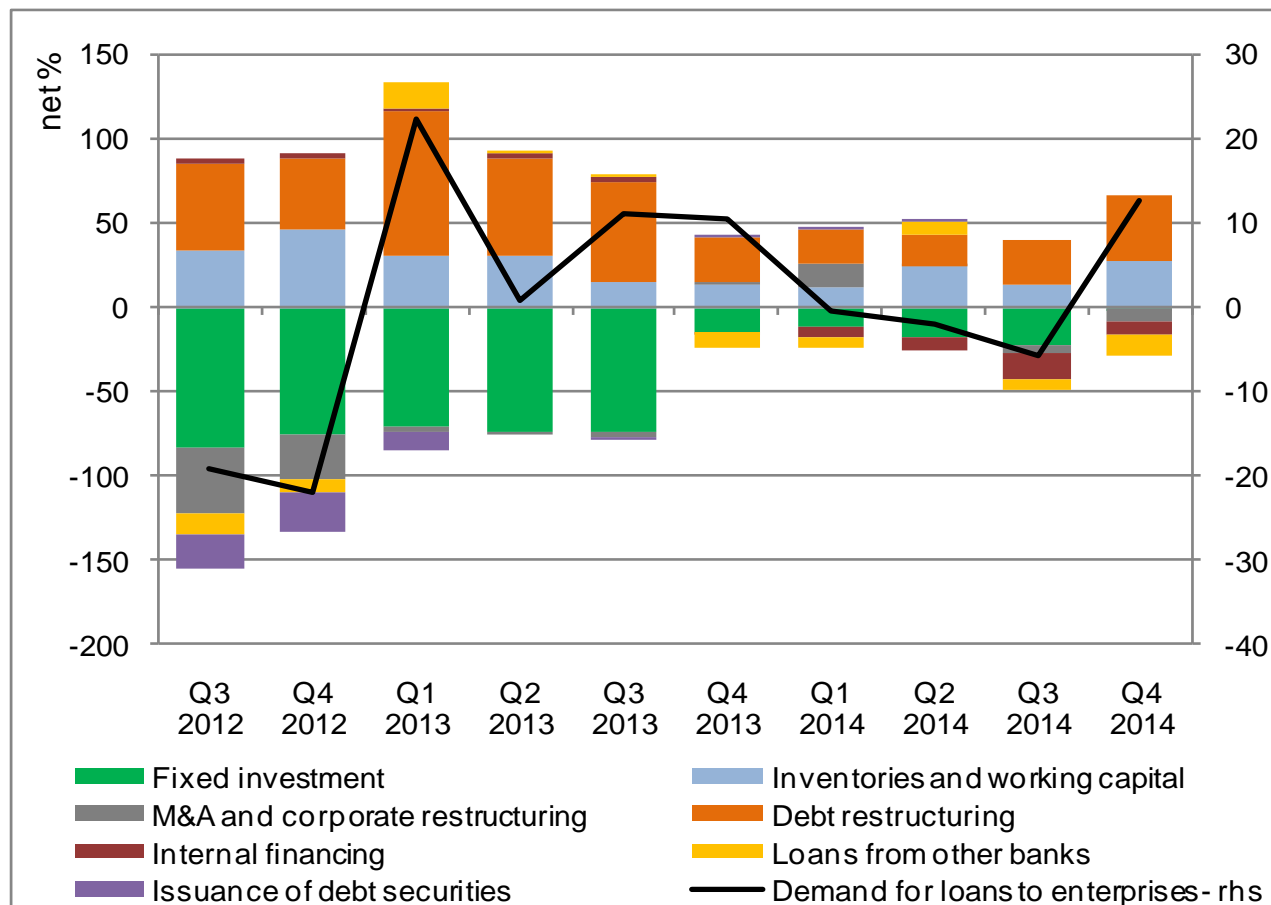
Tightening credit standards for enterprises



Note: The positive value shows that the factor contributes to standard tightening and the negative that it contributes to standard easing.

Source: CNB BLS

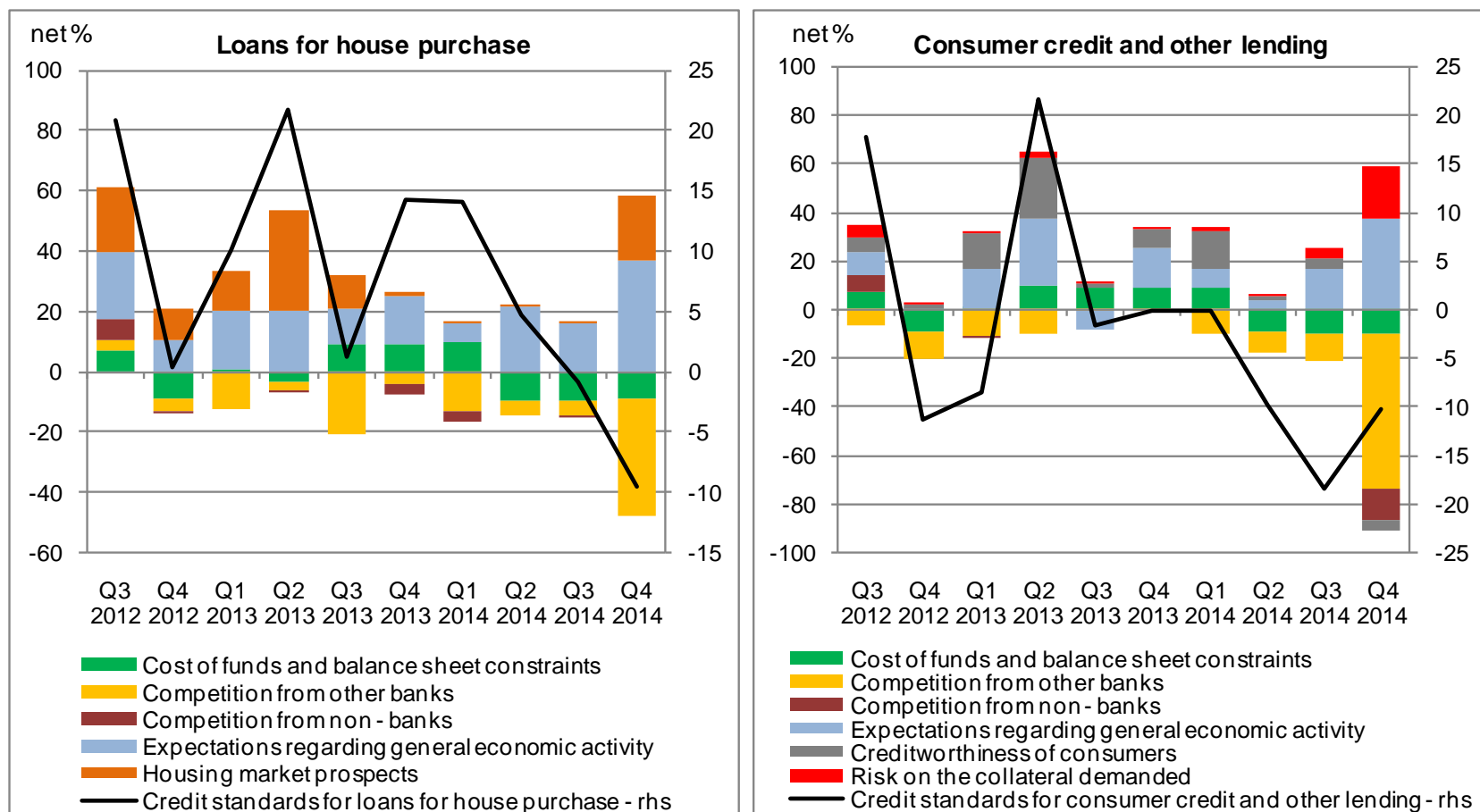
Credit demand of enterprises improving at the end of 2014



Note: The positive value shows that the factor contributes to higher demand and the negative that it contributes to lower demand.

Source: CNB BLS

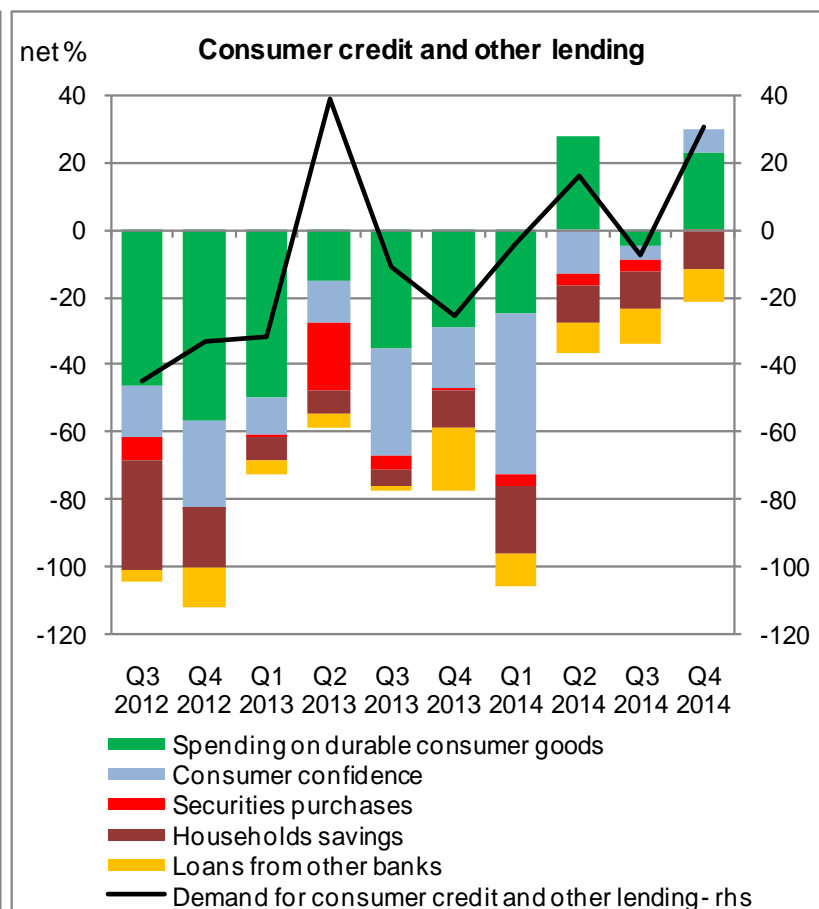
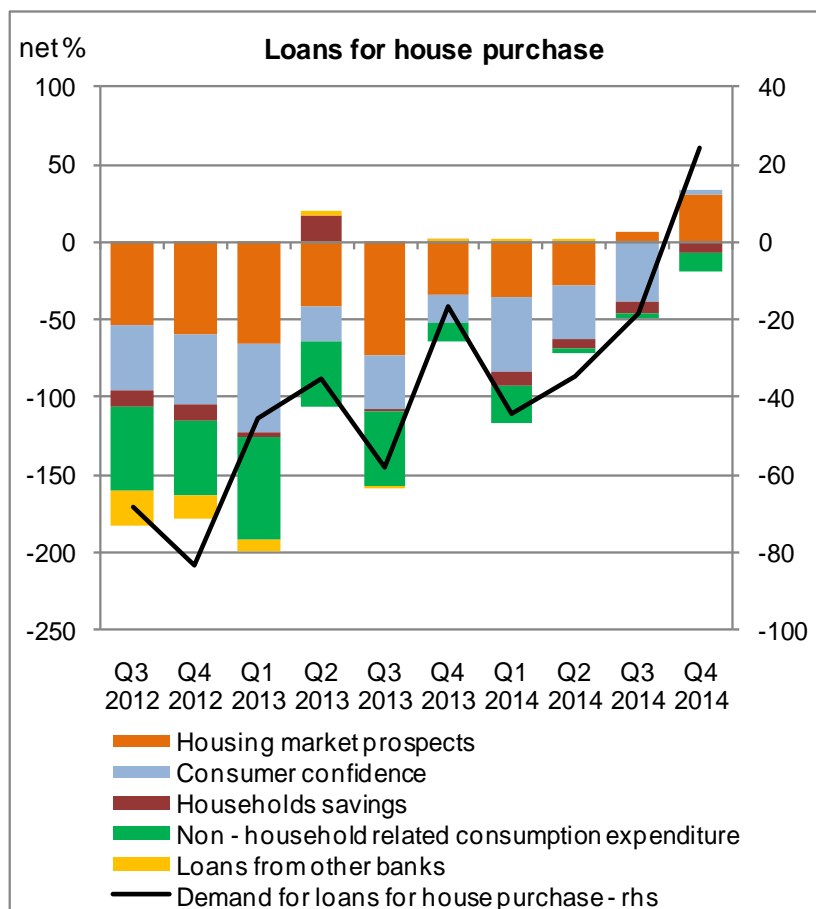
Credit standards for households easing in 2014



Note: The positive value shows that the factor contributes to standard tightening and the negative that it contributes to standard easing.

Source: CNB BLS

Positive trends in credit demand of households



Note: The positive value shows that the factor contributes to higher demand and the negative that it contributes to lower demand.

Source: CNB BLS

MICROECONOMETRIC ASSESSMENT OF THE EFFECTS OF CREDIT SUPPLY AND DEMAND ON CREDIT GROWTH

Equation and data

Regression on an unbalanced panel:

$$y_{i,t} = \alpha + \beta_1 y_{i,t-1} + \beta_2 BLS_S_{i,t-h} + \beta_3 BLS_D_{i,t-h} + \beta_4 X_{i,t} + F_i + F_t + \varepsilon_{i,t}$$

- y = quarterly rate of change of individual types of loans
- BLS_S = indicator of credit standards (dummy variable)
- BLS_D = indicator of demand for loans (dummy variable)
- X = vector of control variables
- h = quarter lag (0 to 4 quarters)
- F_i = bank fixed effect
- F_t = quarter fixed effect
- $\varepsilon_{i,t}$ = residual

Data used in the analysis

- Unbalanced panel
- 29 banks
- 10 quarters (2012 Q3 – 2014 Q4)
- Dependent variable: QoQ rate of change of individual types of loans at the bank level
 - loans to enterprises
 - loans for house purchase
 - consumer credit and other lending to households

Dependent variable correction

- The growth rates of loans are corrected to exclude:
 - The one-off effects: the assumption of shipyards' debts by the Ministry of Finance (applies only to loans to enterprises), transfer of claims to another company, bank mergers and acquisitions and change in the method of reporting on fees.
 - The exchange rate effect: the effects of the euro, the Swiss franc and the United States dollar exchange rate changes against the Croatian kuna are excluded. Loans in a specific currency are loans either disbursed in or indexed to such currency.

BLS standards and demand indicators

- ❑ Standards indicator: a dummy variable for the quarters in which credit standards tightened/eased or a specific factor contributed to tightening/easing
- ❑ Demand indicator: a dummy variable for the quarters in which credit demand increased/decreased or a specific factor contributed to increased/decreased demand
- ❑ The type of indicator for each group of loans depends on which type of answers by the banks were most frequent

Control variables

- All data at the bank level:
 - Nominal interest rate on new business
 - Capital adequacy ratio
 - Cost of funds (stocks)

RESULTS FOR LENDING TO ENTERPRISES

TABLE 2: Results for lending to enterprises A

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Loan growth (t-1)	-0.0457 (0.0864)	-0.0838 (0.0761)	-0.1115 (0.0899)	-0.1299 (0.0880)	-0.2829*** (0.1072)	-0.2876*** (0.1100)	-0.2669*** (0.0802)	-0.2777*** (0.0836)	-0.2955*** (0.0935)	-0.3308*** (0.1008)
Credit standards										
Tightened	0.074 (1.311)	0.903 (1.400)								
Tightened (t-1)			1.524 (1.413)	2.085 (1.373)						
Tightened (t-2)					0.332 (1.331)	0.413 (1.393)				
Tightened (t-3)							-1.088 (1.352)	-1.113 (1.327)		
Tightened (t-4)									-2.684 (1.738)	-3.176* (1.689)
Credit demand										
Increased	4.535*** (1.629)	4.055** (1.787)	3.670*** (1.350)	3.259** (1.393)	4.684*** (1.419)	4.605*** (1.421)	4.440*** (1.617)	4.405** (1.787)	5.565*** (1.842)	6.110*** (1.970)
Control variables										
Interest rate new loans		-2.089* (1.188)		-1.42 (1.097)		-0.289 (1.044)		-0.143 (0.987)		-0.003 (1.034)
Capital adequacy		-0.596 (0.626)		-0.110 (0.254)		-0.338 (0.266)		-0.459 (0.334)		-0.768** (0.368)
Cost of funds		0.549 (2.125)		-1.071 (2.120)		0.444 (2.279)		1.289 (2.757)		0.446 (3.427)
Constant term	0.066 (0.864)	25.306 (16.831)	-0.119 (0.725)	15.750* (8.733)	0.277 (0.764)	7.540 (9.363)	0.334 (0.799)	6.499 (11.837)	0.094 (0.821)	13.324 (14.048)
Observations	261	259	227	225	200	198	171	169	145	143
R-squared	0.37	0.41	0.48	0.50	0.59	0.60	0.48	0.50	0.57	0.60
Adjusted R-squared	0.26	0.29	0.38	0.38	0.50	0.49	0.35	0.35	0.43	0.46
Number of banks	29	29	29	29	29	29	27	27	27	27

Note: Dependant variable: Quarter-on-quarter growth of loans to enterprises, excluding one-off effects and the exchange rate effect.

Unbalanced panel regression with bank and quarter fixed effects. Heteroscedasticity robust standard errors in parentheses.

***p<0.01; **p<0.05; *p<0.1

Source: CNB

TABLE 3: Results for lending to enterprises B

	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Loan growth (t-1)	-0.2932*** (0.0979)	-0.3092*** (0.1057)	-0.3060** (0.1184)	-0.3524*** (0.1307)	-0.1043 (0.0867)	-0.2735** (0.1227)	-0.3233*** (0.1071)
<u>Credit standards</u>							
Tightened (t-1)	3.217** (1.444)	3.695** (1.494)			2.513* (1.394)	2.401* (1.391)	3.146** (1.431)
Tightened (t-4)			-3.043 (1.964)	-3.494* (2.022)			
<u>Credit demand</u>							
Increased (t-1)					0.597 (1.536)		
Increased (t-2)			-1.974 (1.639)	-2.044 (1.470)		-0.705 (1.430)	
Increased (t-3)	-2.595* (1.393)	-2.308* (1.343)					
Increased (t-4)							-2.361 (1.875)
<u>Control variables</u>							
Interest rate new loans		-0.993 (0.967)		-0.503 (1.060)	-1.749* (1.039)	-1.069 (0.871)	-1.558** (0.753)
Capital adequacy		-0.338 (0.320)		-0.643* (0.385)	-0.153 (0.294)	-0.280 (0.292)	-0.567* (0.313)
Cost of funds		3.558 (2.990)		3.840 (3.860)	-0.456 (2.508)	0.753 (2.598)	3.404 (3.608)
Constant term	1.833** (0.755)	5.611 12.733	3.061*** (1.139)	8.588 (14.655)	18.111* (9.699)	12.952 (9.996)	14.249 (12.783)
Observations	179	176	150	147	235	202	150
R-squared	0.48	0.50	0.53	0.56	0.44	0.58	0.55
Adjusted R-squared	0.35	0.36	0.38	0.41	0.31	0.48	0.40
Number of banks	28	28	28	28	29	29	27

Note: Dependant variable: Quarter-on-quarter growth of loans to enterprises, excluding one-off effects and the exchange rate effect. Unbalanced panel regression with bank and quarter fixed effects. Heteroscedasticity robust standard errors in parentheses.

***p<0.01; **p<0.05; *p<0.1

Source: CNB

TABLE 4: Results for lending to enterprises C

	(18)	(19)	(20)	(21)	(22)	(23)
Loan growth (t-1)	-0.0287 (0.0857)	-0.0556 (0.0823)	-0.2582** (0.1101)	-0.2661** (0.1122)	-0.2823*** (0.0837)	-0.3033*** (0.0860)
Credit standards factor: Expectations regarding general economic activity						
Tightened	0.598 (1.198)	0.861 (1.349)				
Tightened (t-2)			-1.451 (1.070)	-1.538 (1.124)		
Tightened (t-3)					-2.772*** (1.027)	-3.299*** (1.098)
Credit demand factor: Debt restructuring						
Increased	2.183 (1.370)	2.148 (1.415)	2.055* (1.129)	2.184* (1.150)	2.553** (1.251)	2.675** (1.314)
Control variables						
Interest rate new loans		-2.198** (1.105)		-0.622 (0.933)		-0.760 (1.042)
Capital adequacy		-0.462 (0.616)		-0.288 (0.286)		-0.466 (0.329)
Cost of funds		0.069 (2.167)		1.490 (2.240)		2.217 (2.486)
Constant term	0.302 (0.952)	25.360 (17.201)	1.612** (0.803)	7.492 (9.694)	1.628** (0.796)	10.217 (11.352)
Observations	263	261	201	199	173	171
R-squared	0.36	0.39	0.58	0.59	0.49	0.51
Adjusted R-squared	0.25	0.27	0.49	0.48	0.36	0.37
Number of banks	29	29	29	29	27	27

Note: Dependant variable: Quarter-on-quarter growth of loans to enterprises, excluding one-off effects and the exchange rate effect. Unbalanced panel regression with bank and quarter fixed effects. Heteroscedasticity robust standard errors in parentheses. ***p<0.01; **p<0.05; *p<0.1

Source: CNB

TABLE 5: Results for lending to enterprises D

	(24)	(25)	(26)	(27)	(28)	(29)
Loan growth (t-1)	-0.2985*** (0.0971)	-0.3262*** (0.1050)	-0.3053*** (0.0995)	-0.3300*** (0.1069)	-0.2873*** (0.0955)	-0.3137*** (0.1027)
Credit standards factor: Expectations regarding general economic activity						
Tightened (t-3)	-2.650** (1.161)	-3.168** (1.232)	-2.720** (1.200)	-3.104** (1.272)	-2.433** (1.138)	-2.946** (1.207)
Credit demand factor: Debt restructuring						
Increased (t-1)	1.688 (1.093)	1.490 (1.082)				
Increased (t-2)			0.354 (1.098)	0.411 (1.118)		
Increased (t-3)					-0.567 (1.154)	-0.395 (1.290)
Control variables						
Interest rate new loans		-0.966 (1.066)		-0.919 (1.007)		-1.073 (1.051)
Capital adequacy		-0.454 (0.352)		-0.457 (0.352)		-0.503 (0.352)
Cost of funds		4.889* (2.873)		4.173 (2.986)		4.124 (2.927)
Constant term	2.192*** (0.838)	4.775 (11.932)	2.775*** (0.919)	6.787 (11.876)	2.950*** (0.988)	9.108 (11.993)
Observations	177	174	178	175	184	181
R-squared	0.46	0.49	0.46	0.49	0.46	0.49
Adjusted R-squared	0.32	0.34	0.32	0.34	0.32	0.34
Number of banks	28	28	28	28	29	29

Note: Dependant variable: Quarter-on-quarter growth of loans to enterprises, excluding one-off effects and the exchange rate effect. Unbalanced panel regression with bank and quarter fixed effects. Heteroscedasticity robust standard errors in parentheses.

***p<0.01; **p<0.05; *p<0.1

Source: CNB

Summary of results for loans to enterprises

- ❑ A rise in the demand for loans to enterprises causes a rise in the quarterly credit growth from 3.3 to 6.1 percentage points in the same quarter
- ❑ Banks reporting expectations regarding general economic activity as a factor of tightening standards experienced, with a lag of three quarters, a loan growth which was 2.4 to 3.3 percentage points lower compared to other banks
- ❑ Banks reporting debt restructuring as a factor contributing to increased demand experienced a 2.1 to 2.7 percentage points greater loan growth in the same quarter compared to other banks

Results for loans for house purchase

- Reasons for no statistically significant results:
 - Banks report changes in credit standards and demand for loans for house purchase much less frequently than for the other two groups of loans
 - Longer average maturity of loans for house purchase
 - Deleveraging of households and weak activity in the real estate market

RESULTS FOR CONSUMER CREDIT AND OTHER LENDING TO HOUSEHOLDS

TABLE 6: Results for consumer credit and other lending A

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Loan growth (t-1)	0.1368 (0.0863)	0.0859 (0.0877)	0.1104 (0.0912)	0.0944 (0.0902)	0.0880 (0.0878)	0.0747 (0.0901)	-0.2950*** (0.1111)	-0.2743** (0.1102)
<u>Credit standards</u>								
Eased	0.894 (1.001)	0.679 (0.949)			1.024 (1.036)	0.937 (1.052)	1.993* (1.126)	1.722* (1.013)
Eased (t-1)			-0.133 (1.357)	-0.319 (1.363)				
<u>Credit demand</u>								
Increased	1.024 (0.768)	0.875 (0.776)	1.426* (0.818)	1.450* (0.800)				
Increased (t-1)					2.425*** (0.716)	1.979** (0.763)		
Increased (t-4)							0.105 (0.894)	0.238 (0.904)
<u>Control variables</u>								
Interest rate new loans		-0.832 (0.588)		-1.148 (0.755)		-1.333 (0.979)		-3.383*** (1.070)
Capital adequacy		-0.316*** (0.119)		-0.172 (0.122)		-0.199 (0.126)		0.152 (0.171)
Cost of funds		1.575 (1.233)		1.067 (1.429)		0.238 (1.616)		-2.094 (2.429)
Constant term	-0.020 (0.295)	9.884 (7.743)	0.180 (0.294)	12.101 (9.399)	-0.186 (0.340)	16.656 (12.427)	0.489 (0.329)	37.582*** (13.725)
Observations	257	255	225	223	225	223	142	140
R-squared	0.39	0.43	0.41	0.44	0.41	0.43	0.61	0.67
Adjusted R-squared	0.28	0.32	0.29	0.31	0.28	0.30	0.48	0.54
Number of banks	29	29	29	29	29	29	27	27

Note: Dependant variable: Quarter-on-quarter growth of consumer credit and other lending, excluding one-off effects and the exchange rate effect. Unbalanced panel regression with bank and quarter fixed effects. Heteroscedasticity robust standard errors in parentheses. ***p<0.01; **p<0.05; *p<0.1

Source: CNB

TABLE 7: Results for consumer credit and other lending B

	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Loan growth (t-1)	0.1004 (0.1085)	0.0821 (0.1103)	-0.0031 (0.1293)	0.0273 (0.1276)	-0.1011 (0.1524)	-0.0839 (0.1450)	-0.2727* (0.1630)	-0.2103 (0.1461)
Credit standards								
Eased (t-1)	-0.860 (1.425)	-1.017 (1.496)						
Eased (t-2)			-0.440 (1.173)	-1.235 (1.386)				
Eased (t-3)					-0.492 (1.201)	-0.622 (1.470)		
Eased (t-4)							3.984 (3.883)	3.852 (3.482)
Credit demand								
Increased (t-1)	2.277*** (0.737)	1.520* (0.851)	2.649*** (0.801)	1.853** (0.932)	2.465*** (0.849)	1.237 (0.928)	1.576* (0.924)	1.030 (0.978)
Control variables								
Interest rate new loans		-2.098* (1.269)		-3.538** (1.723)		-4.933*** (1.734)		-5.767*** (2.151)
Capital adequacy		-0.330* (0.187)		-0.106 (0.185)		0.054 (0.199)		0.225 (0.228)
Cost of funds		2.555 (2.425)		2.601 (2.956)		0.864 (2.756)		-0.647 (2.713)
Constant term	0.312 (0.382)	20.735 (13.471)	0.247 (0.447)	31.122* (17.892)	0.227 (0.519)	47.163*** (14.833)	0.183 (0.475)	56.0789*** (20.614)
Observations	235	232	203	200	176	173	149	146
R-squared	0.32	0.37	0.35	0.42	0.38	0.46	0.47	0.55
Adjusted R-squared	0.19	0.23	0.20	0.26	0.22	0.30	0.31	0.40
Number of banks	29	29	29	29	28	28	27	27

Note: Dependant variable: Quarter-on-quarter growth of consumer credit and other lending, excluding one-off effects and the exchange rate effect. Unbalanced panel regression with bank and quarter fixed effects. Heteroscedasticity robust standard errors in parentheses. ***p<0.01; **p<0.05; *p<0.1

Source: CNB

Summary of results for consumer credit and other lending to households

- The easing of standards causes a rise in the growth of consumer credit and other lending of 1.7 to 2.0 percentage points in the same quarter, but the statistical significance is weak
- The rise in demand causes a rise in the quarterly credit growth of 1.4 to 2.6 percentage points, the highest significance being achieved with a one quarter lag

Comparison with other countries for loans to enterprises

	Croatia	Denmark	Italy	Germany	Netherlands
Credit standards					
Tightened		-3.261**			
Tightened (t-1)			-1.72***		-1.02
Tightened (t-3)				-1.213**	
Tightened (t-4)	-3.043				
Credit Demand					
Increased	4.684***	-0.973	1.39***		
Increased (t-1)				1.351**	1.10*

Note: Dependant variable is quarter-on-quarter growth of loans to enterprises, except for Germany for which the dependant variable is the change in ln(loan). Data for Netherlands and Italy refer to "somewhat tightened standards" and "somewhat increased demand" since these types of answers were most common in CNB's Survey. Data for Croatia are those with the lowest p-values. No control variables are included.

***p<0.01; **p<0.05; *p<0.1

Source: Data shown can be found in the following tables in the respective papers: Pintaric (2015) for Croatia: Tables 2 and 3 (pages 14 and 15); Kuchler (2012) for Denmark: Table 4 (page 25); Del Giovane et al (2010) for Italy: Table 2 (page 18); Blaes (2011) for Germany: Table 6 (page 29); van der Veer and Hoeberichts for Netherlands (2013): Table 1 (page 21).

Conclusion

- ❑ Analysis proved that there are statistically significant and, in economic terms, expected effects of standards and demand on the growth of certain groups of loans
- ❑ Generally, credit growth reacts faster to changes in credit demand, whereas changes in credit supply affect credit growth with a somewhat greater lag
- ❑ Despite the high primary liquidity in the monetary system, there can be no recovery of credit activity without improvements in demand and economic outlook

Thank you