Delayed Credit Recovery in Croatia: Supply or Demand Driven?

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Abstract

In order to enhance the understanding of credit cycle dynamics in Croatia we explore the evolution of credit demand and credit supply of corporates and households in Croatia and identify their determinants based on the switching regression framework. These results are crosschecked by the insights from the bank lending survey. The conducted analysis shows there are both supply and demand-side factors that limit the possibility of intensifying household and corporate credit activity. However, a more pronounced drag seems to be coming from subdued demand, which is greatly influenced by the unfavourable domestic macroeconomic environment and particularly GDP developments. This suggests that it is not unusual that credit recovery is still missing, but also confirms that the scope for monetary policy to stimulate lending is limited.

Keywords:
credit supply, credit demand, households, corporates, Croatia, switching regression framework

JEL:
E44, G21, G28

Contents

1 Introduction

After the prolonged recession, at the beginning of 2015 credit recovery was still not on the horizon in Croatia, and countercyclical monetary policy efforts to boost lending were constrained by various factors. In the post-crisis period, credit activity in Croatia slowed down considerably from the pre-crisis levels. Household loans had recorded negative annual rates of change since mid-2009, while corporate loans started to decrease at the end of 2012. Although the literature does not provide an unequivocal proof of the nature of the relationship between credit activity and economic growth or pace of recovery, the identification of the determinants of credit supply and demand is important for understanding the capacity and scope of monetary policy to influence loan dynamics. The fact that credit activity slowed down despite the expansive monetary policy and high banking system liquidity raises the question as to whether the reasons for such developments lie on the supply side. For instance, banks might be less inclined to offer loans and might tighten lending standards if they conclude that increased risk of default cannot be sufficiently compensated by increased interest rates (Ghosh, 2009). The problem could also be on the demand side as a result of negative current real developments, structural problems in the balance sheets of the private sector and pessimistic expectations regarding future economic developments. This equivalence problem has become known as the supply-versus-demand puzzle (Bernanke, 1993).

The main goal of this paper is to identify the determinants and analyse the evolution of credit demand and supply of households and corporates in Croatia from the third quarter of 2001 until the first quarter of 2015, by using the switching regression framework. This paper broadens the research conducted by Čeh et al. (2011) on the disequilibrium in the market of total domestic and foreign loans by an analysis of individual corporate and household sectors. The paper also covers a longer data sample and accounts for monetary policy actions. The model results are accompanied by narrative findings on credit supply and demand obtained from the bank lending survey (BLS). The results show there are factors that limit the possibility of intensifying credit activity for households and corporates on both the supply and the demand side, with a more pronounced drag coming from subdued demand.

This paper is divided into five parts. After the introduction, a brief overview of credit activity and its main determinants in Croatia from 2001 to the beginning of 2015 is given. Part three presents the approach applied in the model for the analysis of the determinants of credit supply – the credit market disequilibrium model. The fourth chapter presents the results of the model estimations and describes the evolution of surplus or deficit credit supply through time; for the recent period, these results have been supplemented by the findings from the BLS. The paper ends with concluding considerations in the context of the capacity of monetary policy to influence the revival of credit activity in the current phase of the economic cycle.

2 Credit developments in Croatia

The first part of the period from 2001 to 2015 in Croatia was marked by rapid credit growth, followed by a significant deceleration and stagnation in the post crisis period (Figure 1). A similar pattern has been observed in other Central and Eastern European countries (CEEC) accompanying their convergence towards the old EU Member States before the crisis, and the process of "sobering up" after the onset of the global financial crisis. During this time span, various determinants of credit supply and demand interacted and changed courses of action.

Credit growth in Croatia in the pre-crisis period was supported by strong foreign capital inflows that financed growing domestic consumption. Significant parts of these inflows came from cheap sources of financing, the parent banks of the largest domestic banks. In such circumstances, credit potential was growing and lending conditions were relaxed (Figure 2, left panel), which was enhanced by the strong competition among foreign banks. At the same time, a gradual reduction in interest rates on household loans from the relatively high levels in the early 2000s took place. Additional fuel to credit growth came from the low initial level of household indebtedness. The macroeconomic environment was characterised by positive

Figure 1 Credit and economic activity in Croatia: from boom to a halt
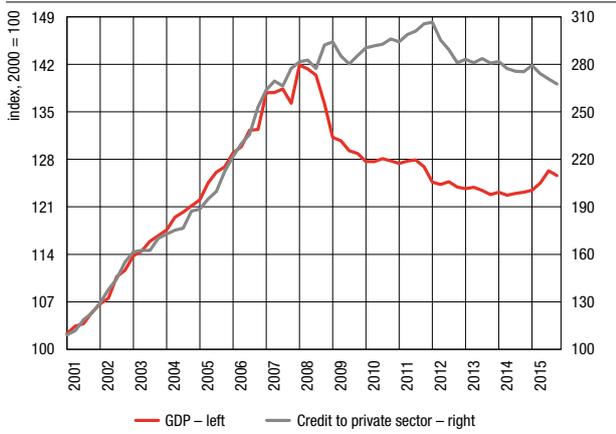
Sources: CBS and CNB.

developments in the labour market, increasing consumer confidence and general expectations of growth in future income, partially stimulated by the real estate boom (Figure 3). Therefore, in that period demand for and supply of credit were both strong and on an upward path.

However, after the slump in Croatia during the prolonged recession from 2009 onwards, the credit dynamics changed considerably. The banks' asset quality started deteriorating, affecting their profitability (Figure 2, right panel), while the private sector, burdened by high indebtedness and balance sheet weaknesses, became less desirable as a debtor. Consequently, banks' risk aversion increased significantly. Simultaneously, the decline in economic, especially in investment activity, dampened corporate credit demand. Unfavourable trends in the labour market resulted in a continuous and gradual deleveraging of households. From 2008 till 2015 households cumulatively reduced their level of indebtedness, while corporates started the same process a bit later (Figure 4, left panel).

Overall, the changing interplay in many of the credit demand and supply determinants from the early 2000s to 2015,

Figure 2 Lending rates, country risk and banks' performance
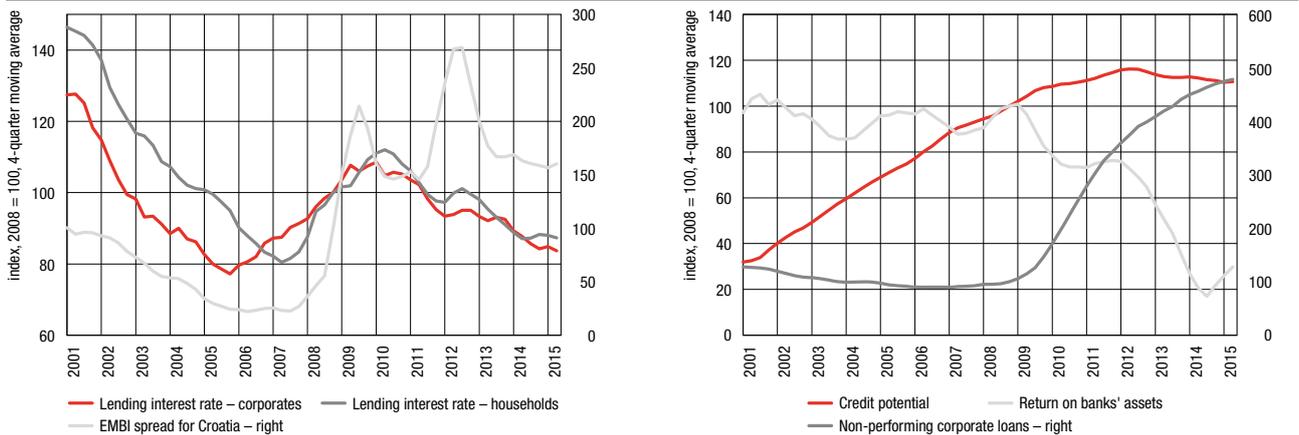
Note: Detail description of variables is shown in Appendix.
Sources: CNB and J. P. Morgan.

Figure 3 Confidence, wages and real estate boom bust
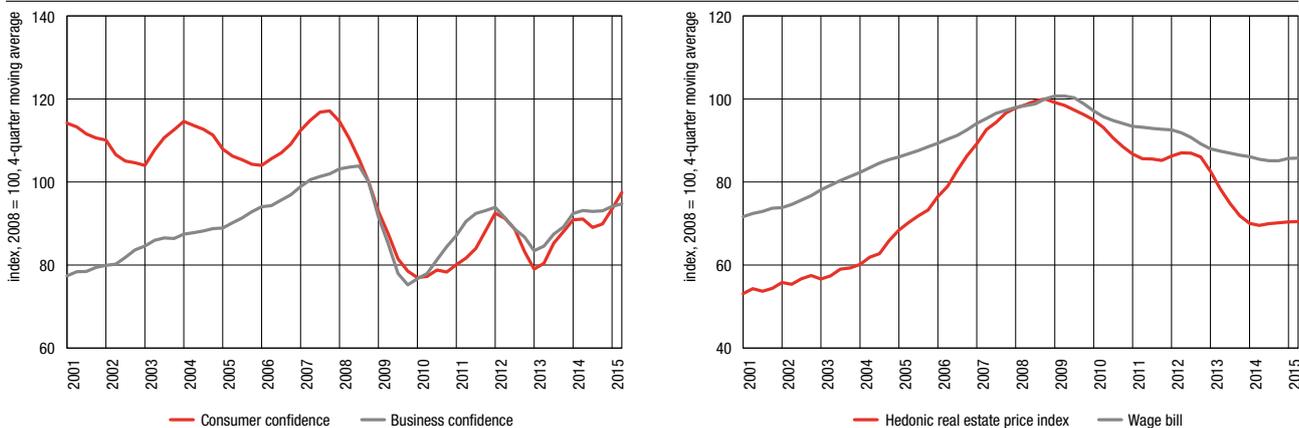
Note: Detail description of variables is shown in Appendix.
Sources: CNB and CBS.

and the evident structural break in credit and GDP developments in 2009, present a strong motivation for assessing the evolution of credit demand and supply. The following paragraphs provide a detailed analysis of credit dynamics for corporates and households and discuss the relevant impact of monetary policy in that context.

Credit developments by sectors show that the growth in corporate loans was most prominent from 2001 to 2002, and in the period from 2006 to 2007 (Figure 4, right panel). The average annual growth rate of corporate placements from 2001 until the end of 2008 was almost 20%, but after the escalation of the crisis it recorded a multiple decrease and stood at about 2%. Interestingly, the annual growth rates of loans to the corporate sector were positive until the end of 2012, despite the absence of any economic recovery.

During the entire observed period, corporates significantly also relied on foreign financing, usually from the parent banks

of domestic banks. This was particularly the case during the period in which the CNB's measures for limiting domestic credit growth were in force (Figure 5, left panel). Although the number of corporates with exclusively domestic debt considerably exceeds the number of externally indebted corporates (over 30 thousand compared to about one thousand[1]), the balance of external debt is higher than all domestic corporate loans, which confirms the importance of foreign financing.

Nevertheless, despite the above-average growth of corporate loans in 2010 and 2011, as compared to the majority of CEE countries, the deleveraging of this sector intensified in 2014 and at the beginning of 2015 when the highest annual drop in corporate loans of 4% was recorded.

For the household sector, divergence of credit dynamics before and after the escalation of the crisis was even more pronounced (Figure 6, right panel). From 2001 until the end of 2008 household placements grew on average over 25%,

Figure 4 Credit to corporates and households in levels and credit flows to corporate sector
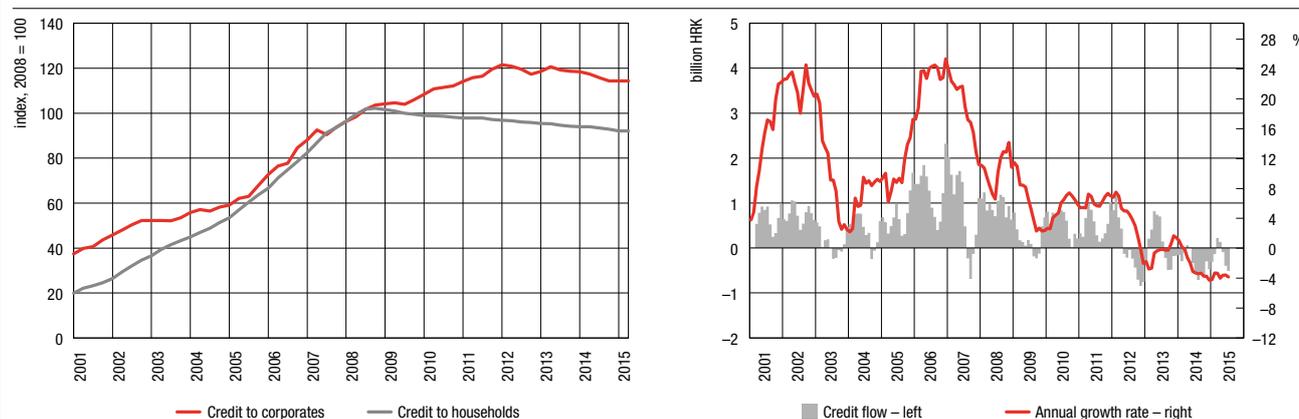
Note: Data are adjusted for exchange rate movements and one-off effects, including loan sales, bank bankruptcies, methodological changes and the government assumption of the shipyards' debt. Data for monthly credit flows are 3-month moving averages.
Source: CNB.

Figure 5 CNB measures to limit excessive credit growth and corporate reliance on foreign borrowing (left panel), monetary policy indicator and credit dynamics (right panel)
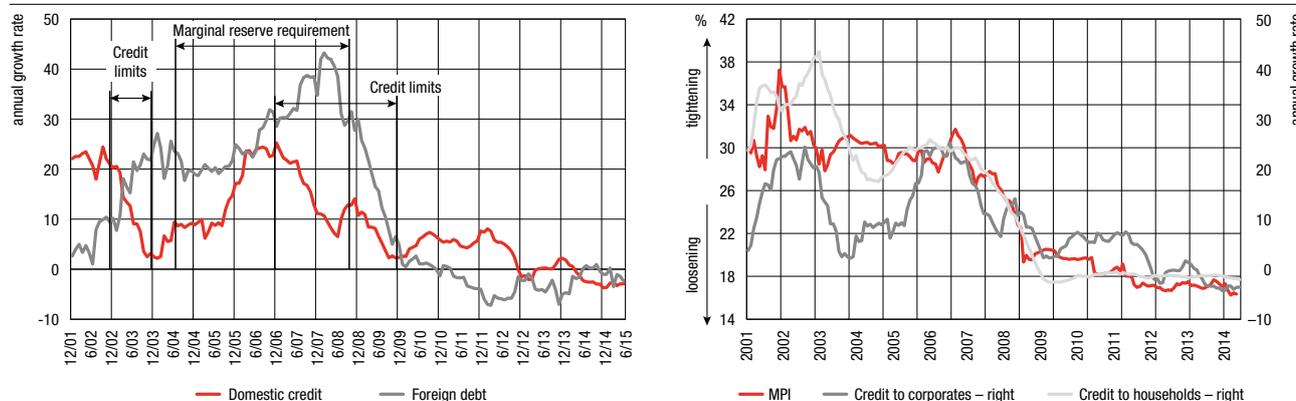
Note: Data are adjusted for exchange rate movements and one-off effects, including loan sales, bank bankruptcies, methodological changes and the government assumption of the shipyards' debt. Monetary policy indicator (MPI) = Credit institutions' assets required by regulation/Total credit institutions' assets. Assets required by regulation (net of excess liquidity) include calculated reserve requirement in kuna, allocated reserve requirement in f/c, marginal reserve requirement, CNB bills and minimal f/c liquidity.
Source: CNB.

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1   CNB's Bulletin No. 205, Box 3 An overview and structure of the debt of non-financial corporations in 2013.

Figure 6 Households debt burden and credit dynamics

Note: Data are adjusted for exchange rate movements and one-off effects, including loan sales, bank bankruptcies and methodological changes. Data for monthly credit flows are 3-month moving averages.
Sources: CNB and HANFA.
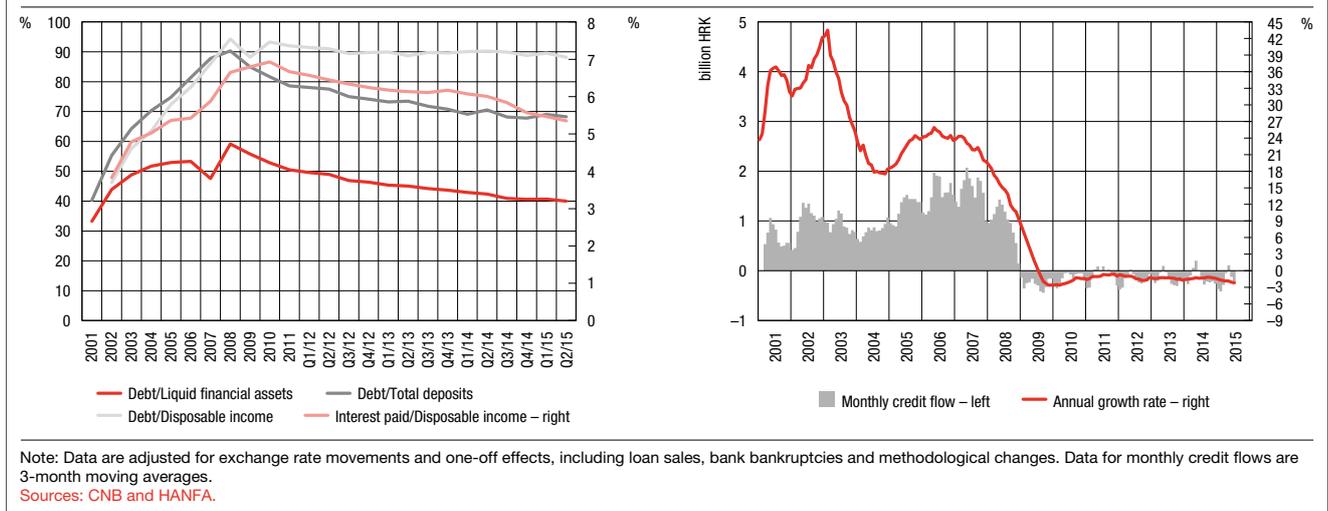
encouraged by growth in the disposable income of households and a considerable easing of price and non-price related lending conditions. Simultaneously, relatively faster growth in total debt from income considerably worsened the indicators of their indebtedness and increased the risks related to a possible surge in the debt repayment burden (Figure 6, left panel).

The decline in real income during the recession spurred the adjustment of household balance sheets. In 2009 credit growth was halted, and since mid-2009 households have been continuously deleveraging at a very stable rate of around 1.5% per year. In the environment of delayed recovery, unfavourable developments in the labour market and negative expectations regarding future developments it is uncertain when this trend might be stopped or reversed.

As mentioned above, during the observed period the CNB conducted an active countercyclical monetary and macroprudential policy. Before the crisis, the set of unconventional monetary (macroprudential measures) focused on decreasing the profitability of foreign sources of financing and discouraging expansive credit supply due to rapidly growing external imbalances and overheating of the domestic economy, thus reducing the loan supply. Despite the fact that these measures limited the excessive credit growth prior to the crisis and influenced loan dynamics, especially for households (Ljubaj 2012), a significant portion of surplus corporate credit demand prior to

the crisis was met by direct borrowing abroad in order to avoid the imposed restrictions (Figure 5, left panel). With the beginning of the crisis, the nature of monetary policy changed in an anti-cyclical manner as the CNB relaxed previously introduced measures and significantly increased banking system liquidity with the aim to improve domestic financing conditions. The central bank also encouraged various credit programs. However, despite the monetary policy efforts, credit activity remained subdued and constrained.

As the CNB's monetary framework is based on exchange rate stability and operates in the absence of a reference policy rate, it is difficult properly to assess the monetary policy stance. Following Ljubaj (2012), as a proxy for central bank policy actions we use the monetary policy indicator that measures the level of funds immobilized by the regulatory requirements and the intensity of use of monetary and macroprudential measures. More precisely, this indicator is measured as a share of allocated reserve requirement in kuna and in foreign currency (net of excess liquidity), marginal reserve requirement and CNB bills and minimal f/c liquidity in total assets of banks. Correlation of the MPI with domestic credit clearly shows how policy and credit dynamics switched courses, which confirms the need to include this variable in modelling credit supply and demand (Figure 5, right panel).

3 Disequilibrium model in the market of corporate and household loans

The main aim of the credit market disequilibrium model is to determine the periods of a surplus or a deficit of credit supply or demand, and to identify the factors that determine credit supply or demand for corporates and households. This work builds on the analysis of Čeh et al. (2011) who used the credit market disequilibrium model to analyse determinants of supply or demand for total domestic bank loans and foreign loans to domestic sectors from 2000 to 2010. Apart from a longer sample that includes the period from the third quarter of 2001

to the first quarter of 2015, determinants of supply and demand in this research are separately estimated for household and corporate sector. Another contribution of this paper is the inclusion of the variable that reflects the CNB policy actions (monetary policy indicator) that have significantly influenced credit dynamics in Croatia. The results of the model are supplemented by the findings obtained from the BLS, available since 2012, which are also used for the robustness check.

The model used for assessing this problem is based on that

of Ghosh and Ghosh (1999),[2] who applied the switching regression framework to analyse credit supply and demand developments. Maddala and Nelson (1974) laid the foundation of such an approach and Quandt and Ramsey (1978) also applied the switching regression framework, and detected periods of surplus or deficit of credit supply as two regimes with a certain likelihood of occurrence.

Credit market disequilibrium models were rated using the maximum likelihood method (Maddala and Nelson, 1974), a procedure that selects the set of values of the model parameters that maximizes the likelihood function. This approach is based on the assumption that both demand and supply depend not only on price but also on other exogenous factors and that price does not clear the market (Goldfeld and Quandt, 1980). As explained by Maddala (1974), the model consists of three equations – the demand equation, the supply equation and the condition that the quantity observed is the minimum of demand or supply. By using this system of simultaneous equations, the main determinants of real credit supply and demand of corporates and households were established and the periods of surplus supply or demand were identified. Surplus supply or surplus demand are calculated as the difference between the estimated credit demand and credit supply, with the loans actually utilised at each given moment, C_t, assumed to equal the lower of the values between supply and demand.

$$C_t = \min (C_t^d, C_t^s),$$

where:

$$C_t^d = \mathbf{X}_{1t}^{'} \boldsymbol{\beta}_1 + \varepsilon_{1t} \tag{1}$$

$$C_t^s = \mathbf{X}_{2t}^{'} \boldsymbol{\beta}_2 + \varepsilon_{2t} \tag{2}$$

$\mathbf{X}_{1t}^{'}$ represents the determinants of credit demand, $\mathbf{X}_{2t}^{'}$ determinants of credit supply, $\boldsymbol{\beta}_1, \boldsymbol{\beta}_2$ are the parameters to be estimated, and $\varepsilon_{1t}, \varepsilon_{2t}$ are random errors. This condition helps in the avoidance of the usual identification problems in credit market equilibrium models, given that, in each period, the volume of credit is determined by either supply or demand.

The dependent variables are logs of real bank loans to the corporate and household sectors. The choice of independent variables has been influenced by the theoretical assumptions, available literature and specific characteristics of the Croatian economic and financial system. The final set of explanatory variables is mainly determined by their statistical significance and economic relevance. This is in line with Everaert et al. (2015) who use a similar model to assess the determinants of credit demand and supply in five CEE countries, where the choice of explanatory variables is determined by a priori exclusion restrictions, along with pragmatism. Following that, insignificant variables are dropped from the regressions unless explicitly stated in order to improve the stability of the estimation results that are somewhat sensitive to the model specification and the choice of variables used.

Following this approach, it is assumed that the real demand for corporate loans should be negatively correlated with lending interest rates, GDP gap, profitability of corporate assets and country risk premium, while it should be positively

correlated with an increase in economic activity and business confidence:

$$C_t^d = \boldsymbol{\beta}_0^d + \boldsymbol{\beta}_1^d r_t + \boldsymbol{\beta}_2^d y_t + \boldsymbol{\beta}_3^d y_t^{gap} + \boldsymbol{\beta}_4^d bc_t + \boldsymbol{\beta}_5^d p_t + \boldsymbol{\beta}_6^d e_t + \varepsilon_t^d \tag{3}$$

where r represents the real interest rate on corporate loans, y is GDP, y^{gap} is GDP gap, bc stands for business confidence, p for profitability of corporate assets, and e for EMBI spread for Croatia.

Higher interest rates, GDP growth and increased lending capacity of the banking system are expected to influence credit supply to the corporate sector positively, while increase in NPLs and higher country risk premium should work in the opposite direction. A more restrictive central bank policy represented by a higher monetary policy indicator is also expected to discourage loan supply. Therefore, additional variables in the credit supply equation to corporates are represented by cp for credit potential, mpi for the monetary policy indicator, and npl for non-performing corporate loans:

$$C_t^s = \boldsymbol{\beta}_0^s + \boldsymbol{\beta}_1^s r_t + \boldsymbol{\beta}_2^s y_t + \boldsymbol{\beta}_3^s cp_t + \boldsymbol{\beta}_4^s mpi_t + \boldsymbol{\beta}_5^s npl_t + \boldsymbol{\beta}_6^s e_t + \varepsilon_t^s \tag{4}$$

Apart from the same independent variables included to the demand equations for the corporate sector, which are expected to have the same effect on the demand for loans of the household sector (lending interest rate, GDP and GDP gap), this equation also includes consumer confidence (cc), wage bill (w) and real-estate prices (h which stands for the hedonic real estate price index). All of these variables are expected to be positively correlated with the real demand for loans, and the equation is defined as follows:

$$C_t^d = \boldsymbol{\beta}_0^d + \boldsymbol{\beta}_1^d r_t + \boldsymbol{\beta}_2^d y_t + \boldsymbol{\beta}_3^d y_t^{gap} + \boldsymbol{\beta}_4^d cc_t + \boldsymbol{\beta}_5^d w_t + \boldsymbol{\beta}_6^d h_t + \varepsilon_t^d \tag{5}$$

In addition to the several independent variables also included in the supply equation for the corporate sector (lending interest rate, GDP, credit potential and monetary policy indicator), real supply equation for households also contains bank profitability (roa) and real-estate prices (h):

$$C_t^s = \boldsymbol{\beta}_0^s + \boldsymbol{\beta}_1^s r_t + \boldsymbol{\beta}_2^s y_t + \boldsymbol{\beta}_3^s cp_t + \boldsymbol{\beta}_4^s mpi_t + \boldsymbol{\beta}_5^s roa_t + \boldsymbol{\beta}_6^s h_t + \varepsilon_t^s \tag{6}$$

Since real variables are used for modelling, GDP, credit and lending capacity are deflated by the consumer price index. GDP is seasonally adjusted, while the GDP gap is calculated by using Hoddrick-Prescott filter. The Augmented Dickey-Fuller test statistics imply that it is not possible to reject the hypothesis that there is no unit root in corporate and household loan time series. In order to reduce their volatility and standardise them, logs of most of the variables are used (description of the variables is presented in tables 3, 4 and 5).

Due to the fact that the estimated model uses non-stationary data, the parameter results and hypothesis tests make sense only if the estimated supply and demand for loans and the actually realized loans are co-integrated, as emphasized by Čeh et al. (2011). Following Ghosh and Ghosh (1999), in order to check if the determinants of loan supply and demand function form a co-integrated vector with the actual credit activity, Johansen's maximum eigenvalue and trace tests for cointegration

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2 Ghosh and Ghosh estimated a similar model for Latvia, Hungary and Poland (World Bank, 2009).

have been performed. The test results imply that the null hypothesis on the nonexistence of cointegration links can be rejected for both supply and demand models for the corporate and for the household sector (Tables 1 and 2). Although such results are usually sensitive to the cointegration specifications (different lags in the initial VAR definition and inclusion of trend variable in the model), all tests suggest the presence of at least one cointegration relation.

4 Estimation results

4.1 Corporate sector

The estimated disequilibrium model for corporate loans (Table 1) shows that higher economic activity positively affects corporate credit demand as it increases the ability of debtors to fulfil their obligations, an explained by Ghosh and Ghosh (1999). A GDP growth that is stronger than potential growth acts in the opposite direction, which probably implies the increased possibility of corporate internal financing in the conditions of stronger expansion, and vice versa. This also holds true for higher corporate profitability, as in the results of Nehls and Schmidt (2003), where profitability is associated with heightened investment activity, but lower credit demand.

An increase in lending interest rate, as expected, reduces credit demand. Despite the insignificance of the estimated coefficient, the interest variable should enter both equations as this is the most appropriate measure of the price of loans, for debtors and creditors. Higher business confidence increases corporate credit demand, while higher country risk premium measured by EMBI spread reduces credit demand. The magnitude of the estimated coefficients implies that domestic GDP has the strongest impact on corporate credit demand.

As expected, credit supply is positively influenced by higher economic activity (although less than credit demand), increased credit potential of domestic banks and higher interest rates. On the other hand, a more restrictive monetary policy reduces loan supply, as well as the growth of partly or fully irrecoverable placements. This finding is in line with Catao (1997), who also used rising NPLs to explain sluggish credit activity in an environment marked by high banking sector liquidity. However, in our case this effect is statistically insignificant. Higher country risk premium reduces credit supply, as it increases the borrowing costs for all borrowers, including banks and their customers. This can partially be attributed to the effect of the balance sheet channel as the higher risk premium reduces profitability and the value of collateral and increases the spread between corporate lending rates and risk-free assets (Baek, 2002). Apart from that, higher yields on government debt, which is still usually perceived as "risk-free", might result in restrained credit flows to the private sector, which is comparatively risky. Monetary policy negatively affected loan supply prior to the crisis and stimulated it afterwards.

Estimated supply and demand show that the pre-crisis period was primarily marked by surplus demand for loans (Figure 7), which is in line with the described real and financial developments in that period, but also with the data that show that part of this demand was met abroad. Since 2011 credit demand has mostly been gradually declining because of the low level of economic activity, negative future expectations, and to a certain extent because of the stabilisation in the international financial markets and easier access to foreign capital. For the above reasons, the period from 2012 onwards was marked by surplus supply of loans over demand, confirming that lack of domestic demand constrains credit recovery for the corporate sector.

Table 1 Results of the disequilibrium model for the corporate loan market

Demand		Supply	
Independent variable		Independent variable	
Constant	2.61*	Constant	5.13*
Lending interest rate	−0.00	Lending rate	0.02***
GDP	2.04*	GDP	1.29*
GDP gap	−1.76*	Credit potential	0.77*
Business confidence	0.23*	Central bank policy indicator	−1.21*
Profitability of corporate assets	−1.37*	Non-performing corporate loans	−0.05
EMBI spread for Croatia	−0.02*	EMBI spread for Croatia	−0.05*
Standard deviation	0.05	Standard deviation	0.03
Null hypothesis: no cointegration links		Null hypothesis: no cointegration links	
No. of cointegration links	2	No. of cointegration links	1
Trace stat./Max Eig	4.95**	Trace stat./Max Eig	20.77/18.12**

Note: * significant at 1%, ** significant at 5%, *** significant at 10%. The maximum likelihood standard deviation is the sample standard deviation, which is a biased estimator for the population standard deviation.
Source: Authors' calculation.

Figure 7 Estimated supply and demand for corporate loans
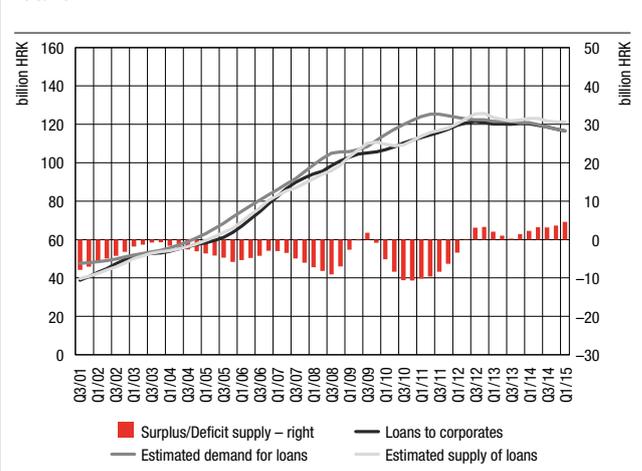
Note: Moving average of last four quarters.
Source: Authors' calculation.

4.2 Households

As some variables have similar effects on credit demand or supply for both sectors, in the following section only the variables characteristic for households are described (Table 2). The increase in consumer confidence, as expected, positively affected the household demand for loans. An increase in real estate prices increases the demand for home loans through the expectation channel, but it may also increase household borrowing capacity and the inclination of banks to grant loans to debtors due to higher collateral value, which is shown in the supply equation. The growth in the wage bill, which depends on the level of wages and the number of employees, as expected, has a positive sign, but is statistically insignificant. Nevertheless, due to its economic importance it has been included in the model as unemployment and expected income have proven to be significant determinants of credit demand by Catao (1997) and Ikhide (2003). In the case of credit supply, monetary policy actions are again properly addressed, confirming that higher regulatory requirement reduces credit supply. Higher returns on banks' assets are also related to lower credit supply, which is a bit surprising. A possible explanation could be that at a certain level of profitability banks become

Figure 8 Estimated supply and demand for household loans

Note: Moving average of last four quarters.
Source: Authors' calculation.

Table 2 Results of the disequilibrium model for the household loan market

Demand		Supply	
Independent variable		Independent variable	
Constant	–6.83	Constant	–2.52*
Lending interest rate	–0.06*	Lending rate	0.00
GDP	4.43*	GDP	1.85*
GDP gap	–5.03*	Credit potential	0.59*
Consumer confidence	0.03*	Central bank policy indicator	–0.60**
Wage bill	0.09	Return on banks' assets	–0.06**
Hedonic real estate price index	0.32**	Hedonic real estate price index	0.23*
Standard deviation	0.06	Standard deviation	0.04
Null hypothesis: no cointegration links		Null hypothesis: no cointegration links	
No. of cointegration links	2	No. of cointegration links	2
Trace stat./Max Eig	5.72**	Trace stat./Max Eig	4.32**

Note: * significant at 1%, ** significant at 5%, *** significant at 10%. The maximum likelihood standard deviation is the sample standard deviation, which is a biased estimator for the population standard deviation.
Source: Authors' calculation.

less inclined to take additional credit risk. Regarding the magnitudes of the influence of supply and demand determinants, domestic GDP also stands out.

Despite the fact that the lending rate coefficient in the supply equation is insignificant, as in the model for corporate loan market, following the theoretical assumptions we have included it in the model. Robustness of estimated results has been checked by including several different interest rate variables, as well as the interest rate spread in the supply equation, but the results were similar and the estimated evolution of credit demand and supply remained unchanged.

Model results show that a major part of the pre-crisis period was marked by excessive demand for household loans (Figure 8), particularly during the period of the most intensive use of the CNB's measures aimed at reducing credit growth, which were more difficult to avoid as households usually did not have access to foreign funding sources. After the onset of the crisis a continuous and gradual fall of both demand and supply of household loans was recorded, with sporadic oscillations. Although the crisis also clearly shows the presence of a structural break on the household credit market, the puzzling interplay of deficit credit supply or demand suggests that a lot of factors together constrain credit growth to the household sector, as estimated supply and demand are on the gradual downward trend.

5 Robustness checks

As the CNB started conducting BLSs from October 2012, there are insufficient observations for this information to be included in the credit market disequilibrium model. Therefore, for the robustness check, narrative survey results for the recent period are combined with model estimations.

Loan supply and demand are often analysed using data obtained by regular BLSs conducted by central banks, which provide an important source of information on price and non-price related lending terms and conditions, as well as on factors that impact credit demand. The CNB's survey is methodologically aligned with the BLS conducted for the euro area by the European Central Bank. It includes questions that refer to the previous quarter and to the expectations for the subsequent three months. Questions are grouped with regard to two types

Figure 9 Factors affecting credit standards as applied to the approval of loans to corporate sector
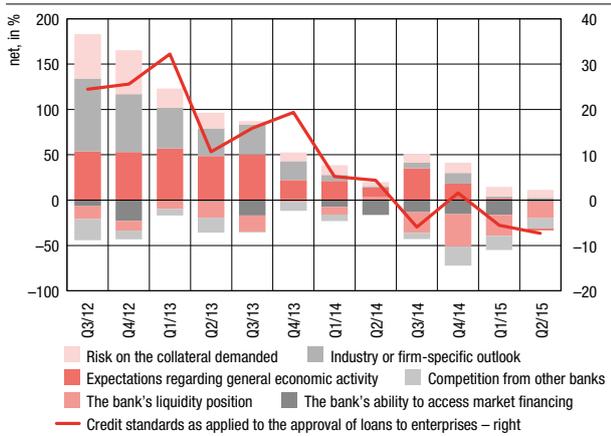
Note: A positive value shows that the factor contributes to standard tightening and a negative that it contributes to standard easing.
Source: CNB – BLS.

Figure 10 Factors affecting demand for loans to corporate sector

Note: A positive value shows that the factor contributes to higher demand and a negative that it contributes to lower demand.
Source: CNB – BLS.

of banks' credit portfolio, households and corporates, and responses to them are provided by bank managers responsible for credit operations with these sectors.

Results of the BLS are interpreted on the basis of the net percentage of the banks' responses weighted by the size of the banks. For lending standards, net percentage is the difference between the share of the banks that have tightened and that have eased lending standards. A positive net percentage indicates net tightening as the share of the banks that have tightened their lending terms is higher than the share of the banks that have eased them, and vice-versa. Therefore, when commenting on credit demand, a positive net percentage indicates that the share of the banks reporting that the demand has increased is higher than the share of those reporting a decline in demand, so that it is the case of net growth in demand, and vice versa.

According to the BLS, up to 2015 lending standards for corporate loans were tightened almost continuously, primarily prompted by negative expectations of general economic developments, a pessimistic outlook for industry or specific corporates and risks related to the collaterals (Figure 9). The negative contribution of these factors decreased over the survey period and eventually in 2015 completely disappeared as negative expectations and risks gradually diminished during the recession. Insights from the lending survey confirm the model results, in which economic growth increases credit supply, while higher provisioning works in the opposite direction as the risks related to collaterals may increase provisioning for non-performing corporate loans. Simultaneously, favourable liquidity in the banking system, competition from other banks and eased financing conditions contribute to the easing of standards in the second half of 2014 and first half of 2015. This implies that financing conditions for banks were positively influenced by the expansionary monetary policy, thus supporting the credit supply. But, as stressed by Allain and Oulidi (2009), the presence of high liquidity in the banking system accompanied by non-negligible credit demand implies the existence of some kind of credit rationing as, despite the central banks' incentives and stable financial market conditions, abundant liquidity cannot find its way to the real sector.
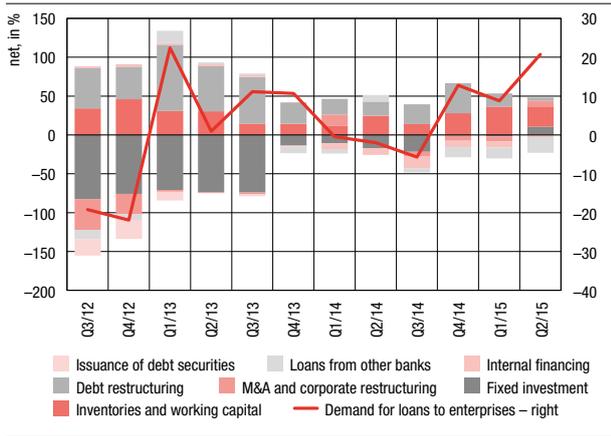
Figure 11 Factors affecting credit standards as applied to the approval of loans to households
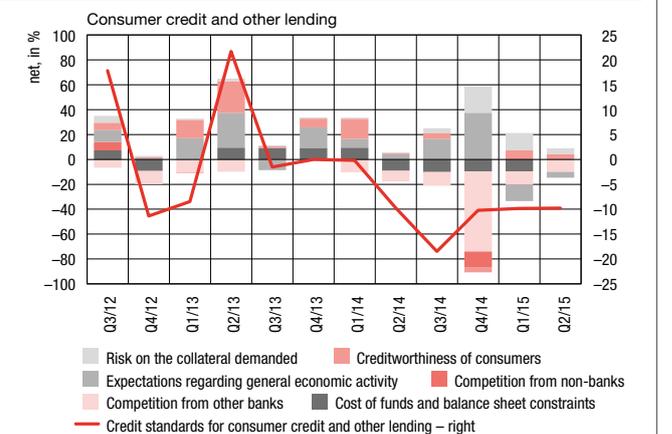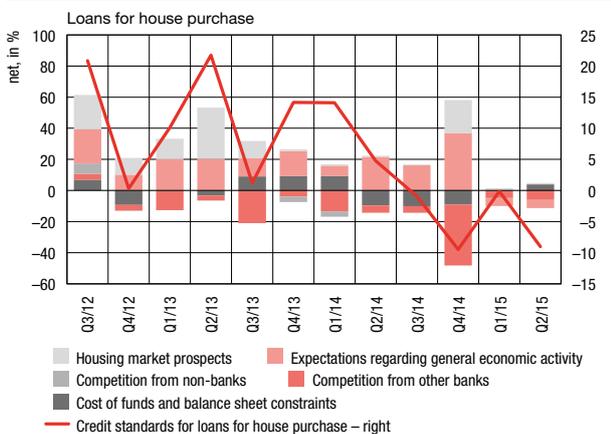
Note: A positive value shows that the factor contributes to standard tightening and a negative that it contributes to standard easing.
Source: CNB – BLS.

Figure 12 Factors affecting demand for loans to households

Note: A positive value shows that the factor contributes to higher demand and a negative that it contributes to lower demand.
Source: CNB – BLS.
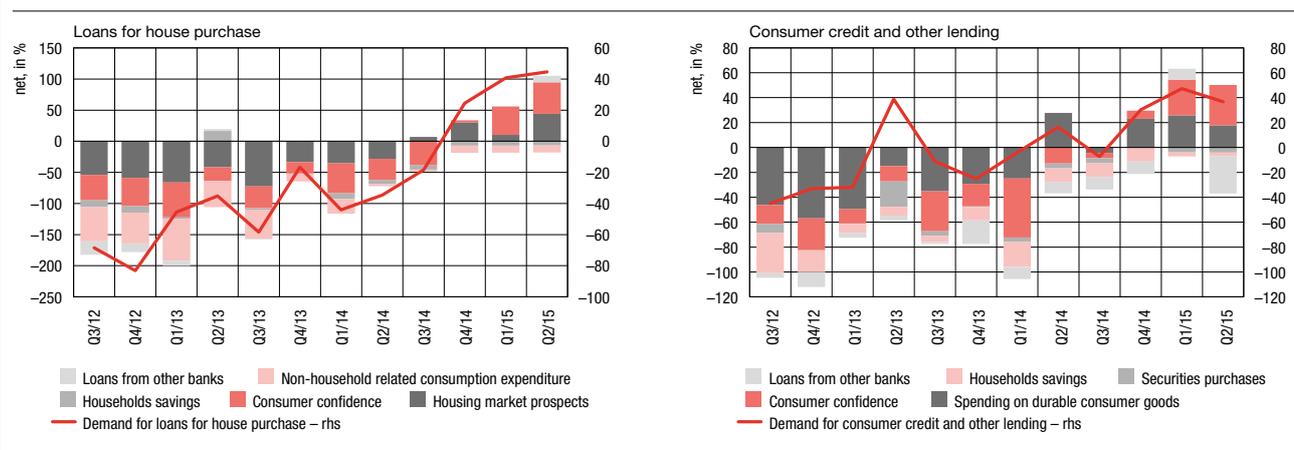
The BLS also shows that corporate credit demand decreased at the end of 2012, and then increased in 2013, after which less favourable developments were recorded again until the end of 2014 (Figure 10). In view of the constraints caused by the long-term recession, changes in the debt levels and capitalisation of corporates, their demand for domestic loans was subdued, especially for new loans, as the increased loan demand was primarily driven by the need for debt restructuring and the financing of working capital. On the other hand, the lack of investments negatively affected the demand for loans, especially in 2012 and 2013. Also noticeable here is the way in which the negative influence of this factor has been gradually falling, while demand for debt restructuring was also significantly higher in the beginning of the survey.

Therefore, it is not surprising that from 2012 to 2014 model-estimated credit demand gradually declined and the supply exceeded the demand. It can be concluded that the demand determinants from both the BLS and the model estimation confirm that the delayed recovery of the Croatian economy has limited the recovery of corporate credit demand.

In case of households, the recent period has been marked by decreasing levels of both supply and demand for household loans and the continuous deleveraging of this sector. The BLS confirms these results as it points to the tightening of lending standards for housing loans granted during most of the observed period (Figure 11). In the same time, for consumer and other loans banks reported almost a continuous easing of lending standards. The main factor contributing to the tightening of lending standards for both groups of household loans is the negative expectations about general economic trends, which is also confirmed by the disequilibrium model for households. As with credit supply for corporates, this negative effect disappeared at the end of the survey sample (2015), and even started positively to affect lending standards.

The negative perspective of the real estate market for home loans and the credit capacity of the clients for consumer loans (again, it can be linked to the negative effect of value adjustments on credit supply indicated by the model) also emphasise restrictions to loan supply, especially during the first part of the survey sample. By contrast, banking competition, funding costs and balance sheet restrictions are the main factors that contribute to the easing of lending standards for household loans, which is information that supplements the findings from the model estimation. For funding costs, this is noticeable from 2014 onwards, which partially suggests the way in which monetary policy efforts are transmitted to the lowering of domestic interest rates.

Household demand for loans from 2012 to the end of 2014 mostly decreased according to the BLS as well, particularly for housing loans, but also for consumer loans, with periodic oscillations (Figure 12). In general, it has been unfavourably affected by decreased consumer confidence, household consumption, the perspectives of the real estate market and housing savings. Most of the factors changed during 2014, and started to positively affect credit demand.

Altogether, the survey results broadly confirm the model results, implying that without economic recovery it is difficult to expect recovery in credit demand, and that a more pronounced drag on credit growth seems to be coming from subdued demand. These considerations are in line with findings based on the BLS from Pintarić (2016), who has shown that credit demand has affected loan growth more than credit standards, especially for corporate loans.

6 Conclusion

From the policymaker's perspective, an understanding of the determinants and evolution of credit supply and demand is crucial for the analysis of the capacity of monetary policy measures to influence credit activity. Although the interrelations of various factors affecting credit demand and credit supply are very complex, it seems that the postponed recovery and weak growth prospect are the most significant factors influencing credit developments in Croatia. This observation comes from an assessment of the disequilibrium model of credit supply and demand and is cross checked against banks' views on credit market conditions (from the BLS survey).

Main determinants of corporate and household credit demand are greatly influenced by the domestic macroeconomic environment. In the recent period the demand for corporate loans was subdued and is not healthy (i.e., corporates sought loans for the refinancing of old debts, but not for investment), while lending conditions were tightened, despite the surplus supply of credit. In the case of households, there were problems both on the supply and the demand side, which resulted in the long-lasting deleveraging of this sector. Such developments altogether weaken the scope of monetary policy measures that have been aimed at stimulating credit recovery and shows that monetary stimulus by itself probably might not be sufficient for a stronger credit recovery.

7 Appendix: Data description and statistical information

Table 3 Variables in the model for the market of corporate loans
Model for the market of corporate loans

	Description	Source
Dependent variable:		
Loans to corporate sector	Real total placements to non-financial corporations, adjusted for one-off effects and exchange rate developments (log).	CNB
DEMAND FUNCTION		
Explanatory variables:		
Lending interest rate	Credit institutions' interest rates on long-term (over 1 year) loans to non-financial corporations indexed to foreign currency (new business).	CNB
GDP	Gross domestic product (log).	CBS
GDP gap	Difference between actual output (GDP) and potential GDP estimated by the Hodrick-Prescott filter.	Authors' calculation based on CBS data
Business confidence	Economic sentiment index for corporate sector, combined with the business confidence index calculated by Privredni vjesnik for the period before May 2008 (log).	CNB, Privredni vjesnik
Profitability of corporate assets	Return on assets of corporate sector.	FINA
SUPPLY FUNCTION		
Explanatory variables:		
Lending interest rate	Credit institutions' interest rates on long-term (over 1 year) loans to non-financial corporations indexed to foreign currency (new business).	CNB
GDP	Gross domestic product (log).	CBS
Credit potential	Credit instituitions' total foreign liabilities and time and saving deposits in domestic and foreign currency (log).	CNB
Monetary policy indicator	Share of banks' assets required by central bank's regulation (claims on central bank and banks' foreign assets maintained due to minimum fx liquidity requirements), adjusted for excess liquidity (log).	CNB
Non-performing corporate loans	Share of non-performing loans of corporate sector in total loans to corporate sector (log).	CNB
EMBI spread for Croatia	The J.P. Morgan Emerging Market Bond Index (EMBI) reflects the risk on investment in Croatian securities and measures the country's risk premium (log).	J. P. Morgan

Table 4 Variables in the model for the market of household loans

Model for the market of household loans

	Description	Source
	Description	**Source**
Dependent variable:		
Loans to household sector	Real total placements to household sector, adjusted for one-off effects and exchange rate developments (log).	CNB
DEMAND FUNCTION		
Explanatory variables:		
Lending interest rate	Credit institutions' interest rates on long-term (over 1 year) loans to households indexed to foreign currency (new business).	CNB
GDP	Gross domestic product (log).	CBS
Consumer confidence	Consumer confidence index (log).	Ipsos Puls
Wage bill	The amount of money paid to employees on a country level (log).	Croatian Pension Insurance Fund, Croatian Bureau of Statistics
Hedonic real estate price index	The hedonic real estate price index that takes into account qualitative characteristics of the real estate (log). Details on the calculation of HREPI are available in Kunovac, D. et al., 2008, Use of the Hedonic Method to Calculate an Index of Real Estate Prices in Croatia, CNB Working Paper W-19, December.	CNB
SUPPLY FUNCTION		
Explanatory variables:		
Lending interest rate	Credit institutions' interest rates on long-term (over 1 year) loans to households indexed to foreign currency (new business).	CNB
GDP	Gross domestic product (log).	CBS
Credit potential	Credit instituitions' total foreign liabilities and time and saving deposits in domestic and foreign currency (log).	CNB
Monetary policy indicator	Share of banks' assets required by central bank's regulation (claims on central bank and banks' foreign assets maintained due to minimum fx liquidity requirements), adjusted for excess liquidity (log).	CNB
Non-performing household loans	Share of non-performing loans of household sector in total loans to households (log).	CNB
Hedonic real estate price index	The hedonic real estate price index that takes into account qualitative characteristics of the real estate (log). Details on the calculation of HREPI are available in Kunovac, D. et al., 2008, Use of the Hedonic Method to Calculate an Index of Real Estate Prices in Croatia, CNB Working Paper W-19, December.	CNB

Table 5 Descriptive statistic for the variables included in the model

	Loans to corporate sector, HRK million	Loans to households, HRK million	GDP_ quarterly, HRK million	Credit potential, HRK million	Non-performing corporate loans, HRK million**
Min	36.119,85	23.476,83	65.660,82	72.794,19	5.813,66
Max	122.689,20	128.846,44	91.082,50	277.710,05	32.417,77
Mean	87.917,68	93.482,46	79.348,82	208.270,10	14.325,92 (7.9)
Mean (in EUR)*	11.823,94	12.572,34	10.671,52	28.009,98	1.926,68
St dev	29.490,13	35.775,64	6.339,66	64.226,52	9.976,39
Number of obs	**59**	**59**	**59**	**59**	**59**

*HRK amount divided by average EUR/HRK exchange rate in period from 2001 to Q2 2015.
**Data in brackets refer to NPL ratio between NPL stock and total loans data used in model.

	Business confidence, index	Profitability of corporate assets, %	Return on banks' assets, %	EMBI spread for Croatia, basis points	Monetary policy indicator
Min	70,24	0,63	0,23	28,98	0,16
Max	102,80	0,87	1,88	569,65	0,37
Mean	86,30	0,74	1,27	207,90	0,25
St dev	7,88	0,09	0,42	140,54	0,06
Number of obs	**59**	**59**	**59**	**59**	**59**

	Lending interest rate, corporates, %	Consumer confidence, index	Wage bill, HRK billion	Hedonic real estate price index	Lending interest rate, households, %
Min	4,97	−47,80	18,33	56,80	5,97
Max	9,41	−14,67	26,32	113,60	11,64
Mean	6,49	−29,46	22,69	87,25	8,05
St dev	0,86	9,80	2,08	17,15	1,32
Number of obs	**59**	**59**	**59**	**59**	**59**

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