

The Need for Selective Credit Policy Implementation: Case of Croatia

Drago Jakovcevic, Mihovil Andelinovic, Igor Husak

Abstract—The aim of this paper is to explore the economic circumstances in which the selective credit policy, the least used instrument of four types of instruments on disposal to central banks, should be used. The most significant example includes the use of selective credit policies in response to the emergence of the global financial crisis by the FED. Specifics of the potential use of selective credit policies as the instigator of economic growth in Croatia, a small open economy, are determined by high euroization of financial system, fixed exchange rate and long-term trend growth of external debt that is related to the need to maintain high levels of foreign reserves. In such conditions, the classic forms of selective credit policies are unsuitable for the introduction. Several alternative approaches to implement selective credit policies are examined in this paper. Also, thorough analysis of distribution of selective monetary policy loans among economic sectors in Croatia is conducted in order to minimize the risk of investing funds and maximize the return, in order to influence the GDP growth.

Keywords—Global crisis, Selective credit policy, Small open economy.

I. INTRODUCTION

SELECTIVE credit policy, along with financial operations on the open market, discount rates and reserve requirements ratio, represents one of the four main instruments by which the central bank implements objectives of monetary policy. Listed instruments, due to the frequency of use, often generalize the concept of the conventional monetary policy. The main purpose of selective credit policy, in terms of the inability to use conventional instruments of monetary policy, is redistribution of loans from the primary emission to selected commercial banks and economic sectors with the intention of promoting reconstruction and development of an area, or realization of some other objective of the economic policy.

With the appearance of the world economic crisis, selective monetary policy became a necessary tool of encouraging the recovery of both developed and developing countries, where the final objective was, and still is, the recovery and returning of the original role of the financial systems.

Generally speaking, selective credit policy is that policy which has direct influence on price and availability of external financing for banks, households and non-banking institutions. These sources of financing may occur in the forms of

increased liquidity of the financial system from the central bank; approved loans, and buying and selling of securities or stocks. Usually, the price of external financing is higher than short-term inter-bank interest rates, on which monetary policy relies heavily, and in that way the central bank can decrease the difference between external financing and the impact on asset prices and cash flows of the economy. These measures have an impact on financing conditions, so their form must be adapted to the structure of the economy, especially to the cash flow structure.

With the appearance of the world financial crisis and numerous studies on this topic, the various divisions of types and effects of measures of implementing selective credit policy also appeared. Although many of these are called measures, they often refer to the action and desired effect on the financial system. For example, [1] states selective credit policy changes the composition and size of the central bank's balance sheet, as well as the length of time holding certain types of property, not necessarily coinciding with the term of maturity of securities. According to [1], unconventional monetary policy includes increasing the liquidity of the financial system, buying long-term government bonds by the central bank, buying private sector securities by the central bank and currency exchange arrangements between central banks. Although this is correct, the division reflects the extent to which the instruments of the unconventional monetary policy are used. Therefore, for the purpose of this study, the division of quantitative easing and credit easing (sometimes qualitative easing) is accepted. The division is the closest to the one by [2] who divides selective credit policy based on commitment effect, quantitative easing and credit easing.

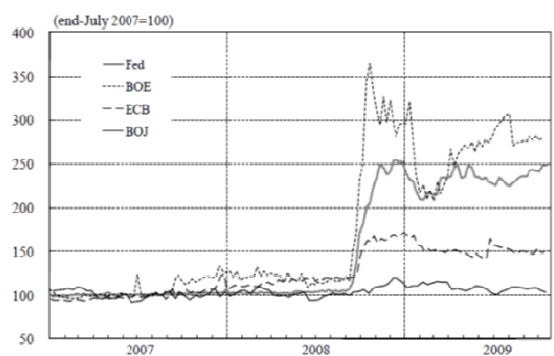


Fig. 1 Balance sheet assets of FED, BOE, ECB and BOJ, period 2007-2009 [3]

Instruments of the unconventional monetary policy can be described as rough, rule-of-thumb instruments. In order to

Drago Jakovcevic is with the Department of Finance, Faculty of Economics and Business Zagreb, University of Zagreb, Zagreb, 10000, Croatia (phone: +385-1-238-3199; e-mail: djakovcevic@efzg.hr).

Mihovil Andelinovic is with the Department of Finance, Faculty of Economics and Business Zagreb, University of Zagreb, Zagreb, 10000, Croatia (e-mail: mandelinovic@efzg.hr).

Igor Husak is with the Faculty of Economics and Business Zagreb, University of Zagreb, Zagreb, 10000, Croatia (e-mail: igor.husak@gmail.hr).

achieve a substantial impact on the financial system, the needs for funds are great and it is most obvious in changes of the central banks' balance sheet, shown in Fig. 1. It is evident that in the two-year period of the implementation of the unconventional monetary policy there has been a significant increase in the balance sheet, where the assets of all banks were the largest in the last quarter of 2008. In that period, the balance sheet of the Bank of England has increased 2.5 times and the balance sheet of the FED 1.5 times. Smaller increases are recorded among the ECB, with an increase of 50%, and the central bank of Japan, whose balance sheet increased by approximately 30%.

II. SELECTIVE CREDIT POLICY IN THE U.S. AS A RESPONSE TO THE WORLD FINANCIAL CRISIS

The recession that has gripped the U.S. with appearance of the global crisis, by its scale, is equal to the recession in the thirties of the twentieth century. The liberalized financial system has proved inadequate for self-recovery in the recession that has occurred, with falling equity markets and transmission mechanism which seemed unstoppable. In such economic conditions, the FED implemented drastic measures in the form of introducing the selective credit policies. The bubble of the real estate market soon became a financial bubble by increasing approved loans. Looking for an extra income and with little oversight of financial institutions and their operations, loans were approved with reduced attention to the creditworthiness of borrowers because it was still expected for prices of real estate to grow. In early 2007, the bubble burst as a result of the increase in non-repayment and falling of HPI index. Instruments related to real estate, such as MBS's and ABS, lost value, so the investors withdrew from the market and the banks stopped approving loans. The crisis further deepened in September 2008, when the losses and irregularities in the operation of many financial institutions were discovered. Investors were, at that point, losing confidence in the market and stock prices were falling. Uncertainty in imminent recovery further reduced the efficiency of the transmission mechanism and the size of the U.S. economy caused the occurrence of global crisis [4].

In the second half of 2009 the U.S. unemployment rate reached 10%. The committee argued that the recession officially began in December 2007 [5]. The emergence of the financial crisis has introduced selective credit policies in the U.S. The FED has never officially announced the implementation of the policy or explicitly set a date for its implementation. Also, it has not changed the operating target from the overnight interest rates to targeting reserves. On the occurrence of the crisis in the middle of 2007, the FED responded by reducing the overnight interest rate overnight by 50 base points in September of that year. As the economy weakened further, the FED continued to reduce the interest rate that was, until spring of 2008, decreased by a total of 325 points. Due to the strengthening of the crisis, reduction in interest rates continued - in October 2008 the decrease was 100 points. In December of the same year, it was decided to target an increase in interest rates overnight of 25 base points.

Low interest rates and reduced efficiency of the transmission channel were directing the FED towards non-conventional instruments. Reducing interest rates carried the risk of high inflation. The fear of inflation, which reached its peak in the middle of 2008, was largely based on the rapid rise in oil prices. The inflation expectations were based upon the growing demand for raw materials in countries with high economic growth, which was reduced as the crisis proceeded and the threat disappeared.

Ben Bernanke [6], in response to the emergence of the crisis, divided FED instruments into three categories. The first group of instruments consisted of short-term liquidity support to financial institutions. Aside from the reduction in the overnight interest rates, this group also consists of programs established to provide short-term liquidity. Term Auction Facility (TAF) is an expanded version of open market operations with an increased number of eligible collaterals, as well as the institutions with whom the FED conducts transactions. Term Securities Lending Facility (TSLF) gives primary dealers the possibility of borrowing government bonds with a pledge of lower-quality securities, while the Primary Dealer Credit Facility (PDCF) was established with the intention of increasing dealer's liquidity. Asset Backed Commercial Paper Money Market Mutual Fund Liquidity Facility (AMLF) was introduced in September. With this program ABCP were accepted as collaterals in order to increase the liquidity of money market funds. The importance of this program lies in the fact that securities that were not traded on this market were accepted as collaterals. The Commercial Paper Funding Facility (CPFF) program was initiated in October, in which unsecured commercial paper was accepted as collateral. The Money Market Investor Funding Facility program was established in November in order to improve the liquidity of money markets. This group includes separate swap arrangements between the FED and 14 central banks. This program enabled central banks to borrow dollars in exchange for national currency with the aim of stabilizing the national currency and dollar as world currency. The risk of non-repayment, unless with another currency counter value, was reduced also by the fact that central banks are directly responsible for repaying funds, rather than institutions that borrowed the funds. According to these characteristics, it is evident that this is an indirect credit easing.

The second group of FED instruments includes direct credit easing, and refers to the buying of commercial papers of private investors. The program aims to help the private sector in the process of refinancing under conditions where investors feel that companies are not capable of carrying out the obligations arising from securities (rollover risk) and non-liquid capital markets. In cooperation with the Ministry of Finance, the FED would also accept the collateral securities issued on the basis of student loans, loans granted to small and medium businesses, loans for buying cars and credit card transactions. Securities must be AAA-level and an additional discount (haircut) is charged at their purchase.

Buying government bonds is the third group of instruments,

and the direct quantitative easing category. This includes the purchase of securities of GSE, such as the MBS's. Purchase of toxic assets also means a reduction in the quality of the central bank's balance sheet. The obvious intent of the FED is purchasing these securities to increase their market price [7].

By reviewing the taken measures in chronological order, they can be seen in four steps [8]. In the first period, which lasted from June to December 2007, the FED reduced overnight interest rates, but the size and composition of its balance sheet was not significantly changed. GDP and employment did not achieve a significant drop. In August of that year, FED increases overnight lending to thirty days, which becomes the first sign of tension in the financial system. The second period began in December 2007 and there was a significant deterioration of macroeconomic indicators, while the FED introduced the TAF and TSLF programs.

Despite introduced programs, economic indicators continued to worsen in 2008 and the culmination of the third period was a problem of refinancing the investment bank Bear Stearns, which was saved thanks to the FED's intervention and toxic assets removal, after which the bank was sold to JP Morgan Chase Bank. In the same month the FED introduced PCDF and TSLF programs. In the first three periods, that lasted until September 2008, the policy implemented by the FED can be described as qualitative (credit) because it refers to reformulation of the balance sheet – the FED had higher quality securities, mostly government bonds, which through various programs were replaced with lower-quality assets, while the balance sheet increased by minor amount of about 3%. The fourth period began with the bankruptcy of Lehman Brothers and the further deterioration of economic indicators. The FED stopped the sterilization of purchased securities by selling government bonds and at the same time started lending to the same banks. After the collapse of Lehman Brothers, the central bank did not have a sufficient number of government bonds for sale, or lending to commercial banks. As a result of this policy FED's balance sheet increased during the period of September and December by more than 100%. During this period, new programs, AMLF, CPFF, and MIFF, were introduced.

Programs AMLF, CPFF, PCDF and TSLF and swap arrangements with central banks were abolished in January 2010, and TAF in April the same year [10]. The FED's balance sheet increased by 177% in the observed period. On the asset side the growth of the securities stands out as 181%. Within this item, there is an evident reduction of assets contained in Treasury bills by almost 100%, while the categories of government bonds have increased to more than 100% and exceeded \$1 trillion. These sizes are the result of the Federal Reserve's efforts to cut down the interest rates. MBS comprises one of the most important balance sheet items and their value, including the securities guaranteed by the government, exceeds \$1 trillion. The absence of repossession with a regard to the insolvency of the financial system is understandable. The categories of other loans and other assets increased by 1600% and 200% respectively, but their importance in absolute terms is little. Despite many programs

that the FED started, it is evident that FED's balance sheet reflects the results of a quantitative policy. Specifically, on January 3rd 2007 and February 9th 2011, 90% of the asset side of the balance sheet is contained in the securities.

TABLE I
THE BALANCE SHEET OF THE FED BEFORE AND DURING THE
IMPLEMENTATION OF UNCONVENTIONAL MONETARY POLICY [9]

ASSETS (in millions of dollars)	January 2007	February 2011	Change (%)
Gold Stock	11041	11037	0
Special drawing rights certificate account	2200	5200	136
Securities	810771	2279028	181
Bills	277019	18423	-93
U.S: Treasury Bonds	533752	1150904	116
Federal agency debt securities	NA	144624	NA
Mortgage backed securities	NA	965077	NA
Repurchase Agreements	39750	0	-100
Other Loans	1262	22112	1652
Maiden Lane LLC	NA	26565	NA
Maiden Lane II LLC	NA	16038	NA
Maiden Lane III LLC	NA	23028	NA
Term Securities Lending Facility	NA	686	NA
Central banks liquidity swaps	NA	70	NA
Other Assets	39107	117990	202
TOTAL	904131	2501754	177
LIABILITIES AND CAPITAL (in millions of dollars)	January 2007	February 2011	Change (%)
Currency in Circulation	818497	947260	16
Reverse Repurchase Agreements	29742	56022	88
Deposits	19827	1427328	7099
Deposits with F. R. Banks, other than reserve balances	13342	1189250	8814
US Treasury, General Account	6156	62516	916
US Treasury, Supplementary Financing Account	NA	174967	NA
Foreign official	90	118	31
Other	239	477	100
Other liabilities and capital	36065	71144	97
TOTAL	904131	2501754	177

Note: Items marked with NA did not exist before the introduction of unconventional monetary policy.

Liabilities show that the reverse reposessions have increased by almost 90%, which is understandable due to efforts to increase the liquidity of the system. The most significant increase has been recorded in the item of deposits, in fact specifically reserves, which have increased by 8814%, and is also most important in absolute terms with an increase from 13.3 billion to 1.1 trillion dollars. Supplementary Financing Account in item deposits emphasizes the support for the growth of the economy with \$174 billion. Given the growth of the balance sheet, recapitalization of the FED is not surprising. These changes have illustrated the importance of the items of liabilities and equity. While the most important item before the crisis was the currency in circulation, with a share of almost 90%, the emergence of the crisis and the growth of reserves, made this category the most important one by a margin of 48%, while currency in circulation makes up 38% of liabilities and capital.

III. THE MODELS OF SELECTIVE CREDIT POLICY INTRODUCTION IN CROATIA

When conducting monetary policy, CNB has adhered strictly to its main task - the preservation of price stability - since the beginning of its work. Except for stopping hyperinflation in the mid-nineties, the central bank has not undertaken any major operations upon the market; neither has changed the structure or composition of the balance sheet significantly. The deterioration of macroeconomics indicators and the decline in the capital market after 2007 encourages consideration to more active participation in economic recovery than in the period before the crisis. The analysis of macroeconomic indicators in Croatia shows the great importance of two factors when making decisions regarding monetary policy [11].

One trend is the increase in public debt. The trend begins in the latter half of the nineties when the national debt rises and continues after the privatization of banks along with consequential increased borrowing by business and households. In 2006 the Government, by established guidelines, tried to stop the increase in national debt and partially succeeded.

Another trend is the euroization of the financial system. After the hyperinflation and experiences from the former economic system, the confidence in the domestic currency has fallen and the euro, despite stability of kuna (HRK) which has lasted for more than 15 years, represents the currency that is most trusted concerning citizen's savings.

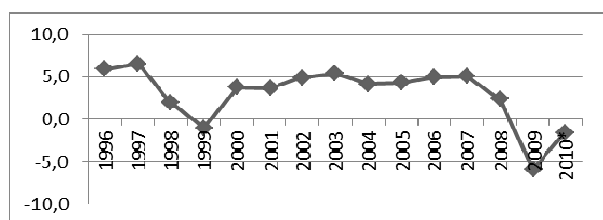


Fig. 2 Real GDP increase in Croatia, period 1996-2010 [12]

In the period from 1996 to 2010 the share of foreign currency deposits in the total time and savings deposits varied between 65 and 87 percent while in 2010 settled around 80 percent. The currency structure of government debt also indicates the domination of euro with almost 60 percent of the debt in euro currency. The advent of the global financial crisis was followed by the stagnation of GDP growth (Fig. 2), and finally, the emergence of recession with turmoil in the capital market. The Government has decided on restrictive fiscal policy in order to avoid the further growth of the national debt. Assistance programs, that were subsequently introduced, have not shown satisfactory results and accordingly there were some debates about the role of central bank in the revitalization of the economy. In that case, selective credit policy or policy that would contain its elements is presented as a possible instrument of the CNB.

Selective credit policy in Croatia could be introduced in several ways. Due to this, quantitative and qualitative easing

can be introduced and following the FED's pattern, or the direct effect on the interest rate level, in order to facilitate the financing of the selected sectors in economy.

When considering the introduction of selective credit policies, it is logical to ask if introducing the quantitative and qualitative easing is justified because it would mean the change in size and structure of CNB balance sheet. "Table II shows assets of CNB on December 31st 2010." From this table the main characteristics of the Croatian financial system, euroization, is evident. This results in the entire assets of the central bank consisting of international reserves.

TABLE II
ASSETS OF CNB ON DECEMBER 31ST 2010 [12]

ASSETS (in billions of HRK)	31 Dec 2010	(%)
Foreign assets	78.729,1	99,98
Loans to central government	0,0	0,00
Loans to banks	13,0	0,02
Loans to other sectors	3,8	0,00
TOTAL	78.745,9	100

Selecting this option most likely would lead to introduction of a combination of the quantitative and qualitative easing with establishment of special programs modeled on those of the FED, but adjusted to the needs of a Croatian bank dominated financial system. This program has two significant downsides, described below.

- The increase in liquidity in heavily affected systems, such as the USA system, was necessary, but the introduction of the same system of quantitative and qualitative easing in Croatia loses its meaning. In a bank-dominated financial system such as the Croatian one, the increase in liquidity of financial system would refer almost entirely to the banking sector which is not facing a shortage of liquidity but bulk of loans, typical during a recession. It is likely that banks would have saved the increase in funds in liquidity, rather than in granting new loans, which is a cause of stagnation during a period of uncertainty and crisis.
- Euroization of the financial system is another limitation. The quantity of changes of balance sheet composition, regarding the operations of quantitative and credit easing, should be significant in order to achieve noticeable effects and should be carried out while maintaining price stability as the primary task of CNB. Since price stability is closely associated with exchange rate stability, due to euroization of the system, it is necessary to take their relationship into account. Because of the circulation of the HRK in the system and the possible transactions between CNB and other banks, the trade-off between the exchange rate stability and efficiency of applied policy is possible.

Considering all the possible risks and the efficiency problem in the case of Croatian shallow bank-centralized financial system, which is not linked with the lack of liquidity, the pure forms of quantitative and qualitative easing techniques are unlikely to be viable.

The second approach refers to the direct manipulation of

interest rates, which can also be accomplished in several ways. The interest rate at which commercial banks grant loans to businesses is directly affected by government's borrowing interest rate, and so this will indirectly affect the availability of private sector lending. CNB, by using discretionary measures, can also determine the interest rate level at which commercial banks will lend to the government. In that way a benchmark, the interest rate at which the government is borrowing, will be increased by the risk premium and the formed cumulative will be smaller.

Another way to manipulate the interest rate is by determining the interest rate at which banks will grant loans to a particular sector, such as manufacturing or shipbuilding industries. Interest rates formed in a discretionary way would stimulate their development of subjects in targeted industries. The effect upon economic agents can be observed in two ways; firstly the reduction in costs of borrowing would contribute to the improvement of business results; and secondly, because the demand for bank loans would be increased as a result of more favorable borrowing terms.

To the above ways of action for revitalizing the economy, in fact its different branches, it is necessary to include significant risks. One of the largest risks relates to administrative changes where the banks would simply compensate the reduced component of interest rate at which the government borrows, with an increase in risk premiums. Another problem of discretionary changing of interest rates is the classical disadvantage of interest rate ceiling. Low levels of interest rates can be considered by banks to be insufficiently high to lend to the private sector and thus consideration is given to placing funds elsewhere. In the extreme case in which interest rate ceiling affects business and households, banks consider that the interest rate does not reflect the taken risk, which causes a reduction in the volume of placed funds as banks await for a possible change of the environment, for example until such time as the demand for loans increases enough to affect an increase in interest rates. Such possibility is shown in Fig. 3 and illustrates how the determination of the interest rates by direction CC, well below the equilibrium level of free market E, leads to the exhaustion of available funds and to the appearance of a gap between the points M and N. In the scenario of reduced lending by banks, theoretically, a financial system could transition to bank privatization in which the government is unable to perform the function of market mechanisms and households and businesses, in the absence of available funds, accepted the high cost of borrowing by banks that were willing to provide it because of the high returns.

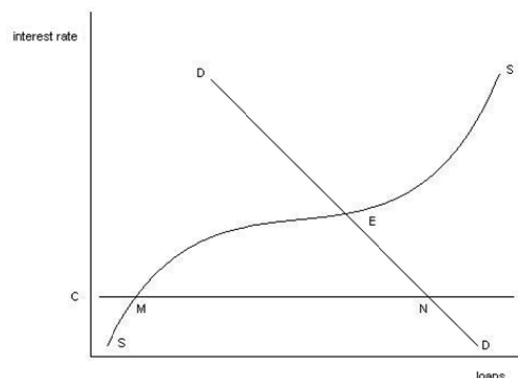


Fig. 3 The interest rate ceiling [13]

In addition to the above problems associated with discretionary formation of interest rates, there are those related to the impact on the borrowers. Lack of motivation for borrowing funds to certain industries can be interpreted in two ways. One is that the rate at which banks are willing to lend funds is too high and so businesses hardly achieve the desired business results with the high cost of borrowing. The second reason is that the risk of non-repayment of loans is too high, such that banks are not willing to credit businesses. According to the market mechanism laws, such entities will collapse on the market and will be replaced by more efficient operations, or will make the necessary changes to become more desirable borrowers. The Croatian shipbuilding industry is an example, which, despite large subsidies from the government, has not achieved satisfactory business results. Loans to this sector are the result of bank participation solely based upon government guarantees whereby the banking sector saw an opportunity to make a profit with little risk. In this way, the function of monitoring, one of the most important elements between banks and borrowers, or oversight of entity's business to which the funds are borrowed with an awareness of how its failure means the inability to refund to the lender, is lost.

Assuming the exceptional importance of certain sectors for Croatian economy, where failure is not considered as an acceptable outcome, it is necessary to find another solution. One possible solution is a program under which the banks would approve loans to a selected sector at lower interest rate that the market interest rate and the difference would be subsidized by the CNB or by a specially established government agency. The effect of such a program is shown in Fig. 4. In this way, the selected sector would receive favorable loans, and banks would charge the market interest rate at which they would be motivated to finance borrowers. The interest rate that is higher than the one which is ordered with discretionary measures by CNB and would motivate banks for the further approval of loans, while the relationship between the borrower and the lender would be the classic type without government guarantees and would motivate banks to conduct monitoring.

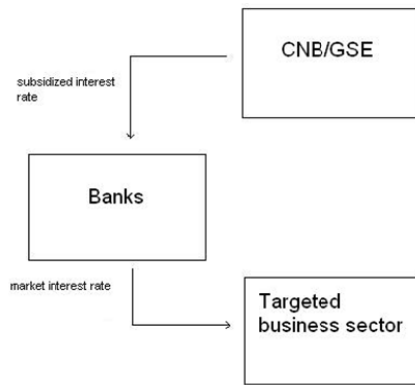


Fig. 4 Schematic overview of subsidizing the interest rate, case of Croatia

Assuming the structural changes that would provide an incentive to selected sector increase efficiency and profitability, favorable interest rates would become a basis for further development. Decision of CNB would provide approval of subsidized interest rates, while the central bank, or the selected or created agency for that purpose, would conduct only subsidization. One possibility is that this role would be undertaken by HBOR (Croatian Bank for Reconstruction and Development) on the condition of sufficient disposable funds being available. The main concept of the presented model is connecting and providing incentives to banks for lending to selected sector with minimal interference in market processes. Successful examples in practice can be found in government agencies for financing agriculture and approving student loans in the USA which managed to interest the financial institutions that were in charge of financing traditionally unattractive sectors. Due to this characteristic and the current needs of the Croatian economy, this approach is more appropriate than quantitative or qualitative easing.

Authors also provide analysis of distribution of selective monetary policy loans among economic sectors in Croatia in order to minimize the risk of borrowing and maximize the return in order to influence the GDP growth. For the purpose of this paper, authors will analyze two main variables which are as follows:

- The movement of sales within economic sectors
- The movement of gross value added within economic sectors

Sales, according to the methodology of Croatian Bureau of Statistic, includes accrued income from sales of products, goods and services to third parties, without VAT, where financial and extraordinary income are excluded. Gross value added corresponds to surplus resulting from operating activities of the company after the expenses of staff are deducted. In other words, the sales data will be used as operating income while operating expenses will be calculated deducting gross value added from sales. Dividing those two values will give us a measure of productivity and the calculations can be seen in the following table.

For the development of effective selective credit policy,

authors use a mathematical formula which will give us the answer to question of how to minimize the risk of investing funds (through granting of loans to selected sectors of the economy) and at the same time maximize the return in order to more efficiently influence the movement of the rate of growth of gross domestic product. The gross domestic product, according to the productive method, is calculated as the sum of sales and investments in inventory and it is in the interest of the person in charge of selective credit policy to find the most effective way to increase the amount of sales in order to maintain the growth rate of GDP.

TABLE III
OVERVIEW OF THE PRODUCTIVITY CALCULATIONS [14]

ECONOMIC SECTORS	2008	2009	2010
Mining and quarrying	1,00000	1,19638	1,30590
Manufacturing	1,12334	1,11755	1,11399
ELECTRICITY, GAS, STEAM AND AIR CONDITIONING	1,12638	1,16519	1,24766
Water supply, waste water management and remediation activities concerning environment	1,32473	1,32402	1,25484
CIVIL ENGINEERING	1,16065	1,16010	1,14450
TRANSPORTATION AND STORAGE	1,22419	1,20624	1,20642
Accommodation providers and food service	1,21031	1,17316	1,17258
INFORMATION AND COMMUNICATION	1,33573	1,32617	1,36176
REAL ESTATE	1,51326	1,62687	1,74461
PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES	1,24751	1,25975	1,24036
ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES	1,15612	1,14884	1,11166

The mathematical model used in this paper is taken from the Modern Portfolio Theory and it assumes investing in order to maximize return with the lowest possible risk. The general problem is presented using the following formulas:

$$\mu = \begin{bmatrix} \mu_1 \\ \vdots \\ \mu_N \end{bmatrix}, R = \begin{bmatrix} R_1 \\ \vdots \\ R_N \end{bmatrix}, w = \begin{bmatrix} w_1 \\ \vdots \\ w_N \end{bmatrix}, 1 = \begin{bmatrix} 1 \\ \vdots \\ 1 \end{bmatrix},$$

$$\Omega = COV(R), w^T \mu = \sum_{i=1}^N w_i \mu_i,$$

$$w^T \Omega w = \sum_{i=1}^N \sum_{j=1}^N w_i w_j \Omega_{i,j} \quad (1)$$

where:

μ - is the expected return on the portfolio

R - is a vector of expected returns

w - is a vector of portfolio weights and $\sum_{i=1}^N w_i = 1$

Ω - is the covariance matrix for the returns on the assets in the portfolio;

$w^T \Omega w$ - is the variance of portfolio return

$w^T \mu$ - is the return of the portfolio

The efficient frontier is found by minimizing the following expression:

$$w^T \Omega w - q * R^T w \quad (2)$$

where:

$q \geq 0$; $q \in [0, \infty]$ - is a "risk tolerance" factor, where 0 results in the portfolio with minimal risk and results in the portfolio

infinitely far out on the frontier with both expected return and risk unbounded.

After calculating all the necessary indicators and intermediate steps, the only thing left is to place restrictions on the minimum standard deviation in order to ensure minimal risk of lending to certain sectors of the economy. Results, which show the extent of investments in certain sectors, can be seen in the following table.

According to this research, and given the assumption that the Croatian National Bank is not ready to release into circulation more than 1 billion € of its international reserves in order keep national currency exchange rate stable, one could easily determine how such a policy would reflect in economy using the following formula:

$$GDP_{2011} = GDP_{2010} + 1bneuro * 1,221 * CER \quad (3)$$

where:

GDP – represents gross domestic product (275 bnHRK in 2010)

CER – currency exchange rate EUR/HRK (7.2857 for 2010)

TABLE IV
RESULTS OF CALCULATION

ECONOMIC SECTORS	Weights
Mining and quarrying	0,050%
Manufacturing	16,244%
ELECTRICITY, GAS, STEAM AND AIR CONDITIONING	7,672%
Water supply, waste water management and remediation activities concerning environment	10,164%
CIVIL ENGINEERING	9,908%
TRANSPORTATION AND STORAGE	10,598%
Accommodation providers and food service	11,453%
INFORMATION AND COMMUNICATION	10,075%
REAL ESTATE	4,151%
PROFESSIONAL, SCIENTIFIC AND TECHNICAL ACTIVITIES	9,361%
ADMINISTRATIVE AND SUPPORT SERVICE ACTIVITIES	10,323%
TOTAL	100%
RETURN ON INVESTMENT	22,091748%
STANDARD DEVIATION	0,00000314942360%

The result is that, with all other variables *ceteris paribus*, the growth rate of gross domestic product is to be 3.23%.

IV. CONCLUSION

With the appearance of the world financial crisis, the selective credit policy has unexpectedly, but justifiably, become the topic of the research papers and many analysis.

Selective credit policy has never been officially introduced in US, but programs of assistance and support to the financial system were stressed to avoid speculations about its duration. After the introduction of the programs without composition changes of the balance sheet which had not returned the expected results, the FED introduced quantitative easing and in the last quarter of 2008 had increased the balance sheet by more than 100%, thus providing direct support to the system. The final effects have been subjects of different

interpretations. While one view highlights the poor results of the recovery of the financial sector, the second underlines the role of FED policy in preventing even deeper crisis than the actual. Specifics of the potential use of selective credit policies as an instigator of economic growth in Croatia preclude the use of classical forms of quantitative and qualitative easing. Options such as specifying the rate at which Croatia borrows in discretionary way and subsidizing the interest rate for loans to certain sectors of the economy are possible, but require the alignment of monetary and fiscal policy. Understanding the effects of selective credit policy and practical examples are the bases for performing several important observations.

Selective credit policy is, regardless of its form, a rough instrument of monetary policy. In its opposites, it requires a large increase in the balance sheet, or significant changes in its composition in order to realize effects on the economy, while mostly practiced are a combination of the two forms. Such operations necessarily take place for an extended period in which the central bank, along with higher costs, takes over the role of market mechanisms and thus further contributes to the distortion of financial markets. Due to the inability to use the discount interest rate, which is usually close to or equal to zero, fine adjustments are difficult.

Authors conducted analysis in order to optimize the distribution of selective monetary policy loans among economic sectors in Croatia.

REFERENCES

- [1] C. Towe, "Exiting from Monetary Crisis Intervention Measures - Background Paper", IMF, 2010.
- [2] B. Bernanke, V. R. Reinhart and B. P. Sack, "Monetary Policy Alternatives at the Zero Bound: An Empirical Assessment" FED, Washington D.C., 2004.
- [3] S. Shiratsuka, "Size and Composition of the Central Bank Balance Sheet: Revisiting Japan's Experience of the Quantitative Easing Policy", Bank of Japan, 2010.
- [4] B. Bernanke, "Four Questions About The Financial Crisis". Speech held at Morehouse University, Atlanta, Georgia, April 14th, 2009b available at : <http://www.federalreserve.gov/newsevents/speech/bernanke20090414a.htm>
- [5] MSNBC, "It's official: US in recession", 2008, available at: http://www.msnbc.msn.com/id/27999557/ns/business-stocks_and_economy/
- [6] B. Bernanke, "The Crisis and the Policy Response". Speech held at London School of Economics, January, 13th. BIS Review 3/2009, 2009c.
- [7] A. Shleifer and R. W. Vishny, "Asset Fire Sales and Credit Easing", National Bureau of Economic Research, Cambridge, Massachusetts, 2010.
- [8] Ph. Bagus and M.H. Schiml, "A Cardiograph of the Dollar's Quality: Qualitative Easing and the Federal Reserve Balance Sheet during the Subprime Crisis", Prague Economics Papers, 3, 2010.
- [9] Federal Reserve Statistical Release, 2012, <http://www.federalreserve.gov/releases/h41/hist/>
- [10] FED Monthly Report on Credit and Liquidity Programs and the Balance Sheet, 2010, available at: http://www.federalreserve.gov/monetarypolicy/clbs_appendix_b_201005.htm
- [11] A. Ahec-Šonje, "Analiza osjetljivosti bankarskog sustava – primjena signala nemetode", Ekonomski pregled, 53 (9-10), 2002, pp. 807-848.
- [12] CNB Publications, <http://www.federalreserve.gov/releases/h41/hist/>
- [13] P. A. Samuelson and W. D. Nordhaus, Ekonomija, 15th edition, Mate, Zagreb, 2000.
- [14] Croatian Bureau of Statistic, Structural Business Statistics for Companies, April 22nd 2013.