

# MONETARY POLICY CREATES MACROECONOMIC STABILITY

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**Abstract:** *The study of monetary policy concentrates on the systematic analysis of the interaction between the major monetary policy targets and macroeconomic indicators as signals to policymakers about possible changes which may influence the macroeconomic stability. In this respect, the purpose of this article is to justify the arguments supporting the role and importance of monetary policy and its proximate targets for ensuring macroeconomic stability. The object of the study is the impact of monetary policy on macroeconomic changes. The method is analysis of monetary theory, scientific literature and documents. Such a methodological position enables justification of the influence of the key targets of the monetary policy on the global economic processes related to inflation, finance stability and economic growth.*

**Key words:** *monetary policy, targets, monetary instruments, macroeconomic indicators, money supply*

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## Introduction

The instability in the global economy encourages to review monetary policy and its role up to the current crisis. The main question is how monetary policy should be used to prevent global economic crises. The question has many aspects; some of them are addressed in this article.

First of all, we shall examine the interaction among the main monetary instruments, proximate targets of monetary policy and macroeconomic indicators such as economic growth, employment, price stability, balance of payments and exchange rate stability. Then, the focus will shift to the role of the proximate targets of monetary policy such as money supply, interest rate, exchange rate and inflation, liquidity and credit.

In this respect, the major scientific challenge of the monetary policy remains the impact of the monetary policy instruments and targets on the macroeconomic indicators in case of instability.

Before the 2007 crisis, the monetary policy in 2002–2006 was too loose even as regards the main monetary proximate targets such as money supply and macroeconomic indicators such as inflation. However, the majority of the most advanced economies successfully reduced the fluctuation of inflation during the current crisis through the regula-

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tion of money supply and other monetary targets. Unfortunately, in order to achieve the macroeconomic growth and drive the recovery from the recession in the current global economic crisis, much more was needed than just to regulate the fluctuation of inflation, no matter how important this macroeconomic indicator is. Monetary regulation instruments are combined with macroeconomic indicators because such combination can help to indicate future changes more successfully than just the examination of separate targets. Monetary policy should have two main targets: the output close to potential and a stable low inflation; “controlling inflation remains the primary responsibility of the central bank, but the crisis forces us to think about how these targets can be achieved” (Blanchard, 2010). When analyzing the interaction between monetary policy and its regulatory tools, Olivier Blanchard, in his research study about a new macroeconomic policy, has made the conclusion that the interest rate as a monetary tool is too weak to deal with excess leverage, excessive risk, etc: “We need a combination of monetary and regulatory tools”. In this respect, the main goal of this article is to develop the framework for monetary policy instruments and proximate targets in combination with macroeconomic indicators. Such a position should help to achieve a more successful implementation of the main monetary tools for the future macroeconomic expectations.

The object of the research is the interaction between monetary policy instruments, proximate targets and macroeconomic indicators.

The method used is the analysis of monetary theory, macroeconomics, scientific literature, statistics, and documents.

Money supply can be analyzed from the aspects of the quantity theory of money, by showing how money supply corresponds to the national product, and of the value of assets, by showing how the monetary base affects the assets and their value. According to the quantity theory of money, the analysis of money supply can give an answer to the question whether the surplus of money supply causes price increase and a violation of the purchasing power parity of money. If money supply increases faster than does the domestic national product, this means the potential growth of prices and a depreciation of the national currency. On the basis of the quantity theory of money, the law of inflation was developed by Irving Fisher (Fisher, 1911) and later by Victoria Chick (Chick, 1973). The analysis of money supply in regard of asset value affected by the balance of assets and liabilities held by the central bank, government and public, could predict future changes and risks for macroeconomic stability.

The paper is organized as follows. The next section deals with the monetary policy theory and monetary theory and definitions, as well as with the aspects of the significant role of monetary policy in achieving macroeconomic stability. The methodological consequences were investigated for the implementation of the monetary policy instruments in regard to macroeconomic indicators. The third section deals with the analysis of the

central banks' monetary policy during the current crisis. Macroeconomic implications during last three years were investigated as desirable results achieved by exploration of the monetary policy tools. The third section ends with the new approach, taken by the author, to the monetary policy pattern, which was implemented in selected advanced economy countries from 2007 to 2010. The article ends with the conclusions.

### **Money supply, inflation and macroeconomic stability**

Money supply should be regulated and play a significant role in achieving macroeconomic stability since the main objectives of the monetary policy should be an output close to potential and a low inflation. Money supply is still defined as the total value of banknotes, coins and bank deposits, and can be expressed as the total sum of money held by the public. The regulation of money supply is the most effective instrument of the monetary policy held by the central bank, which is always necessary, in particular when dealing with the challenges of instability (current asset liquidity, unemployment, fall in GDP, consumption as well as investment) during the recession. In each case when a country's inflation rate remains extremely high for any sustained period of time, the growth of money supply is extremely high as well, and this argument was proved by F. Mishkin (Mishkin, 1992). Such a tendency may cause hyperinflation, if the central bank fails to take timely actions to stop it by regulating the money stock in circulation. At the same time, the regulation of money supply, directly through the interest rates, makes influence on the components of GDP spending.

Under the stable conditions for production and trade growth and the velocity of money circulation, the quantity of money will increase together with the price level. Naturally, the price level in reality is immediately affected by a variety of factors, such as price variation on the global market, investments and new technologies, new products, etc. In this respect, the basic requirement for the monetary policy is to prevent the initiation of inflation, i.e. to provide conditions for ensuring price stability by regulating money supply and using the knowledge of the demand for determining the quantity of money. If the quantity of money increases for reasons other than growth of production and domestic national product, it leads to a rise in prices.

Money supply as a general target of the monetary policy, together with other related targets, always creates the environment for the price stability, balance of payments and exchange rate stability.

By means of monetary policy, central banks need to control money supply as a proximate target which directly affects the level of inflation. Therefore, monetary policy affects the economy by changing the quantity of money through different econometric models of the classical theory by way of interaction between the theoretical and empiri-

cal aspects of monetary policy. Also, the level of the national money supply depends on the interaction between various asset markets.

Investigation of the relationship between money supply and macroeconomic goals such as economic growth, price stability, high income, exchange rate stability could be carried out on the basis of equations obtained from empirical investigations.

Having results of these equations, we could determine what changes should be made in the monetary policy to keep inflation at a lower level.

Many scientific studies were conducted at the end of the 1970s after the oil crisis in the world, before 1985 and after 1985 up to 2009. These scientific investigations resulted in the approval of open financial markets with floating exchange rates. The floating exchange rate allows a supplementary monetary influence on the economic system. If a central bank adopts a fixed exchange rate, it is deprived of monetary policy instruments regulating money supply; consequently, it may be necessary to change the fixed exchange rate by a sudden decision in the face of the increasing price level or even a financial crisis. Thus, the scientific investigations resulted in:

- the acceptance of market exchange rate a floating exchange rate;
- the acceptance that variables in the use of money by consumers and intermediaries play a crucial role;
- the acceptance that both the exchange rate and the interest rate are the crucial channels for monetary policy to transform and affect the economic system.

Thus, we proved a relationship among exchange rate, money supply and inflation. Economists employ Tinbergen's equations (Tinbergen, 1967) to assess the impact of the results of macroeconomic policies. The determination of the macroeconomic results is very sensitive and inevitable. The central principle of this analysis is that there must be at least one effective instrument in place to achieve a definite target .

Accepting the above statements about the regulation of money supply, including the theory of quantity of money, money supply could be described as a supplementary function (M) depending on deflator (P) as price level, (y) incomes, (r) interest rate, interest rate of money itself ( $r_m$ ), and ( $p^e$ ) the expected inflation rate.

$$M = Pf(y, r, r_m, p^e); \tag{1}$$

$$f_y > 0; f_p < 0; f_r < 0; f_{r_m} > 0.$$

The equation was developed in the course of empirical investigations. The difference between theories and viewpoints was ignored. Here, the price level  $P$  is a scale variable implying that the demand for money is the demand for real money balances, income  $y$  is a proxy for transactions or a proxy for wealth. Thus, variables  $y, r, r_m$  are exogenously obtained from the market.

The expected inflation rate  $p^e$  is a variable which is obtained from monetary targets. So,  $y, r, r_m$  are taken from the area of exogenous variables, which at the same time are the goal or target of the monetary policy. The expected inflation rate  $p^e$  is from the area of endogenous variables obtained from monetary targets.

In practice, the implementation of this empirical equation is possible only by investigating each separate variable.

The prices of real capital portfolio will be affected by the following channels:

- the anticipated rate of inflation ( $p$ ),
- anticipated return on real capital per unit of capital ( $e$ ),
- anticipated prices ( $ap$ ),
- nominal interest rate ( $r$ ).

The quantity of issued base money (currency)  $B$  and bonds  $S$  could be obtained by the equations<sup>1</sup>:

$$B = \lambda (r, p, ap, w, H, e) \quad (2)$$

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$$S = \beta (r - \pi, p, ap, w, H, e) \quad (3)$$

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$$W = PK + vS + B. \quad (4)$$

The real capital  $K$  is productive, earns additional income, is used for the production of goods and services, sells at a price  $P$ , and its nominal value of the capital stock is  $PK$ . National consumption is financed by issuing money, their base  $B$  and bonds  $S$ . Debts are rated following the effective interest rate;  $VS$  presents the market value of a still-outstanding debt. By buying bonds, the public lends money to the bond issuer.  $W$  is the value of the public assets market or the net liabilities. The variables marked by pluses and minuses at the bottom show the answers how an argument (variable) affects the assets functions  $\lambda$  and  $\beta$ ,  $B$  and  $S$  respectively, or the reaction of functions to the arguments. The function of the money base  $B$  decreases due to the increase in interest rates  $r$ ; i.e. the larger interest rates have to be paid, the more money the public has to have, and, for example, the rise in the price of capital  $P$  (the market value of the capital stock  $PK$ ) adds to the money base; the larger the market value of a share, the higher its price; it also results in a larger income generated by a share owner, measured in money, and it increases its function of the need for money and the money base  $B$ ; increasing prices (in general) also boost the function of the need for money; rising inflation, which reflects not only

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<sup>1</sup> These formulas demand derivatives as they illustrate the results of empirical research. Derivative formulas and equation systems may be found elsewhere (Višokavičienė, 1998; (Višokavičienė, 2008).

the deflator increase, but also the currency devaluation in progress, decreases the money base as it devaluates the latter. The rise in the market value of the available resources  $W$  increases the money base and the growth in human (labour) capital or labour value as well as  $B$ ; the anticipated growth in capital return  $e$  per capital unit will decrease the money base  $B$  because, in the hope for larger profit in future, the public will try to acquire as much assets as possible by using the money it already has. When  $r - \pi$  is positive and the difference between  $r$  and  $\pi$  is growing, the function of debts  $S$  as the loan granted by the public in the form of the bonds acquired will increase accordingly; the rise in the assets price  $P$  will also increase  $S$  because the interests rates  $r$  will rise correspondingly; the current and anticipated growth in prices  $P$  and  $ap$  will reduce the tendency towards having larger  $S$ ; in such a case, the public expects that the rise in prices as the outcome of inflation will also increase the interest rates of bonds issued in future and then it will appear that it is more advantageous to buy bonds in future than at the moment, as well as  $S$  may decrease with the hope of its increase in the forthcoming years. The growth in the market value of assets  $W$  may always potentially increase  $S$ , too, and the the growth in labour value  $H$  increases income; it means that the solvent demand will also be shaped for buying bonds, i.e. an increase in  $S$ ; the anticipated growth in the return per capital unit  $e$  will cut  $S$  as the need will rise for  $K$ .

As we see, the effect of these variables on the function was examined here by adhering only to the relationship between one variable and the function or to the relationship between two variables and the function. The explanation is based on the logics and on equations (2), (3) and (4) worked out by carrying empirical research and mathematical analysis.

The expected rate of inflation  $\pi$  and expected return per unit of capital  $e$  are the principal channels of the impact on the asset market. The anticipated prices  $ap$ , the anticipated rate of inflation  $\pi$  and the nominal rate of interest  $r$  are the major funds that affect the current price of the asset package and the value  $W$ .

We will use equalities (2), (3) and (4) to find the equilibrium conditions in compliance with the values of  $r$ ,  $P$ ,  $B$ ,  $S$  and  $K$ . We shall define that  $\beta$  dependence on  $P$  is positive: rising  $P$  increases  $\beta$  function depending on the arguments (variables) in brackets. The reason is that an increase of  $P$  constantly reduces return on real assets affecting the substitutes, i.e. securities. More specifically, if the price of assets goes up while its return goes down, the value of shares is likely to decrease; so is the return on them.

On the basis of the relationship between exchange rate, money supply and inflation (as the price level of GDP and consumption deflator), we could investigate another relationship between ultimate target variables and those we wish to influence. Nowadays the main goal for policymakers is the recovery after the global financial crisis. In the context of the role of monetary policy instruments discussed above, we can analyse the behaviour of monetary policymakers during the current global crisis (2007–2010).

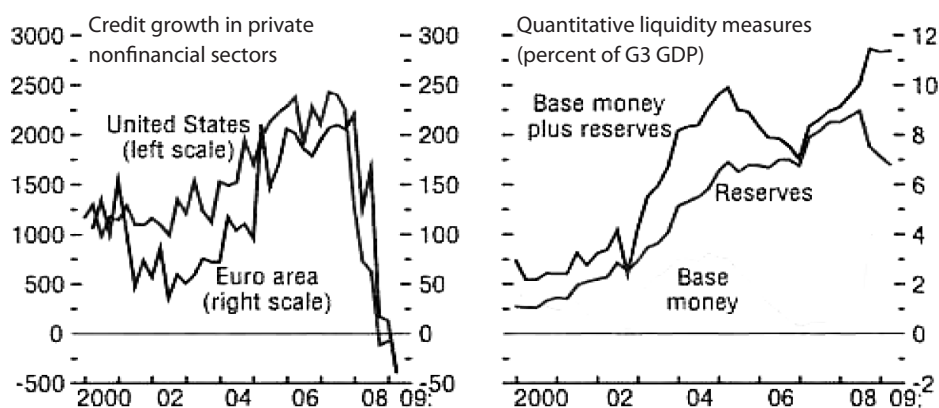


FIG. 1. **Measures of monetary policy and liquidity in selected advanced economies**  
(global financial stability report, 2009)

The issue of whether policymakers should or should not respond to the leading indicators is taken up later by examination of empirical evidence on how booms in credit, asset prices, and investment bring about banking crises and asset price busts; the present empirical evidence was analyzed by Borio and Lowe (Borio and Lowe, 2002). Figure 1 shows that measures of monetary policy and liquidity in selected advanced economies during the period 2007–2008 were implemented by reducing the central banks’ reserves. Also central banks have opted for unusually large interest rate cuts to combat the recession. In addition, they have intervened in credit and asset markets by easing financial conditions. Figure 1 shows that in 2007 the credit growth in the US private nonfinancial sectors fell by 2500 billion U.S. dollars (there are quarter-over-quarter changes; in billions of local currency). As figures show, the credit fall demanded monetary policymakers to reduce reserve requirements and extend supplementary financial support for maintaining the banking liquidity in future.

Selected macroeconomic variables before and during house price busts represent the relationship between credit and GDP growth, house price growth and inflation, changes of current account and investments. The post-1985 period shows large increases in credit growth and in the ratio of investment to GDP during the run-up to stock price busts. The question is how predictive these variables are. From a policymaker’s perspective, abnormal credit initiates inflation growth, and these extreme movements may strongly signal impending asset price busts (Global Financial Report, 2009). Therefore, monetary policymakers must choose the monetary instruments to minimize the growth of the credit/GDP ratio. Unfortunately, monetary policy was too loose at that time. During 2009, however, central banks in advanced economies offered a huge financial infusion to support credit resources, liquidity and GDP growth. GDP growth was observed and estimated in all advanced countries at the end of 2009 as a result of successful monetary policy instruments increasing money supply.



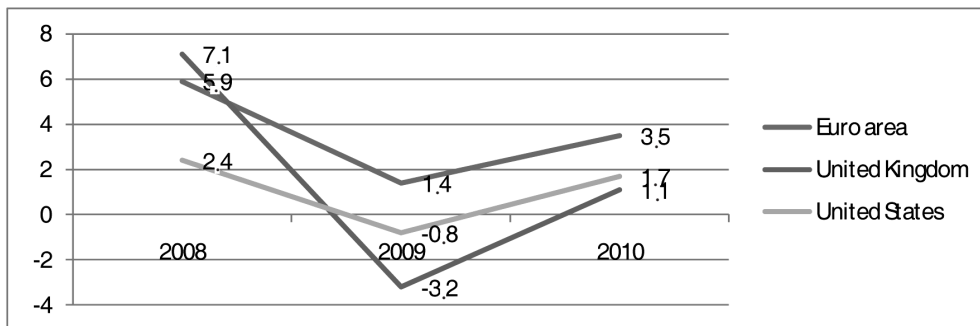


FIG. 2. **Growth of credit demand from nonfinancial private sector, per cent**  
(prepared by the author on the basis of the Global Financial Stability Report, 2009)

The weak economic activity in selected advanced economy countries, as figures show, restrained private sector credit demand during 2008, but, according to the IMF and national authority's expectations, private sector demand for borrowing will increase in 2010. It has been noted that the demand increases in three broad sectors – nonfinancial corporates, residential mortgages, and nonmortgage consumer credit. The expected growth of credit demand in the nonfinancial sector in 2010 is consistent with the projections for the relevant macro-variables such as the growth of real private sector output and private consumption, which was primarily driven by private consumption expenditure, demonstrating the emergence of favourable conditions for credit demand (Global Financial Stability Report, 2009).

In advanced economies, the real GDP will improve from –3.4 percent in 2009 to 1.3 percent in 2010: in the USA from –2.7 percent to 0.3 and in the euro area from –4.2 percent to 0.3 percent (Global Financial Stability Report, 2009).

Despite the huge financial support to credit resources and liquidity in the advanced economies in 2009, inflation fell below zero, core inflation fell below 2 percent all over the world as well as in emerging economies (IMF World Economic Outlook, 2009). The trend of such inflation could be explained by a significant excess capacity. At the same time, the risk of long-time deflation is low because the expected inflation rate in a number of economies is still within 1–2 %. “In the advanced economies, potential output growth rates have taken a hit, with activity in the housing and financial sectors slumping and a need for a reallocation of resources toward other sectors” (IMF World Economic Outlook, 2009).

### Central bank interventions

During the current crisis, monetary policy manifests itself as huge infusions of money to maintain banking liquidity. When exploring traditional monetary policy tools, all monetary remedies can be classified into interest rate changes and liquidity support.



Although market reaction shows that the countries which implemented monetary policy interventions indeed fared better in the current crisis as far as the GDP growth is concerned, the results should not be taken as anything more than suggestive correlations. Money supply growth supported liquidity and stimulated output growth during the recession, since central bank reserves and interest rate reduction created macroeconomic stability by providing facilities for lending and future credit growth in the private sector. At the same time, all advanced economies encouraged investment as well as consumption. Therefore, the real GDP growth was observed, as figures show, in all advanced economies.

TABLE 1. **Market interventions – classifications of events** (Data from Global Financial Stability Report, 2009)

<b>Central Bank – monetary policy and liquidity support</b>	
Measures	Tools
Interest rate change	Reduction of interest rates
Liquidity support	Reserve requirements, longer funding terms, more auctions, and higher credit lines; domestic system lender of last resort: broader set of eligible institutions, wider collateral rules; other liquidity support (support of money market funds); foreign exchange lender of last resort: forex swap lines (with other central banks) and forex repos.
<b>Government – financial sector stabilization measures</b>	
Recapitalization	Capital injection (common stock/preferred equity) Capital injection (subordinated debt)
Liability guarantees	Debt guarantee (all liabilities, new liabilities) Government lending to an individual institution
Asset purchases	Asset purchases (individual assets, bank by bank) Provisions of liquidity in the context of bad asset purchases/removal. Asset guarantees.

The main goal of such interventions, however, was to restore the market's confidence and prevent the collapse of the financial system. The analysis of the effectiveness of intervention in markets should include the study of the long-term sustainable growth of the economy. We should examine future changes of different variables and indicators of monetary targets as well as macroeconomic stability indicators. Taking this attitude, monetary proximate targets should be re-examined later when the money supply infusions will decrease and the impact of interventions in money markets diminishes.

The impact of the huge long-term support of central banks of the selected countries (the intervention of the U.S. Federal Reserve Bank was most substantial and amounted to 1000 billion U.S. dollars) will become apparent later because it is too early to assess the effectiveness of such interventions as the estimations of capital flow changes or future interest rate changes are still to follow.

TABLE 2. **Major crisis interventions introduced by central banks** (Global Financial Stability Report, 2009).

	Maximum amount	Amount used as of the end of June 2009
<b>Bank of England (in billions of pounds sterling)</b>		
Outright purchases of assets		
Asset purchase facility <sup>1</sup>	175	105
<b>Bank of Japan (in billions of yen)</b>		
Short-term liquidity provisions		
SFSOFCF <sup>2</sup>	Unlimited	7,467
Outright purchases of assets		
Commercial paper	3,000	197
Corporate bonds	1,000	174
<b>European Central Bank (in billions of euros)</b>		
Short-term liquidity provisions		
Long-term refinancing operations <sup>3</sup>	Unlimited	728
Outright purchases of assets		
Covered bonds	60	0
<b>U.S. Federal Reserve (in billions of U.S. dollars)</b>		
Short-term liquidity provision		
TAF	– <sup>4</sup>	282
CPFF	– <sup>5</sup>	114
Long-term liquidity provision		
TALF	1,000	25
Outright purchases of assets		
Agency mortgage-backed securities	1,250	462
Agency debt	200	97
Treasury securities	300	184

<sup>1</sup> Purchasing commercial paper, corporate bonds, and gilts.

<sup>2</sup> Providing liquidity against collateral of private credit instruments up to three months.

<sup>3</sup> Providing liquidity up to one year.

<sup>4</sup> The amount is determined at each auction.

<sup>5</sup> There is a limit per issuer.

In future, central banks should play a greater role in macroeconomic changes. The appropriate policy response should be shaped subsequent to the systematic analysis of the interaction between monetary policy instruments, targets and macroeconomic indicators following the suggested monetary policy pattern. Thus, according to the monetary policy pattern, central banks, by exploiting all main monetary instruments, can control proximate targets and macroeconomic variables.

The monetary policy pattern indicates the current monetary policy instruments, implemented during the recent crisis of 2007–2010, and proximate targets of the traditional monetary policy as well as macroeconomic stability goals, which can be achieved duly combining the monetary policy and the fiscal policy.

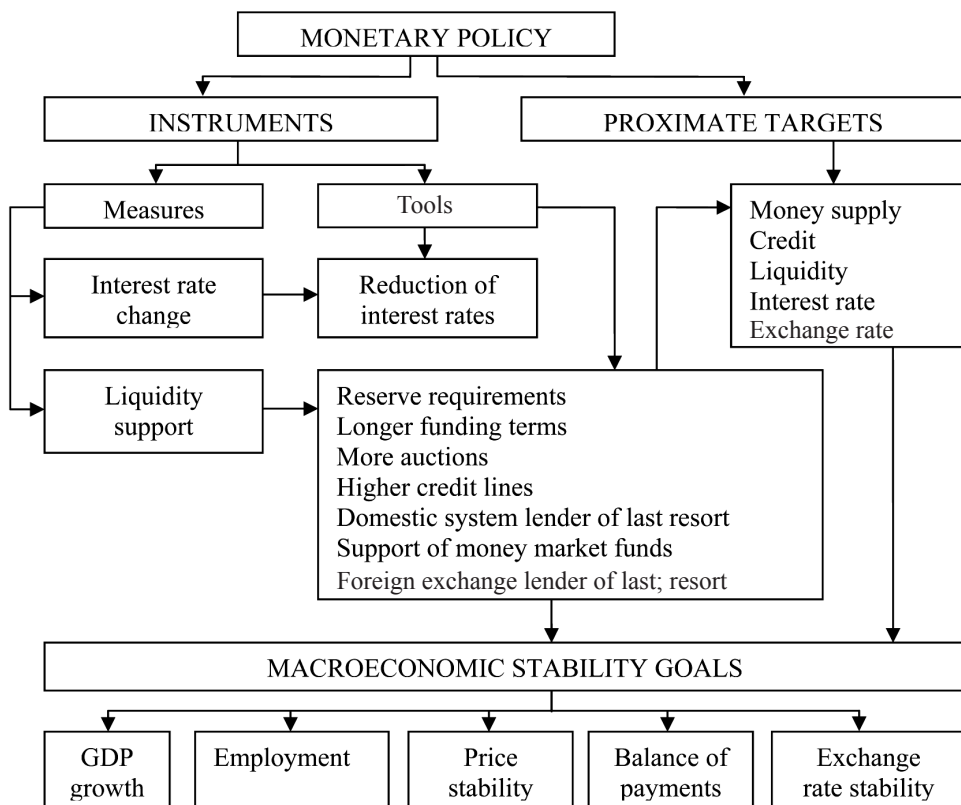


FIG. 3. **Monetary policy pattern** (developed by author and adjusted to the monetary policy developments in advanced economies in 2007–2010)

As figures show, in 2010 the real GDP growth is expected to rise by 1.3% versus –3.4 % in 2009. The inflation remains low; the core inflation fell below 2% all over the world in 2009; consumer prices in the advanced economies fell below 0.1% in 2009; the annual change of 1.1% in consumer prices is expected in 2010 (Global Financial Stability Report, 2009).

The exchange rate (as U.S. dollars per euro) increased from 1.3 dollar per euro at the end of 2008 to 1.4 dollar per euro in 2009 in the euro area. A decline of the exchange rate was observed during the first three quarters of 2008; the fluctuations of the euro will continue within the limits of 1%, but generally the euro will appreciate and, according to the IMF expectations, this sustainable trend will be maintained throughout 2010 (Global financial stability report, 2009). In nominal effective terms, the U.S. dollar depreciated about 10% during 2009. The exchange rate as a proximate target simultaneously serves as a monetary indicator for the estimation of future price changes, especially in case of the inflation in the country of import trading partners, since the domestic currencies of other countries appreciate as compared to the currency of the country experiencing inflation.

Central banks made use of the traditional monetary policy tools such as support for liquidity of commercial banks and lender of last resort, thus increasing deposits and decreasing interbank lending interest rates. The market took advantage of the favourable borrowing terms and increased investment; therefore, the credit demand began to rise in the non-financial sector. The market, in its turn, started increasing its output and prompting the GDP growth. The statistics show GDP growth from  $-3.4\%$  to  $1.3\%$  in all advanced economies (Global Financial Stability Report, 2009).

Assuming the basic macroeconomic indicators and monetary policy targets which were achieved thanks to the huge financial support provided by central banks and governments in advanced economies, we can conclude that the recovery from the crisis began in 2009, as the above-mentioned indicators show. Unfortunately, the high level of unemployment ( $9.3\%$ ) is still the main problem of these countries.

## **Conclusions**

The goal of the monetary policy is primarily to maintain macroeconomic stability; in the pre-crisis period (2002–2006), however, the monetary policy was too loose. The credit expansion and the growth of asset prices did not receive adequate response. This once again necessitates and proves the need for monetary policymakers to apply all monetary policy instruments to monitor and control all monetary policy targets. As the past years marked by the crisis show, central banks of advanced economy countries restored the confidence in banks by means of large financial injections and provided business with borrowing opportunities at low interest rates and favourable conditions, and this resulted in the growth of credit demand, industrial output, and GDP.

The application of monetary policy theory assists in finding an interaction between the major targets of the monetary policy and fundamental macroeconomic indicators. The interaction among the main monetary instruments, proximate targets of the monetary policy and macroeconomic indicators should be constantly examined using the empirical methods of analysis, which enable more clear and correct forecasts of future macroeconomic instabilities.

The empirical investigations, however, bring us to the conclusion that the main problem still exists in finding an effective combination of monetary and regulatory tools. In order to achieve the macroeconomic growth and drive the recovery from the recession in the current global economic crisis, much more was needed than just to regulate the fluctuation of inflation because deflation was caused mainly by the credit fall in 2008 and the weak activity of the private sector.

Analysis of the implications of monetary policy instruments applied during the current global crisis shows a significant expansion of money supply for achieving liquidity as a proximate target as well as ensuring simultaneous interest rate cuts.

Unfortunately, all efforts of monetary policymakers to achieve a long-term macroeconomic stability by providing a huge financial infusion during the current crisis cannot help to predict unwelcome developments in future. Despite some acceptable macroeconomic indicators such as GDP growth, lower inflation, exchange rate stability as well as the improved balance of payments in selected advanced economies, there is an unacceptable unemployment rate which would have been even higher without such monetary interventions. The credit growth in the private sector and the growth of credit demand indicate the recovering activity of the nonfinancial private sector, which was encouraged by the interest rate cuts and other favourable credit conditions as well as the increasing liquidity of banks. However, it is too early to talk about the long-term stability.

Money supply should be analysed from the perspective of the quantity theory of money. If money supply increases faster than does the domestic national product, this means a potential growth of prices and a depreciation of the national currency. In this respect, money supply should be controlled by central banks.

According to the suggested monetary policy pattern and the main theoretical approach, a proper combination of monetary and regulatory tools could help to improve the forecast of the future macroeconomic situation as well as the effectiveness of monetary policy actions.

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