

## **CHAPTER 6**

### **THE STRUCTURE OF MONEY SUPPLY IN POLAND DURING AND BEFORE FINANCIAL CRISES**

#### **Introduction**

The aim of article is analyses of money supply structure in Poland before and during international financial crises. Main paper thesis is that this structure is under strong influence of the crises, what results in changes of such important variables as money multiplier and velocity of money. Therefore research dealing with these variables can give the answer to question about how deep is the crises in Poland and if its results are already visible. Such research gives us also better understanding of changes in money supply components and better knowledge about their role can add additional dimension to monetary policy.

The first question which has to be asked is about the rationale behind linking monetary policy to speculative bubbles and the policy efficiency in preventing such bubbles and economic crises. There is quite a lot of papers negating such possibility on the basis of insufficient precision of monetary tools (Posen, 2006); (Mishkin, 1997) or based on paradigm of neutrality of money (Bullard, 1999). However some economist has always stressed the need for including in monetary policy the risks arising from financial sector and capital markets (Ling, 2006), (Roubini, 2006). These proposals has got “new charm” when present crises hit the global economy (Bredin, 2007) (Więznowski, 2009). In these latter articles authors stress the possibility and need to include, among central bank goals, stabilization of financial markets, preventing the bubbles and financial crises and responding to more variables then just inflation indexes (The New Monetary Policy, 2005).

The second question is dealing with the fact, that it is not obvious, that money and monetary variables other then interest rates has to be taken into account when analyzing monetary policy and the preconditions for the crises. However it is also fact, that the second pillar of ECB monetary policy is control over supply of money (Gaspar, 2001). There is also a lot of publications – some of them very recent – confirming the importance of money for the economy and any successful economic policy (Setterfield, 2006) (Hafer, 2001). Therefore there is a possibility and a need of the analyses of money supply behavior before and during the financial crises. Such analyses should take into account structure and dynamic of monetary variables. The more popular tools of monetary policy – especially central bank interest rates - are excluded from this research, as the categories much more deeply researched and well known.

The research of money supply structure concentrates on reserve money, narrow money and wide definition of money (M0, M1, M3). Present NBP’ definitions are used, as describing researched variables in most coherent form. Those definitions are also similar to definitions used by international institutions and other central banks.

The research consists of 5 stages – introduction, description of changes in money supply structure in Poland, analyzing variations in money supply dynamics, changes of money multiplier and velocity of money. Then the conclusions are presented.

The period researched are years 1997 – 2009, what creates possibility to compare present crises with past data of more stable periods as well as last stagnation of Polish economy (years 1999 – 2002).

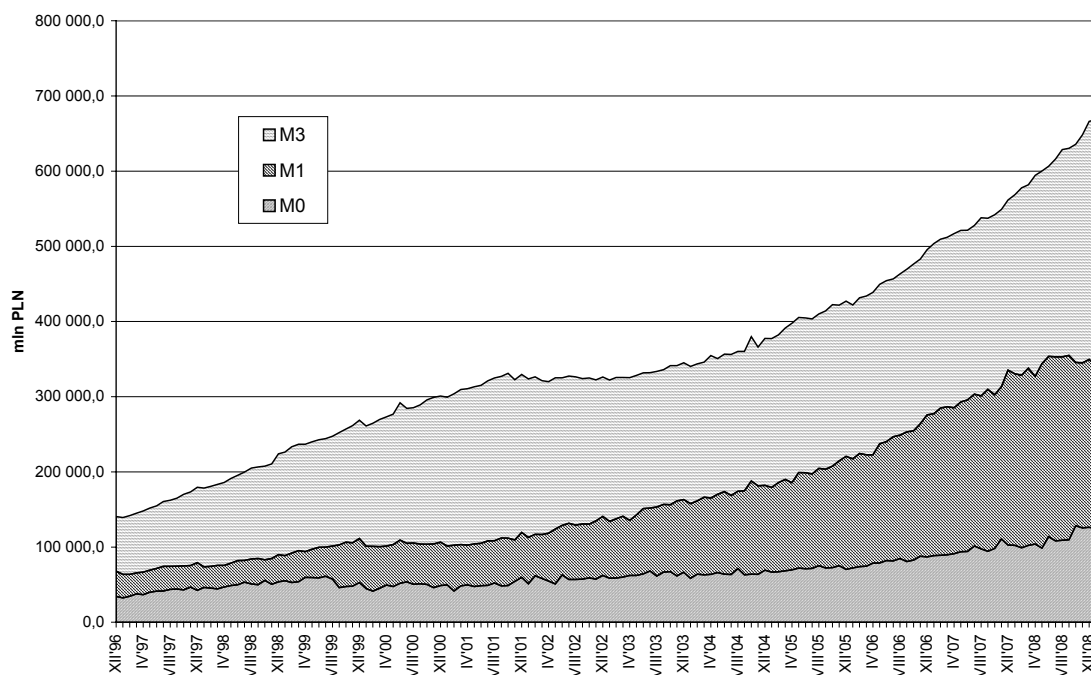
Taking into account the scope of this article, mostly simple statistical tools are used, supplemented by graphs and tables.

### Money supply structure 1997 – 2009

Money supply has changed substantially in the researched period. First of all there was growth of all researched variables, which was much quicker than the growth of PKB and global value of all transactions (picture 1). The yearly growth of PKB averaged 4,7% in the period 1997 – 2008, when average growth of reserve money was 10,6% yearly, average yearly growth of M3 equaled 13,6% and growth of M1 averaged 15,5%. The resulting difference was consumed by inflation (average yearly growth of prices in Poland of 5,5% between 1997 and 2008) and decrease in velocity of money.

There were also big differences in relative changes of different components of money supply – until mid 2001 the liquidity of money supply structure decreased quickly, partly caused by lowering obligatory reserves ratio and sterilization operation of NBP. On July 21<sup>st</sup> 1999 NBP lowered obligatory reserves to bring them closer to European Monetary Union levels, however to prevent unprecedented growth of money supply caused by such changes it sterilized markets withdrawing huge amounts of cash (Więznowski, 2003). The other factor was the development of Polish economy and its financial system, what meant more possibilities of profitable ways of saving. Then for almost 3 years the M3 aggregate stagnated, reserve money, including cash in circulation, was unstable but fluctuated around the same level and money deposited on current accounts increased very rapidly. This was most probably the result of quick growth of popularity of current accounts among wide groups of employees, retirees and wider use of credit by households, when the whole economy was still stagnated. Then, starting at the time when Poland entered European Union and lasting until the end of year 2007, all monetary aggregates increased quickly, what paralleled the development of our economy.

Chart 1. Money supply in Poland 1996 – 2009



Source: Own compilation based on [www.nbp.pl](http://www.nbp.pl), miarypieniadza\_nowe.xls, as on April 2009.

In the last 15 months the pattern of changes again changed, with stabilization of reserve money amount, substantial decrease of M1 and continuing increases of M3. These very last changes are visible result of financial crisis.

All the results described above can be supported by data presented in table 1, where the structure of money supply for break even points is analyzed. To properly describe structure of money, when every wider monetary aggregate includes the more narrow ones, only the differences were analyzed. Therefore the aggregate M1 was subtracted from the aggregate M3, to account for the least liquid part of money supply. Then the reserve money was subtracted from M1, to account for money deposited on current accounts. Reserve money (M0) was analyzed in “gross” amounts.

Table 1. Structure of money supply in Poland 1996 – 2009

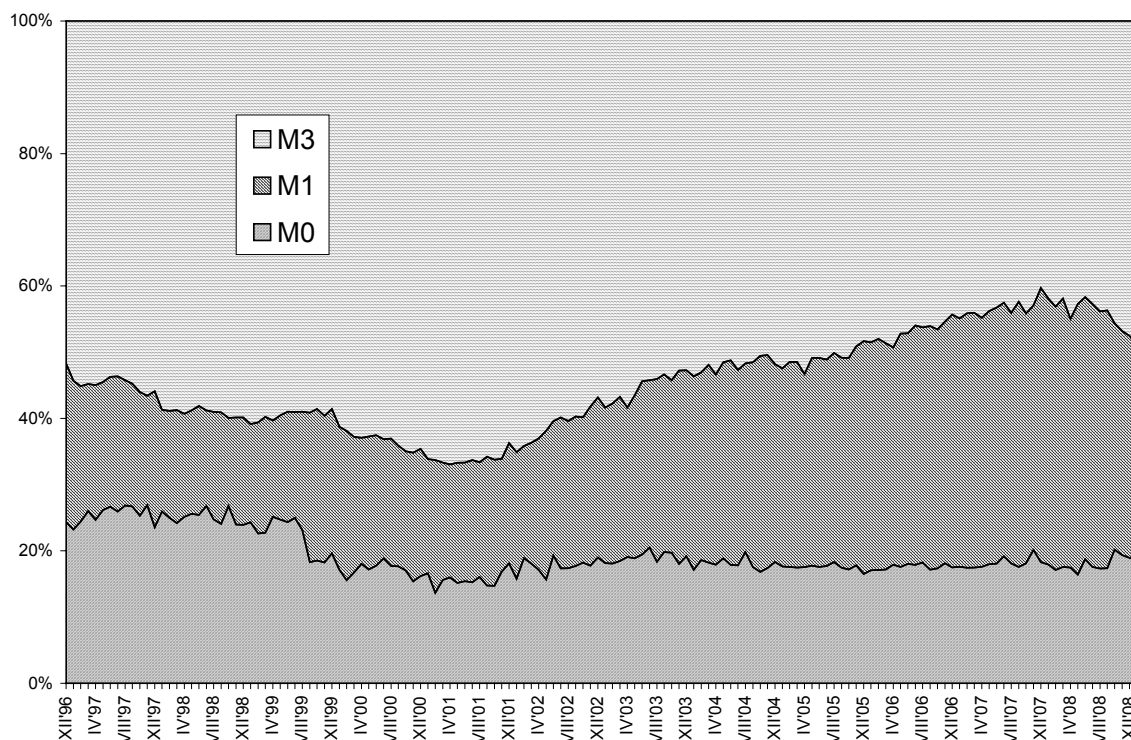
<b>Okres</b>	<b>M0</b>	<b>M1-M0</b>	<b>M3-M1</b>
Dec 96	24,35%	23,98%	51,67%
Jul 99	24,98%	15,98%	59,04%
May 01	15,18%	18,13%	66,69%
May 04	18,88%	29,60%	51,52%
Dec 07	18,28%	41,42%	40,30%
Feb 09	18,77%	32,27%	48,95%

Source: Own compilation based on data from [www.nbp.pl](http://www.nbp.pl), as of April 2009

The most liquid money supply consisted in one forth of cash in circulation and monetary reserves until July 1999. That way the money multiplier was just below 4, confirming limited efficiency of Polish financial system and big stream of cash circulating outside banking sector. Then the huge and unpredictable changes in components of money supply occurred, being clear indication that NBP lost control over monetary variables. This is confirmed by substantial increase in inflation (from less than 7% to more than 10% yearly – so increase of more than 40%) which occurred in years 1999 – 2000 and sky high real central bank interest rates that followed (13% in 2000 and 10% in 2001).<sup>1</sup> All in all reserve money share was reduced to just 15% (and money multiplier jumped to 6,7), when the share of the least liquid components as saving accounts increased sharply to two – thirds of money supply. Such structure created insufficient liquidity in the economy and monetary policy was one of the most important factors responsible for stagnation of Polish economy and very high unemployment rate.

<sup>1</sup> Own calculation based on IMF Financial Statistic Yearbook 2005, p. 490 – 492.

Chart 2. The structure of money supply in Poland



Source: Own calculation based on data from [www.nbp.pl](http://www.nbp.pl), as of April 2009.

The reserve money share was surprisingly stable for more than next 6 years, standing at 18% after described variations. It can not be said about other components of money supply, which changed their shares in different directions. In the last 14 months (December 2007 – February 2009) the share of M1 minus M0 components (current accounts and other) decreased rapidly by almost 25%. However it has not been a proof of panic of Polish withdrawing their money from financial institutions, because the share of reserve money stayed stable. It rather marked the substantial move from liquid – current accounts into much more profitable deposits and saving accounts, which share at the same time increased by one – fifth (table 1 and picture 2).

### Money supply dynamics 1997 – 2009

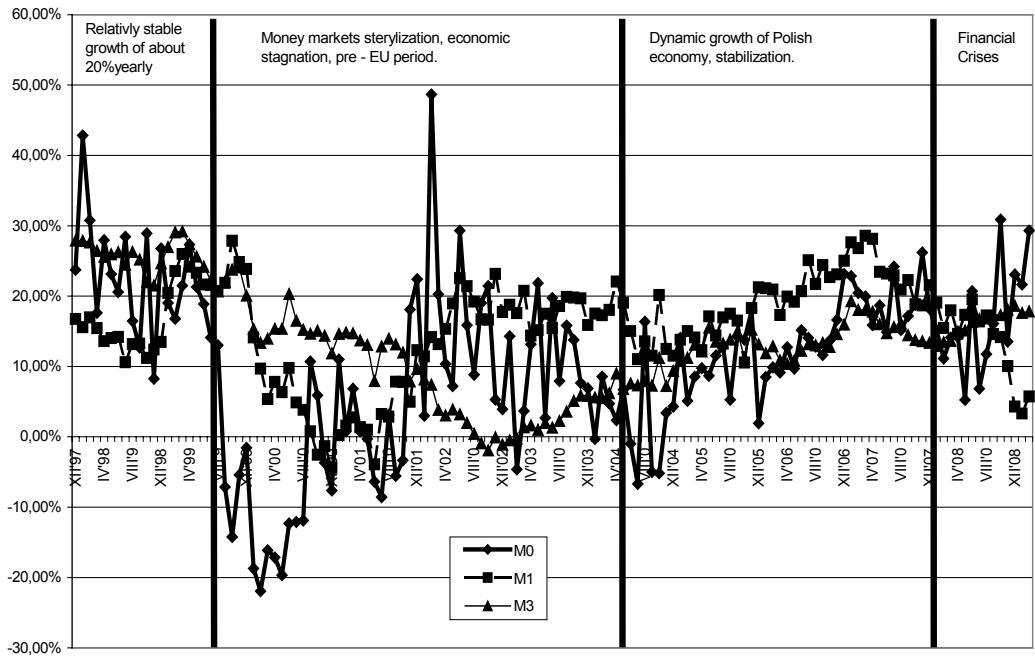
Different, however complementary information can be derived from analyzing the dynamics of components of money supply in Poland in researched period. First the whole period is verified and results are presented on picture 3.

The 4 main periods can be identified. The first one lasted until July 1999 and was characterized by relatively stable growth of all monetary variables with average of about 20% yearly. Here again the unprecedented variability of different monetary aggregates in the period July 1999 – May 2004 is clearly visible. Then the variability of all 3 researched components of money supply much narrowed, with stably growing dynamics from about 10% yearly growth in 2004 to average growth of 18% - 20% in 2007. For the year 2008 the variability of money supply components increased again – what is the only visible feature for such short time at the picture illustrating such a long period. However this variability still has not reached the levels characterizing money in Poland at the start of this century.

For more detailed analysis the researched period is shortened to years 2007 – 2009 and data is presented for monetary aggregates diminished by overlapping data – for example the

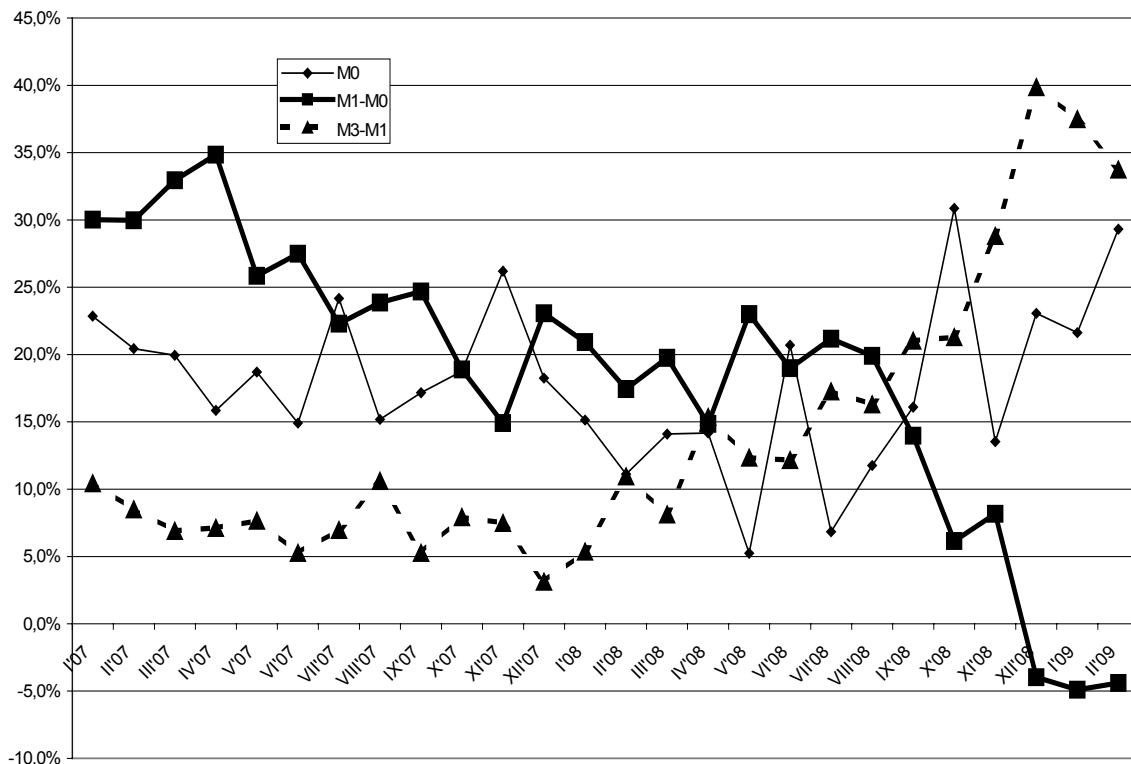
dynamics of components of M3 not included in M1 is analyzed (picture 4).

Chart 3. Money supply dynamics in Poland, yoy.



Source: Own calculation based on data from [www.nbp.pl](http://www.nbp.pl), [miarypieniędza\\_nowe.xls](#), as of April 2009.

Chart 4. Dynamic of money supply components in crises, yoy, Poland.



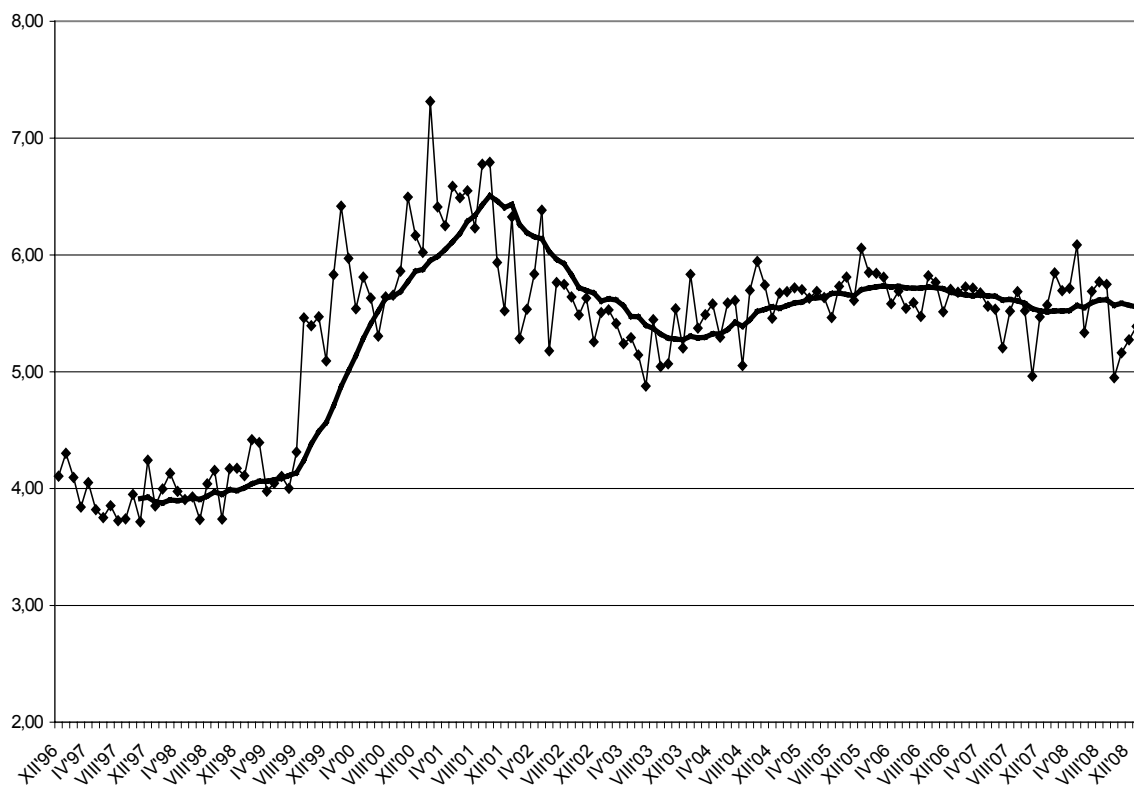
Source: Own calculation based on data from [www.nbp.pl](http://www.nbp.pl), [miarypieniędza\\_nowe.xls](#), as of April 2009

Until early months of 2008 nothing special happened to money supply. Then the dynamics of the least liquid components started to rise, from less than 5% against the same month of previous year in December 2007 to 40% yearly in December 2008. This trend can be explained by reverting into money much more risky assets invested on the stock market when seeking the best possible profitability. One quarter later reserve money dynamics get destabilized followed by rapid decreases in dynamics of M1 minus M0 component. These decreases have brought dynamics of this category down to minus 5% in December 2008, January and February 2009, on a yearly basis. It has to be underlined that in August 2009 this category was growing at speed of 20% yearly. This reduction was probably caused by withdrawal of cash from banks by some customers frightened by crises and moving into more profitable but less liquid assets by the others. However the whole process is, at least until now, much more stable and orderly than rapid and unpredictable changes of last stagnation (2000 – 2002).

### Money Multiplier

Money multiplier for Poland was calculated for aggregate M3. This aggregate was chosen because starting from March 2002 wide definition of money (M3) became the basic analytical and communication monetary category for Poland (www.nbp.pl, 2009). Again years starting December 1996 onward were analyzed to include in the research volatile years of slow down after 1997, sterilization policy accompanying reduction of obligatory reserves in July 1999, Polish stagnation years 2000 – 2002, as well as the rapid development that followed (picture 5).

Chart 5. Money multiplier (M3), Poland 1996 – 2009 (monthly level and 12 month moving average)



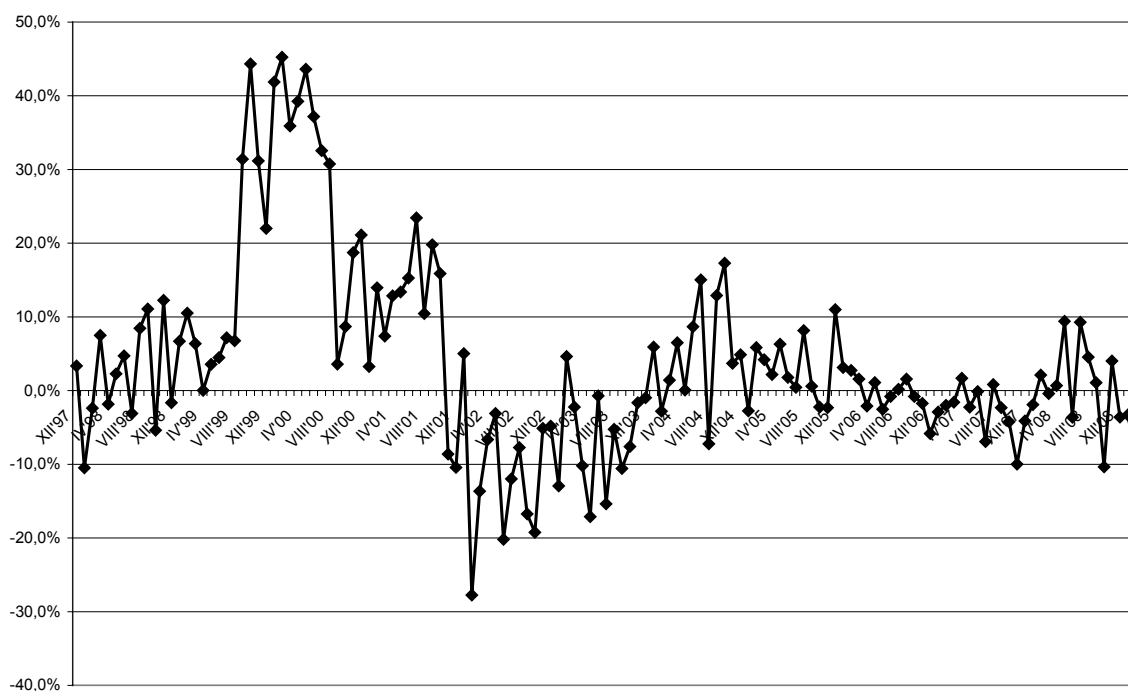
Source: Own calculation based on data from www.nbp.pl, miarypieniądza\_nowe.xls, as of the end of April 2009.

There are two periods of relatively stable multiplier and one very volatile. The multiplier was stabilized until end of 1999 at about 4, and then stabilized again after 2004 at higher level of 5,6 – 5,7. In the meantime it increased very rapidly in 2000 and 2001, with levels surpassing 7 and average reaching 6,5. The basic cause of this increases seems to be related to slowdown of Polish economy accompanied by extraordinary decreases in central bank reserve money. This was the time of huge NBP sterilization operation directed at preventing higher inflation when decreasing the obligatory reserves rate. This operation deprived Polish economy of huge amounts of cash, when liquidity thirsty economy caused higher rates of money creation (this was made easier by lower obligatory reserves). Unfortunately the inflation also speeded up (from 7% to 10%), what forced NBP to continue restrictive policy. These factors are probably responsible for the fact, that money multiplier kept increasing until the end of 2001.

When monetary conditions stabilized and NBP policy became more relaxed, then the multiplier started to decrease. After it the multiplier stabilized on much higher level than before the crises, what probably reflected the development of Polish financial sector and higher demand on “electronic” money.

The most important for current situation is relatively weak decrease in money multiplier during present crises. The multiplier is from mid 2008 under its 12 month average, however the gap is not extraordinary. It suggests lower money creation by financial sector, however the present crises looks much less dramatic then the last one (at least until February 2009). Another important difference is that in the stagnation of 2000 – 2002 the monetary conditions created by NBP were potential cause, among others, of the slowdown of Polish economy. This time the story looks quite different, when Polish Central Bank is increasing system liquidity with real sector and commercial banks being able to absorb this extra stimulus.

Chart 6: Changes in money multiplier (M3), monthly based, against the same month of previous year, Poland



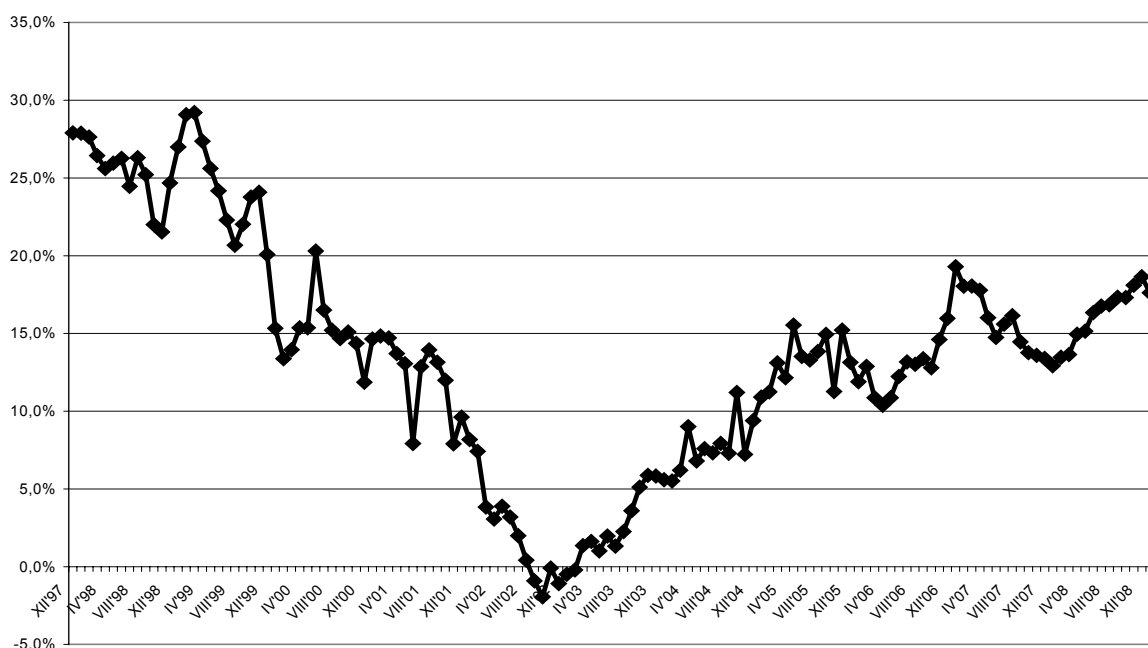
Source: Own compilation based on [www.nbp.pl](http://www.nbp.pl), miarypieniędza\_nowe.xls, as on end of April 2009.

Once more it has to be underlined that the whole presently observed disturbance is relatively weak and inconclusive, without any serious deviation from the medium term trend, which can signal potential problems.

Now, for more detailed evaluation, the changes in money multiplier are analyzed. The change which occurred in a given month was calculated against the same month of the previous year. The results are summarized in Chart 6. The changes observed in 2008 and first two months of 2009 are much stronger than in years 2006 – 2007. However years 2006 – 2007 were very stable. When any earlier year is added to comparison, we have to conclude, that until end of February 2009 the money multiplier was still relatively stable, showing only weak pressure down.

To create better picture of monetary conditions in Poland the overall measure of liquidity has to be added. Those are the changes of M3. With the crises reducing growth potential of Polish economy, one can expect reduction of M3 growth rate. This is not the case observed (picture 7). The wide money supply in Poland is growing at the rate of about 18% yearly, after slowing down to about 13% in 2007. Anyway there is no sign of lack of overall liquidity in Poland, and the money supply growth looks healthy, especially when compared to end of year 2002, when combined decrease of reserve money and multiplier growth rates caused absolute decreases in M3. It is worth to remember that this was the time, when Polish unemployment reached almost 20% and Polish economy was for the second consecutive year in stagnation.

Chart 7. Polish M3 changes, against the same month of previous year



Source: Own compilation based on [www.nbp.pl](http://www.nbp.pl), [miarypieniędza\\_nowe.xls](#), as on end of April 2009.

### Velocity of money

The velocity of money measures how many times the average unit of currency circulates in the economy (“changes hands”) in a given period of time. It is the opposite of demand for money, which measures what part of an income earned in a given period of time economic agents are willing (or are forced) to keep in the liquid form. According to quantity theory of money it is one of the most important monetary variables to be observed and evaluated. Usu-

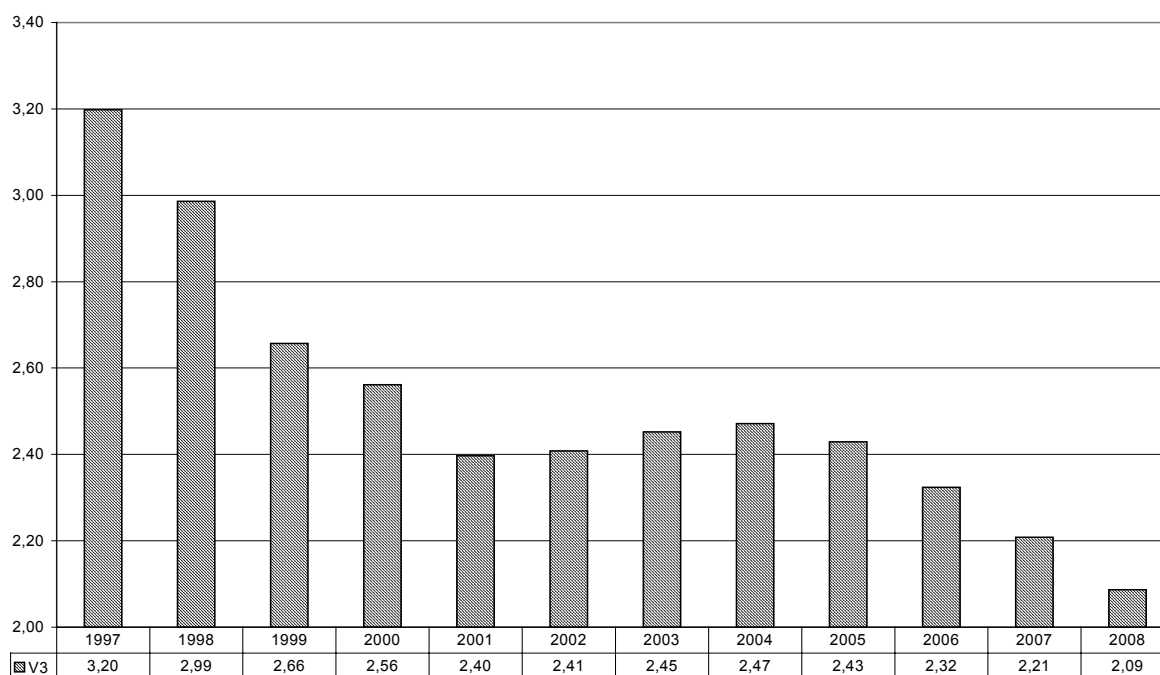


ally the assumption is made about its stability, at last in the long term and when there is no such thing as hyperinflation.

Velocity of money stability assumption has no support in collected data. In researched period in Poland there can be observed trend of increasing demand for money, resulting in decreasing velocity of money circulation (picture 8).

The velocity of money decreased from 3,2 in 1997 to just 2,09 in 2008. However the speed of decrease was changing and the increase of demand for money resulting from growing real income and wealth of Poland could not be the only explanation. The very rapid decrease of 25% between 1997 and 2001 has to be attributed to overrepresentation in Polish money supply of not liquid assets (not included in M1), with reserve money share reaching bottom low. Therefore the money was circulating slowly. Then with the increase of share of more liquid assets and the economy growing quicker then money supply the circulation rate had to increase. And it did increase for next 3 years (until 2004), what was clear deviation from long term trend. Starting 2005 rising incomes and demand for money caused the decreasing trend in velocity of money to come back. The crises itself has not influenced visibly this trend – the growing share of M3 can only speed up the process (with the opposite influence of rapid growth of reserve money dynamics being not able even to visibly slow down the decrease).

Chart 8. Velocity of money in Poland 1997 – 2008



Source: own calculations based on [www.stat.gov.pl](http://www.stat.gov.pl) and IMF Financial Statistic Yearbook 2005, p. 490 – 492.

## Conclusions

Evaluating the results of research it is visible, that at the time of writing this article there are almost no signs of monetary or liquidity crises reaching Polish economy. NBP creates conditions for relatively stable and predictable growth of money, commercial banks are rather able to exploit these conditions creating liquidity and the real side of economy is able and willing to absorb this money at the rate of growth of 18% on a yearly basis. This rate is high when compared to present rates of money supply growth in other EU countries, as at the

end of 2008 and during the first month of 2009.

For evaluation purposes it is interesting to compare present monetary developments in Poland to situation during a few last years. It has to be underlined that the situation now is much better than in the difficult (at least for Poland) years 1999 – 2002, when the rate of reserve money (M0) growth strongly deteriorated in the medium term, with negative changes in amount of reserve money resulting, in the end, in decrease of wider money supply, stagnation of Polish economy and record high unemployment of 19% of labor force.

The present monetary data shows, that current crises is (yet?) by no means as deep as one observed at the beginning of this century. It can result from relatively early stage of crises in Poland, active NBP policies directed at securing liquidity in the economy, rapid depreciation of zloty, helping exporters and expanding domestic demand for locally produced goods. In the overall picture it confirms quite healthy condition of Polish economy, what can be source of optimism for our ability to deal with crises.

However we have to remember that crises in Poland is on the early stage yet and monetary conditions can deteriorate, especially if the global conditions force real economy to stagnate, or even cause recession. At this stage it is worth stressing, that Polish economy still has the chance to pass through the crises years in relatively good condition and this time NBP and quite stable monetary conditions are one of the factors protecting Polish economy against global problems.

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