Changes of money supply in European area caused by global trading with financial derivatives

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Abstract - The intensive use of derivative instruments and massive trading with these derivatives, has affected the monetary policy and the money supply provided by central banks. The large usage of various derivatives has led to an increase in trading with derivatives on financial markets. This means that financial derivatives are no more used only to protect against financial risks, but are used to gain profit from earning by trading on financial markets. The aim of this paper is to analyze the impact of trading with financial derivatives on money supply provided by central banks. The econometric model shows the impact of each group of financial derivatives and the amount of changes of monetary aggregates. The results of analysis indicate that the huge volume of trading with financial derivatives has an effect on money supply and in that way disturbs the aims of monetary policy of central banks.

Keywords - derivative instruments, speculative trading, monetary policy

I. INTRODUCTION

Each company and financial institution seeks to maximize its business, profits and wealth of the owner, but at the same time, higher profit for the company means taking on higher levels of risk. Companies and institutions in various ways try to decrease the effects of risk, for example by diversifying their portfolio. It is very important for each company to develop appropriate methods for continual supervision and decrease of certain risks that appear in enterprises [1]. In the last few years, they are increasingly using an active approach to risk. That means that they are no longer satisfied only with the awareness of the existence of risk and because of that incorporating risk premium in the price of their product, but they want to actively manage risks.

Development of financial derivatives has greatly contributed to the development of hedging. Companies protect their transactions by taking positions that cover both (opposite) scenarios that could occur. Growing awareness of the existence of the risk and needs of companies to protect themselves from the risks in their businesses has led to a large usage and development of various hedging instruments. Companies have recognized the role of derivatives as highly effective in protecting against almost all business risks. Financial derivative products are complex financial instruments derived from basic simple financial products [2]. Characteristics of derivative instruments are that they are banded to the assets to which they are related and their price is derived from the value of the basic instrument. Alone, for themselves, derivatives have no value [3]. Following the successful application of financial derivatives for hedging and the rapid development of financial derivative markets in the late 20th century, more complex variations of options and structured products have appeared [3].

In this paper, emphasis will be put on the trade on the OTC derivatives market which has led to the high volume of trading without a unified monitoring and control. Something that at first seemed like a very effective protective mechanism has turned against its original purpose and become the trigger for instability and the reason for the emergence of new risks that cannot be eliminated by financial derivatives.

Financial derivatives as method of risk insurance, has led to excessive volume of trading in the financial markets and caused the collapse of the entire system of protection against risk. It is already shown that "an increase in the extent of hedging diversification increases the default risk"[4], what speaks in favor of increasing risks because of massive usage of financial derivatives. In this paper it will be presented the classification of risks, the use of derivatives and the analysis of the causes of problems in the financial derivatives market.

II. RISK OF FINANCIAL INSTITUTIONS AND DERIVATIVE INSTRUMENTS FOR THE PROTECTION OF CERTAIN RISKS

Risk can be defined as a measurable probability of appearance of adverse event. Therefore, the most important feature of risk is the measurability or the possibility of quantifying. Due to this characteristic, it is important that the protection from the certain risk is also measurable.

Today there are quite a number of risks, depending on the nature of business enterprises or institutions. The simplest division is into internal and external risks, so Bešker [5] distinguishes the following risks that could emerge in enterprises:

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Fig. 1 types of risk
Source: Bešker, M. (2009): Sustav upravljanja organizacijom, Oskar, Zagreb, pp.15

Risks that the financial institutions face today are as follows [6]:

- Credit risk
- Liquidity risk
- Interest rate risk
- Market risk
- Off-balance sheet risk
- Currency risk
- Country risk
- Technological risk
- Operational risk
- The risk of insolvency

Hereafter will be presented risks that could be managed and whose influence could be reduced by using financial derivatives. Other risks such as country risk, technology risk and operational risk are underlying to other methods of control or elimination.

A. Credit risk

Credit risk is the probability of losing part of the assets of financial institutions. Credit risk is the wider concept then the risk related to loans. It refers to any financial transaction of institution that produces certain claims for principal and interest [7]. Credit risk occurs in placing loans and buying bonds. Apart from a detailed analysis of potential applicants for loans and portfolio diversification of assets, the financial institution can manage credit risk using insurance, replacement, risk transfer through participation in the group, or by derivative instruments [8].

Derivatives that are used to protect against credit risk are synthetic transactions such as swaps or options associated with the value of each loan or loan portfolio [9]. So far, the most prevalent way to protect against credit risk has been securitization. Securitization was used to convert illiquid financial assets into liquid assets. In this way, the initiator transfer credit risk through a new issue of securities [10].

B. Liquidity risk

Liquidity is the ability of the smooth "flow" of assets from one form to another. More specifically, it could be said that liquidity is the ability of quickly conversion of non-cash assets into cash, and vice versa, in order to settle obligations as they mature. Liquidity risk arises when the owners of the liabilities of financial institution (depositors) ask for cash for their receivables [9].

Financial institutions are exposed to liquidity risk in the way there is a risk that they will not be able to monetize assets in order to settle the claims of liabilities. Liquidity risk could be managed by stored liquidity reserves or purchased liquidity reserves.

Buying liquidity reserves is hedging instrument that managers use in the similar way like derivatives to protect against financial risk. Buying liquidity performs in the interbank market for short-term loans. In addition, the financial institution could issue additional certificates of deposit with a fixed maturity or medium or long-term bonds [6]. As the purchased liquidity techniques were increasing, the associated markets were strengthened.

C. Interest rate risk

Interest rate risk is often mentioned in the context of banking risks. The interest rate risk is defined as the probability of an adverse effect of the movement of market interest rates on the bank's earnings and profits [11], or maturity mismatch between assets and liabilities. Maturities of assets and liabilities are associated with the transformation of assets including the purchase of primary securities and issuing secondary securities in order to fund assets [6]. If the maturity of assets and liabilities are not aligned, there is a risk of changes in interest rates.

The most commonly used derivatives to hedge against interest rate risk are interest swaps or replacements. Interest replacement (swap) refers to the agreement that parties undertake to exchange payment obligations under the same or different contractual interest rates on the principal amount over a certain time period [11].

D. Market risk

Market risk is one of the most important risks of financial institutions, because it involves changes in interest rates, changes in exchange rates and other changes in the market at which the institution can not affect or reduce their impact on its business by any portfolio diversification. The increase in the share of derivative instruments, which occurred due to the protection of other risks, has led to greater monitoring and evaluation of market risk because derivatives are more exposed to market risk [12]. There are different methods of measuring market risk, and among them, the most important method it value at risk [12].

Hereafter will be explained in more detail why the use of derivatives for protection against the risks has actually potentiated increase of market risk for financial institutions.

E. Off-balance sheet risk

In order to obtain higher profits, financial institutions are more concerned with off-balance sheet activities. Off-balance sheet activities include trading with financial instruments and the generation of income from fees and loan sales, the provision of guarantees and warranties, revolving loans, lines of credit [13] and other activities which affect the profits, but they do not appear on the balance sheet of financial institutions [14].

Based on the assumed off-balance sheet commitments, financial institution is exposed to credit risk, as there is a risk of irretrievable future outflow of funds. As an example of off-balance sheet commitments it could be mentioned took over guarantees commitments, uncovered letters of credit, promissory notes or other guarantees, commitments under the credit agreement and similar [15].

F. Currency risk

Because of globalization and competition growing, financial institutions are more oriented to foreign investments. This kind of business exposes them to the risk of exchange rate, which means that there is a risk of change of foreign portfolio value due to changes in the value of foreign currencies. Currency risk is therefore defined as the probability that the changes in exchange rates will affect the value of the assets and liabilities of financial institutions denominated in foreign currencies [6]. Besides the operations in the money market and term transactions, currency risk could be managed by derivative instruments.

Derivative instruments are used in a way of taking the opposite position on the secondary financial markets than the one that is exposed to currency risk [16].

G. The risk of insolvency

Insolvency is a condition in which the financial institution is unable to settle its obligations in the anticipated maturity. Insolvency can be caused by many factors that negatively affect the work of the institution. For example, the insolvency could appear as a result of changes in interest rates, risk off-balance sheet activities, changes in the legislative framework and similar problems. With regard to these reasons, the risk of insolvency is closely linked to interest rate risk, market risk, country risk, liquidity risk, et cetera.

As a protection against the risk of insolvency, there are various measures to protect against the risk that precede this risk, which are already mentioned in previous sections.

III. FINANCIAL DERIVATIVES MARKET

Institutions and individuals are mostly risk-aversed and they try to decrease and eliminate risks of their business whenever it is possible. Because of that, until today, there are a great number of forms of financial derivatives. Because of the extensive application of derivatives, it was necessary to develop financial markets for derivatives. In relation to the risks mentioned in the previous chapter, companies and institutions have developed various forms of derivative instruments that are used to protect against these risks, which could be grouped into the following categories [17]:

• Forward contract is an agreement to buy or to sell property on a certain date in the future at a price that was agreed at the time of conclusion of the contract.

• Futures are type of forward contracts with a highly standardized and accurately specified terms and conditions.

• Option is a contract to exercise the right to purchase or sell a specific asset at the agreed price within a certain time period. There are two types of options, call options and put options. The owner of the call option has the right to purchase a specified asset at a certain price by a certain date in the future. The owner of the put option has the right to sell a particular asset at a specified price by a certain date in the future.

• Warrants are contracts, very similar to a call option where the warrant holder has the right but not the obligation, to buy a security at agreed price.

• Forward rate agreement is a derivative instrument that is used to protect against unwanted movements in interest rates on credit or loans. Using this derivative, interest rate is fixed for a certain period in the future.

• Swap is an agreement between two or more parties that is binding them to replace those cash flows over a certain period in the future.

• Cap, floor and collar agreements; Cap agreement fixes the interest rate for option holder. If interest rates rose, difference in increment will be borne by the issuer of cap options. Floor contract fixes rate of return on investment. If there is a reduction below the expected rate of return, the issuer bears certain reimbursement to the option holder. Collar contract fixes the highest and the lowest interest rate.

• Credit derivative is a contract used for protection against particular risk that could occur (for example, the risk of non-payment of loans). The buyer of protection pays a premium for this particular event. Credit derivatives considering the type of event could be; return share swap, spread option, default swaps, linked borrowing, linked notes, synthetic securitization, and collateral debt obligation.

Types of financial derivatives markets are formed according to the basic instruments, so Tuškan [3] distinguishes:

• Derivatives of money market or interest derivatives, which are aimed at the protection of the interest rate risk.

• Derivatives of exchange market or currency derivatives, which manage foreign currency risk, and include currency exchange, currency options and currency futures contracts.

• Derivatives of capital markets, which are related to long-term financial instruments, and include options and interest rate swaps, options on interest rates and options on the fall and rise in interest rates [11].

The rapid development of derivatives and their markets is not a problem by itself, but the problem is that derivatives are traded on the OTC markets and this trade takes place on the basis of personal purchase, without intermediaries and without an official announcement. Therefore, data on trade in financial derivatives are not complete, but they could be considered only as an indicator of trends in the market, and the actual volume of trade is certainly higher than reported.

According to the World Federation of Exchanges [18], in the year 2009, the volume of trade in derivative contracts amounted 17.9 billion USD, and in 2010 the volume of trade was 22.4 billion USD, what is an increase of 25%.

Many experts believe the collapse of investment bank Lehman Brothers in 2008 was the beginning of the financial crisis, and which was result of rampage in market prices of derivatives.

Bank for International Settlements groups derivatives into the following categories:

- Interest rate contracts
- Foreign exchange contracts
- Equity-linked contracts
- Commodity contracts
- Credit default swaps

The table 2 in appendix shows movements of derivatives by category and data gathered from Bank for International Settlement.

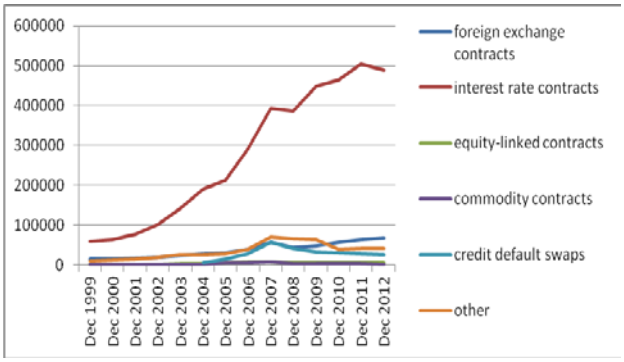

Fig. 2 trade in the global OTC derivatives market in billion USD

Source: Author, according to the Bank for International Settlements, Statistical release: OTC derivatives statistics, several numbers, https://www.bis.org/publ/otc_hy1205.htm, 2013

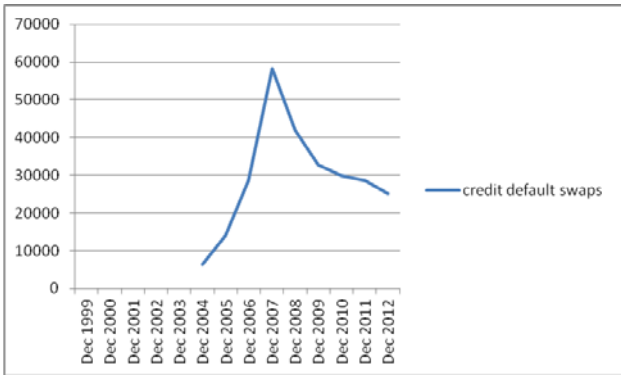

Fig. 3 trade in global OTC derivatives market with credit default swaps in billion USD

Source: Author, according to the Bank for International Settlements, Statistical release: OTC derivatives statistics, several numbers, https://www.bis.org/publ/otc_hy1205.htm, 2013

The data presented in Table 2, Figure 2 and 3 provide insight into the trade in the global OTC derivatives markets and it could be noticed that there was strong growth in trade volume of derivatives by the end of 2007, especially within interest rate contracts. The year 2008 is the beginning of the financial crisis, but despite of changes that followed, the trade with interest rate derivatives has continued to grow, which indicates the speculative trade of derivatives. Credit default swaps have been singled out, as a special case, whose trade volume grew strongly until 2008, followed by a sudden drop.

Since the expansion of derivatives trading indicates speculative character and not only for the purpose of financial risk management, it could be assumed that a certain amount of funds of the real sector spilled over in financial sector of derivatives trading. “The tricks of trade connected to derivatives refer to their ability to rapidly generate imaginary profits or virtual losses“[19] and in that way the transactions change the money supply and liquidity in real sector.

Financial derivatives that are used to protect and manage the financial risks have actually brought new risks in the financial markets and caused new problems. Some new risks have appeared, such as the risk of price relationships between hedging object and speculative risks of commodity markets, where sellers of goods, that take a short position in the markets, are forced to buy back their contracts at higher prices [20]. A large number of products in circulation have led to an imbalance in the money markets and to the "inflation of money" which presents the decrease of money value. Speculative trading and non-transparency in the trading of derivatives, especially with foreign exchange contracts, have caused the biggest problems regarding to the value of money. That kind of trading has led to a considerable risk for all parties, known as counterparty risk [21]. In addition, it could be assumed that the money from the real sector remained "trapped" in the speculative sector of trade in financial derivatives. Money that is "moved" from the real sector in not a part of bank deposit any more, but it is used for virtual transactions. This overflow of funds from one sector to another and keeping funds trapped, limits the money supply provided from the central banks in reality. The effect of these transactions is reduced liquidity in the real sector. Aiming the financial stability, “monetary policy should take into account asset price development” [22], and this paper shows that the prices of financial assets are crucial for efficient monetary strategies.

IV. ECONOMETRIC ANALYSIS AND THE DATA

The model presented in this paper shows the impact of global trading with financial derivatives on monetary aggregates. The financial derivatives are divided in four groups; interest rate contracts (INT_R), foreign exchange contracts (FOR_EXC), equity-linked contracts (EQU), commodity contracts (COMM) and credit default swaps (CRED). The data regarding to the monetary aggregate are gathered from European Central Bank (ECB) and the data regarding to the trading with financial derivatives are gathered from the Bank for International Settlement (BIS), and refer to annual figures from year 1999 till 2012. There were 14 observations. The dependent variable is financial transactions of monetary aggregate M1 (M1_FINTRANS_MIL). The model is estimated as multiple linear regression by Least Squares method.

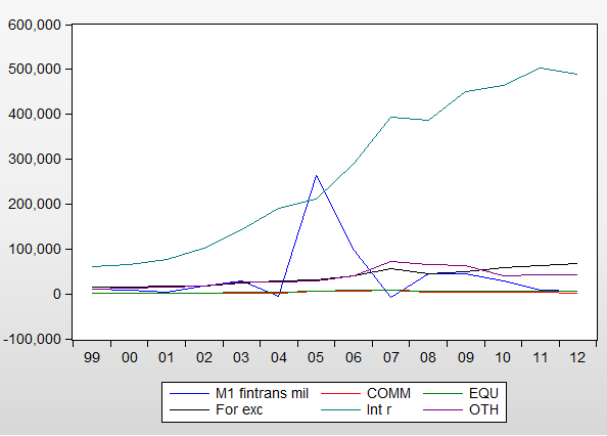

Fig. 3 flow of monetary aggregate M1, commodity contracts, equity-linked contracts, foreign exchange contracts, interest rate contracts, other financial derivatives

Source: author

The Figure 3 shows strong interruption of a M1 flow between year 2004 and 2007. This is probably connected to high liquidity in the financial system in that period and could be connected to huge volume of trading on OTC markets. The extra ordinary increase of M1 flow indicates that in that period had started to grow a bubble in financial sector. Later, in 2008 and 2009, it was shown that inflation of money and its surrogate preceded escalation of crisis in year 2007.

The variable CRED is excluded from the model because there is lack of observations (BIS notice data for credit derivatives only from the year 2004) and the lack of data disturbs the results of the model.

VARIABLE	COEFFICIENT	STANDARD ERROR	P-VALUE
Intercept	123107.2	75341.60	0.1409
Comm	21.43944	23.10859	0.3807
Equ	25.32852	39.35266	0.5378
For_exc	-12.89948	5.522514	0.0477
Int_r	1.409068	0.677418	0.0711
Oth	-4.729709	2.020348	0.0473
S.E. of regression	56992.45		
R^2	0.590275		

Table 1multiple linear regression

Source: author

The model shows that variables that have impact on flow of monetary aggregate M1 are FOR_EXC and OTH. That means if the trading with foreign exchange contracts would increase for 1 billion USD, holding all the other variables fixed, the flow of monetary aggregate M1 would decrease in average for 12.90 million USD with a level of signification of 5%. If trading with other financial derivatives (besides commodity, equity, foreign exchange and credit derivatives) would increase for 1 billion USD, holding all the other variables fixed, the flow of monetary aggregate M1 would decrease in average for 4.73 million USD with a significance level of 5%.

Coefficient of determination amounts 0.590275 what speaks about medium strong representatives of the model. The model would be more representative if there would be more observation included, either on monthly or yearly level.

V. CONCLUSION AND RECOMMENDATIONS

Trading in financial derivatives in presented volume indicates that the derivatives are used for speculative purposes more than for their main intention, to protect against financial risk. As a consequence of these actions, the outflow of money from the real sector to the financial sector has occurred, and this money was used for speculative purposes. Also, there was huge affect on flow of monetary aggregate M1. The analysis showed that the speculative trading with financial derivatives influenced on monetary aggregate M1. The most important variables that have decreased the flow of monetary aggregate M1 were foreign exchange contracts and other derivatives (besides the one that BIS group separately). In this way, the imbalance between the real and financial sectors has intensified. Expansion of derivatives trading caused the emergence of the "cloud" of instruments that have no real cover. In order to establish better control over transactions on the OTC derivatives market, Bank for International Settlements has made certain studies and analysis of derivatives markets and suggested certain regulations. It has been recommended to create centralization of transactions in derivatives markets. In this way, anonymous transactions would be eliminated and it would provide insight into the overall trade with financial derivatives [23]. To prevent uncontrolled price increasing and restore the original function of derivatives as an instrument for protection against financial risk, it is necessary to prevent and limit speculative trading in financial derivatives. For this purpose it is necessary to establish a central regulatory body to monitor trade of derivatives and restrict the issuance of derivative instruments only to those who have real coverage in the basic instruments. Such legislation should be similar to the regulation of multiplication of loans and deposits at depository institutions.

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APPENDIX

	TOTAL	Foreign exchange contracts	Interest rate contracts	Equity-linked contracts	Commodity contracts	Credit default swaps	Other
Dec 1999	88201	14344	60091	1809	548		11408
Dec 2000	95199	15666	64668	1891	662		12313
Dec 2001	111178	16748	77568	1881	598		14384
Dec 2002	141679	18460	101658	2309	923		18330
Dec 2003	197167	24475	141991	3787	1406		25508
Dec 2004	257894	29289	190502	4385	1443	6396	25879
Dec 2005	297670	31364	211970	5793	5434	13908	29199
Dec 2006	414845	40271	291582	7488	7115	28650	39740
Dec 2007	595738	56238	393138	8469	8455	58244	71194
Dec 2008	547371	44200	385896	6159	3820	41883	65413
Dec 2009	603900	49181	449875	5937	2944	32693	63270
Dec 2010	601048	57798	465260	5635	2922	29898	39536
Dec 2011	647777	63349	504117	5982	3091	28626	42610
Dec 2012	632579	67358	489703	6251	2587	25069	41611

Table 2 trading in financial derivatives on the global OTC markets in bil USD

Source: Author, according to the Bank for International Settlements, Statistical release: OTC derivatives statistics, several numbers, https://www.bis.org/publ/otc_hy1205.htm, 2013