Montenegrin Journal of Economics

Vol. 12, No. 3 (2016), 155-165

Quantitative Easing in Europe and its Impact on the Stock Market

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ARTICLE INFO

Received May 12, 2016
Received in revised from June 26, 2016
Accepted August 27, 2016
Available online 15 September 2016

JEL classification:

G11, G15, E51

DOI: 10.14254/1800-5845.2016/12-3/11

Keywords:

stock market,
real economy,
monetary aggregate,
M3,
quantitative easing

ABSTRACT

The development over the last decade has offered a new perspective on the interaction between the stock market and the real economy. The growth of government debts together with the efforts to eliminate the negative impacts of the financial crisis resulted into a wider usage of new stimulation tools to kick-start the stock markets as well as the real economy. The recent experiences with various fiscal and monetary tools used in the USA and in Japan show that the most important tool is the growth of the money supply, i.e. quantitative easing. A lot of economists evaluate its positive results. Also the ECB initiated the quantitative easing in order to support the economic growth. The aim of this paper is to investigate the connection between the growth of the M3 monetary aggregate in the Eurozone and the growth of the Eurozone stock markets.

INTRODUCTION

The importance of the financial markets, institutions and instruments has grown markedly during the last years (Vychytilová, 2015; Tvaronavičienė, Grybaitė, 2012; Travkina, Tvaronavičienė, 2015). The monetary policy tools used to be considered to be highly efficient in the fight against the negative impacts of economic crises, as they were able to stimulate the share markets as well as the real economy in the past. The global financial crisis of 2008 forced the financial theory and praxis to revaluate the old tools of the monetary policy and to look for new solutions of the economic problems.

Regarding the monetary theory, the money supply is represented by monetary aggregates M1, M2 and M3. The money supply is considered to be one of the most important factors affecting the behaviour of share markets. The share market development is affected by the M2 mon-

etary aggregate[1]. Assuming that the demand for money is constant in the short term and the central bank raises the money supply, particular economic subjects (households and companies) should try to allocate the money into assets that are able to provide higher returns. It results into an increased demand for stocks and into higher stock prices. This effect is also known as the "liquidity effect". This relation works also in the opposite direction. A decrease of the money supply leads to a lower demand for stocks and to lower stock prices.

From the transmission mechanism point of view, a growth of the money supply initiates an increased demand for bonds at first. The higher demand pushes the bond prices higher which pushes bond yields lower. As the bond yields decline below a critical level, investors start to move their money from bond to stock markets. But the growth of money supply should support the real economy first of all. Growth of money supply leads to a decrease of interest rates which supports the efficiency of companies and improves conditions for real investments.

1. LITERATURE REVIEW

A lot of famous economists pointed at the positive relation between the money supply and stock markets during the last century (for example Keynes, J.M., 1936). During the 1970's, problems of the global economy resulted into the collapse of the international monetary system and a subsequent debt crisis impacted various countries (mostly emerging and countries) during the 1980's. These developments drew attention of various economists to the stimulatory effects of growing money supply: Keran, M.V. (1971), Rogalski, R.J. and Vinso, J.D. (1977), Ritter, L.S. and Silber W.L. (1989), Mishkin, F.S. (1996), Bernanke, B.B. (1992). Also some of the Czech authors (Musilek, P.(2002), Kohout, P. (2009) Orylski, O. (2009) analyse the ability of the monetary policy to cope with the financial crises. Jilek, J. (2015) studied the impacts of growth of the so called broad monetary aggregates on economies of the Eurozone, Japan, Great Britain and Czech Republic.

After the 2008 financial crisis, the tools of the monetary policy got into the centre of attention once again (Janus, J., 2016, Żuchowska, D., 2015). Some of the authors (Nayan, S., Kadir, N., Abdullah, M.S and Ahmad, M., 2013, Robinson, R., Nasser, M.E., 2013) tried to find a usage for the modified Keynesian economic policies in today's conditions. Chinese economist Quishui Chi (2014) tried to apply these policies on the current Chinese economy that undergoes some significant structural changes. Titze, M. (2015) focused on the unconventional policy of the Bank of Japan. Some of the authors (Palley, T.I., 2015) also criticise the monetary policies currently applied by central banks around the World. Some of the Slovak authors (Siranova, M. and Kotlebova, J., 2015) analyse the impacts of the ECB monetary policies on the economic growth of selected EU countries.

2. AIM AND METHODOLOGY

This paper is focused on the analysis of the relation between the money supply and stock market development. The aim of this paper is to quantify the relation between the money supply and stock market development and to find historical connections between these two phenomena in World and in the Eurozone. The following hypotheses are set:

Hypothesis 1: The growth of the money supply during the QE in the USA and in Japan contributed to a significant growth of the stock market.

Hypothesis 2: The recent QE undertaken by the ECB supports the European stock market growth.

The regression and correlation analyses are used to evaluate the aforementioned hypotheses. The following model is used to measure the relation between the monetary aggregates and stock markets: $Y = \beta_0 + \beta_1 M_1 + \beta_2 M_2 + \beta_3 M_3 + u$, where: Y is the percentage change of stock index value; M1, M2, M3 represent the percentage change of particular monetary aggregate values. It is expected that all of the β coefficients are positive which means that the growth of the monetary aggregates is related to the growth of the stock markets. The monetary aggregates data were provided by the FED, BoJ and ECB databases. The stock markets are represented by benchmark stock indices: S&P 500 (USA), NIKKEI 225 (Japan) and EUROSTOXX 50 (Eurozone).

3. QUANTITATIVE EASING IN THE WORLD

3.1 Quantitative easing in the USA

Year 2008 is related to a huge panic on financial markets. In early 2009, the U.S. stock market bottomed some 60% below its peak levels. In order to stop the downfall and to kick-start the stock market growth, FED started its first quantitative easing (QE). Other rounds of the quantitative easing followed. The U.S. history of quantitative easings can be divided into following phases:

- *QE 1* (November 2008-2010) was aimed to support and save banks and mortgage agencies from bankruptcy. In this round of the QE, FED was focused on repurchasing of high risk bonds and mortgage backed securities (MBS). By repurchasing these assets, it supplied the banking sector with liquidity. But the banks were worried about the future development of the global economy and they were unwilling to let the newly acquired liquidity to the real economy. As a result, QE 1 was unable to support the economic growth as much as expected. On the other hand it was able to kick-start the stock market growth.

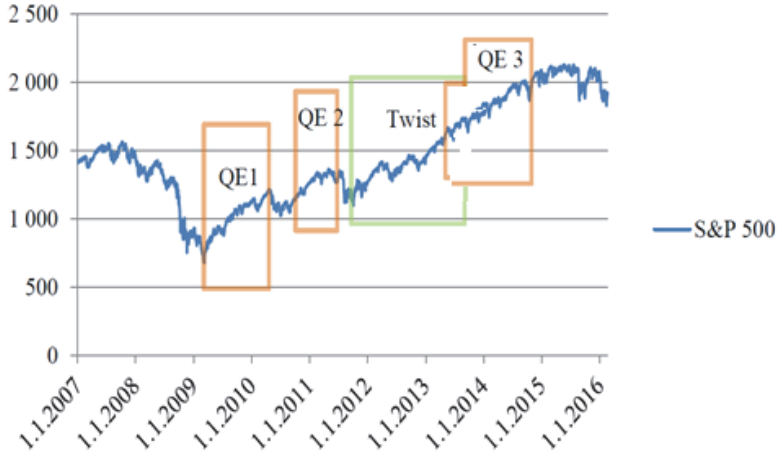

Figure 1: S&P 500 and the U.S. quantitative easings

Source: own processing, using data of YahooFinance and FED

- *QE II (2010-2011)* represented another attempt of FED to support the U.S. economy. In this round of QE, FED was repurchasing government bonds. The aim of QE II was to support

domestic consumption and economic growth. It was expected that growth of bond prices will lead to a higher volume of capital market investments. At the same time, the increased volume of money supply was expected to lead to a weaker USD and higher volume of exports.

- *Operation TWIST (2011)* – the aim of this operation was to exchange long term debt securities (maturity of 6 – 30 years) for short term debt securities. This exchange was meant to stimulate the lending activities.

QE III (September 2012) – during this round of QE, FED was purchasing mortgage backed securities again. The QE3 overlapped with the Operation Twist. The aim of QE3 was to support banks, depreciate the USD, support the economic growth and decrease the unemployment rate.

As shown also by Figure 1, the first round of QE was the most efficient one. Taking into account the stock market only, QE2 was successful as well, although not as much as QE1. The impact of QE3 and Operation Twist was less efficient. I tis able to conclude that the impacts of the quantitative easing on the stock market decrease gradually, as other conditions remain almost unchanged. The expected inflation pressures haven't materialised and there were no essential fiscal policy measures applied.

3.1.1 Correlation and regression analysis – S&P 500 and M2

The correlation analysis that focused on the relation between S&P 500 and M2 monetary aggregate over the time period from November 1980 to October 2015 shows a strong positive correlation. The value of the correlation coefficient is 0.89, which means that Hypothesis 1 is valid for the U.S. stock market.

Table 1: Correlation analysis results – S&P 500 and M2

Corr (SP500. M2) = 0,88758685
Under the null hypothesis of no correlation:
T(418) = 39,3946, with two-tailed p-value 0,0000

Source: own processing, using data of YahooFinance and FED

The regression analysis resulted into following formula: y= -5.33 + 1.423 M2. It confirms that there is a positive relation between S&P 500 and M2 and growth of M2 by 1% is able to boost S&P 500 by approximately 1.42%. This finding is in line with Hypothesis 1. On the other hand a relatively high constant (-5.33) means that over the analysed time period, the M2 monetary aggregate had to grow by approximately 3.75% to prevent the S&P 500 from declining. The model is able to explain almost 85% of S&P 500 variability.

Table 2: Regression analysis for % changes in M2 and S&P 500

Model 2: OLS, using observations 1980: 11-2015:10 (T = 420)				
Development variable: 1_SP500				
HAC standard errors, bandwidth 5 Bartlett kernel)				
	coefficient	std.error	t-ratio	p-value
Const	-5,53316	0,496706	-11,14	2,05e - 025 ***

1_M2	1,42334	0,0590849	24,09	4,87e – 081***

Mean dependend var	6,444181	S.D. dependent var	0,840477
Sum squared resid	45,06710	S.E. regression	0,328353
R – squared	0,847737	Adjusted R-squared	0,847373
F (1, 418)	580,3122	P - value (F)	4,87e - 81
Log – likelihood	- 127, 2127	Akaike criterion	258,4254
Schwarz criterion	266, 5059	Hannan – Quinn	261,6192
Rho	0,991315	Durbin-Watson	0,018396

Log – likelihood for SP500 = - 2833,77

Source: own processing, using data of YahooFinance and FED

3.2 Quantitative easing in Japan

After the long term policy of zero level interest rates turned out to be inefficient, the Bank of Japan initiated a quantitative easing in March of 2001. The main difference between the U.S. and the Japanese QE was the fact that while FED focused on the actives side of its balance sheet, the Bank of Japan focused on current accounts balances on the passives side. The different approach wasn't caused by different targets but by different legislative environments and structures of financial systems.

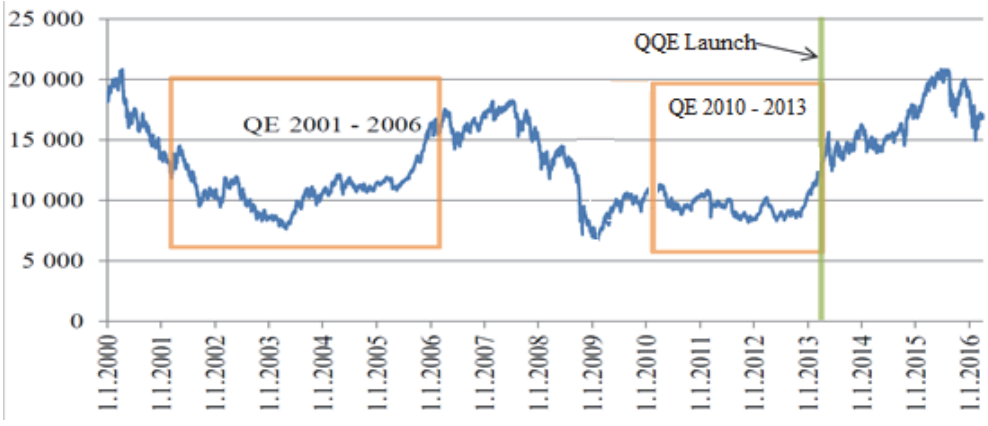

Figure 2: Nikkei 225 and the Japanese quantitative easings

Source: own processing, using data of YahooFinance and FED

The Bank of Japan was purchasing long term government bonds, asset backed securities (ABS) and asset backed commercial papers (ABCP) during the QE. The aim of the operation was to kick-start the economy and to cope with the long term deflation pressures.

As shown by Figure 2, although with a little lag, the first Japanese QE that started in 2001 was able to support the stock market that started to grow in 2003. After it was halted in 2006, the market started to stagnate. A significant decline happened in 2008. It was related to the global financial crisis. As a response to the crisis, Japan initiated another QE program. This program lasted to April 2013, when a more robust QE, also known as QQE was announced. QQE

means Quantitative and Qualitative Easing. While the QE is focused on buying debt securities and pushing the broad capital market interest rates lower, the qualitative part of the QQE focuses on decreasing interest rates in selected segments of the financial markets.

It is able to conclude that QE2 had only limited impact on stock markets that were stagnant or slightly declining for a better part of this program. On the other hand the positive impact of QQE was much more significant.

3.2.1 Correlation and regression analysis – Nikkei 225 and M2

The correlation between Nikkei 225 and the Japanese M2 monetary aggregate was negative during the 1990 – 2015 time period. It means that growing M2 is related with falling stock market and vice versa. On the other hand, after dividing the whole time period into some partial sub-periods, the results are quite different. During the 2012 – 2015 sub-period, the correlation between Nikkei 225 and M2 was highly positive (0.96). These findings are supported also by Figure 2.

Table 3: Correlation analysis results – Nikkei 225 and M2

Korelácia Nikkei 225 a M2 (1990-2015)

Corr (Nikkei 225. M2) = - 0,69115903
Under the null hypothesis of no correlation:
T(300) = -16,5645, with two-tailed p-value 0,0000

Korelácia Nikkei 225 a M2 (2012-2015)

Corr (Nikkei 225. M2) = 0,96253369
Under the null hypothesis of no correlation:
t(36) = 21.298, with two-tailed p-value 0,0000

Source: own processing, using data of YahooFinance and FED

The regression formula is as follows: y = 27.2377 – 1.31909 M2. There is a negative relation between Nikkei 225 and M2, however it is important to note that the constant is high (27.24) and the R-squared value shows that this model is able to explain only slightly more than 50% of Nikkei 225 variability. It means that there are other significant factors that have a strong impact on Nikkei 225. It is able to conclude that in Japan, the long term impact of the M2 monetary aggregate changes on the stock market are lower than in the USA.

Table 4: Regression analysis for % changes in M2 and Nikkei 225

Model 2: OLS, using observations 1990: 1-2015:02 (T = 302)
Development variable: 1_Nikkei 225
HAC standard errors, bandwidth 5 Bartlett kernel)

	coefficient	std.error	t-ratio	p-value
Const	27,2377	2,57687	10,57	2,05e - 022 ***
1_M2	- 1,31909	0,193564	- 6,815	5,18e – 011***

Mean dependend var	9,585630	S.D. dependent var	0,329791
Sum squared resid	16,18479	S.E. regression	0,232270

R – squared	0,505618	Adjusted R-squared	0,503970
F (1, 300)	46,44073	P - value (F)	5,18e -11
Log – likelihood	13,36021	Akaike criterion	-22,72042
Schwarz criterion	-15.29937	Hannan – Quinn	-19.75125
Rho	0,965904	Durbin-Watson	0,075386
Log – likelihood for Nikkei 225 = - 2881,5			

Source: own processing, using data of YahooFinance and FED

3.3 Money supply and the European stock market

The Eurozone has a relatively short history which limits the analysis of the impacts of the money supply on the European stock market represented by the Eurostoxx 50 index. Moreover, there are some other economically important countries that are not members of the Eurozone.

Table 5 shows that the Eurozone key monetary aggregate (M3) increased every single year over the 1999 – 2015 time period. The data also show that in recent years, there doesn't seem to be any positive relation between M3 growth and the stock market development. In 2008, 2009, 2012 and 2013, the growing M3 was accompanied by falling stock market. In 2009, 2012 and 2013, the M3 increased while the Eurozone GDP decreased.

Table 5: Selected Eurozone economic fundamentals

Year	*Eurostoxx 50 (% change)*	*M3 (% change)*	*GDP (% change)*	*Interest rate (% - average)*	*Inflation rate (% - average)*
1999	23.83	5.72	2.33	2.90	1.14
2000	35.06	4.82	4.03	4.04	2.09
2001	-20.15	5.54	2.48	3.94	2.3
2002	-24.90	7.25	0.90	2.75	2.2
2003	-17.52	8.13	0.70	2.25	2.1
2004	16.53	5.80	2.20	2.00	2.1
2005	14.42	7.40	1.70	2.25	2.2
2006	18.58	8.48	3.20	3.00	2.2
2007	13.90	11.23	2.90	3.88	2.1
2008	-22.89	9.53	0.40	3.44	3.3
2009	-20.54	2.99	-4.40	1.44	0.3
2010	11.98	0.38	2.00	1.00	1.6
2011	-5.75	1.52	1.50	1.25	2.7
2012	-5.93	2.98	-0.60	0.75	2.5
2013	15.06	1.01	-0.30	0.25	1.35
2014	4.41	4.86	0.90	0.05	0.43
2015	3.85	5.14	1.64	0.05	0.03

Source: own processing, using data of ECB

The most significant declines of Eurostoxx 50 were caused by the burst of the internet bubble (2000) and by the global financial crisis (2008). The M3 monetary aggregate experienced only a limited growth during the 2009 – 2013 period and Eurostoxx 50 was unable to rebound from the crisis lows meaningfully. In 2009, the European Economic Recovery Plan was adopted. Its target was to improve the effective demand, improve the business environment, support the job creation and provide investment incentives to European companies. The investments should have been aimed to upgrade the infrastructure of key industrial sectors (automotive, construction, green technologies). Goal of some of the fiscal incentives was to prevent the spill-over effect between particular Eurozone countries. The total value of the stimulus package was 200 billion EUR which represented approximately 1.5% of the Eurozone GDP.

In June 2010, the European Financial Stability Facility (EFSF) was established. It was a temporary crisis resolution mechanism that helped to solve some of the acute problems of Ireland, Portugal and Greece. In September 2012, EFSF was replaced by the European Stability Mechanism (ESM). Although ESM is a permanent mechanism that should help Eurozone to cope with the debt crisis, it was unable to help to get rid of the economic stagnation. Moreover ECB was unable to push the inflation rate up to the targeted values, despite of the long term near-zero interest rates, negative deposit rates and long term refinancing operations.

As a result, the ECB approached to the quantitative easing. As a part of the QE, the ECB started to purchase bonds with 2-30 years maturities. The bonds have to be denominated in EUR and they must be investment grade rated. Bonds worth 60 billion EUR are being purchased every month. The QE has been initiated in March 2015 and its termination was planned for September 2016. But in March 2016, the ECB announced that it will be prolonged by March 2017 at minimum. The ECB governor Mario Draghi declared that it will be further prolonged, if the inflation rate doesn't hit the targeted 2% level.

2.3.1 Correlation and regression analysis – Eurostoxx 50 and M3

Some of the aforementioned facts are confirmed also by Figure 3. The Figure shows that during the post-crisis period, the European stock market was stagnant, although the M3 monetary aggregate kept on growing.

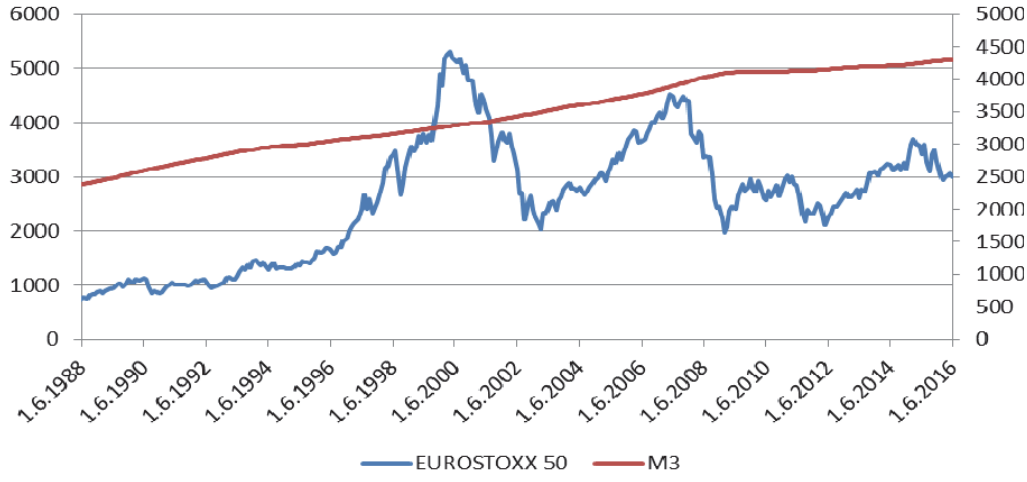

Figure 3: Eurostoxx 50 and the Eurozone M3

Source: own processing, using data of YahooFinance and FED

The correlation analysis (Table 6) shows that there is a relatively high positive correlation (0.58) between Eurostoxx 50 and the Eurozone M3 monetary aggregate, over the 1987 – 2015 period. Although the results indicate that growing M3 should be accompanied by growing stock market, this relation is weaker in Eurozone compared to the USA, where the correlation coefficient for correlation between S&P 500 and M2 equalled 0.89.

Table 6: Correlation analysis results – Eurostoxx 50 and M3

Corr (Eurostoxx50. M3) = 0,58413311
Under the null hypothesis of no correlation:
T(324) = 12,9542, with two-tailed p-value 0,0000

Source: own processing, using data of YahooFinance and ECB

Table 7 shows results of the regression analysis that studies the relation between M1. M2 and M3 Eurozone monetary aggregates and Eurostoxx 50, over the 2000 – 2015 time period. The results show that the M1 and M3 aggregates have positive impact on the stock market, while the M2 aggregate has a negative impact. The regression formula is as follows: y = 4919.88 + 0.577 M1 – 1.214 M2 + 0.569 M3. But it is important to note that only the constant and M2 are statistically significant according to the t-test, as the t-stats were below the critical value of 1.976. The two variables are statistically insignificant even at the α=0.10 confidence level (critical value of 1.655).

Table 7: Regression analysis for % changes in M3 and Eurostoxx 50

Model : OLS, using observations 1-180
Dependent variable: Eurostoxx50

	Coefficient	*Std. Error*	*t-ratio*	*p-value*	
const	4919,88	341,074	14,4247	<0,00001	***
M1	0,577191	0,472293	1,2221	0,22356	
M2	-1,21402	0,604843	-2,0072	0,04650	**
M3	0,568559	0,388132	1,4649	0,14502	

Mean dependent var	3257,116	S.D. dependent var	849,1533
Sum squared resid	84303000	S.E. of regression	744,7315
R-squared	0,245709	Adjusted R-squared	0,230821
F(3, 152)	16,50455	P-value(F)	2,46e-09
Log-likelihood	-1250,960	Akaike criterion	2509,920
Schwarz criterion	2522,119	Hannan-Quinn	2514,875

Source: own processing, using data of YahooFinance and ECB

The R-squared and adjusted R-squared values show that the model is able to explain less than 25% of Eurostoxx 50 variability. It is able to conclude that the presented model doesn't support the anticipated relation between money supply and stock market in the Eurozone. Only the M2 monetary aggregate is able to impact the stock market significantly but given the low R-

squared value, it is able to conclude that there are other factors significantly impacting the stock market in Eurozone.

CONCLUSION

After the global financial crisis of 2008, stimulating the economy using the monetary policy tools became inevitable. The central banks began with their quantitative easing programs that were meant to support the economy by increasing the money supply significantly. The quantitative easing programs were adopted in Japan and in the USA at first, the Eurozone approached to this unconventional tool of monetary policy in 2015. This is why it is yet too soon to evaluate the impacts of the European QE properly. On the other hand the long term relations between the stock markets and money supply and the U.S. and Japanese experiences with their own QE programs may indicate a lot.

Table 8: The comparison of correlation and regression analyses of the relation between the key monetary aggregates and stock markets in the USA, Japan and Eurozone

	Time period	*Correlation coefficient*	*Regression coefficient*
USA (S&P 500; M2)	1980 - 2015	0.887	1.423
Japan (Nikkei 225; M2)	1990 – 2015	-0.691	-1.319
Eurozone (Eurostoxx 50; M3)	1987 - 2015	0.584	0.568

Source: own processing, using data of YahooFinance, FED and ECB

The comparison of results of the correlation and regression analyses of relations between key monetary aggregates and benchmark stock indices of the USA, Japan and Eurozone indicate that the money supply changes have the strongest positive impact on stock markets in the case of the USA. In Japan, the relation is negative. The analyses show that growth of the money supply is accompanied by decline of the stock market. However it is important to note that the situation has changed rapidly over the last 3 years and the QQE initiated in 2013 seems to have a highly positive impact on the stock market. I tis too soon to evaluate the efficiency of the Eurozone QE. Unlike in Japan, the long term relation between money supply and stock markets is positive in Europe, but it is not as positive as in the USA. I tis able to expect that the Eurozone QE will be able to support the stock market at least in the short term.

ACKNOWLEDGMENTS

This contribution is the result for the project VEGA (1/0124/14) “The role of financial institutions and capital market in solving problems of debt crisis in Europe”

REFERENCES

Bernanke, B. S.(1992), “The Federal Funds Rate and the Channels of Monetary Transmission”, *The American Economic Review*, Vol. 82, No. 4, pp. 901-921

Boeckh, J.A. (2012), *Velké oživení*, Grada Publishing, Praha.

Janus, J. (2016), “The Transmission Mechanism of Unconventional Monetary Policy”, *Oeconomia Copernicana*, Vol. 7, No. 1, pp. 7-21. DOI: http://dx.doi.org/10.12775/OeC.2015.001

Jílek, J. (2015), "Makroekonomický dopad rústu širokých měnových agregátu ve vybraných zemích v letech 1960-2017", *Ekonomický časopis*, Vol. 63, No. 1.

Kohout, P. (2010), *Finance po krizi*, Grada Publishing, Praha.

Krugman, P. (2009), *Návrat ekonomické krize*, 1. Vyd,Vyšehrad, Praha.

Mishkin, F.S, (1996), "The transmision mechanism and the role of asses in the prices in monetary policy", *Working paper 8617*, www.nberg.org ()

Musílek, P. (2002), *Trhy cenných papíru*, Ekopress, Praha.

Nayan, S., Kadir, N., Abdullah, M. S., Ahmad, M., (2013), "Post Keynesian endogeneity of money supply: Panel evidence", *Procedia Economics and Finance*, No. 7, pp. 48-54.

Orylski, O. (2009), "Central and Eastern European Capital Market's Development Possibilities", *Economics & Sociology*, Vol. 2, No 2, pp. 46-53.

Robinson, R., Nasser, M.E. (2013), "Decomposing US Money Supply Changes since the Financial Crisis", *Financial Studies*, No 1, pp. 32–44.

Siranova, M., Kotlebova, J. (2015), "Possible Impact of the ECB´s Outright Purchase Programmes on Economic Growth from Individual Eurozone Countries´ Point of View", In *Managing Sustainable Growth. MIC 2015 Management International Conference*, pp. 195–201.

Thomas, I. P. (2015), "Money, Fiscal Policy, and Interest Rates: A Critique of Modern Monetary Theory", *Review of Political Economy*, Vol. 27, No. 1, pp. 1–23.

Titze, M. (2015), "Netradičná menová politika a kvantitatívne uvoľňovanie centrálnej banky Japonska v rokoch 2001-2006" In *Politická ekonomie*, Vol. 63, No. 5, pp. 603-623.

Travkina, I., Tvaronavičienė, M. (2015), "Peculiarities of export structure in Lithuania: synthesis and analysis", *Entrepreneurship and sustainability issues*, Vol. 2, Issue 4, pp. 233-247.

Tvaronavičienė, M., Grybaitė, V. (2012), „Sustainable development and performance of institutions: approaches towards measurement", *Journal of Security and Sustainability Issues,* Vol 1, Issues 3, pp. 167-175.

Qishui Chi (2014), "The Impact of Money Supply on the Price: Evidence from China, Research in World Economy", Vol. 5, No. 1.

Vychytilová, J. (2015), "Linkages among U.S. Treasury Bond Yields, Commodity Futures and Stock Market Implied Volatility: New Nonparametric Evidence", *Journal of Competitiveness*, Vol. 7, Issue 3, pp. 143-158.

Żuchowska, D. (2015), "Accession to the Eurozone as Lithuania's Exit Strategy From the Currency Board System", *Equilibrium. Quarterly Journal of Economics and Economic Policy*, Vol. 10, No. 3, pp. 27-43, DOI: http://dx.doi.org/10.12775/ EQUIL.2015.023

http://finance.yahoo.com

http://www.federalreserve.gov

http://www.standardandpoors.com

http://www.tradingeconomics.com

http://www.econstats.com