

“Interventions on the markets (quantitative easing, central bank interventions, special economic programs). Use selected case studies of interventions on the markets. Present most known and largest interventions programs in selected countries or blocks of the countries. What are the reasons for undertaking them? Were they effective? What effects they brought to the real economy? Present theoretical and practical implications on selected economies.”

By: Reutov Oleksii
Tereshchenko Andrii

Student Number: 38 285
38 279

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Course Coordinator:
mgr. Tomasz Schabek

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Introduction

Historically, almost only discussed type of interventions was the interventions of central bank on foreign exchange market, which were important part of the financial world in the Breton Woods time and after it due to high dependence of world trade on the foreign exchange rate. If some country wants to get advantage for its export on the world market than this country could intervene on local markets with buying foreign currency and depreciate (devalue) the domestic currency. This type of interventions, classically, was conducted through direct buying (or selling, if we want to appreciate domestic currency) of foreign currency with domestic currency and was differed only by influence on the monetary base¹: sterilized - without effect on nominal base, or non-sterilized - with effect on nominal base (Edison, 1993; Inoue, 2012; Kamil, 2008; Kearns and Rigobon, 2003; King, 2012; Miyajima, 2013; Vitale, 1998).

However, the importance of other types of interventions and issue of simplification of foreign exchange interventions description became clear only after the financial global crisis of 2008 due to global challenge for monetary policy instruments. For example, the developing country could make “pseudo” foreign exchange intervention with monetary policy changes or with introduction of administrative limitations as it was in Ukraine in 2008 after huge capital outflow from the country. It is understandable that the effects of such instruments are more limited than direct operation on foreign exchange market. At the same time, central bank and government do not need the presence of foreign currency in foreign exchange reserves for the replacement foreign market instruments through monetary policy instruments (and others), but it could anyway lower the pressure on foreign exchange market and diminish the pressure on domestic currency. Only after the financial global crisis of 2008, the mistakes in core financial system and in understanding of interventions climbed out.

In this work, our accent will be on interventions with wider coverage. In Chapter 1, we will overlook the interventions program with different foundations: verbal or policy-makers interventions, monetary policy interventions, or fiscal policy interventions, and with different goals: market liquidity support, funding liquidity support, government liquidity support, inflation targeting, or foreign exchange management. Finally, in Chapter 2, we will discuss the main reason of market interventions and the direct (in general) and indirect (occasionally) effects of the market interventions with the theoretical examples through IS-LM models and with the practical examples through the relation between S&P 500 index and Federal Reserve System² balance.

¹ The monetary base is the nominal amount of domestic currency in circulation.

² The Federal Reserve System is the central bank of the United States of America.

Chapter 1. The market interventions

In Table 1, there are presented different examples of interventions or crisis that led to huge interventions programs which, as we think, characterize the meaning of interventions in the best way. All this situations are presented through the different sections in relation to the foundations and the goals of interventions which are described in more detail hereafter.

Table 1

Coverage of interventions through foundations and goals

Goal/Foundation	<i>Verbal or policy-makers interventions³</i>	<i>Monetary policy interventions⁴</i>	<i>Fiscal policy interventions⁵</i>
<i>Market liquidity support</i>	1. “Irrational Exuberance” speech on 5 December 1996, by Alan Greenspan; 2. Bernanke speech of 19 June 2013.	4. Black Monday of 19 October 1987; 5. Dot-com bubble March 2000 – October 2002.	-
<i>Funding liquidity support</i>	-	6. The liquidity crisis of 2008 (threshold of financial global crisis of 2008); 7. The European debt crisis of 2009.	11. Troubled Asset Relief Program.
<i>Government liquidity support</i>	3. “To do whatever” speech on 26 July 2012 by Draghi.	-	12. Ireland’s Programme; 13. Greek government-debt crisis.
<i>Inflation targeting</i>	-	8. The Great Inflation of the 1970s.	-
<i>Foreign exchange management</i>	-	9. Asian financial crisis of 1997; 10. Swiss National Bank (SNB) interventions from 12 March 2009, till 15 January 2015.	-

The next three interventions will describe the way in which the verbal (policy-makers) interventions are working: the goal is to influence market assets prices with the highest speed. In these examples, the effects were sometimes uncertain; however, it is possible theoretically also to use them more flexible with enough experience which has not been got yet.

³ Verbal or policy-makers interventions are new type of interventions which is tested mainly by the Federal Reserve System and the European Central Bank. The main goal is to influence market expectations without taking changes in policy or making hard decisions due to monetary policy rule calculations.

⁴ The classical type of interventions which is used by the central bank of developed and developing countries. The main goal is to change the monetary base through operations on markets. Before the financial global crisis of 2008, the interventions on foreign exchange market is discussed more often; however, after this crisis, the interventions on money markets received enough attention.

⁵ Fiscal policy interventions are the unique type of interventions which is used occasionally to stimulate the gross domestic product through government spending. Almost always, these steps are taken after structural crisis in domestic economy, and it is already late to change something without economy modernization.

Intervention №1: On 5 December 1996, the markets observed the falls of world stock markets in the time of the speech of former chairman of the Federal Reserve System (the FED), Alan Greenspan: Tokyo stock market fell by 4%, Hong Kong by 3%, and the U.S. market by 2%. Fall of stock markets was caused by the words of Alan Greenspan (1996):

“But how we do we know when irrational exuberance has unduly escalated asset values, which then become subject to unexpected and prolonged contractions as they have in Japan over the past decade? ... We as central bankers need not be concerned if a collapsing financial asset bubble does not threaten to impair the real economy, its production, jobs, and price stability.”

The markets were afraid that The Federal Reserve System could take steps for slowing the heating economy of USA due to possible formation of bubble on the U.S. stock markets, but the meaning of this words was other and was clarified by later comments: if the collapse of an asset bubble does not create systemic risk, the FED does not need intervene.

Intervention №2: June 19, 2013, Ben Bernanke (2013) announced possibility of “tapering” of quantitative easing program (QE) with the number 3 from \$85 billion U.S. government bond purchases to \$65 billion purchases monthly if the positive economic data continue. In this speech, Ben Bernanke did not announce an interest rate hike, but he announced the thresholds (not triggers) of future rate hike: inflation target on the level of 2%, unemployment target on the level of 6.5%. But these words were enough for the markets to be feared, and the stock markets dropped in average by 4.3% over next three trading days (also this speech caused the huge outflow from developing countries). On 18 September 2013, the FED decided to postpone the “tapering” of QE 3 at least till next year.

Intervention №3: July 26, 2012, the current President of the European Central Bank, Mario Draghi, stated (2012) in a panel discussion that the European Central Bank (ECB) “... is ready to do whatever it takes to preserve the Euro. And believe me, it will be enough”. This statement was turning point in the prices of government bonds of most stressed countries in European Union: Portugal, Italy, Greece, Spain, etc., which yields began to fall after it. With such brave statement, Mario Draghi gave the chance of making structural changes for European Union leaders by using the verbal intervention, but they have not used it.

The next seven interventions will describe the usage of monetary policy instruments to solve different crises, and they will be described by goals of this instruments usage. This type of interventions is used ubiquitously through the world due to higher flexibility of the central bank instruments. At the same time, it cannot change the structural problem of a national economy and can only give more time to the government for cardinal restructure.

Interventions №4, №5 solved the crises which need the support of market liquidity in the times of quick decrease in asset prices due to possible problem with collateral funding. On 19 October 1987 (the Black Friday), the U.S. stock market fell after the crashes through the stock markets of other countries on 22.61% (according to Dow Jones Industrial Average). But on 10 March 2000 (start of Dot-com bubble deflating), the U.S. stock market fell only on 1.63% to 5 048.62 (according to NASDAQ), but it was the turning point and markets decreased for the next 2 years (on 9 October 2002, NASDAQ hit the

low point of 1 114.11). The Black Friday was supported by the FED short intervention: central bank encouraged banks not to stop lending mechanisms and assured them that would help with collateral financing if the problem does not disappear. But deflating of Dot-com bubble was more prolonged in time, and the same mechanism of the FED did not work; therefore the FED starts to decrease the federal fund rate⁶: from 5.98% at the beginning of 2001 to 1.00% at the outbreak of 2004.

Interventions №6, №7 solved the crises which need the support of funding liquidity due to ceasing of interbank market operations. After the Lehman collapse on 15 September 2008, the interbank markets through the world ceased to exist – no banks lent money to others, even for collateral. And in 2009, there was spread the fear for lending money to the bank of problem countries: Portugal, Italy, Greece, and Spain. These crises could be solved only temporary through monetary policy instruments: decrease of central bank interest rate, expansion of instruments of the lender-of-last-resort, and changing demands for bank reserve at central banks. At the time of the liquidity crisis of 2008 and the European crisis of 2009, the central bank used only the first two instruments. FED lower the interest rate from 3.94% at the beginning of 2008 (5.25% at the beginning of 2007) to 0.15% at the outbreak of 2009 and lend to the bank any amount if they need them. At the same time, ECB acted more slowly and decreased key interest rate from 3.25% at the beginning of 2008 to 1.25% in May of 2009.

Intervention №8 is used in times of high- or hyper-inflation when government has necessity to reestablish confidence with help of central bank. In 1970s, USA and its markets were a mess: stock market lost 40% during 18-month period; economic growth was weak, and unemployment reached double-digits. The easing of monetary policy: M1 grew from \$228 billion to \$249 billion between December 1971 and 1972 could not help the country, which had structural problems, but could cause the high inflation pressure which reached 8% in 1973 and almost 12% later in the decade. The problem was solved only with brutal policy of tight money - someday, interest rates reached 20%.

Interventions №9, №10 are classical example of currency interventions and their results. Asian financial crisis of 1997 was caused by high inflow of foreign capital which was supported by fixing rate regimes. As always, high inflow of foreign capital into Thailand (and later into other Asian countries) was stopped abruptly after Thai government was forced to float the baht (Thai currency) due to lack of foreign currency reserves. The problem of Thailand was spread through other developing countries as contagion. The scope of the crisis was so huge that the problem could be solved only with help of global financial institution, International Monetary Fund (IMF), through “structural adjustment package” (SAP). IMF financed the problem country and set up special conditions: reduction of government deficit through decrease of spending, allow insolvent financial institutions to fail, and aggressive rise of interest rates. At the same time, SNB was caused to start intervention due to problem in other countries of European Union: Swiss franc was perceived (and continues to be perceived) as the “safe heaven”⁷. This caused high inflow of the foreign money that resulted in appreciation of the domestic currency and hurting of

⁶ The federal funds rate is the interest rate at which U.S. banks trade balances held at the FED.

⁷ Safe heaven is the special type of assets which is seen as more stable than other types of assets.

national economy. The interventions were stopped due to high level of SNB assets comparing to GDP, almost 75% in the end of 2014.

Next three interventions are example of government interventions in the time of crises. Government does not like to act quickly and to call things by their real names; therefore, in general, we could say that government intervention effect is limited, but the structural problems could not be solved without the government interventions. And sometimes, the capabilities of the central bank are also limited without government interventions as it was in 2008 in USA.

Intervention №11: October 03, 2008, the Troubled Asset Relief Program (TARP) was signed into law. The main goal of this program was support of financial sector which was on the brick of default after collapse of Lehman Brothers on September 15, 2008, and liquidity evaporated from the interbank markets. TARP was an example of actual government program for solving the crises, but its coverage was only \$700 billion and was not enough for restarting of U.S. economy without the interventions of the FED - at its peak at the end of 2008, the FED had about \$1 500 trillion in outstanding credits on its book (Chan and McGinty, 2010). The effect of TARP is controversial, but the U.S. gross domestic product could be lower than 6.61% in 2010 with no policy response⁸ (Blinder and Sandi, 2010).

Interventions №12, №13 were the examples of government liquidity support and they have some similarities with the intervention example №9. However, the difference is more deeply: in example №9, there are two currencies (domestic and foreign), but in these situations, countries had no problem with currencies but the problem with its national currency which they could not print. Such anomalous situations could be found in European Union. After the global financial crisis of 2008, government budgets of some European countries could not be achievable due to fall of GDP and taxes revenue. On capital markets, these countries had also no possibilities to borrow money due to high interest rate. In the end, stability of banking sector of problem countries: Portugal, Ireland, Italy, Greece, and Spain, was put into a question because money was transferred from them to more stable countries: German, France, etc. For solving crises in Greece and Ireland were special programs developed: Ireland's Programme (Economic Adjustment Programme for Ireland) and First and Second Economic Adjustment Programme for Greece. Ireland's Programme was started on 28 November 2010 with the support from the European Union and IMF and was finished on 15 December 2013. Within the program, Ireland gets €85 billion from which €17.5 billion was provided by Ireland's own resources (National Pension Reserve Fund and cash reserves). The conditions of Ireland program were classical: downsizing and reorganization of banking system and sustainable budget position. Despite Ireland, Greece has not still finished its program which started in May 2010 due to low political willingness and higher debt burden. At the moment, the scope of Greece program is equal to €153.88 billion (only €11.98 billion was gotten from IMF), and fight for unlocking additional €7.2 billion is taking place currently.

⁸ These calculations should be interpreted critically due to some controversial in its basis. For example, after 2010, the difference between base scenario and with no policy response is decreasing very quickly. However, the reality shows that the effects of the financial global crisis are felt even in 2015.

Chapter 2. Reasons for and impacts of the market interventions

2.1 Reasons and issues of the market interventions

As can be seen from Chapter 1, goals of interventions mostly relate to the support of liquidity (and its different types) or management of inflation or foreign exchange rate. However, goals cannot explain in the best way reasons for taking huge risk of the economy manipulation. Therefore, it is necessary to look on reasons separately. For example, why does the government take steps for curbing inflation? Because consumer demands, investment in economy, and government revenues depend on the real value of money but not on the nominal value. However, all this could be described in more simple way – recovery of financial stability. All the market interventions, at first, are done due to necessity of financial stability recovery (which is determined by confidence) on which the assets prices, stability of banking systems, and consumer and investment demands are tied.

But, also, it is necessary to understand that not always things happen as planned. Sometimes, government makes interventions in one or another way to stimulate economy when the economic growth is disappearing⁹. Later, national economy could develop in two ways. First way, the economy is restarting, and almost nobody knows about this program at all. Or the program disrupts the financial stability of the decreasing economy, and the new program should be developed for returning of financial stability as was defined as the main reason of market interventions.

Additionally, all the interventions produced the issue of “moral hazard”. Moral hazard is the perspective that the economic agent who is protected will behave differently from the way it would behave if it were fully exposed to risk. Moral hazard was the main doubt of the FED in the question “to save Lehman Brothers or not” in September of 2008. Henry Paulson, the head of U.S. Treasury in the time of Lehman Brothers’ collapse, explained the issue as follows (Cassidy, 2014): “It was important that the terms be harsh because I take moral hazard seriously. ... When companies fail, shareholders bear the losses. It’s just the way our system is supposed to work.”

2.2 Direct impacts of interventions in general

In Chapter 1, the market interventions were divided on three sections depending on their foundations: the vocal interventions, the monetary instrument interventions, and the fiscal interventions. In order to understand differences in interventions deeply, classic macroeconomic models should be used. All the short-term economic consequences - and also impacts of the market interventions - for economy in terms of changes in GDP (y) and interest rate (i) could be described by simple IS-LM model. In these models, IS-line describes a goods market, and consists of GDP determinants: consumption, government spending, investments, and net export. Therefore, the government could influence not only government spending at times of fiscal interventions, but also other determinants of gross domestic product. At the same time, LM-line describes the money market that is determined by demand and supply for money.

⁹ As was beforementioned, the government does not like to name it as interventions. In general, it was named as stimulation program or something like this.

Fiscal intervention influences theoretically¹⁰ the goods market (IS-line) as it is shown on Fig. 2.2.1. The government makes fiscal intervention through the stimulation of the goods market and moves IS-line to IS1 position that, additionally to growth of GDP, also influences interest rate which grow due to increase in opportunity costs. Due to changes of interest rate, money market is also influenced by intervention, and LM-curve should move to LM1 position for finding balance. In the end, the fiscal intervention results in increase of GDP and stable interest rate (point “C”) what is described on Fig 2.2.1.a. However, at times when fiscal interventions are used for their main goal – recovery of fiscal stability – the mechanism is a little different (Fig. 2.2.1.b). Due to negative consequences of some factors which decrease GDP, the IS-line moves to the left to IS1-position; however, that influences financial stability of national economy, and for financial stability restoration, government should make fiscal interventions and return the goods market to the position IS2 which is equal or almost equal to initial position of IS-line.

Source: authors' assumptions.

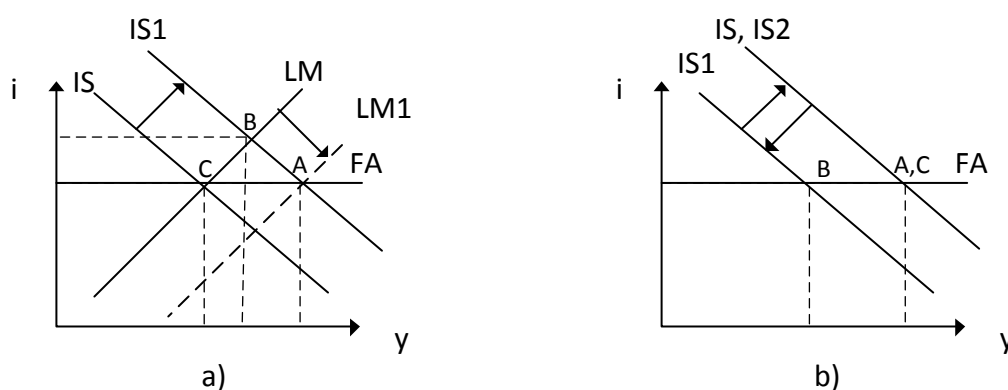


Fig. 2.2.1 The IS-LM schemes of the fiscal policy intervention impacts

Both, monetary and verbal foundations for interventions, aim money market as their primary impact or, in other words, LM-curve. However, these interventions use different market elements: monetary interventions affect money supply, verbal interventions affect money demand.

Monetary intervention results in money supply increase as it is shown on Fig. 2.2.2.b, that lowers interest rate. At the same time, on economy level that is shown on Fig. 2.2.2.a, LM-curve moves to LM1 position. Shift represents decrease of interest rate as it was described for money market, but also it increases GDP. Further theoretical reaction of economy is represented by IS-curve shift to IS1 position; the goods market found new equilibrium point “C”. As the result, economy is balanced, interest rate remains the same, and GDP increased.

¹⁰ Each of intervention foundations has different source of impact on economy. Consequences of interventions are different but it depends not only on chosen type but also on economy openness for capital and exchange rate regime. In addition, real effect of intervention may not match theoretical background.

Source: authors' assumptions.

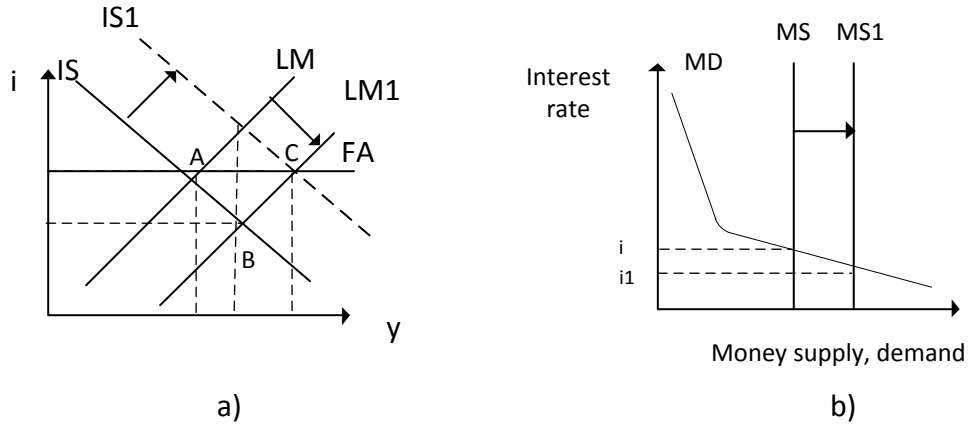


Fig. 2.2.2 The IS-LM schemes of the monetary policy intervention impacts

The verbal (policy-makers) intervention is a kind of interventions that also affects money market, but the main difference from monetary interventions is that the impact of interventions is money demand, not money supply. As it is shown on Fig. 2.2.3.b, the money demand line changed its curviness, as result interest rate decreased. The changes on economy, from verbal intervention are the same as from monetary, Fig. 2.2.3.

Source: authors' assumptions.

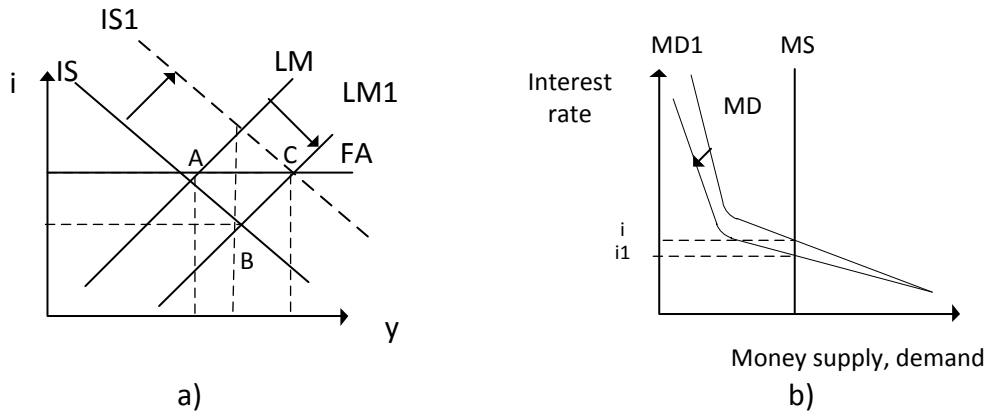


Fig. 2.2.3 The IS-LM schemes of the verbal intervention impacts

2.3 Indirect impacts of interventions, i.e. U.S. stock market and QE

Apart from the direct impact (in general), the market interventions can also have the indirect impact (occasionally) which is not expected before conducting the market interventions. As an example of indirect impact could be used the huge dependence of U.S. stock market on monetary policy interventions. The question about causality of FED balance on S&P index is ambiguous (Kassen, 2013) but the fact that these variables are correlated is irrefutable. We think that the causality takes place and we estimated the strength of influence through simple linear regression with weekly data (Fig. 2.3.1):

$$S\&P\ 500\ Index_t = 107.03 + 0.429 * FED\ balance\ in\ bln.\ of\ U.S.\ dollars_t + \varepsilon_t. \quad (1)$$

It is very important to mention that equation (1) should be used carefully because this model is not optimal and does not include all the important inputs: heteroscedasticity test is failed; residuals are not distributed normally and are correlated. Furthermore, there is high probability that the model structure should be non-linear (usage of natural logarithm have not solved this problem). However, explanatory power is high (94% of volatility is described by it); all the variable coefficients are significant; and, there is no problem of stationarity and multicollinearity because the model is not autoregressive and with only one input. Therefore, this model is good for solving our goal – estimating of correlation in sensitivity of one factor in relation to other.

Source: Bloomberg, authors' calculations.

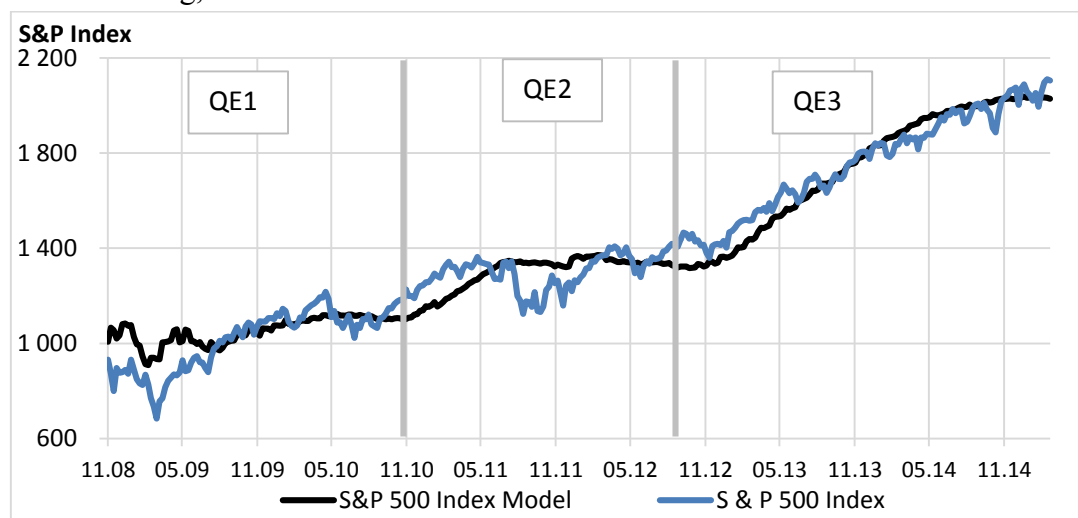


Fig. 2.3.1 S&P 500 Index model according to equation (1)

As could be seen from the equation (1), growth of the FED's balance on \$1 bln. causes in general growth of S&P index on 0.429 point with the standard error on the level of 6% from average in the period from November 2008 to the current times. The model according to equation (1) explains about 94% of S&P changes; therefore, only 6% of changes could be described by other economic factors changes.

But the effect from the FED balance on S&P 500 index was not equal during three parts of quantitative easing program. QE 1 showed the biggest impact of all program on stocks markets with an increase in 0.735 point of S&P 500 for each billion of the FED balance; the changes of the FED balance explained only 58.3% of S&P 500 index changes. QE 2 showed the smallest impact on stock markets: increase only on 0.092 point for each billion of the FED balance; at the time of QE 2, the influence of program was the smallest on S&P 500 index – only 4.2% of S&P 500 index changes were explained by the changes of the FED balance. The indirect impact from QE 3 was the highest (and this induces the questions about necessity of QE 3): 96.1% of S&P 500 index changes were explained by the changes of the FED balance. Such huge dependence is very tricky due to possibility of usage the market interventions for enrichment of market participants. However, the effect from QE 3 was lower than from QE 1, S&P 500 index increased on 0.348 point in average due to increase in the FED balance on \$1 bln.

Conclusion

The market interventions are more various than could be seen from the literature before the financial global crisis of 2008. As we showed in this work, all the market interventions could be divided into sections in addition to foundations and goals. The foundations are as follows: the verbal or policy-makers interventions, the monetary policy interventions, and the fiscal policy interventions. The monetary policy interventions are used more often due to their flexibility and possibility of quick usage. The verbal interventions are new type of interventions with often uncertain effects; however, they could find the biggest usage in the future due to speed and impacts in short time period without actual policy decisions. At the same time, fiscal policy interventions are used less often, but the possible impact from their usage is the biggest.

The main goals of the market intervention are market liquidity support, funding liquidity support, government liquidity support, inflation targeting, and foreign exchange rate management. However, the main reason to conduct market interventions could be described only by one main reason: recovery of financial stability. The additional possible reason is the stimulation of economy in the period of slowdown, but we do not think that it is worth to do due to possible issue – moral hazard - and negative indirect impact which cannot be seen in the time of decision-making – for example, creating of asset bubble on the stock markets.

Bibliography

1. Bernanke, B., 2013. *Bernanke's press conference*, Transcript of Chairman Bernanke's press conference, 19 June, The Federal Reserve Board, viewed 09 April 2015, < <http://www.federalreserve.gov/mediacenter/files/FOMCpresconf20130619.pdf>>.
2. Blinder, A.S. & Zandi, M., 2010. *How the Great Depression was brought to an end*, Article, 27 July, viewed 09 April 2015, <<https://www.economy.com/mark-zandi/documents/End-of-Great-Recession.pdf>>.
3. Cassidy, J., 2014. *Hank Paulson's telling admission*, From print edition, 7 October, The New Yorker, viewed 09 April 2015, <<https://www.economy.com/mark-zandi/documents/End-of-Great-Recession.pdf>>.
4. Chan, S. & McGinty, J.C., 2010. *Fed documents breadth of emergency measures*, From print edition, December 1, The New York Times, viewed 09 April 2015, < <http://www.nytimes.com/2010/12/02/business/economy/02fed.html?ref=global&r=0>>.
5. Draghi, M., 2012. *Verbatim of the remarks made by Mario Draghi*, speech by Mario Draghi, 26 July, the European Central Bank, viewed 09 April 2015, < <https://www.ecb.europa.eu/press/key/date/2012/html/sp120726.en.html>>.
6. Edison, H. J., 1993. *The effectiveness of central-bank intervention: a survey of the literature after 1982*, Special papers in international economics No 18, July, Department of economics Princeton University, viewed 09 April 2015, < http://www.princeton.edu/~ies/IES_Special_Papers/SP18.pdf>.
7. Greenspan, A., 1996. *The challenge of central banking in a democratic society*, Remarks by Chairman Alan Greenspan, 5 December, The Federal Reserve Board, viewed 09 April 2015, < <http://www.federalreserve.gov/boarddocs/speeches/1996/19961205.htm>>.
8. Inoue, T., 2012. *Central bank intervention and exchange rate behavior: empirical evidence for India*, IDE discussion paper No 353, June, Institute of developing economies, viewed 09 April 2015, < <http://www.ide.go.jp/English/Publish/Download/Dp/pdf/353.pdf>>.
9. Kamil, H., 2008. *Is central bank intervention effective under inflation targeting regimes? The case of Columbia*, IMF Working Paper WP/08/88, April, International Monetary Fund, viewed 09 April 2015, < <https://www.imf.org/external/pubs/ft/wp/2008/wp0888.pdf>>.
10. Kassen, A., 2013. *The Fed's POMO isn't really driving stocks higher*, Digital news, October 24, SeeItMarket.com, viewed 09 April 2015, < <http://www.seeitmarket.com/the-feds-pomo-isnt-really-driving-stocks-higher-15070/>>.
11. Kearns, J. & Rigobon, R., 2003. *Identifying the efficacy of central bank interventions: evidence from Australia*, Research Discussion Paper 2003-04, April, viewed 09 April 2015, < <http://www.rba.gov.au/publications/rdp/2003/pdf/rdp2003-04.pdf>>.
12. King, R. G., 2012. 'Central banking in an open economy'. *International Journal of Central Banking*, March, p. 10.
13. Miyajima, K., 2013. *Foreign exchange intervention and expectation in emerging economies*, BIS Working Papers No 414, June 2013, Bank for International Settlements, viewed 09 April 2015, < <http://www.bis.org/publ/work414.pdf>>.

14. Vitale, P., 1998. 'Sterilised central bank intervention in the foreign exchange market'.
Journal of International Economics 49, 10 August, p. 22.