

To QE or Not to QE? The Japanese Experience

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Abstract: This paper studies the effect of a series of quantitative easing initiatives belonging to the Bank of Japan on Central and Eastern European sovereign CDSs. Using daily data for the 2005 – 2013 period and considering 23 announcements of QE initiatives we build an econometric event study approach in order to compute and investigate the abnormal returns induced by these announcements. The results indicate a strong effect of the Japanese QE policies on the CEE sovereign Credit Default Swaps.

Keywords: quantitative easing, credit risk, CDS, Bank of Japan

JEL classification G14, F34, E44

1. Introduction

During the economic crises the deficiencies of the financial markets became obvious resulting in a considerable wave of distress and uncertainty that recoiled into the wider economy affecting its dynamics.

In order to counteract this trend and restore a state of economic functionality, the central banks had to step in. In most of the cases, the central banks guide their monetary policy through the manipulation of the short-term nominal interest rates. However, during the global crisis the short rates were nearing the zero lower bound which resulted in the need for new tools of economic stimulation and recovery. The measures put forward are known as quantitative easing and have been deemed as unconventional instruments that aim to absorb shocks and ensure the stability of the financial system

Given the nature of the quantitative easing initiatives and their novelty they became the source of a strong and rapidly developing literature that gravitates around empirical tests of their impact on various areas of the financial systems. The main body of academic work follows the measures issued by four main central banks: The Bank of Japan, the European Central Bank, Federal Reserve or the Bank of England.

The scientific literature considers that quantitative easing originated from the deflationary period which influenced Japan in the 2001-2006 period. These early initiatives are investigated in studies like Bernanke et al (2004), Hosono (2006), Ugai (2007) or Wieland (2009). The latter concludes that these initiatives had an important impact on the market's expectations towards a low interest rate level, though he does not provide a clear effect on bond returns or risk premiums.

Building on the study of Hosono (2006), Bowman et al. (2011) investigate the efficiency of the Bank of Japan's liquidity injections into the interbank market for expanding bank lending. The authors observe a strong and significant effect of the QE policy in stimulating credit expansion.

The initiatives issued by the Federal Reserve have been discussed in an important number of papers, among which we nominate Doh (2010), Gagnon et al. (2011), D'Amico et al (2012), Hancock and Passmore (2011) or Stroebel and Taylor (2012).

Doh (2010) constitutes one of the first attempts to characterize the Federal Reserve's Large Scale Asset Programs. Using a preferred-habitat model, Doh (2010) reports that these programs succeed in decreasing term premiums for long-term bonds. Similar results are obtained by Gagnon et al. (2011) who observe a reduction between 30 and 100 basis points for the ten-year term premium. D'Amico et al. (2012) continue the study of Large Scale Asset Programs and demonstrate their efficiency as a monetary policy. Their results indicate a reduction of 35 basis points on long-term Treasury yields.

Vough (2011) also focuses on the impact of the Federal Reserve QE measures on long-term interest rates and conclude that the effects were significant. Other interesting approaches are found in Krishnamurthy and Vissing-Jorgensen (2011) which observe the "QE1" and "QE2" programs through an event study methodology and in Fratzscher et al. (2012).

Joyce et al. (2010), Breedon et al. (2012) and Kapetanios et al. (2012) analyze the impact brought by the QE policies issued by the Bank of England. Joyce et al. (2010) observe an effect of reduction in guild prices of about 100 while the other studies focus the bond market and on the macroeconomic implications of the first part of the British QE.

Similar investigations have been conducted for the ECB in studies such as Peersman (2011) or Szczerbowicz (2012).

Albu et al (2014a) and (2014b) offer a comparative analysis of the quantitative easing measures issued by the four central banks mentioned above.

In general, the vast majority of empirical studies consider the implications of quantitative easing measures on developed financial markets. However, the financial literature manifests recently an important dose of interest towards the investigation of less popular markets, such those belonging to the CEE countries, relevant results being reported by Harrison et al (2010), Miclaus et al (2008), Lupu and Lupu (2009) and Panait and Lupu (2009).

In this context, the purpose of this paper is to examine the effects induced by a series of quantitative easing measures adopted by the Bank of Japan on the dynamics of nine sovereign CDSs belonging to CEE countries.

The remainder of the paper is organized in the following manner. Section II discusses the data used and the methodology. Section III focuses on the presentation of the results, and section IV concludes.

2. Methodology and data sources

As stated above, the methodology is based on an econometric event study analysis. The modeling context has two input building blocks. The first category of input data consists in daily closing prices that characterize the evolution of nine five-year sovereign credit default swaps. We collected the data from DataStream, considering the (2005-2013) period and focusing on the following countries: Austria, Bulgaria, Germany, Hungary, Poland, Romania, Russia, Turkey and Ukraine. The evolution of the sovereign CDSs closing prices is presented in Figure 1.

The econometric model also uses a table of calendar information that represents the moments in which a BOJ QE initiative was announced.

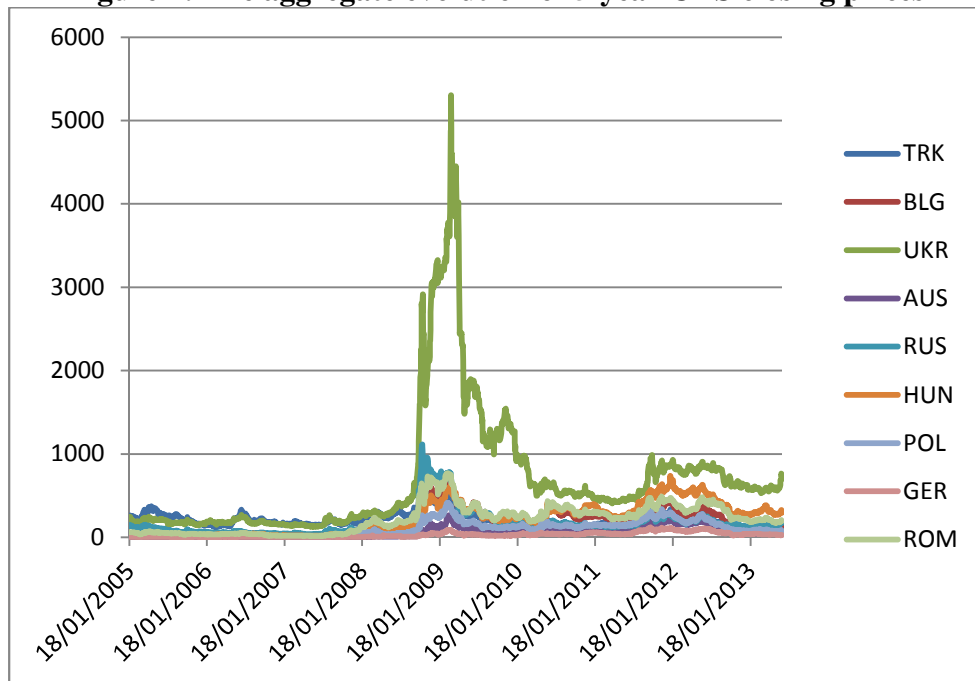
We build on our methodology previously put forward in Albu et al. (2014a) and Albu et al. (2014b) and we calibrate an ARMA (1, 1) – GARCH (1, 1)¹ model for 100 returns that correspond to a window of 100 days.

$$R_{t+1} = lR_t + m\varepsilon_t + \varepsilon_{t+1}, \varepsilon_{t+1} \sim N(0, \sigma_{t+1})$$

$$\sigma_{t+1}^2 = \omega + \sum_{i=1}^p \alpha_i R_{t+1-i}^2 + \sum_{j=1}^q \beta_j \sigma_{t+1-j}^2$$

Where $\alpha + \beta < 1$

Figure 1: The aggregate evolution of 5-year CDS closing prices



Source: Authors' work

From this point we conduct the calculation of the variances with reference to the error terms determined by the computation of the differences to the returns. In other words, for each of the chosen events, we set an event window of 41 days (20 days before the event and 20 after) and then formulate predictions of the variances.

We thus obtain two types of results. Firstly, the model generates the series of abnormal returns which are defined as the differences between the prediction of the ARMA – GARCH model and the actual returns of the event window. Secondly, we compute a set of squared abnormal returns which are given by the differences between the predictions on variance and the squared returns of the event window.

Using the estimated variance we thus calculate the values of the t test for both categories of results. The results for the abnormal returns are summarized in Figure 2.

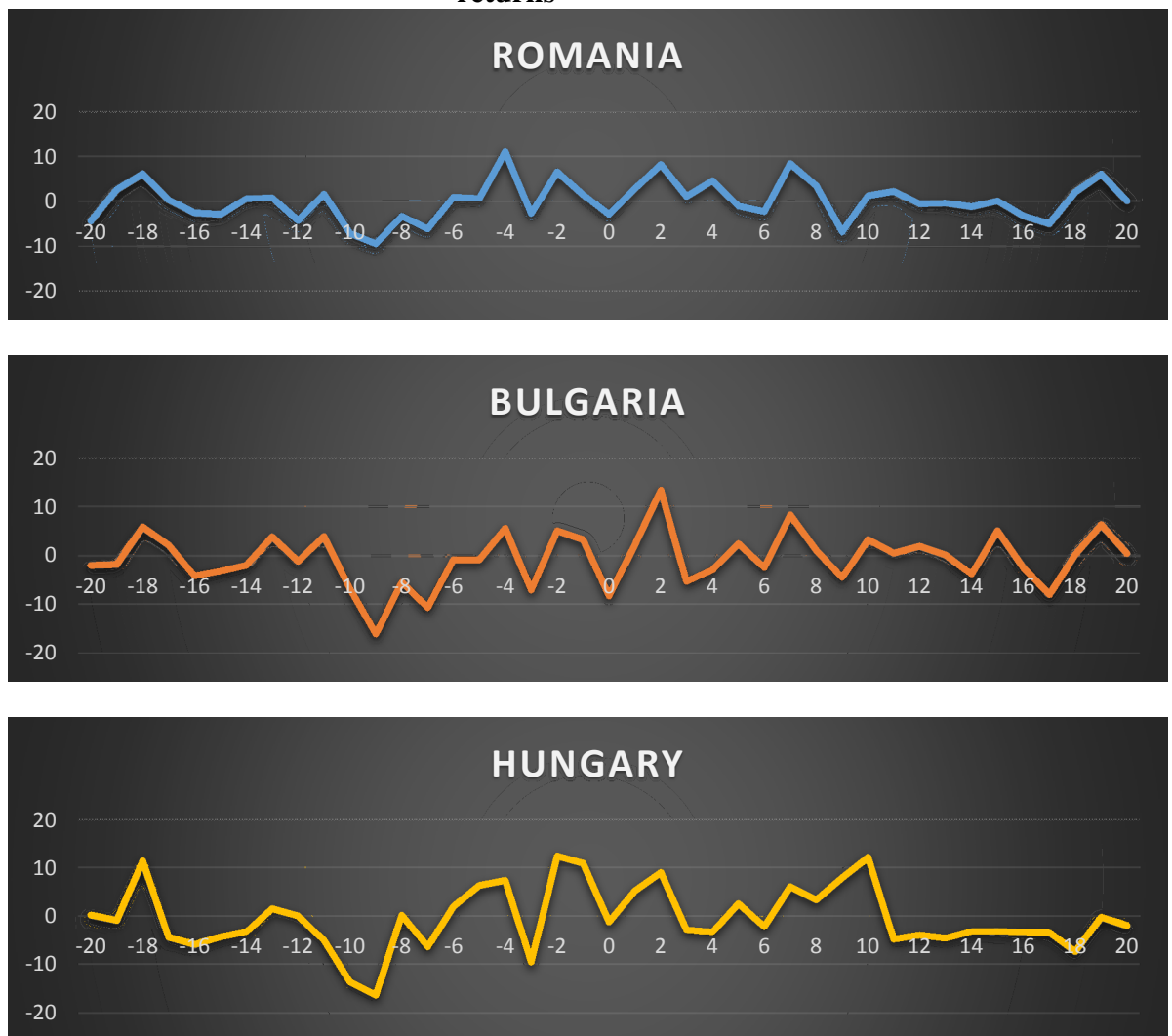
¹ For a more ample discussion on GARCH modeling see for example Călin et al. (2014) or Lupu and Lupu (2007).

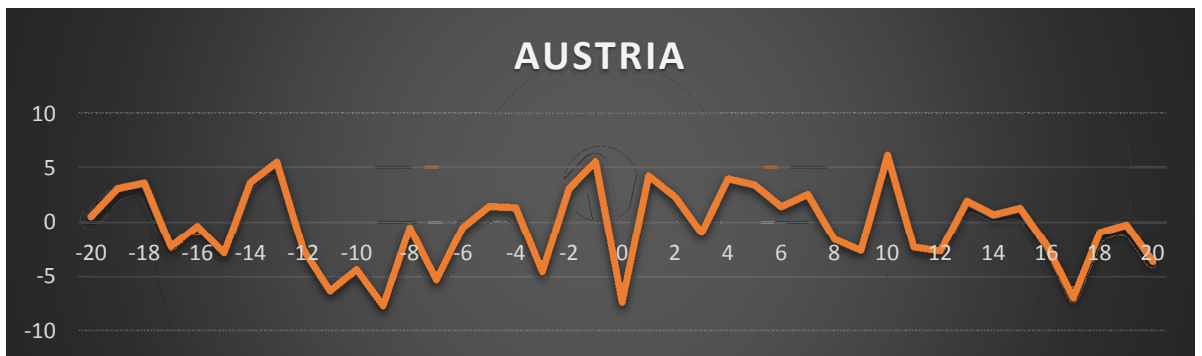
3. Results

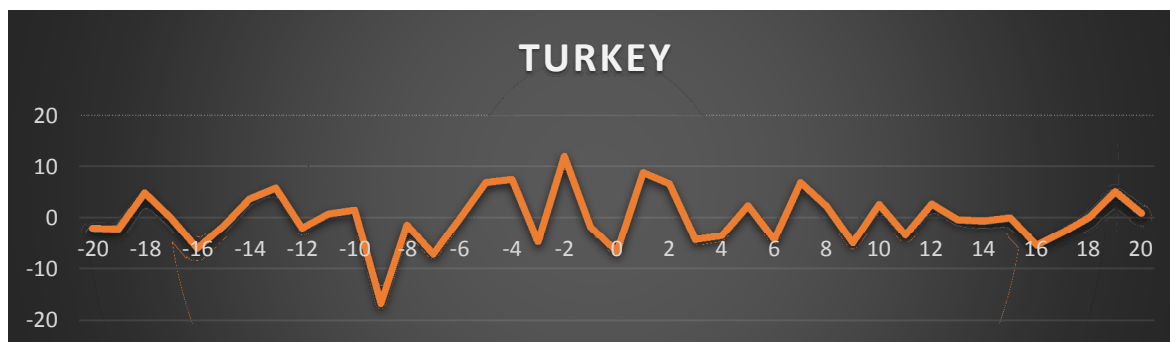
In the case of Romania the values of the t test exhibit significant levels of the abnormal returns in 64% of the days in the event window. The information present on the financial markets determine a decreasing tendency of the credit risk associated to the Romanian CDS in the (-20, -7) interval. On average, the launch of the QE policy by the Bank of Japan triggers a decrease of the abnormal returns on the day of the announcement (day zero). After this moment, the risk level of the financial instrument tends to mildly rise in the first week. After day 8, the results show a fluctuating tendency dominated by an expansionist trend.

The abnormal returns obtained for the Romanian CDS show an influence that is statistically significant in 739 of the total of moments found in the event windows of the 23 QE events. This represents a percent of 78.36%, which places the Romanian CDS on the third place among the studied instruments from the point of view of sensitivity to the Japanese QE measures. We also find 63 cases of influence regarding the squared abnormal returns which we interpret as a growth in the uncertainty about the right valuation of the CDS.

Figure 2: The evolution of the average values of the t test for the abnormal returns







Source: Authors' work

In the case of Bulgaria we find a degree of sensitivity that is superior to the one obtained for Romania. On average, the QE policies of the BOJ have a statistically relevant influence on the abnormal returns in 29 days of the event window.

Similarly to Romania, the results indicate a credit risk contraction in the (-16, -6) interval. In addition to this, in the announcement day of a policy the credit risk signals a reduction. The average reduction value for Bulgaria is the highest found in this study.

After this stage, the evolution of the abnormal returns alternates between periods of risk rise and fall.

The abnormal returns for the Bulgarian sovereign CDS show a greater sensibility to the QE policies compared to the case of Romania, the percent of 78.47% (740 de zile) placing the CDS on the second place among the countries included in the analysis.

Until the launch of a new quantitative easing policy by the BOJ, the Hungarian CDS behaves similarly to the cases of Romania and Bulgaria, the abnormal returns showing a risk reduction in the (-17, -7) interval, but not on the announcement day.

Unlike the first two states, in the case of Hungary we find a relevant tendency of risk reduction after the launch of a policy, the interval with the maxim impact being (11, 18).

The abnormal returns for the Ukrainian CDS follow a different paradigm. The results indicate an initial credit risk fall in the (-11, -3), which is accompanied by the similar effect in the day of the announcement (day zero). Afterwards, the first two weeks are dominated by a surge of the risk component, but this tendency is corrected towards the end of the event window. This evolution is totally symmetric with that found in the case of Austria.

Despite a high degree of sensitivity to the Japanese QE policies, the Polish CDS does not exhibit a statistically significant value on the day of the announcement. Nevertheless, the results indicate a reduction of credit risk in the (-20, -3) interval, followed by a mild increase in the (12, 17) period.

The German CDS instrument reacts strongly but also volatile to the QE announcements. On average, the (-20, -13) interval is marked by a solid increase tendency which is corrected in the twelve days before the announcement. After this moment, the abnormal returns continue to grow. The analysis of the abnormal returns reflects an influence percent of 62.98% which is among the lowest found in this study. With respect to the squared abnormal returns, the results indicate the largest number of days with a significant statistical influence among which more than two thirds suggest the expansion of uncertainty about the correct valuation of the CDS.

In case of Russia, there isn't a statistically significant influence on the day of the announcement and the results highlight the fact that risk is increasing towards the end of the event window.

Unlike Russia, the case of Turkey exhibits a bigger sensitivity to the set of policies that are analyzed in this paper. The abnormal returns are statistically significant in 71% of the

cases. For Turkey, the results show an average decrease of the credit risk on the launch day, followed by 21 days of oscillations.

4. Conclusions

The results of this study show that the launch of the BOJ QE policies influences credit risk in the analyzed countries in a manner that is similar to the results found by Albu et al. (2014a) and Albu et al. (2014b) who investigate the QE policies issued by the ECB, FED and BOE.

The results indicate a risk reduction for all the instruments in the following days: (-9, -7 and 17). Moreover, the majority of the instruments exhibit a reduction of the risk on the entire (-11, 7) interval.

The instruments that are the most sensitive to QE policies belong to Turkey, Bulgaria and Romania and the CDSs with the lowest degree of sensitivity belong to Russia, Germany and Austria.

On average, the QE policies issued by the BOJ trigger oscillating influences between lowering and augmenting credit risk. Except Ukraine, in the cases of the other countries the results show that the number of cases in which these policies reduce credit risk are greater than the number of cases in which they lead to a rise. The biggest credit risk reduction effect found in this study is specific to the Bulgarian sovereign CDS.

5. Acknowledgement

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6. Bibliography

- [1] Albu, L. L., Lupu, R., Calin, A. C., Popovici, O. C. (2014a), “Estimating the Impact of Quantitative Easing on Credit Risk through an ARMA-GARCH Model”, *Romanian Journal of Economic Forecasting*, Issue 3, pp. 39-50
- [2] Albu, L. L., Lupu, R., Calin, A. C., Popovici, O. C. (2014b), “The effect of ECB’s Quantitative Easing on Credit Default Swap Instruments in Central and Eastern Europe”, *Procedia Economics and Finance*, Volume 8, pp. 122–128.
- [3] Barry H., Lupu R., Lupu I. (2010), “Statistical Properties of the CEE Stock Market Dynamics. A Panel Data Analysis.” *The Romanian Economic Journal* 13 (37) pp. 41–54.
- [4] Bernanke, B., Reinhart, V. and Sack, B. (2004,) “Monetary Policy Alternatives at the Zero Bound: An Empirical Assessment” *Brookings Papers on Economic Activity*. Vol. 35. Issue 2. pp. 1-100
- [5] Breedon F., Chadha J. S., Waters A., (2012), “The financial market impact of UK quantitative easing” *Oxford Review of Economic Policy*, Volume 28 Issue 4, pp. 702-728
- [6] Calin A.C., Diaconescu T., Popovici O.C. (2014), *Nonlinear Models for Economic Forecasting Applications: An Evolutionary Discussion*, *Computational Methods in Social Sciences*, Vol II, Issue 1, pp. 42 – 47.
- [7] D’Amico, S., W. B. English, D. Lopez-Salido, and E. Nelson (2012), “The Federal Reserve’s Large-Scale Asset Purchase Programs: Rationale and Effects”, *Working Paper*, Federal Reserve Board, pp. 1-58
- [8] Doh T., (2010) “The efficacy of large-scale asset purchases at the zero lower bound”, *Economic Review*, 2010, issue Q II, pp. 5-34

- [9] Fratzscher M., Lo Duca M., Straub R. (2012), "A Global Monetary Tsunami? On the Spillovers of US Quantitative Easing", Centre for Economic Policy Research Available at <http://www.cepr.org/pubs/new-dps/dplist.asp?dpno=9195.asp>
- [10] Gagnon J., Raskin M., Remache J., Sack B. (2011) "The Financial Market Effects of the Federal Reserve's Large-Scale Asset Purchases". *International Journal of Central Banking*, 7, 3-43.
- [11] Hancock, D., Passmore, W., (2011), Did the Federal Reserve's MBS Purchases Program, Lower Mortgage Rates?, *Journal of Monetary Economics* 58, p. 498-514.
- [12] Hosono K. (2006) The "Transmission Mechanism of Monetary Policy in Japan: Evidence from Banks' Balance Sheets", *Journal of Japanese International Economics* 20, pp. 380-405.
- [13] Joyce M.A.S., Lasaosa A., Stevens I., Tong, M., (2011), "The financial market impact of quantitative easing in the United Kingdom", *International Journal of Central Banking* 7(3), pp. 113-162.
- [14] Kapetanios G., Mumtaz H., Stevens I. Theodoridis K. (2012), "Assessing the Economy-wide Effects of Quantitative Easing", *The Economic Journal*, pp 316-347
- [15] Krishnamurthy A., Vissing-Jorgensen A., (2011), "The effects of quantitative easing on interest rates: channels and implications for policy". *Brookings Papers on Economic Activity* 2, pp. 215-287.
- [16] Lupu R, Lupu I. (2007), „Testing for Heteroskedasticity on the Bucharest Stock Exchange”, *Romanian Economic Journal* 11 (23), pp. 19-28.
- [17] Lupu R., Lupu I. (2009), "Contagion across Central and Eastern European Stock Markets: A Dynamic Conditional Correlation Test." *Economic Computation and Economic Cybernetics Studies and Research* 43 (4): 173–86.
- [18] Miclaus P.G, Bobirca A., Lupu, R., Ungureanu S. (2008), „EXPECTED DEFAULT FREQUENCIES FOR THE COMPANIES LISTED AT THE BUCHAREST STOCK EXCHANGE”, *Annals of the University of Oradea, Economic Science Series*, 17(3).
- [19] Panait I, Lupu I, The behavior of the Bucharest Stock Exchange during the current financial markets crisis and proposed measures for its sustainable development, *Analele Universității Spiru Haret, Seria Economie*, year 9, no. 9, 2009, Bucharest, pg. 61-72, ISSN: 1582-8336
- [20] Peersman, G., (2011), "Macroeconomic Effects of Unconventional Monetary Policy in the Euro Area", *CEPR Discussion Papers* 8348, C.E.P.R. Discussion Papers.
- [21] Stroebel, J.C., Taylor, J.B., (2012), "Estimated impact of the federal reserve's mortgage-backed securities purchase program", *International Journal of Central Banking* 8(2), pp. 1-42.
- [22] Szczerbowicz U., (2012), "The ECB unconventional monetary policies: have they lowered market borrowing costs for banks and governments?" *Document Du Travail, Centre D'Etudes Prospectives et D'informations Internationales*
- [23] Ugai, H. (2007), "Effects of the Quantitative Easing Policy: A Survey of Empirical Analyses", *Monetary and Economic Studies*, Institute for Monetary and Economic Studies, Bank of Japan. Vol.25. Iss.1. pp. 1-48.
- [24] Vought L., (2011), "The Effect of Quantitative Easing on Long-Term Interest Rates" *Senior Honors Theses. Paper* 264
- [25] Wieland W. (2009), "Quantitative Easing: A Rationale and some Evidence from Japan", *NATIONAL BUREAU OF ECONOMIC RESEARCH, Working Paper* 15565