

# CO-MOVEMENTS OF REGIME SHIFTS IN GBP CURRENCY PAIRS AROUND BOE QUANTITATIVE EASING ANNOUNCEMENTS

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Radu LUPU, PhD<sup>1</sup>  
Adrian Cantemir CALIN, PhD<sup>2</sup>

## Abstract

In the current post-crisis era, the events with the highest probability to move the financial markets are the announcements of financial authorities concerning the quantitative easing decisions. The objective of this paper is to build an analysis of the existence of connections among the GBP currency pairs in terms of regime switching that could be related to the moments when the Bank of England generated announcements about its monetary decisions.

**Keywords:** quantitative easing, regime shifts, foreign exchange market

**JEL Classification:** G14, F34, E44

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## Introduction

In the turbulent financial environment of 2009 the Bank of England (BOE) observed the necessity to focus on its monetary policy. This focus was supported by a battery of conventional and unconventional elements that represented a counteractive action against the adverse phenomena that characterized the global financial system. With the policy rate at the level of 0.5 percent by the

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<sup>1</sup> *Scientific researcher II, Institute for Economic Forecasting, Romanian Academy; Associate Professor, Bucharest University of Economic Studies.*

<sup>2</sup> *Scientific researcher III, Institute for Economic Forecasting, Romanian Academy.*

spring of 2009, BOE had to rely on a set of measure known as quantitative easing. The cornerstone of this approach was the large scale asset program that assumed the acquisition of private and public financial assets in a bid to force money into the economic system and thus kick-start its recovery. By instilling a constant stream of money the BOE hoped to boost the market liquidity and therefore extend asset prices. This action should have minimized borrowing costs determining a larger inclination towards investments and consumption.

BOE's reaction was by no means singular. Similar actions were conducted by other major central banks such as the European Central Bank, the Bank of Japan or the Federal Reserve.

Quantitative easing was from its genesis an interesting topic for the academic literature. This interest resulted in a robust and fast developing literature that tries to determine whether these initiatives met their foreseen goals.

The main part of this literature gravitates around the measures taken by European Central Bank (Beirne et al. (2011), Peersman (2011), Szczerbowicz (2012) or Albu et al (2014b)); Bank of Japan (Bernanke et al (2004), Ugai (2007), Wieland (2009), or Lupu and Calin (2014)); Federal Reserve (Hancock and Passmore (2011), Gagnon et al. (2011), Krishnamurthy and Vissing-Jorgensen (2011), D'Amico et al (2012), or Stroebel and Taylor (2012)) and the Bank of England (Joyce et al. (2010), or Kapetanios et al. (2012)).

In this paper we try to demonstrate the effects induced by the British quantitative easing measures on a battery of currency pairs containing the GBP. In a Markov Switching scenario we seek to determine the connections of the dynamics of these pairs in relation to the QE announcements. The remainder of the paper is constructed on the following structure. Section II offers a brief literature review on the BOE's QE. Section III discusses the data used and the methodology. Section IV exhibits our results and section V concludes.

### **Literature review**

Joyce, Tong and Woods (2011) conduct an extensive review of the United Kingdom's quantitative easing measures. In a parallel initiative, Joyce et al. (2011) concentrate on the effect of British QE on asset prices. After discussing the relation between the concepts indicated above and arguing on the asset price channels, the authors bring forth three empirical analyses. The first two use econometric

event study methodologies while the last relies on a VAR estimation. In this way the authors investigate the reaction of the gilt market, the response of other assets and a series of portfolio balance effects. One important conclusion of the study is the fact that the QE seemed to cause a decline in gilt returns of about 100 basis points. In addition to this, Joyce et al. (2011) find that other assets behave in similar way. A similar investigation is present in Breedon et al. (2012).

Joyce et al (2014) turn to the study of QE effects on the evolution of insurance companies and other pension funds. The authors use a reduced-form modeling scenario based on a set of variables that are invariant in relation the BOE's asset purchasing program. The investigation offers a set of interesting results, among which we notice the fact that there is correlation between QE and net investment in risky assets.

Christensen and Rudebusch (2012) conduct a comparative analysis between BOE and the Federal Reserve in terms of reducing government bond yields through QE. Christensen and Rudebusch (2012) also rely on an event study methodology for each of the studied markets, but also incorporate a dynamic term structure model in order to decompose yields into two main components: the expected short rate and a component specific to term premium. The results for the British market show that the entire reduction of gilt yields was influenced by seven UK announcements.

Albu et al (2014a) develop an ample investigation on the impact of quantitative easing on financial instruments, focusing on nine 5-years CDSs and a wide battery of QE announcements issued by the four main central banks mentioned earlier. In an event study approach, the authors find a clear influence of the UK QE on the evolution of CDSs.

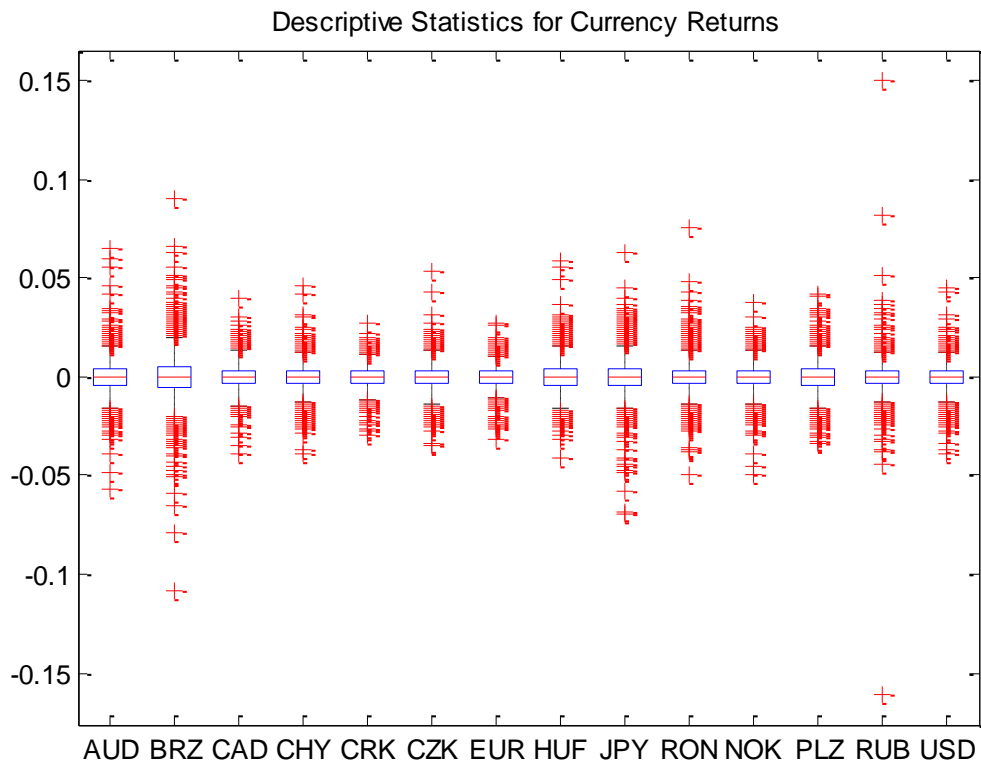
Joyce and Spaltro (2014) investigate the influence of the BOE's quantitative easing policy on bank lending and bank balance sheets in general. The authors employ a set of non-publicly available data and a two-period equilibrium model and conclude that QE might have increased bank lending through a deposit ratio mechanism.

### **Data and methodology**

We are using daily values of GBP against fourteen currencies: Australian Dollar, Brazilian Real, Canadian Dollar, Chinese Yuan, Croatian Kuna, Czech Koruna, Euro, Hungarian Forint, Japanese Yen, Romanian Leu, Norwegian Krone, Polish Zloty, Russian Rouble

and the US Dollar. Our regime shifting analysis covers the period from January 2001 until August 2014. The data was organized in a common sample of log-returns covering 3907 realizations. We are providing in figure 1 a general presentation of the statistical properties of these currencies. We also employ a set of 48 events of quantitative easing announcements issued by the Bank of England between January 2011 and August 2014.

**Figure 1 - Boxplots of the returns of GBP currency pairs**



*Source: Reuters-Datastream and authors' computations*

We can notice that the currency returns have similar statistical properties, with means and standard deviations that are situated at approximately the same levels and with large probabilities in the tails. We notice large outliers on one hand especially in the case of Brazilian Real, Romanian Leu, Japanese Yen and the Russian Rouble.

Our methodology relies on the classic Markov Switching modeling scenario. This is given by a process characterized by:

$$y_t = \mu S_i + \epsilon_t$$

The two state progression considered here has the following form:

$$\begin{aligned} \text{first state } y_t &= \mu_1 + \epsilon_t & \epsilon_t &\sim (0, \sigma_1^2) \\ \text{second state } y_t &= \mu_2 + \epsilon_t & \epsilon_t &\sim (0, \sigma_2^2) \end{aligned}$$

For the estimate phase we rely on the maxim likelihood method which has the following expression.

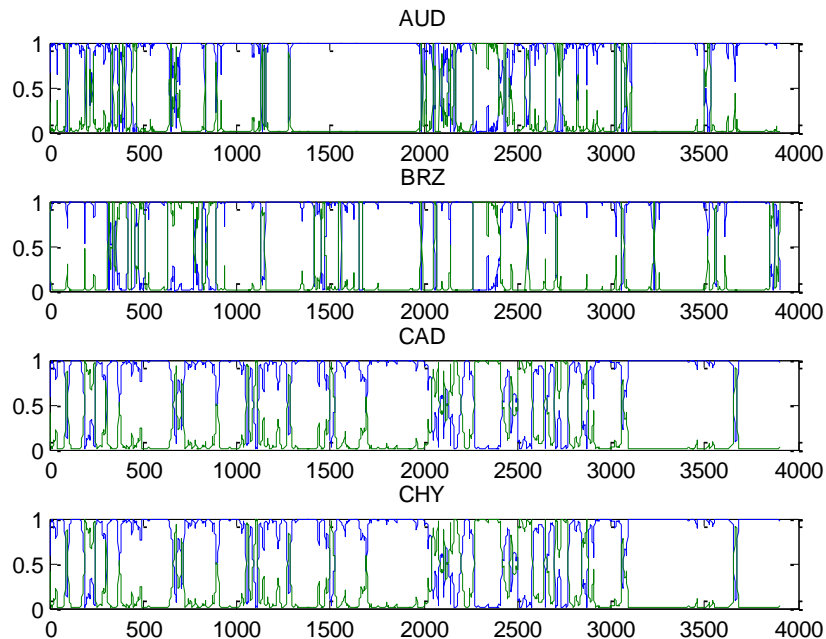
$$\ln L = \sum_{t=1}^T \ln \left( \frac{1}{\sqrt{2\pi\sigma^2}} \exp\left(-\frac{y_t - \mu S_i}{2\sigma^2}\right) \right)$$

## Results

The fitting of the Markov Switching model with two states to our series determined the estimation of the dynamics of the transition probabilities.

We organized the results in four different charts, containing results for four (figures 2 and 3) and three (figures 4 and 5) currencies.

**Figure 2 – Dynamics of Probabilities for the two states at the univariate approach for Australian Dollar, Brazilian Real, Canadian Dollar and Chinese Yuan**



*Source: authors' computations*

We notice the fact that, with the exception of the Slovenian economy, there is very little dependence of the economic growth on the stock market dynamics. Latvia shows also a larger significance of the MIDAS regression coefficients, but there is not a particular significant contribution found for the whole sample in the rest of the cases.

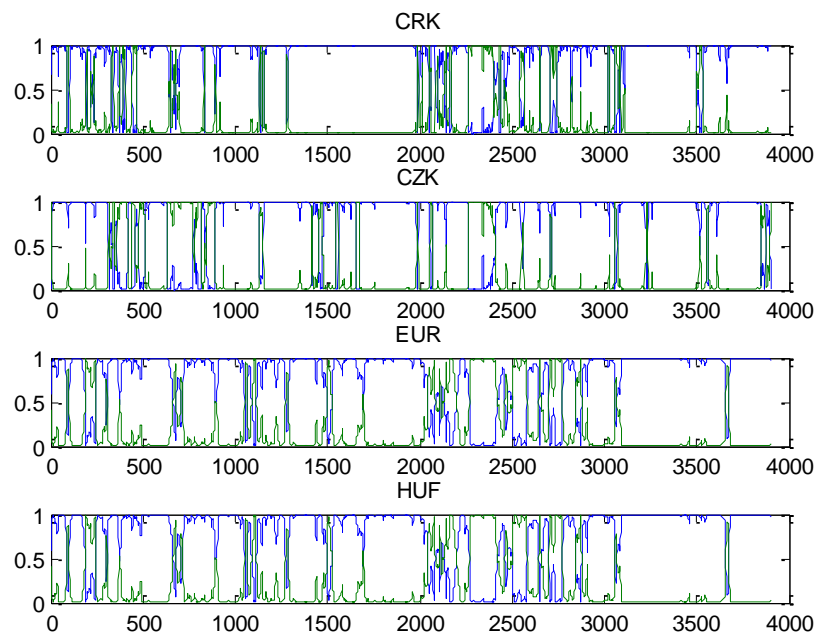
Considering the horizontal axis (that exhibits the time) we notice that the four currencies share a lot of moments in which regime shifting is present at the same time. We notice a larger level of comovement among the Canadian Dollar, the Chinese Yuan and the Brazilian Real.

On the other hand, in figure 3 we also acknowledge a set of simultaneous changes of regime shifts for the Euro and the

Hungarian Forint and to a lesser degree for the Croatian Kuna and the Czech Koruan.

The existence of these simultaneous changes of regimes could be explained by the fact that they could be generated by the same fundamental phenomena. The existence of monetary decisions announcements could be in theory the result of such changes at a certain moment in time.

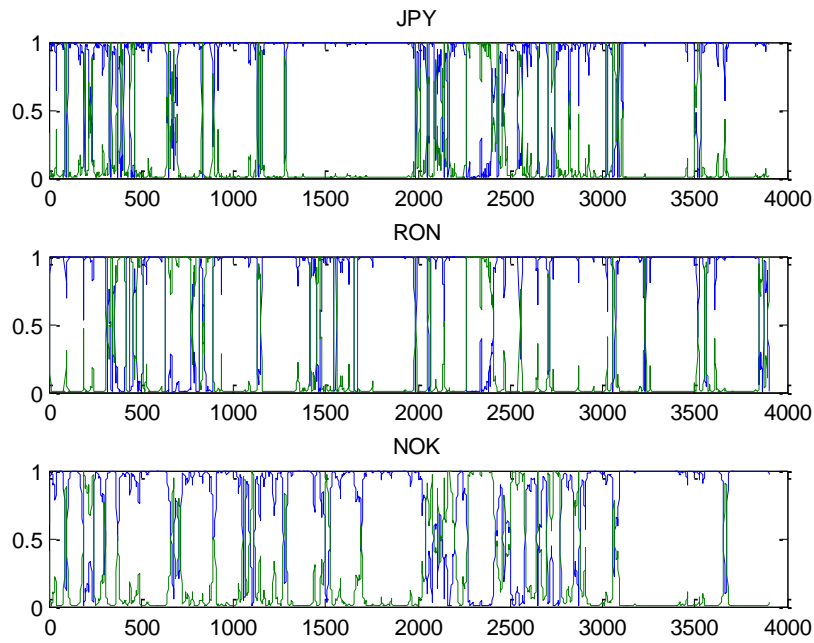
**Figure 3 - Dynamics of Probabilities for the two states at the univariate approach for GBP currency pairs with Croatian Kuna, Czech Koruna, Euro and Hungarian Forint**



*Source: authors' computations*

Figure 4 reveals the fact that there is an important level of simultaneity for the Romanian Leu and the Norwegian Krone, which is a possible proof of the fact that the GBP currency tends to react in the same way when it is rated with respect to many of the currency counterparts.

**Figure 4 – Dynamics of Probabilities for the two states at the univariate approach for Japanese Yen, Romanian Leu and Norwegian Krone**

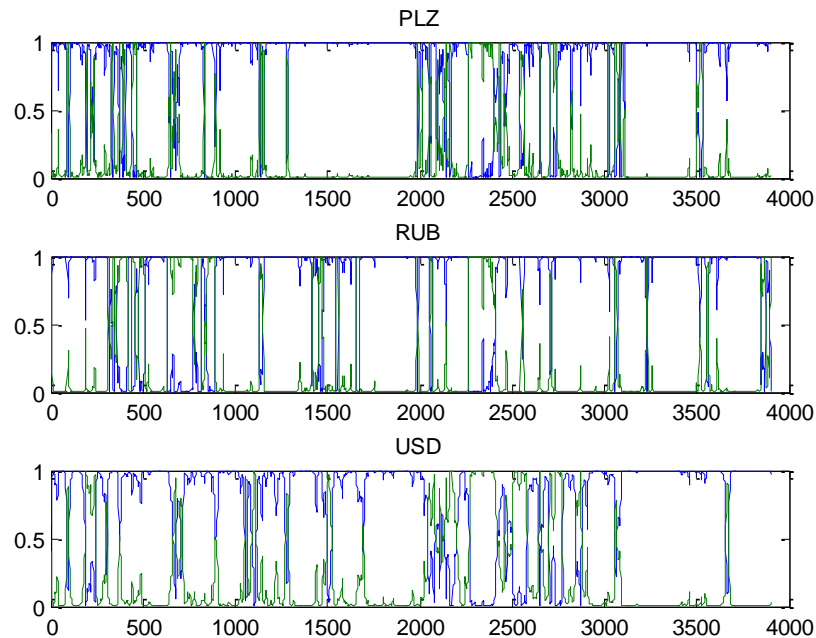


*Source: authors' computations*

Figure 5 shows the same type of reaction for the Rouble and the US Dollar and a less simultaneous reaction from the perspective of the Polish Zloty, especially in the first part of the sample. There are however many other situations that reveal large levels of simultaneity when regimes move from one state to another.



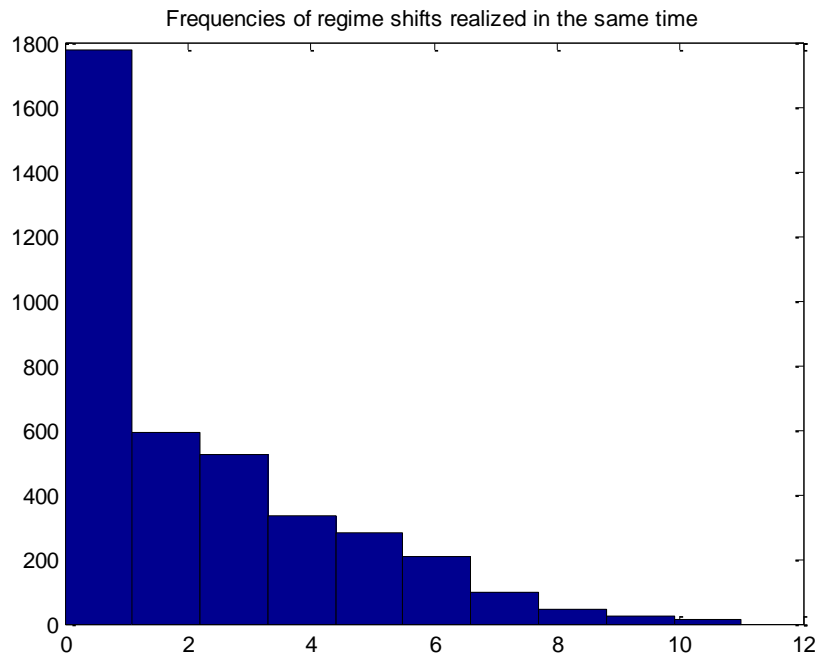
**Figure 5 – Dynamics of Probabilities for the two states at the univariate approach for Polish Zloty, Russian Rouble and US Dollar**



*Source: authors' computations*

In order to provide an analysis of the situations when we can notice simultaneous movements from one regime to another, we decided to count the number of simultaneous changes across all the fourteen financial assets under investigation and we built a histogram of the situations in which we found such phenomena. Figure 6 presents this map of frequencies of simultaneous regime shifts. We notice the fact that approximately 1800 situations show no change (out of the 3902 simultaneous returns in our sample), which means that the rest reveal a lot of simultaneous phenomena. We consider that we found evidence for a large number of simultaneous changes for the GBP currency pairs.

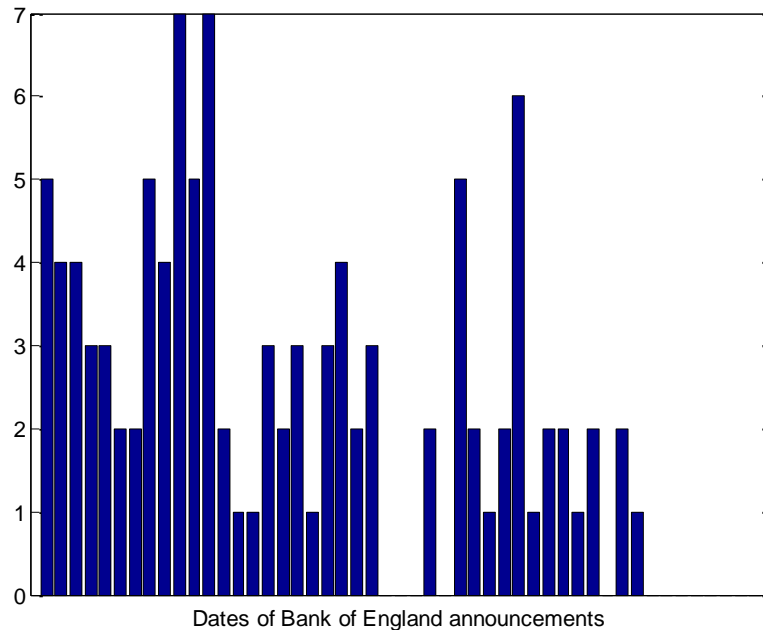
**Figure 6 – Histogram of appearances of common regime shifts across all GBP pairs**



*Source: authors' computations*

As mentioned previously, one reason for such simultaneous changes could be driven by the fact that fundamental events are realized at the moments when we notice such regime shifts. Looking at the moments when the Bank of England issued monetary decisions we cross checked the simultaneity analysis and observed that most of the days in which we acknowledged such policy decisions were also days in which we observed simultaneous regime shifts. Figure 7 presents the number of simultaneous shifts that happened in the same time with Bank of England announcements.

**Figure 7 – Simultaneity of regime shifts at the moment of the Bank of England Announcements**



*Source: authors' computations*

The analysis comprises 49 such events, covering the period from January 2011 until August 2014.

### **Concluding remarks**

This paper represents an analysis of the simultaneity of regime shifts in the dynamics of fourteen GBP currency pairs, with a daily frequency. A Markov Switching model with two states that take into account the dynamics of both the means and the standard deviations was employed. This investigation reveals the fact that there the sample covering January 2001 until August 2014 exhibits a large amount of simultaneity when as far as the regime shifts are considered. Since these changes are simultaneous, there are sufficient arguments to support the idea that maybe they are the result of some fundamental phenomena, such as the decisions of

monetary policies issued by the Bank of England. We found evidence that many of the changes were simultaneous during these events.

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