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**The Efficiency of Monetary and Fiscal Policy based on
IS-MP-AS model during Financial and Eurozone Crisis**

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Zásady pro vypracování:

Introduction

Define the objectives and the application methods used in the Master thesis.

I. Theoretical part

- Prepare the critical literature review focused on monetary and fiscal policies in selected countries.

II. Practical part

- Explain and demonstrate practical use of the IS-MP-AS model.
- Analyze collected data for selected countries and the influence of monetary and fiscal policy on the functioning of chosen countries during the financial crisis and the European debt crisis.
- Evaluate, which country has implemented the most appropriate monetary and fiscal policies during the financial and European debt crisis.

Conclusion

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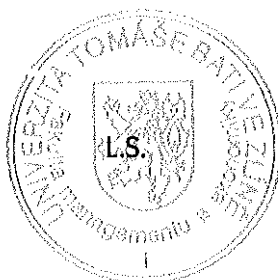
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ABSTRACT

This dissertation observes efficiency of monetary and fiscal policy in the Czech Republic, the United Kingdom and Euro Area based on an extended IS-MP-AS model. Empirical results show effective fiscal policy with positive relationship between GDP and government debt/GDP ratio, which support Keynesian theory of increasing government spending. On the other hand monetary policy shows ineffective or inconclusive monetary policy, it could be caused by the global financial and Eurozone debt crisis which effect data rapidly.

Keywords: Monetary Policy, Fiscal Policy, Financial Crisis 2007-09, Eurozone Crisis

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1 INTRODUCTION AND BACKGROUND TO THE RESEARCH

1.1 Introduction

With the occurrence of the financial crisis in 2007-09, it became more obvious to economists that most monetary policies were no longer efficient enough in dealing with the new challenging developments that occurred during this crisis. In this research, it was seen as critical to investigate this event comprehensively, including details of the fiscal policies that have influenced particular variables of interest in case studies within European Union (EU) countries. In the last decade, 2006-2015 monetary and fiscal policy had to adopt novel tools and react quickly to dynamic changes in their respective economies. Hence, it is an interesting period to investigate the efficiency of monetary and fiscal policy.

1.2 Background to the research

Every state interfere with their economy to achieve more prosperity, growth and development. European Commission (2016) presented the one of the most competitive economic indices ranking high on key sectors of the economy ranging from low unemployment, steady and low inflation, and stable GDP growth. Economist over years argue what approach is the best to use to attain prosperity within the economy, those economists usually follow economic theories, such as Keynesian (Keynes, 1936), Monetarism (Friedman, Schwartz, & National Bureau of Economic Research, 1963), neo-classical amongst others details of which are discussed in later sections of the literature review. The conclusions of a critical appraisal of the theories that were most influencing in the past decades suggests Keynesian and Monetarism and therefore they will be the main focus of this research.

This paper investigate what steps and tools used by central banks and governments with most positive impact with the last decade. Before the crisis in 2007, most developed economies used targeting interest and inflation rate as the main mechanism driving their respective monetary policy (McCallum, 2008). Fiscal policy was more in background as an objectionable approach in advanced economies, when most economists believed economy is the most efficient with almost no interference from governments (Friedman et al., 1963). During the global financial crisis governments changed their opinion about

the afore mentioned monetary policy and they were trying to stop or at least control the full blown effect of the financial crisis and avoid a repeat of the Great Depression in 1930s. They were ready to use every (even hybrid Monetary and Keynesian) monetary policy to avoid it. After all, they were successful and in 2009 the financial crisis stopped, however economy in most of countries were in recession the crisis came to an end and world was ready to recover (Ball, Maguire, & Goodson, 2012). Nevertheless, crisis proved very expansive, governments had to indulge in spending, to stimulate the economy, and central banks bailout of bank sector had a significant contribution to make to these developments. EU suddenly found itself in debt crisis when deficit of some countries, such as Greece, Spain, Cyprus, Ireland, and Portugal was not manageable anymore and EU needed to send them financial support (Al Jazeera, 2012; Elpais, 2014; Higgins, & Klitgaard, 2011, STANDARD, 2014). Due to the Eurozone crisis, some countries in Europe had to devaluate their currency to make their goods and services to remain competitive in Eurozone countries (CNB, 2016). A more concise review of the monetary and fiscal policy from 2006 until 2015 is presented in the second chapter of the report.

There exist a lot of prior research on this study, nevertheless last ten years Europe suffered from two crises and therefore it is always a contribution to measure efficiency of monetary and fiscal policy during these challenging times. The financial crisis 2007-09 is finished; however, the Eurozone crisis caused by the global financial crisis is still affecting most economies. Greece is still in deep debt even in the face of multiple help from the European Union. Some other countries, such as Cyprus and Spain are on the verge of follow the footsteps set by Greece. Many countries are not as productive as before crisis. Economic crisis is like a natural disaster and it is almost impossible to stop it. On the other hand, it is possible to apply some policy to help economy and influence it to minimal impact. To investigate last decade to find out which fiscal or monetary policy tool was the most positive for economies in addition to which country was more successful in applying such policy.

In the third chapter of this research paper, three case study investigation of three countries member states of the European Union is presented. The uniqueness of the case studies lie in the nature of the activities within their respective economies, the Czech

Republic (CR) for example is one of the case study, which was observed to be an exporting country with its own currency but obligated to adopt the Euro (OEC, 2014a). The UK economy is on the other hand country with negative trade balance (when import highly exceed export). The UK has exception not to adopt euro in the future (OEC, 2014b). The last investigated sector is Euro area and European central bank (ECB); research will be investigated Euro area, which contains 19 countries as one, because their monetary policy is control by European Central Bank (CIA, 2016).

1.3 Research Rationale

There exists several publications, which investigate the efficiency of monetary and fiscal policy during the financial crisis 2007-09 (Andriushin, & Burlachkov, 2009; Gerson, Cottarelli, & Senhadji, 2014; Lukasevich, Fedorova, & Mukhin, 2012; Visokaviciene, 2014). As an outcome of the global financial crisis, the Eurozone crisis follow and still it is not clear if all consequences of the global financial crisis are over. Therefore, the use of new efficiency measuring system with recent data coupled with modifications to basic models applied in the past is an exciting contribution from this research paper. Many economists still argue the efficiency of adopted monetary policy mechanisms in their respective states. It is also worthy to note that most EU countries are now in a steady recovery stage and financial sector is becoming more and more reliable. It has been long asserted that financial crisis are not preventable and therefore central banks, governments, economists, and public should learn from the past to be prepared for the future when crisis occurs again.

1.4 Research Objectives and Questions

1.4.1 Research Objectives

The main aim of the research is to investigate the efficiency Monetary and Fiscal policy in European Union by three-country sample, the first objective is focus on monetary policy when the main indicator is the real interest and inflation rates, which are target by most central banks. The second objective is to investigate the efficiency of fiscal policy, which was till recently considered as non-popular approach due increased tax. Last

objective is to compare the research sample and conclude which sample was the most efficient in their policy. These three objectives can be summarize as:

1. Examining the efficiency of monetary policy
2. Examining the efficiency of fiscal policy
3. Comparison of sample

1.4.2 Research Questions

To accomplish the research objectives, the paper has three research questions, which if answered will achieve make possible the successful achievement of the pre-defined aim(s) and objectives. First research question will find out if central banks have been efficient. While the second will investigate the steps used by governments during 2006-2015 and summarize its usefulness. In last question answers the validation aspects related to the case studies discussed; In a nut shell the following key questions are below are addressed in this study.

1. Was monetary policy efficient?
2. Was fiscal policy efficient?
3. What country or area from my chosen has effective monetary and fiscal policy?

1.5 Dissertation Structure

This paper is divided to the following chapters:

First chapter provides the background of the research along with the research objectives and questions.

The second chapter provides a literature review of the global financial crisis and Eurozone crisis are then explained by the two main economic theories of Keynesian theory and Monetarism theory. The review further contains a characterisation of monetary and fiscal policy by prior studies. Finally, a summary of the development of applied statistical models are discussed.

Third chapter presents details of a sample frame with sample selection (case study) including the method of data collection. Finally, the chapter is concluded with the theoretical and practical implementation of IS-MP-AS model and practical apply.

In the fourth chapter, detailed analysis of secondary data using multiple linear regression by EViews is presented including concise discussion of the main findings of the test.

Last chapter contain conclusion of this report.

1.6 Conclusion

First chapter explains the reason for undertaking this study. It also provides brief background of the study focusing on the global financial and Eurozone crisis, briefly introduce Keynesian and Monetarism theories which effect monetary and fiscal policy. Additionally, this chapter includes the main research objectives and questions.

2 LITERATURE REVIEW

2.1 Introduction

This chapter elaborates on the details of the financial 2007-09 and Eurozone crisis. With further emphasis on the characteristics of economic theories, such as the Keynesian and the Monetarism as the most influencing economic policies for last seven decades all over the world. Most economists are divided into one of the aforementioned groups, popularly referring to themselves as Keynesians or Monetarists. During significant economic crisis, most countries are observed to improve existing economic policy or even introduce novel ones. Historically, it has been observed, Keynesian theory was applied immediately after the great depression period (Klein, 1966). This policy was also changed to Monetarism theory (Dorey, 2005; Kenway, 1994) after years of stagnation in late 1980s. In last ten years, many monetary and fiscal policies were applied to help countries in time of crises. Therefore, in subsequent section(s) of this research paper, a detailed explanation of a variety of monetary policies which central banks have adopted to stimulate growth of their economy. Furthermore, the fiscal policy, which is controlled by the government of every country, is also included. Finally the existing IS-LM model popularly used as a fundamental macroeconomic tool, is revised to a more suitable (IS-MP-AS) capable of addressing the research problem related to modern economy.

2.2 Financial and Eurozone Debt Crisis

Within the past decade, European economy suffered from the financial crises 2007-09 including Eurozone crisis. The aforementioned crisis occurred after a decade of excessive growth in the global economy. The financial crisis initiated in the summer of 2007 as described by Davies (2010), the impact of which was full blown by autumn of 2008. Moreover, most citizens realized the effect on their job security. The global financial crisis began as consequence of encouraging the policy of home ownership, providing easy access loans to subprime borrowers. It was believed that housing prices would continue to appreciate such that the high price of housing was not an issue. Contrary to this assumption, housing price reached its maximum and the U.S. experienced the bursting of the housing bubble (Kolb, 2010). Although a considerable

amount of high-profile financial institutions over Europe and North America had folded and local bailouts and mergers happened the situation was considered as being controllable to some extent. Some markets were overheated and this crisis helped to calm them down, particularly the housing sector. It was believed that in no time economy would bounce back with rapid growth as seen in the previous two decades. Unfortunately, this did not happen, in 2008 U.S. financial authorities decided rather than bailing out Lehman Brothers, collapsed one of the largest bank in U.S. In addition, the natural reaction by the marketers have been discussed in (Fernando, May, & Megginson, 2012). The severity of these on the market were such that the financial system seemed on the edge of collapse, causing hypothetically huge disturbance to the global economy, to public order and to political stability. Luckily, the reaction of governments were quick and coordinated (within two decades before the crisis economies were rarely interfered by governments) and governments of different ideological persuasions launched a wave of nationalisation, bailouts, fiscal and monetary packages, which left nothing to chance (Ball, et al., 2012). As can be seen in the case of Northern Rock bail out by Bank of England, This was later nationalized (Llewellyn, 2008) against the recommendation of groups such as Conservative republicans whom advised government that the bank should be allowed to go bankrupt, because it offered improved market discipline and removal of bad debts from the system. Financial authority or government was not in any temptation to take such risk and follow their advice. They were trying to prevent of a downward deflationary spiral, which had happened in 1929 after the Great Crash, they were determinant to use every policy tool, Keynesian and Monetarist, to stop the danger of repeating the past (Ball et al.,2012).

States had to fulfil their duty as the guarantor of last resort. The Bank of England bailout Lloyds and RBS, if the Northern Rock will not be included (BBC, 2008). Financial meltdown was stopped; the government was successful in their policy. The financial system was not destroyed, banks stopped failing and it was considered a success. Despite of this, the economy was in deep recession and stopping such huge crisis came at a high price. To bailout banks and help the economy out of recession is not cheap for any government (Ball et al., 2012; Davies, 2010), table 2.1 shows

government deficit for the year 2008 and 2009. After that, European Union was split into two parts, one part was for reducing deficit and stop government spending, the second was for maintaining the fiscal stimulus to prevent double-dip recession, and put economy back to a second recession before the recovery had been suitably established. Governments thought it was manageable and were very optimistic as IMF in the end of 2009 when slow recovery took a hold. Nevertheless, in May 2010 debt crisis exposed and showed how preliminarily these expectations were (Ball et al., 2012; Laursen, 2013).

Table 2.1 Government deficit as a percentage of GDP

Country	2008	2009
Czech Republic	-2.2	-5.8
Greece	-9.9	-15.6
Italy	-2.7	-5.4
Spain	-4.5	-11.0
United Kingdom	-5.1	-11.2
United States	-7.2	-12.8
Euro area	-2.1	-6.3

Source: Organisation for Economic Co-operation and Development (OECD), 2014

Some of countries had already high level of debt before crisis and global financial crisis, when they had to indulge in further bailing out of banks and investing in their economy was almost impossible, these include; Greece, Ireland, Portugal, Spain, and Cyprus. All the previously mentioned countries accepted the European bailout mechanism and demonstrated almost complete recovery, except Greece and Cyprus still in need of the EU bailout mechanism (Al Jazeera, 2012; Elpais, 2014; Higgins, & Klitgaard, 2011, STANDARD, 2014). The most problematic countries belong to Eurozone and it had negative effect on Euro, which is one of the most important currency in the world. Therefore, it had also bad effect on other countries. European Union was somewhere

between recession and slow growth and Greece was on the edge of bankruptcy. It was caused by the financial crisis and in the same time, it was the worse time for it to come.

European Union had to decide what to do with problematic countries especially Greece. It divided European countries into two camps, one part of politicians claimed that any reduction in the deficit should be postpone until the recovery is established, the second part was trying to introduce some tools to decrease level of deficit in order not to lose the confidence in financial market (Laurson, 2013). In the end realists won the argument in the wake of the Lehman's' collapse. The Eurozone crisis, which occurred after, stopped the arguments in favour of the deflationists. EU decided to lend money and support problematic countries to avoid other bank crisis. They borrow money to problematic countries but in low amount and it had almost no affect, moreover negative affect because people start to be sceptic and treasure bonds of problematic countries had to rise a risk premium. Euro started decreasing and it started influencing other countries, especially those of which currencies increase and became too expensive for Eurozone countries (Ball et al., 2012).

Switzerland and the Czech Republic are mainly exporting countries and this stopped their growth. They were forced to devaluate their currency to propel the economy, but of course, this came at a price. In the sense that consumer's lost a big amount of their saving while central bank recorded losses on fixed exchange rate to the euro currency. Nevertheless, this policy was successful mainly for the Czech Republic, which has one of the highest GDP in Europe, as we can see in table 2.2 Unfortunately, Switzerland was not as successful, they decided in January 2015 to not hold Franc on fixed exchange rate anymore. Europe is finally in economic growth so states are applying many safe measures to not repeat last two crises (CNB, 2016; The Economist, 2015).

Table 2.2 Economic Growth

Economic Growth (GDP, annul variation in %)	2015
Czech Republic	4.3
Eurozone	1.5
Switzerland	0.9
United Kingdom	2.3

Source: FOCUSECONOMICS, 2016

2.3 Economic theories

In economics there exist many theories, economic schools, most of them, were created in the past, and they are now modified to fit into modern world. In this paper, Keynesian and Monetarism theory are discussed. Those two theories have opposite approach, and both of them have played an important role in the economic history. Keynesian theory was adapted after the Great Depression in 1930s (Keynes, 1936; Klein, 1966) and Monetarism theory after oil crisis and many years of stagnation of economy in 1980s (Dorey, 2005; Kenway, 1994). What theory will be adapted after the global financial crisis and Eurozone crisis? It will be better to discuss after a few more years from now. This is because time is important in all economic theories, as postulated by many economists, also Friedman et al., (1963), Keynes (1936) Wood (2014) Woodford and Walsh (2005) discusses the problems related to how the economy may likely react in short and long time span. Relations, which are in long periods, do not need to exist in short cycles. It is also postulated that all short periods are not alike (i.e. what is true in one phase of business cycle does not need to be true in another phase of business).

The short and long time help to explain further the problems related with the prediction of what will happen in the future. The applicability of theories is complex and can greatly affect the predictable outcome such that economies still stand the risk of sudden fall into crisis without warning, time cycle and behaviour of people who effect economy the most cannot accurately and reliably be predicted. However, usually it follows a pattern as described in Arnon (2012).

2.3.1 Keynesian theory

Keynesian theory is based on a theory of total spending in the economy during difficult times, such as crises or depression and surplus budget in years of prosper. Jahan, Mahmud, and Papageorgiou (2014) explained Keynesian as a theory, when aggregate demand is influenced by a host of economic choices, both public and private, and sometimes acts unpredictably. The public decisions contain fiscal and monetary (e.g. tax, government spending, interest rate) policy. In past, economists argued about the relative strengths of fiscal and monetary policies, some Keynesians were of the opinion that monetary policy is powerless, while monetarists argued that fiscal policy is indeed the powerless one. Essentially all Keynesians and most monetarists believe that both monetary and fiscal policy affect aggregate demand (Blinder, 1988). By Keynesian theory, changes in aggregate demand have their short-run effect on employment and real output, but not on prices, whether changes are anticipated or unanticipated. Philips curve is example of this idea, especially when it shows inflation rising only slowly when unemployment drops. Keynesians agree that what is true in short run cannot necessarily be happening in long run although we live in short run. One of the most famous Keynes's statement makes the point, "*In the long run, we are all dead*" (Keynes, 1923).

Blinder (2008) claimed that monetary policy might produce real effects on employment and output in the case that some prices are rigid. If nominal wages (wages in euros, not in real purchasing power), does not adjust immediately. Then, increase of new money supply would change all prices by the identical percentage. Keynesians believe that prices are somewhat rigid, fluctuations in any component of spending, such as consumption, government expenditures, or investment causes output to fluctuate. One of typical example of fiscal policy is increasing government spending, all others components of spending remains the same, as a result output will increase. Keynesian model also include multiplier effect, output rises by a multiple of the original change in spending that caused it. For Keynesian economics to work, the multiplier must be larger than zero.

Woodford and Walsh (2005), has criticized Keynes's classical model, allowing frictions and imperfect competition, sticky prices and wages combine to give money real effect.

Wood (2014) reproach that Keynesians ignored prices their first quarter century, during time of the greatest inflation in history. The model was also called illogical, that cannot work in world of certainty-equivalence, which is based on policies depending on misleading wage setters (Akerlof, 2007). Keynes bases his theory on the credibility of monetary policy. Many economists have criticized Keynesian theory nonetheless, it is still used by many governments in economy difficult times.

2.3.2 Monetarism theory

Monetarism could be understand as opposite approach to Keynesian theory, with mainly focus on monetary policy. Friedman et al. (1963) as one of the main representative, claimed that central banks should keep the money supply equally stable, increasing it slightly every year to allow economy slow natural growth. Brunner and Meltzer (1976) criticized Friedman that he did not give enough information about timing and speed of adjustment or the length of run to which his models relay. “A Monetary History of the United States, 1867-1960” Friedman et al. describe in his book that monetary policy has the role in creating and possibly worsening the Great Depression. Friedman theory was based on free-market monetarism, and claimed in time when Keynesian theory was considered as the right one that monetary policy with the money supply targeting should be use more strongly than the fiscal policy.

Monetarism theory emphasizes four monetary areas, (1) long-run neutrality, (2) short-run non-neutrality, (3), monetary aggregates in policy analysis, and (4) separate nominal and real interest rate. McCallum (2008), explained long-run neutrality as exogenous rise of x percent in its stock of money would eventually be followed, once all adjustment have taken place, by x percent rise in the general price level, with no effects on real variables (e.g., output, consumption, relative prices of individual commodities). In practice, central banks nearly never conduct policy such as to include exogenous changes in the money supply. Short-run monetary non-neutrality takes place, with monetary neutrality in long run, if the price adjustment to a change in money takes place only slowly, a temporary effect on GDP and employment is observed. Most economists see this as realistic characteristic, however supporters of the real business cycle denies it.

Already in 1800s, British economist and banker Henry Thornton realize the difference between the nominal and real interest rates, Irving Fisher American economist, emphasized it in the early 1900s. Nevertheless, the difference was often neglected in macroeconomic analysis until monetarists started to emphasize its significance especially during 1950s. Keynesians mostly agreed on it however in their models often did not recognize the distinction (McCallum, 2008). The last approach of monetarist theory is emphasised by original monetarists. The key role of monetary aggregates (such as M1, M2) and the monetary base, in monetary policy analysis, on one hand details the difference between Friedman and Schwartz (1963), and on the other hand Brunner and Meltzer (1976). Friedman (1959) argued that the stock of money should be made to grow every month, possibly day by day. Brunner and Meltzer (1976) was also in favour of monetary policy rule, nevertheless they realized the pull of activist rules that relate money growth rate to usual economic conditions. Nowadays when central bank target money supply is gone, and most of central banks are targeting inflation and interest rate. Nevertheless, it would not be complete if this aspect of monetarist theory were skipped. Many models exist these days that still use money supply in their calculations (McCallum, 2008).

De Long (2000) and Hafer (2001) claimed even before the financial crisis 2007-2009 that monetarism is no longer as a distinct approach, nevertheless it can be consider to its benefit. Dropping almost the main rule (the money-growth rule) in favour of a discretionary money-market interest rate, according to the tradition of central banking, Meltzer (2009) defended because it uses information in predictable and consistent way.

2.3.3 Restoration of Keynesian theory

Ball et al. (2012) explained in his book that not everyone agreed on policy, which was applied during financial crisis 2007-2009, says that economic crisis are positive for future of economy because they clear the system from debt and dysfunctional companies. Other positive factor is learning from it for future crisis. Back to the history, the Great Depression of the 1930s lead to creation of one of the main economic theory which governments adopt for more than four decades. John Maynard Keynes (1936) recommended to governments that they are the institution, which should help economy in difficult times, mostly by fiscal stimulus and expansionary monetary policy (Atkins,

Giles, & Guha, 2008; Reddy, 2009). Those four decades from the end of the Great Depression until the early 1970s belongs to Keynesian economy. The 1950s and 1960s period was so successful that it is known as a golden age. Even Milton Friedman who is known as critic of Keynesian theory said in the article in 1965 by Time magazine, “We are all Keynesians now”.

Nevertheless, in the 1970s, economy found itself in stagflation and not even government interventionist were successful. Finally, many critics of Keynesian economics came to the forefront, e.g. Milton Friedman, who was a representative of monetarist, and other schools, were created, such as the Austrian School’s Friedrich Hayek. There was series of events, which contribute to this economic situation. Richard Nixon’s imposition of price and wage controls in 1971, additionally cancellation of the Bretton Woods system in 1972, then 1973 became oil crisis, which was followed by a recession (Kenway, 1994; Dorey, 2005). In 1979, Margaret Thatcher as prime minister transported Keynesian economics to monetarism and it became main economy policy for future years. The same happened in US when Paul Volcker approved similar policies in demand to manage inflation (Bleaney, 1987). Monetarism policy assume that fiscal policy has no effect and monetary policy should only try to target the money supply to control inflation (McCallum, 2008). On the other hand, Keynesian view is targeted at real interest rate to influence unemployment (Blinder, 2008). Monetarists believed in the market’s self-healing power. However, monetarist succeeded in lower inflation on the other hand, unemployment rates increase so rapidly that even excess 10% and it caused the deepest recession in the developed countries after the Great Depression. Most central banks abandoned targeting of the money supply and return to focus on real interest rate, the Bank of England stop targeting sterling M3 in October 1985 (The Economist, 2010; Economist's view, 2008).

In the beginning of new millennium, the U.S. and the UK significantly include moderate form of Keynesian policy to their policy, it was triggered by the Asian financial crisis and dot-com bubble, which happened shortly after. Similarly, continental Europeans started to be a little bit more interventionist nevertheless the difference was not as significant as in U.S. and UK. Though continental Europeans in 1980s did not become

as free market thinkers as the rest of the world. Still monetarist thinking was strongly influencing their economy (Wolf, 2010a, 2010b).

Everything changed during the financial crisis 2007-09, nobody wanted a repeat of the Great depression in 1930s so Keynesian policy came to the front. States were looking for ways to end or at least manage this crisis. The return to Keynesian policy as before 1980s was obvious step. This policy was created to manage problematic times and Keynesian approach gave many suggestions (Giles et al., 2008). First issue was global trade imbalances; Keynes recommended that trade imbalance should be as low as possible. Before the financial crisis 2007-09, most government does not focus on this issue. From late 2008 trade imbalance became one of major concerns for most governments (Wolf, 2010a). Additionally Westers economists abandoned capital controls in 1970s and 1980s, during financial crisis 2008 they started to be part of government's macroeconomic policy toolkit (Davidson, 2009; Rodrik, 2010). The last main challenge, related to the financial crisis involved over-dependence on the mathematical model based on historical data and even though it is not always possible to predict the future accurately (Davidson, 2009; Ravetz, 2009).

Anatole Kaletsky (2011) wrote that Keynesian stimulation was followed by recovery of growth in one country after another, depending on the size of stimulus plan. China was one of the first states who announced signs of recovery, such as a 13% growth in the Chinese stock market over a period of ten days, also a large rise in lending (Dyer, 2009). Europe was more cautious to announce recovery nevertheless the Financial Times reported it after package of leading indicators in March. Likewise growth in consumer and business confidence across most of Europe and emerging economies as Brazil, Russia and India (Giles, 2009). Paul Krugman (2009) claimed "Big Government" had rescued the world from the risk of a second great depression. Most economist agreed that fiscal and monetary policy was successful, however some dissenters such as Robert Barro disagreed. Professor J. Bradford De Long addressed Barro's arguments although he was Keynesian economics (De Long, 2010).

Nonetheless most economist agreed that intervention of government in economic crisis was necessary and in the end helpful. Critics argued that inflation expectation creates inequality of income and consumer expecting future tax increase hold their spending

(Clougherty, 2009; Woods, 2009). Some economists (James M. Buchanan, Edward C. Prescott, Vernon L. Smith,) opinion were that “lower tax rates and reduction in the burden of government are the best ways of using fiscal policy to boost growth. “ Economist Edward Prescott accuse post-Keynesians of failing to forecast the crisis. Economist Jeffrey Sachs question a positive effect, he claimed that in short term it may work nevertheless it could produce greater crises within a few years (WebCite, 2009).

2.4 Monetary and Fiscal Policy

2.4.1 Monetary policy

Monetary policies have been in existence for several decades as one of the main economic ways for ensuring efficiency in economic activities. Although its effectiveness has been one of the most questionable issue in economic debates. Economists from different schools of thought and paradigms such as Keynesian, monetarist, new classical economics, Austrian School etc. have different opinions and some significant global events have been observed to influence the use of this policy over time (Barnett, 2015).

Central banks control the monetary policy in most countries. Most central banks are the only issuer of own currency within their countries except for a few exceptions such as Scotland. By regulating money supply, central banks are designed to focus on three main objectives, which: (i) promote economic growth, (ii) control inflation, and (iii) attain full employment. Therefore, central bank’s interference enables economic system to harness economic growth, market equilibria, and full employment (Evanoff, 2013).

Recently, monetary policies have fallen into four categories, first being policies that target monetary aggregates, often indirectly through interest rate. It is generally understood that money carries significant information about the state of an economy and it is able to foresee discernible monetary fact (Haider, Jan, Hyder, 2013). Effective monetary aggregate targeting needs a steady or at least predictable relationship between inflation and money growth. Since the 1990s, this relationship has become more unclear due to a combination of financial innovation and deregulation. These have significantly changed the preferences of financial sector and households destabilize the money demand function (Bernanke, 2006). As a result, number of developing and developed

countries have changed from a monetary aggregate targeting regime to price level targeting or inflation targeting (Haider et al., 2013). This was already mentioned in earlier sections of the paper (monetarism theory) especially during the era when monetarist held key positions in government it was observed that money supply was top priority. Due to high unemployment rate, most countries return to Keynesian's targeting of interest rate.

The second category of monetary policy emphasised on targeting of inflation, it is one of the most common monetary policy. In 2010 countries such as Canada, UK, the Czech Republic, Brazil, Turkey, Sweden and many more targeted their inflation as main monetary policy as described in the work(s) of (Roger, 2010). Central banks are constantly attempting to adjust householders' expectations by influencing inflation in steady and long run, and increasing central bank transparency (Barnett, 2015). It seems that inflation-targeting countries have done better than others in the inflationary effect of the 2007 fluctuation in commodity prices (Habermeier, and others, 2009). Non-inflation-targeting and low-income economies experienced larger increases in inflation than inflation-targeting countries, however their GDP growth rates depreciated by comparable amounts (Roger, 2010).

Third type is policy is which keeps the exchange rate unchanged. China uses this policy quite often, additionally as a result of recent Eurozone debt crisis similar policy has been applied by the Czech Republic as well (Alichi, 2015). This policy is often criticize for China, government should adopt a more flexible, achieved floating exchange rate regime in dealing with China's gradually problematic open economy trilemma. China's three problems are that it cannot simultaneously target exchange rate stability, have full financial integration and conduct an independent monetary policy (Li, & Tsai, 2013). Alichi (2015) claims that fixed exchange rate policy used in the Czech Republic depended on convincing economic agents that the CNB (Czech national bank) was not introducing an additional nominal objective for monetary policy, rather more of an addition of an exchange rate targeting might hypothetically result in conflicts with its current inflation and output objectives. Switzerland is also another country, which intervene foreign exchange rate nevertheless Peter Rosenstreich, chief market analyst at

Swissquote Banks said, “*Foreign-exchange intervention falls into the category of doing something, without really doing anything*” (Blackstone, 2016).

The last policy is that which targets a linear mixture of individual targets, such as in accordance with the Taylor rule (1993). The best-known representative of Taylor rule is U.S., which follow this policy. It is a guide for monetary policy makers that the federal funds rate should have a step to response to deviations of the contemporaneous inflation rate from its long run target and the output gap (Branch, 2014). Taylor rule is criticized of being obsolete in the time we live today. Low interest rates were not the cure for declined growth but the cause of the problem.

Since 2007, several economists and policymakers have started developing new instruments and tools for central banks because of the effectiveness of conventional monetary policies, which have been questioned. This monetary policy is described as non-conventional and is comprised of quantitative easing, qualitative easing, twisting of the interest rate yield curve, and credit easing. Nevertheless, such alternatives are complicated for some reasons. Due to the coordination between national treasuries and central banks, which compromises the principle of central bank independence. Another problem that arose among central banks was that they tend to sequentially accept uncoordinated non-conventional monetary policies, frequently following diverse programs at different times. In addition, the lack of synchronization among central banks resulted in confusion in the management of non-conventional monetary policy in a global framework. In 2008, Fed began implementing non-conventional monetary policies; however, the ECB and bank of England did not formally follow suit until 2011. Additionally, an analysis points out at least two troublesome findings. Described on the one hand by a study on the effects of non-conventional tools demonstrations, indicating that the resulting reductions in interest rates have not essentially simulate the credit markets, with the purchase of credit remaining weak. On the other hand, problematical question exists as to the suitable date to return to conventional policies and end non-conventional policies. Moreover, those policies do not suit to emerging countries, such as China and Brazil, as it can be convenient for developed countries. It can lead to high inflation and thereby cause risk of a currency war in those countries (Barnett, 2015).

2.4.1.1 Monetary policy in Euro Area

It is important to pay attention to monetary policy in euro area, this economic integration should be managed properly to understand the full benefits of the single currency. For that reason, the euro area is distinguished from other countries of EU by its economic management, specifically, monetary and economic policy-making. Independent Euro system, containing the national banks of the euro-area Member States and the European Central Bank (ECB), which is established in Frankfurt, Germany, controls monetary policy in the euro area. By its Governing Council, the ECB determines the monetary policy for the entire euro area, a single monetary policy with a single monetary authority. Primary objective is to maintain price stability, which is 2% for Euro area (European Commission, 2016).

2.4.2 Fiscal Policy

Delays to the impact of monetary policy on economy mainly due to interference of economic agents, which is not the case when it comes to fiscal policy (Zarra-Nezhad, Motamedi, Hojat, & Anvari, 2015). Hence, a number of economists such as Kuttner (2002), Niemann and Hagon (2008), and Laurens and Piedra (1998) have claimed that monetary policy bears a greater part of economic stabilization problem. Leeper (2010) has argued fiscal policy is more complicated than monetary policy, one of the reasons is the amount of fiscal policy's tools compared with those of monetary policy. Every state follows one of three stances of fiscal policy, depending on stances, tools of fiscal policy are applied. Keynesian theory is based on that in difficult times, such as crisis or recessions, government should apply expansionary fiscal policy. Government spending exceed tax revenue, as a result economy is stimulate to come out of recession (Blinder, 2008). Most of countries are always in this stage, therefore their government debt is increasing annually, and they are just keeping the debt in some level for example Maastricht criteria of EU (ECB, 2016). Once economy is in stable growing stage, government should apply contractionary fiscal policy to pay down government debt or slow down economy, which is growing too fast. Overheated economy has many negative consequences. It can create asset bubble as happened to housing in 2006. If U.S. would have applied contractionary fiscal policy, it could have prevented the financial crisis in the first case. On the other hand, when the economy is growing it is

hard to hit the moment when economy is overheated and needs cool down. In addition, it can create unnatural low level of unemployment and employers have difficulties in finding enough workers (Stojanov, 2009). Many regions in the Czech Republic have higher number of job offered than the unemployment rate, in June unemployment rate was on 5.2% (Kurzycz, 2016). Additionally, it can create inflation or the economy can burn out and which is typically accompanied by recession. Last time when a state applied this policy was in the U.S. by President Bill Clinton when contractionary policy by cutting spending in several key areas and raise income tax rate from 28% to 39.6 (Amadeo, 2016). Another reason why it is not so common and popular approach is that politicians do not like to apply it due to voter unpopularity ratings. Increasing taxes and cutting spending means less money for taxpayers, less money to support unemployed or seniors.

2.4.2.1 Fiscal Policy in Euro Area

Economic policy (Fiscal policy) remains as the responsibility of the Member States, however national governments must manage their individual economic policies to achieve the mutual objectives of growth, employment, and stability. European Union adopt a number of structures and instruments to reach a coordination of European Members. The central instrument is the Stability and Growth Pact (SGP). The SGP includes agreed rules for fiscal policy, for example limits on national debt, and on government deficits, it must be followed by all EU Member States, however only euro-area states are subject to sanction (financial or otherwise) in the case of non-compliance (European Commission, 2016).

2.5 IS-MP-AS model

The model used in this dissertation is based on an elementary IS-LM model, which is well known for economists. IS-LM model was used as a central tool of macroeconomic analysis for more than half a century. Romer (2000) summarized the main points of criticisms about this model. First issue is based on missing microeconomic foundations, IS-LM model also assumes price stickiness, and another issue is that this model is trying to be so simple that the economy's complexities are approximated to a few basic aggregate of relationships. Nevertheless, countless policymakers, teachers, and students

are in favour of the IS-LM model as a strong framework for understanding macroeconomic fluctuations. IS-LM model is not universal, as compared to alternative models, it suited more for the purpose of analysing some issues rather than others. The main problem of this model since 1980s is that its basic assumptions is that central bank targets the money supply. In section 2.3.3 is explained as to the reason why targeting of money supply a current tool adopted by most central banks. As alternative to this problem, economists replace LM curve, with its assumption of targeting the money supply to an assumption that the central bank targets a real interest rate. After all the new approach shows many advantages such as, avoids the complications of involving the nominal versus the real interest rate and price level versus inflation. If central bank are able to follow a real interest rate rule, it must be able to affect the real rate. It cannot do if prices are completely flexible (Alavi, Moshiri, & Sattarifar, 2016; Hsing, 2005, 2006; Whelan, 2015).

So IS which represent fiscal policy remains the same, AS MP as representor of monetary policy, which targets the real interest rate, replaced curve. Third part has been added because of growing significance of inflation. When the IS-LM model was most valuable during 1950s and early 1960s, that time inflation was not as prioritised as later on. However, in the late 1960s and 1970s, inflation became important and model had to be change. It lead to extensions of the model to incorporate aggregate supply (AS) (Alavi, 2016, Hsing, 2005, 2006, Romer, 2000). There exist other version of IS-LM model, but to measure the efficiency of monetary and fiscal policy, researchers decided for IS-MP-AS model as the most suitable. Maybe in the future will exist more suitable and more powerful tool to make macroeconomic analysis, therefore it is decided to use IS-MP-AS model in this paper.

2.5.1 Summary of Assumptions for IS-MP-AS model

Government spending, stock values are expected to have positive relationship with output by Hsing (2005) negative relationship is expected between equilibrium output and inflation rate, taxes, and the world interest rate. The relationship between the exchange rate and output is ambiguous. Barro (1989) suggest in long run deficit-financed government spending might have a neutral effect on output. National saving, capital stock, and economic growth in the future would be reduce by large government

debt. Increase of stock values, the wealth effect would increase household consumption, and Tobin's q theory or the balance-sheet channel would increase investment spending (Mishkin, 1995; Kuttner, & Mosser, 2002). It is difficult to indicate the impact of currency devaluation or depreciation, it depends on theoretical models, regression techniques, the length of time periods, countries under study, etc. Household spending should negatively respond to the real interest rate.

2.6 Conclusion

This chapter provides a review over financial 2008 and Eurozone debt crisis. Then there is mention the relevant literature, which explain two economic theories. It explains how this theories influence decision of governments and central bank in specific time. Keynesian theory encourage increasing government spending in time of crisis, decreasing the interest rate to stimulate investments and many more. The monetarism theory is built based on no interference by government and only uses some money supply targeting. Third part belongs to monetary and fiscal policies. In the end is described development of using IS-MP-AS model.

3 DESIGN & METHODOLOGY

3.1 Introduction

Sekaran and Bougie, (2013), define business research as an organized, data-based, critical, systematic, objective, inquiry or investigation into a specific problem, undertaken with the purpose of finding solutions or answer to it. Research design can be explained as the general plan, which shows how the researcher will answer the research questions, the research objectives and questions outline the sources from which the researcher will gather and analyse data (Saunders, Lewis, & Thornhill, 2016). For that reason, this chapter will provide the explanation of methods, which will be used to collect data, as well as explanation of data analyses. For the research, secondary data will be used in order to accomplish its objective and regarding the time and associated cost. This research examined macroeconomics indicators, therefore most of data are provided by central banks, which act as bank of state. Data collecting is for years 2006 until 2015 as the most recent and years when economy was in financial crisis and European debt crisis. In second part of this chapter IS-MP-AS model will be explained, which will be used as model to answer research questions. The model uses Multiple Regression Analysis, which examined the relationship in this case between relevant macroeconomics indicators.

3.2 Research Method and Strategy

Researcher in this study investigates the efficiency of monetary and fiscal policy for specific period. More precisely, this study examined the most effective steps to stimulate economy during financial and debt crisis. In the beginning, it is important to choose a strategy as a plan to achieve a goal, in this case, it will be to answer research question(s) at hand. This research investigates the relationship between macroeconomics indicators, which are numerical information about a country. Therefore, the quantitative approach will be used in measuring efficiency of monetary and fiscal policy, which use experiment strategy. Saunders et al. (2016, p. 178), “*the purpose of an experiment is to study the probability of a change in an independent variable (IV) causing a change in another, dependent variable (DV).*” This method is the most suitable for this paper based on previous work by researchers. The study also

includes proper examination of the effect of independent and dependent variables. In addition, for this study the most suitable approach is deductive. It is used when the research tries to examine an existing theory rather than emerging a new one. According to Saunders et al. (2016), the deductive method is very often linked with quantitative studies, where the main aim to use data to examine an existing theory. Hence, the researcher is trying to test the relationship between independent and dependent variables to determine whether monetary and fiscal policy were effective on how well countries perform. These variables are tested under the perceptions of Keynesian theory, which believes in efficiency of interference on the economy or monetarist theory, which believes in non-interfering approach as is explained in subsequent sections of the paper.

3.3 Sample Frame and Sample Selection

For answering the research questions, it is not always possible to collect data from an entire population. Saunders et al. (2016), explain that we should not assume a census would essentially provide more valuable results than collecting data from a sample that characterises the entire population. The researcher used sampling techniques to collect the needed data. Nevertheless, in most cases, sampling is determined by the researcher's budget constraints and time and the most limited aspect is usually data access. Nevertheless, the main aspect, which influence the study sample, is research questions and objectives.

3.3.1 Sample Frame

“The sampling frame for any probability sample is a complete list of all the cases in the target population from which your sample will be drawn” (Saunders et al., 2016, p. 277). To accomplish the aim of the research the sample frame for this research will include three countries of European Union. The researcher's questions are focusing on financial and European Debt crisis as a result, sample for this research includes all European Union countries, which now contains twenty-eight member states. The study examines a period of ten years from 2006 to 2015. The reason for choosing this period is firstly to use the most recent data, and secondly which is the main reason is to study crises years and include year 2006 as the year before crisis, when the economy was in growth stage.

3.3.2 Sample Selection

After defining the sample frame, the next step of research is to decide a suitable sample. An examination of monetary policy, which is controlled by central bank of the country. However, 19 countries of European Union are also members of Eurozone with the same currency, and monetary policy strongly controlled by European central bank (ECB). Therefore the researcher investigates Eurozone as one sample, other two countries will be chosen from remaining nine (Bulgaria, Croatia, the Czech Republic, Denmark, Hungary, Poland Romania, Sweden, United Kingdom). As second sample, it was decided to use the Czech Republic, since they recorded strong growth in 2014 and 2015 (CIA, 2016). Additionally it is an exporting country so its economy should be strongly influence by exchange rate. Last country is UK since it is the base of the research and has benefited unique exceptions from EU, including but not limited to, the UK not obliged to join the euro. In addition, as the Czech Republic is considered to being an exporting country UK imports, and this contrast can show interesting results. Countries are examined separately; therefore, it is not necessarily to include size of country to decision.

3.4 Method of Data Collection and Analysis

3.4.1 Method of Data collecting

In this chapter of the paper, the researcher explains how data will be collect for this specific research. To answer the research questions and meet the research objectives will be used as “Secondary Data”. Secondary data are defined as data that were collected for some other purpose. Nevertheless, those data may be further analysed to provide additional or different information, interpretations or assumptions (Saunders et al., 2016). It is also effective approach in terms of money and time saving. Those aspects help the researcher to accomplish this study in the specified deadline, which is September 2016. Another advantage of secondary data is that it allows individuals a permanent source to check on the data and make the research data and results available to public. The researcher will use the internet to access secondary data. This paper is focusing on monetary and fiscal policy, therefore most of data are collected from websites of central banks or statistic websites, such as OECD, BLUENOMICS, etc. All

data are collected quarterly mainly because data, such as GDP, household consumption, government spending etc. are provided quarterly. Data, which are provided monthly, were collected for every third month of the year (March, June, September, and December). Data, which are provided daily or change during month (interest rate) were collected for last day of quarter.

3.4.2 Method of Data Analysis

Quantitative data for most people are meaningless before they have been processed and analysed. Therefore, these data needs to be processed to make themselves beneficial, that is, chance them into information. There exist many quantitative analysis techniques, such as graphs, tables, and statistics, which allows exploring, describing, presenting, and examining trends and relationships within the data. Quantitative analysis techniques helps in the process to analyse and interpreted the data. It can be in the form of simple tables or graphs, which show the frequency of occurrence. Statistics that enable comparisons, through establishing statistical relationships between variables. In this research an advanced data management and statistical analysis software (EViews) is used (Saunders et al., 2016).

3.5 Theoretical IS-MP-AS Model

As previously mentioned, IS-MP-AS model is modified version of IS-LM model, this dissertation draws a model that was used by Hsing (2005) for Poland, which is European country as in the case of this research paper. Others who used this model have made changes to suitable to their country economy. Alavi et al. (2016) investigated Iran's economy and they include income from oil which is the most important income for their economy, on the other hand, European countries are not influenced by oil revenue, therefore it is not relevant in this paper.

According to Romer (2000) and Yu Hsing (2005, 2006) the IS-MP-AS model assumes that household's consumption is influence by output, taxes, the real interest rate, and stock values. Investments are affected by output, the real interest rate, and stock values that real exchange rate determines net exports. The short-run real interest rate determined by central bank is a function of the inflation gap, the output gap, the exchange rate gap, and the world interest rate. Aggregate supply function, the inflation

rate is measured by the expected inflation and the difference of income and potential income. The goods market equilibrium (IS), the monetary policy (MP), and aggregate supply (AS). Those relationships are expressed in three equations below:

$$Y = C(Y-T, R, S) + I(Y, R, S) + G + NX [e (P / P^*)] \quad (1)$$

$$R = R(\pi - \pi^*, Y - Y^*, e - e^*, R^W) \quad (2)$$

$$\pi = \pi^e + \Theta (Y - Y^*) \quad (3)$$

Where:

Y = real GDP,

C = household consumption spending,

T = Government taxes,

R = the real interest rate,

S = stock values,

I = Investment spending,

G = government spending,

NX = net exports,

e = the nominal effective exchange rate,

P = the price level in chosen country,

P* = the price level in European Union,

π = the actual inflation rate,

π^* = the target inflation rate,

Y* = potential output,

e* = the real exchange rate,

R^w = the world interest rate, and

π^e = the expected inflation rate.

“The coefficient Θ describe exactly how much inflation is generated by a 1 percent increase in the gap between output and its natural rate” (Whelan, 2015, p. 12).

In equation (1), the stock price is incorporated in the household consumption function to examine Tobin’s q theory or the balance-sheet channel and to examine the wealth effect.

Equation (2) characterises an extended Taylor rule that the dependent variable is the

short-term real interest rate and is controlled by the central bank. Assume equations (1), (2), and (3) have continuous partial derivatives, we have:

$$0 < C_Y < 1, C_T < 0, C_R < 0, C_S > 0, I_Y > 0,$$

$$(1 - C_Y - I_Y) > 0, I_S > 0, NX_e < 0,$$

$$R_\pi > 0, R_Y > 0, R_e < 0, R_{R^W} > 0, \pi_Y = 0.$$

Equations (4) and (5) gives the slopes of equations (1) and (2), respectively

$$\frac{dR}{dY} |IS = - \frac{1 - C_Y - I_Y}{-(C_R + I_R)} < 0 \quad (4)$$

$$\frac{dR}{dY} |MP = - \frac{-R_Y}{1} > 0 \quad (5)$$

The endogenous-variable Jacobian is written as

$$|J| = (1 - C_Y - I_Y) - \Theta R_\pi (C_R + I_R - R_Y (C_R + I_R)) > 0. \quad (6)$$

Using implicit-function theorem and solving for the equilibrium values for real output, the interest rate, and the inflation, equilibrium output can be written as

$$Y = Y [\pi^e, G, T, e, (P/P^*), S, R^W; \pi^*, Y, e^* \Theta] \quad (7)$$

The impact of appreciation of a change in the nominal exchange rate on equilibrium output, based on comparative-static analysis can be expressed as

$$\frac{\partial Y}{\partial e} = [NX_e (P/(P^*) + R_e (C_R + I_R))] / |J| > 0 \text{ if } |NX_e| < |R_e (C_R + I_R)| < 0 \text{ if} \\ |NX_e (P/(P^*))| > |R_e (C_R + I_R)| \quad (8)$$

As revealed, the net impact hang on whether positive effect of the appreciation on household consumption and investment spending due to a lower interest rate would be larger than the negative effect of reduced net exports.

Equation (9) indicated, increase of stock values would increase household consumption and investment spending and raise equilibrium output. Equation (10) discloses that a higher world interest rate would increase the domestic interest rate and cause to decline consumption, investment and equilibrium GDP (Alavi et al.; Hsing, 2005, 2006).

$$\frac{\partial Y}{\partial S} = (C_S + I_S) / |J| > 0 \quad (9)$$

$$\frac{\partial Y}{\partial R^W} = [R_{RW} (C_R + I_R)] / |J| < 0. \quad (10)$$

3.5.1 Data Measurement

The data used for The Czech Republic (GDP, household consumption spending, Investment spending, government spending, net export) are anchored to the base year 2010. The UK used Chained Volume Measures for GDP, household consumption spending, investment, and government spending, net export is provided in current prices. Eurozone use current prices for GDP, household consumption spending, investment, government spending, and net export. The same methodology of providing data is used for rest of data in all three counties, therefore it is described in the table (3), and the above explanation is just for the case of exceptions. This is limitation of collecting data for more countries, every country preferring to use different methodology for providing data. On the other hand, the IS-MP-AS model is applied separately to every country, for better sensitivity analysis of results.

Table 3.1 Data

Y = real GDP	Quarterly, millions, Expenditure Measure
C = household consumption spending	Quarterly, mil., Expenditure Measure
T = Government taxes	Quarterly, mil., current price, Income Measure
R = the real interest rate ⁽⁷⁾	Calculated
S = stock values ⁽¹⁾	Quarterly, Constant prices of 2010
I = Investment spending	Quarterly, mil., Expenditure Measure
G = government spending	Quarterly, mil., Expenditure Measure
NX = net exports	Quarterly, mil., Expenditure Measure, Calculated Total Export – Total Import
e = the nominal effective exchange rate ⁽²⁾	Monthly, index, base year = 2010
P = the price level in chosen country ⁽⁴⁾	Yearly, index, base year = 2010
P* = the price level in European Union	Yearly, index, base year = 2010
π = the actual inflation rate	Annual growth rate (%), Consumer Prices Index (CPI)
π^* = the target inflation rate	Long target, (%), CPI
Y - Y* = output gap ⁽⁵⁾	Annual, (%)
e* = the real exchange rate ⁽³⁾	Monthly, index, base year = 2010
R ^w = the world interest rate ⁽⁸⁾	Calculated
π^e = the expected inflation rate ⁽⁶⁾	Annual growth rate, (%), CPI

(1) "Stock Values - Share price indices are calculated from the prices of common shares of companies traded on national or foreign stock exchanges" (OECD, 2016c).

(2) "Nominal effective exchange rate (NEER) - A higher value equates to the appreciation of the local currency against the trade-weighted basket of currencies the country is trading with" (Bluenomics, 2016a).

(3) "Real effective exchange rate - An increase in value equates to the real appreciation of the local currency against the trade-weighted basket of currencies the country is trading with and is often interpreted as corresponding deterioration of the country's competitive position" (Bluenomics, 2016b)

- (4) *“Price level - Comparative price level indices are the ratios of purchasing power parities to market exchange rates. At the level of GDP, comparative price levels provide a measure of the differences in the general price levels of countries. This indicator is measured as an index”* (OECD, 2016b).
- (5) *“Output gap – Deviations of actual GDP from potential GDP as % of potential GDP”* (OECD.Stat, 2016).
- (6) *The expected inflation rate - It is defined as the change in the prices of a basket of goods and services that are typically purchased by households. Projections are based on an assessment of the economic climate in individual countries and the world economy, using a combination of model-based analyses and expert judgement. The indicator is expressed in annual growth rates”* (OECD, 2016a).
- (7) The real interest rate – It is calculated as nominal interest rate which change randomly during year (The Czech Republic use 2W Repo rate, UK use Bank rate, Eurozone rate is called Key ECB rate) minus actual inflation rate
- (8) The world interest rate – It is calculated as the real interest rate of U.S. Fed Funds Rate (U.S. Fed Funds rate represents the world interest because of its worldwide influence) minus actual inflation in U.S., Eurozone interest rate could not be used for the world interest rate because of multicollinearity for Euro area.

3.5.2 Unit root test

According to prior publications related to the IS-MP-AS model, it is suggested to firstly check the stationarity of variables (Alavi et al.; Hsing, 2005, 2006). In this study the stationarity of variables were checked using Unit root test. If variables are not stationary, the results are concluded as not reliable because in that case the model tends to generate high levels of R^2 because two variables can be absolutely unrelated. However, data can be stationary in first or second difference and this modified data can be used in the research (Gujarati, 2015).

3.5.3 Johansen test

After stationarity test, the next test, which is according to existing publication related to the method in focus in this research, was Johansen test. Johansen test involves testing cointegration of several variables. Thereby providing the much required cointegrating relationship between more than one variable as a function of time. Therefore, it is more applicable than unit root test, which measure a single cointegration relationship. However, this test is applied on original data before modifying the data by first or second difference unit root test (Gujarati, 2015).

3.5.4 The Multiple Linear Regression

The IS-MP-AS model uses the multiple linear regression as the most suitable way to investigate a relationship between dependent and two and more independent variables.

It is also very flexible data analytic method. The multiple linear regression model makes expectations about the nature of the data that are being analysed and is most surely conducted with “well-behaved” data that meet the underlying expectations of the basic model. The main purpose of using multiple linear regression in this paper was to measure which variables influence dependent variables. Other questions, which to be answered are how strongly are those variables influenced in a positive or negative relationship. These answers provide vital information on how effective government were in specific countries and area during the global financial and European debt crisis (Gujarati, 2015).

3.6 Hypotheses Developing

The research questions are concerned with the effect of individual variable on the dependent variable therefore, the researcher developed the following hypotheses:

1. The main hypothesis (H1)

“There exist a statistical significant effect of dependent variable on independent variables of the Czech Republic, the UK, and Euro area”.

2. The null hypothesis (H0)

“There does not exist statistical significant effect of dependent variable on independent variables of the Czech Republic, the UK, and Euro area”.

3.7 Conclusion

This chapter introduced the research method, which has been used in this study in order to answer research questions and achieve research objectives. This research investigates the efficiency of monetary and fiscal policy during Financial and European debt crises by using secondary data from central bank’s and statistic website. This study has used statistical techniques for analysis of the research sample, applied IS-MP-AS model uses multiple linear regression, that have been also applied by prior researchers who investigated the efficiency of monetary and fiscal policy. Weakness of this model is that the IS-MP-AS model can be applied just separately to every country. Due to the time constrains only three countries were investigated. Three countries will not be good

representative of all countries in the European Union, nevertheless it is good sample as representative of specific case studies.

4 ANALYSIS & DISCUSSION

4.1 Introduction

The aim of this study is to examine and evaluate the efficiency of monetary and fiscal policy between 2006 and 2015, as was mentioned in previous chapters. These ten years were carefully chosen as challenging years for fiscal and monetary policy of the chosen countries. In accordance with the aim, this section of the report presents and discusses the data collection for monetary and fiscal policy. In this chapter, the discussions related to the analysis of the secondary data with EViews software are also elaborated. Each country will be analysed separately in this chapter, so first part will be about The Czech Republic, and then The United Kingdom, the third part about Eurozone as whole, and at the end of the chapter, a comparative study of all the case studies is presented.

4.2 Methods of Statistical Analysis

The main statistical method for measuring the efficiency of monetary and fiscal policy focuses on the GDP. This technique will help to accomplish the research objectives, by considering the relationship between independent variables. In order to make clear findings, statistical techniques have been applied on collected secondary data, these techniques focus on evaluation of the statistical correlations between variables. First step will be to measure stationarity of individual variables, and then Johansen test is adopted for non-stationarity outcomes. And the final step involves a multiple regressions model. Which will be used to test the relationships between variables, to assess their correlation. This technique provides the degree of the significance between tested variables.

Hypotheses are tested by the level of significance shown in the results. It represents the smallest level (threshold) at which null hypothesis for a specific data can be rejected. To obtain this threshold value, an analysis of p-value is performed. If the p-value is below 0.05 (the level of significance) we deny the null hypothesis and accept the alternative hypothesis (H1). If the p-value is above 0.05, the null hypothesis is accepted (Gujarati, 2015; Saunders et al.).

4.2.1 Multiple Correlation (R)

The multiple correlation is applied to test the strength of the association between dependent variable and the independent variables. According to Brewerton and Millward (2001), R variable provides a measurement of the total correlation between the dependent variables and all independent variables. R^2 represent a percentage of prediction, which can be attained by those independent variables. Both R and R^2 define the change of the dependent variables as caused by the independent variables, in this case the monetary and fiscal outputs are most significant. The reason of applying multiple regression is to define the size to which the independent variables together affect the dependent variables. The coefficient of R is measured between -1 to 0 and 0 to 1, when R value is close to one it suggests a strong relationship, positive when it is close to 1 and negative when it is close to -1, a weak relationship is consider when R is close to zero (Berenson et al, 2009).

4.2.2 Empirical Results

In regression analysis the ratio of government deficit to GDP is used to reduce a high degree of multicollinearity. To reflect weights by trade the real effective exchange rate is chosen. The world interest rate is represented by the federal funds rate, Eurozone interest rate could not be used because of multicollinearity for Euro area. The sample runs from 2006. Q1 to 2015.Q4, except UK when are missing data for government data for 2015.Q4.

4.3 The Czech Republic (CR)

The first case study is the Czech Republic, which is member of European Union since 2004, however still has his or her own currency, Czech koruna. It is 30th largest exporting economy in the world and 9th most complex economy according to the Economic Complexity Index (ECI). The main export destinations of the Czech Republic are Germany, Slovakia, Poland, France and the UK. All five exporting countries are members of the European Union and three of them members of Eurozone (OEC, 2014a).

4.3.1 Hypothesis Testing

In the beginning of this chapter (section 4.2) it was explained that the reasons for accepting or rejecting the null hypothesis on the base of p-value. H₀ is accepted in case that p-value is above 0.05 and reject if it is below 0.05, in that case is H₁ accepted. In table 4.1, which shows p-value for dependent variable in this case GDP and five independent variables is p-value (Prob. F-statistic) 0.000819, therefore null hypothesis is rejected and alternative H₁ is accepted. There is a significant effect of independent variables on the real GDP of the CR“.

4.3.2 Data Analysis and Findings for the Czech Republic

According to the Unit root test, which was used to measure level of stationarity for individual variables. When all tested variables appeared to be non-stationary in levels, though when differenced to first level stationarity problem was resolved. The Johansen test, measures if variables are co-integrated. The estimated trace statistic of 107.1517 is larger than the critical value of 95.75366 at the 5% level. Therefore, the null of a zero cointegrating relationship might be rejected, relationship between those variables is stable in long-term.

Table 4.1 introduce the estimated regression and related statistics. As shown, R-squared is 45.6 percent, which is not as high as in prior research, it is caused by two (e^* and R^W) of five independent variables which are not significant enough to effect Y. By result for the Durbin-Watson test 1.119 there may not be made any definite conclusion about positive autocorrelation (Gujarati, 2015). Government deficit/GDP ratio and actual inflation have positive relationship and are significant at the 5% level. S has also positive relationship with Y, however it is significant only at the 10 percent level.

Table 4.1 Results of Multiple Regression for DV log(Y) (CR)

Dependent Variable: Log(Y)

Method: Least Squares

Sample (adjusted): 2 40

Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002156	0.000573	3.758660	0.000663
DY	0.168104	0.066991	2.509340	0.017182
e*	-5.201237	0.000230	-0.225961	0.822624
π	0.220579	0.068766	3.207652	0.002972
S	0.000106	5.744191	1.854690	0.072594
R ^W	0.012177	0.057277	0.212598	0.832948
R-squared	0.456475	Mean dependent var.		0.001845
Adjusted R-squared	0.374123	S.D. dependent var.		0.004439
S.E. of regression	0.003511	Akaike info criterion		-8.324665
Sum squared resid.	0.000407	Schwarz criterion		-8.068732
Log likelihood	168.330976	Hannan-Quinn criter.		-8.232839
F-statistic	5.542964	Durbin-Watson stat		1.118898
Prob.(F-statistic)	0.000819			

Notes:

Y is GDP for the Czech Republic

DY is the government deficit GDP ratio.

π is the actual inflation.

e* is the real effective exchange rate.

S is the Prague stock index.

R^W is the Fed funds rate.

4.3.3 Discussion about the Czech Republic monetary and fiscal policy

First research variable is government deficit/GDP ratio, which is used to prevent multicollinearity between the real GDP and government spending. Prior research suggested that in long-run deficit-financed government spending could have a neutral effect on GDP (Barro, 1989). Nevertheless, it depends on the size of deficit, the CR government deficit/GDP ratio was highest in 2009 (-5.8) when government was trying to stabilize and stimulate economy. Since that, the government deficit is dropping and in 2015 it reached a level of -2.6%. Results in table 4.1 showed positive effect of government deficit/GDP ratio to the real GDP, as conclusion of this action, Keynesian theory of increasing government spending during crisis was good approach, which helped Czech economy to a quick recovery.

Next important variable is the actual inflation, Hsing (2005, 2006) and Alavi et al., (2016) had a negative relationship between output and inflation rate. Results for the CR showed positive relationship, increase of inflation would cause increase of GDP. In the case of the CR, positive relationship between the actual inflation and GDP can be caused by the financial 2007-09 and Eurozone crisis. Section 2.4.1 mentions that Habermeier et al. (2009) concluded better results in inflation for countries, which target inflation rate, the CR is one of them. There was significant increase in inflation for 2008 nevertheless since then inflation rate has been observed to be decreasing. In most cases, decrease of inflation has negative relationship on GDP, people expect that goods and services will be cheaper in the future and therefore, it can cause deflation. However low inflation can increase competitiveness of export when the prices of Czech goods appreciate less than other countries, also investment are more certain. From the results of using the IS-MP-AS model monetary policy of decreasing inflation does not affect output as it should and therefore this policy is inefficient to be applied during the global financial and the Eurozone crisis.

Hsing (2005, 2006) and Alavi et al., (2016) described that household consumption is affected by stock value as was mentioned in methodology section of the research paper. In Mishkin (1995) and Kuttner and Mosser (2002) predicted rise of stock values would cause household to spend more and it would cause increase of investment. Stock values in table 4.1 has positive relationship with the real GDP, therefore this theory is confirmed by results of this report.

Results indicate the presence of two not statistically significant variables, one of them is real exchange rate. Other researchers agreed on positive relationship between real exchange rate and Y, this could not be confirmed because of the not valid results obtained from the multiple linear regression test. This can be caused by interference of CNB and devaluation of Czech Koruna. The negative impact of this line of action cannot be underplayed (Ministry of Finance of the Czech Republic, 2016). Next variable, which could not be included as valid variable is federal funds rate as representative of the world interest rate, there can be two reasons for that. First is that the U.S. real interest rate is not significant enough to influence the CR, and interest rate

of ECB would be more convenient. Second reason can be caused low interest rate when real interest rate adjusted by inflation is below zero.

4.4 The United Kingdom

Second case study is the UK, which is member of European Union since 1973, UK agreed with EU on exception about their currency change from the British Pound to the Euro. It is 9th largest export economy in the world however their import exceed export every year, in 2014 their trade balance was negative \$191B. In ECI are on 11th place in the world. The main import countries are Germany, China, the Netherlands, the U.S., and France (OEC, 2014b).

4.4.1 Hypothesis Testing

In table 4.2, which provides level of significance for dependent variable (GDP) and five independent variables is p-value (Prob. F-statistic) 0.000251, therefore, null hypothesis is rejected and alternative H1 is accepted. “There is a significant effect of five independent variables on the real GDP of the UK“.

4.4.2 Data Analysis and Findings for the UK

Unit root test was applied to measure stationary level of individual variables. All variables are non-stationary in levels, however they are stationary in first difference, and therefore modified data were used in regression. According to the Johansen test, stable and long-term relationship can be confirmed from results. The trace statistic value is 113.5191, which is higher than critical value 95.75366 at 5% level, therefore hypothesis null of a zero cointegration can be rejected.

Table 4.2 describing the regression and related statistics for real GDP. R-squared is 50.8, which is lower than in previous research, it is caused as in example of the CR by two not statistically significant variables (the actual inflation and stock values). The Durbin-Watson test shows that there may not be any definite conclusion made about positive autocorrelation (Gujarati, 2015). In this sample, we need to exclude the actual inflation and stock values as not significant enough to influence the real GDP. Others independent variables are significant at the 5 percent level. Real GDP has positive

relationship with government deficit/GDP ratio, the real exchange rate, and negative relationship with federal funds rate.

Table 4.2 Results of Multiple Regression for DV $\log(Y)$ (UK)

Dependent Variable: DLOGY

Method: Least Squares

Sample (adjusted): 2 39

Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001076	0.000386	2.787044	0.008872
DY	0.090216	0.035771	2.522035	0.016840
e*	0.000296	0.000115	2.561072	0.015352
π	-0.086312	0.075728	-1.139755	0.262847
S	5.231556	8.502466	0.615298	0.542708
R ^W	-0.107503	0.042267	-2.543421	0.016009
R-squared	0.507766	Mean dependent var.		0.001167
Adjusted R-squared	0.430854	S.D. dependent var.		0.003136
S.E. of regression	0.002365	Akaike info criterion		-9.111298
Sum squared resid	0.000179	Schwarz criterion		-8.852731
Log likelihood	179.114665	Hannan-Quinn criter.		-9.019302
F-statistic	6.601957	Durbin-Watson stat		1.335775
Prob. (F-statistic)	0.000251			

Notes:

Y is GDP for the UK

DY is the government deficit/GDP ratio.

π is the actual inflation.

e* is the real effective exchange rate.

S is the London stock index.

R^W is the Fed funds rate.

4.4.3 Discussion about the UK monetary and fiscal policy

Government deficit/GDP ratio has positive relationship with Y, as result it confirms positive effect of Keynesian policy of increasing government spending and increasing of government debt. Different results in prior research could be cause by global financial crisis and Eurozone crisis. Before crises, the main policy was to reduce government debt and because economy was in growth stage, GDP was growing. During and after crises, most countries increase their debt, UK increased the government deficit/GDP ratio from -5.1% (2008) to -11.2% (2009). When government changed their

policy and increased debt to stimulate economy, it shows different results compared to before the crisis. It is possible to conclude that fiscal policy was successful in UK.

Second statistically significant variable is the real exchange rate, results. For this variable a good correspondence to results from previous research (Hsing, 2005, 2006; Alavi et al., 2016). The positive relationship between Y and the real exchange rate signal that assumption to devalue a currency, as a tool to stimulate aggregate demand and net export might not apply to UK (Hsing, 2005). Therefore, monetary policy of UK to not interfere and not to devalue a currency when pound became stronger to euro because of Eurozone crisis was effective. The UK is an important country and expensive currency, which makes importing goods and services cheaper, as a result net import, would be decreased.

Last variable, which is statistically significant, is the federal funds rate, which represents the world interest rate. U.S. interest rate has high effect on UK because U.S. is strong trade partner compare to the CR. Increase of interest rate in U.S. would have negative impact on output in the UK (Hsing, 2005, 2006; Alavi et al., 2016). It means that the Bank of England has positive response to the monetary policy of U.S. federal funds rate.

First non-statically significant variable is the actual inflation rate. It has negative relationship with GDP, therefore policy of decreasing inflation is efficient, unfortunately, this assumption cannot be confirmed because of low levels of significance. Second non-significant variable is stock values, it is quit surprising, UK has one of the largest stock exchange in the world, therefore this variable should effect UK economy in a strong manner. It can be caused by not valid data, or that the stock exchange is so large in UK therefore there could exist a lot of swings during global financial and Eurozone crisis, dependent variable GDP did not experience such quick and often changes, therefore during that time period, stock exchange could not be used to predict output of UK.

4.5 Euro Area

Last sample is Eurozone as representative of all countries, which have the same currency euro and follow monetary policy of European Central bank. In subchapters

2.4.1.1 and 2.4.2.1 monetary and fiscal policy of Euro area is explained in detail. Eleven member states of the EU had fulfilled the euro convergence criteria in 1998, Euro was officially launched on 1 January 1999. Greece qualified one year later, and from 2007 until 2015, seven other countries joined the Euro area. Therefore, in every year data was collected for different number of countries depending on numbers of countries, which are members of Euro area. This could weaken the results of this report (European Commission, 2016).

4.5.1 Hypothesis Testing

Level of significance from table 4.3 provides information as to which hypothesis will be accepted. Based on the fact that the P-value was approximately 0.000007, therefore we reject null hypothesis and accepted the alternative hypothesis, "There can be a significant effect between output and five independent variables in Eurozone".

4.5.2 Data Analysis and Findings for the Euro area

First step to analyse data of Euro Area is unit root test to measure stationarity of variables. Results of this test show that not all variables are stationary in levels, fortunately this problem was resolved by first difference. The Johansen test is used to test cointegration between variables, specifically if there is a long-term relationship. Results show that trace statistic is 124.1676, which is greater than critical value at 5% level 95.75366. For that reason null of a zero cointegration relationship will be refused.

Table 4.3 introduces the estimated regression and related statistics for real GDP. R-squared is highest of all three samples, 60 percent of GDP can be explained by these five variables. However, the real exchange rate, and federal funds rate cannot be included because of low statistical significance. The Durbin-Watson test is 1.231, Gujarati (2015, p. 117) described this "no definite conclusion about positive autocorrelation may be made". Euro area output has positive relationship with government deficit/GDP ratio, the actual inflation, which are significant at the 5 percent level. Stock values have also positive relationship however it is statistically significant at 10 percent level.

Table 4.3 Results of Multiple Regression for DV log(Y) (EA)

Dependent Variable: DLOGY

Method: Least Squares

Sample (adjusted): 2 40

Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002358	0.000383	6.147870	0.000000
DY	0.145241	0.054500	2.664970	0.011822
e*	0.000186	0.000153	1.214421	0.233205
π	0.351981	0.111282	3.162958	0.003345
S	9.020011	4.550531	1.982188	0.055833
R ^W	0.031017	0.049256	0.629713	0.533218
R-squared	0.600789	Mean dependent var.		0.002092
Adjusted R-squared	0.540302	S.D. dependent var.		0.003414
S.E. of regression	0.002314	Akaike info criterion		-9.158249
Sum squared resid.	0.000176	Schwarz criterion		-8.902316
Log likelihood	184.585855	Hannan-Quinn criter.		-9.066422
F-statistic	9.932615	Durbin-Watson stat		1.231302
Prob. (F-statistic)	0.000007			

Notes:

Y is GDP for the Euro area

DY is the government deficit/GDP ratio.

π is the expected inflation.

e* is the real effective exchange rate.

S is the stock index.

R^W is the Fed funds rate.

4.5.3 Discussion about the Euro area monetary and fiscal policy

Government deficit/GDP ratio has positive relationship with output, as was mentioned above in results of the CR and the UK. Barro, 1989 claimed that in the long-run deficit-financed government spending would have neutral relationship, previous research indicated negative relationship, however fiscal policy before and after financial crisis was completely opposite therefore in this research contrary results were obtained. Positive relationship, which occurred for Euro area, confirmed positive effect of increasing government deficit/GDP ratio to stable and stimulate economy in Euro area.

Actual inflation rate has positive relationship with GDP, on the other hand Hsing (2005, 2006) and Alavi et al, (2016) results showed negative relationship. Low inflation rate

should stimulate the economy, decreasing of inflation is now worldwide trend. Therefore negative relationship was expected, nevertheless results in this paper shows positive relationship. It means that increasing inflation would increase GDP. It would be very unique case, however result can show it because of global financial and Eurozone crisis when macroeconomic indicators, which should be stable, change a lot and indicators which are supposed to rise, remain stagnated. GDP from 2006 until 2015 slowly rise, however there was years when GDP decreased and inflation drop, year 2009 and 2010, in those years decrease inflation too since that inflation was growing for two years as GDP. Just in last three years, decrease of inflation is followed by expected increase of GDP. Results of this research can conclude inefficient monetary policy, however result could be affected by drastically by changes, therefore in future years it can change as shown by results as are predict by economic theories.

Stock values did not show strong level of significance as previous two variables, it is still significant on 10% level, hence it is included in this discussion. From prior research is expected positive relationship, therefore it can be interpreted similarly. Increase of stock values would increase the household consumption and investment, and in final the real GDP. As in results for the CR, the real exchange rate and federal funds rate are not statistically to influence the real GDP.

4.6 Comparison of sample

This section will compare the two countries, The Czech Republic, The United Kingdom, and Euro Area. Below in table, 4.4 presents the summarized results for each country or area, every country or area have three statistically significant variables. In previous research all variables were significant, however in this research because logarithm numbers were not used for independent variables, therefore it could be said that the insignificance observed is as a result of this issue. Logarithm variables were not used because of negative federal funds rate in some quarters.

First variable of interest is government deficit/GDP ratio, which was significant for all three examined countries or area. This ratio demonstrated governments' deficit as a percentage of GDP. In all three countries a positive relationship, which is different compared to previous research (Hsing 2005, 2006; Alavi et al., 2016), however it was

expected in this research study that applying Keynesian policy to stimulate economy by increasing deficit has positive impact on the real GDP. Keynes encourage the increase in deficit to increase government spending and stabilize economy, the important suggestion was to decrease government deficit as soon as productive years come, additionally not to overheat economy and not to increase the deficit into unmanageable level. Unfortunately, it happened in some parts of the Euro Area, however those countries had high level of debt before the crisis, hence it was not caused just by the financial crisis, moreover it was conclusion of not economical behaviour.

The next variable was the real exchange rate, which effect the net export, so it is important for trading. The Czech Republic had not statistically significant results, which was surprising because it is an exporting country and trade is important part of their policy, now even more after entering European trade area, from 2004. As was mention before insignificant result could be caused by strong interference from CNB to appreciation of the Czech koruna on specific exchange rate, which is below 27 CZK/EUR (Ministry of Finance of the Czech Republic, 2016). The same result was observed for the Euro Area, it could be cause by strong drop, which was caused by European debt crisis. Nevertheless, the UK results represent positive relationship as in prior research and therefore their policy not intervene when pound became stronger was effective approach.

The actual inflation was significant just in case of the CR and EA, however the relationship were positive in both cases, it denies the basic theory of inflation, increase of inflation would have negative relationship on GDP. However, in years of quick and dramatic changes, when inflation was rising because of crisis dramatically and GDP was more stagnated than dropping, it is understanding result. The result could be different with longer time period before and after resent European debt crisis, results would be different. Nevertheless, results by using IS-MP-AS model showed inefficient monetary policy in the CR and the EA.

Next variable of interest is stock value, which has positive effect on household consumption and investment. There is evidence of positive relationship for the CR and the EA, the same results were observed in previous research, therefore it can be summarized as having good agreement with results each respective country and area.

Increase of stock values would increase household spending and investment expenditure. Unfortunately, this cannot be said about the UK, which did not show significant results.

The world interest rate, which is, represent by federal funds rate show statistically significant relationship just for the UK. It is possible caused by close relationship between those two countries. The Czech Republic is probably effected more significantly by ECB interest rate than by U.S. interest rate. Euro Area showed insignificant result probably because of negative influence of European debt crisis, which had strong effect on the ECB interest rate.

Table 4.4 Summary of results for DV log(Y)

IV	DY	ϵ^*	π	S	R^W
CZE	Positive	Insignificant	Positive	Positive	Insignificant
UK	Positive	Positive	Insignificant	Insignificant	Negative
Euro Area	Positive	Insignificant	Positive	Positive	Insignificant

Research question of this paper investigated the efficiency of monetary and fiscal policy chosen countries, and which country has the best results in past difficult times, global financial and the Eurozone crises. Developed world followed monetarism theory last few decades, however during financial crisis and even before the Keynesian theory became stronger. As table 4.5 showed, there is evidence of effective Keynesian policy, which was replaced inefficient monetarism theory.

Table 4.5 Monetary and Fiscal policy

Country	Monetary policy	Fiscal policy
CZE	Inefficient	Efficient
UK	Inconclusive	Efficient
Euro Area	Inefficient	Efficient

4.7 Conclusion

This chapter analysed data and discuss findings of two countries and Euro Area. Data was analysed by EViews software, which was used to run Unit root test, Johansen test and multiple regression. Each country and area was analysed and discussed separately so findings could be discussed in details. A comparative analysis of the test results was conducted to reveal important findings in the context of correlation of specific case studies with one another. Although some aspects of this correlation were less significant than in previous research outputs, it could be caused by the global financial and the Eurozone crisis, which has negatively affect the significance of data. Another possible explanation is that IS-MP-AS model is not suitable to be applied on crisis period and needs more stationary data.

5 RECOMMENDATIONS & CONCLUSIONS

5.1 Introduction

The main aim of this as outlined in the introductory chapter of the report have been achieved and the intermediate objectives outlined have been successful, as a result provide better understanding of measures on the efficiency of monetary and fiscal policy has been documented. A sample containing two countries and Euro Area was selected for specific and comparative analysis of test results. Secondary data were used in this paper as a method of data collection, data were covering ten years period from 2006 to 2015, during the financial 2007-09 and Eurozone crisis occurred. Detailed analysis of data and discussion about results, were presented in addition to a concise conclusion of the relevant findings related to the research, research limitations and recommendations for future research are also suggested.

5.2 The study conclusion

This research examined efficiency of monetary and fiscal policy in the Czech Republic, the United Kingdom and Euro Area based on the extended IS-MP-AS model. Results showed effective fiscal policy for all three examined subjects. Increase of government deficit/GDP ratio would increase GDP and therefore policy of increasing government debt to stimulate economy and followed Keynesian rule was good approach. However, the Eurozone crisis, which occurred shortly after the global financial crisis, could seem as being a contradictory statement. The UK showed that decision not to devalue their currency was the right approach as it was confirmed by positive relationship between real GDP and the real exchange rate. The actual inflation in the CR and the UK showed also positive relationship with GDP, which is different from results of previous publications, this could have been caused by rapid changes in inflation. Result proved on the base of IS-MP-AS model that monetary policy of inflation is not efficient as prominent monetary policy. Stock value positively influences GDP in the CR and EA, and this can be translated to mean that increase of stock values would rise GDP through household consumption and investments. The UK has significant relationship between GDP and federal funds rate which confirms close relationship between the UK and the

U.S. on economic level. Negative influence of GDP was expected and therefore if the UK would follow policy of the U.S. it would have positive effect on their GDP.

5.3 Limitation and Recommendation

The main limitation of this research was lower level of significance than in previous publications. Every country or area had just three of five significant variables and therefore it was not possible to answer research questions as conveniently as in the case of using more statistically significant variables. The low significance level of test outputs could also be attributed to the fact that this model is not suitable to be applied for years of crises, because the research work of Alavi et al, 2016 which covered period before the crisis. Another explanation could be that data was not stationary in level and modified data in first difference were not conclusive enough. Another limitation was that the data used for the study of Euro Area was collected for different number of countries depending on the size of Euro Area at that specific year. It could have negative effect on the comparison.

5.4 Future research

This research examined specific period in time and therefore it will always contribute to examination of monetary and fiscal policy in any time frame be it in the past or in the future. In few years time, when economy of most countries must have fully recovered from any post effect of crisis, it can be an interesting research topic to investigate the economic indicators (such as the real interest rate and inflation rates) aimed at narrowing down the wide gap that exists between target inflation rate and interest rate. Therefore, many policies are still applied and economy is not fully stabilized to prior the global financial crisis. Future research work may focus on the examination of the complex problems related to large gaps between real indicators (the actual inflation, the nominal exchange rate, and GDP) and target ones (target inflation, target exchange rate and potential output). It would be also interesting to examine exactly the same period and the same countries/area based on different models other than the IS-MP-AS model to compare results and check for variations depending on the changes in test methods and models.

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APPENDICES

Appendix 1 – Random sample of data

Government deficit/GDP ratio

Government deficit / surplus as a percentage of GDP General government financial balance, surplus (+), deficit (-)

	2008	2009	2010	2011	2012	2013	2014	2015
Australia	-0.6	-4.7	-5.1	-3.6	-2.9	-1.4	-2.5	-1.4
Austria	-1.0	-4.1	-4.5	-2.4	-2.6	-1.5	-2.8	-1.3
Belgium	-1.1	-5.8	-4.0	-4.0	-4.1	-2.7	-2.1	-1.2
Canada	-0.3	-4.5	-4.9	-3.7	-3.4	-3.0	-2.1	-1.2
Czech Republic	-2.2	-5.8	-4.7	-3.2	-4.2	-1.5	-2.1	-2.6
Denmark	3.3	-2.8	-2.7	-2.0	-3.9	-0.9	-1.5	-3.0
Estonia	-3.0	-2.0	0.2	1.1	-0.2	-0.2	-0.2	-0.1
Finland	4.3	-2.7	-2.8	-1.0	-2.2	-2.5	-2.2	-0.9
France	-3.3	-7.5	-7.0	-5.2	-4.9	-4.3	-3.8	-3.1
Germany	-0.1	-3.1	-4.2	-0.8	0.1	0.0	-0.2	0.2
Greece	-9.9	-15.6	-11.0	-9.6	-8.9	-12.7	-2.5	-1.4
Hungary	-3.7	-4.5	-4.4	4.2	-2.2	-2.3	-2.9	-2.9
Iceland	-13.5	-9.9	-10.1	-5.6	-3.8	-2.1	-2.0	-2.1
Ireland	-7.4	-13.7	-30.8	-13.0	-8.1	-7.0	-4.7	-3.1
Israel ¹	-3.3	-6.2	-4.6	-3.9	-5.1	-4.3	-3.9	-3.6
Italy	-2.7	-5.4	-4.4	-3.6	-2.9	-2.8	-2.7	-2.1
Japan	-1.9	-8.8	-8.3	-8.8	-8.7	-9.3	-8.4	-8.7
Korea	2.9	-1.0	1.0	1.0	1.0	-0.4	0.1	0.5
Luxembourg	3.2	-0.7	-0.8	0.2	0.0	0.1	0.3	-0.9
Netherlands	0.5	-5.6	-5.0	-4.3	-4.0	-2.4	-2.7	-2.0
New Zealand	0.4	-2.7	-7.4	-4.4	-2.1	-0.3	0.1	0.7
Norway	18.8	10.5	11.1	13.6	13.9	11.1	10.7	10.2
Poland	-3.7	-7.5	-7.8	-5.1	-3.9	-4.3	5.6	-2.9
Portugal	-3.7	-10.2	-9.9	-4.3	-6.5	-5.0	-4.0	-2.4
Slovak Republic	-2.1	-8.0	-7.5	-4.8	-4.5	-2.8	-2.7	-2.6
Slovenia	-1.9	-6.3	-5.9	-8.4	-4.0	-14.7	-4.1	-2.6
Spain	-4.5	-11.1	-9.6	-9.6	-10.6	-7.1	-5.5	-4.5
Sweden	2.2	-1.0	0.0	0.0	-0.7	-1.3	-1.5	-0.8
Switzerland	2.0	0.8	0.3	0.7	-0.2	0.1	0.1	0.3
United Kingdom	-5.1	-11.2	-10.0	-7.9	-8.3	-5.9	-5.3	-4.1
United States	-7.2	-12.8	-12.2	-10.7	-9.3	-6.4	-5.8	-4.6
Euro area (15 countries)	-2.1	-6.3	-6.2	-4.1	-3.7	-3.0	-2.5	-1.8
OECD-Total	-3.5	-8.4	-8.0	-6.5	-5.9	-4.6	-3.9	-3.2
Brazil	-2.0	-3.3	-2.5	-2.6	-2.5	-3.3	-3.4	-3.1
China	0.9	-1.1	-0.7	0.1	-0.3	-0.7	-1.2	-1.2
India	-7.1	-9.8	-7.4	-7.4	-7.5	-7.1	-6.5	-5.9
Indonesia	-0.1	-1.6	-0.7	-1.1	-1.9	-2.2	-2.2	-2.0
Russian Federation	7.3	-4.0	-1.2	4.2	0.5	-0.5	0.0	0.2
South Africa	-1.4	-5.2	-6.0	-5.6	-6.2	-6.1	-5.8	-5.5

Last updated: 4 June 2014; disclaimer: <http://oe.cd/disclaimer>

Note: For more information, see OECD Economic Outlook Sources and Methods (<http://www.oecd.org/eo/sources-and-methods.htm>).

1. Information on data for Israel: <http://oe.cd/israel-disclaimer>.

Source: OECD Economic Outlook No. 95 (database)

Output gap

Economic Outlook No 99 - June 2016 ⁱ : Output gaps: deviations of actual GDP from potential GDP as % of potential GDP

		→ Variable	Output gap of the total economy					
		→ Frequency	Annual					
		→ Time	2010	2011	2012	2013	2014	2015
			▲ ▼	▲ ▼	▲ ▼	▲ ▼	▲ ▼	▲ ▼
→ Country	Unit							
Czech Republic	Percentage	ⁱ	-0.575	0.079	-1.922	-3.683	-3.278	-0.900
United Kingdom	Percentage	ⁱ	-3.552	-2.632	-2.594	-1.661	-0.476	0.038
Euro area (15 countries)	Percentage	ⁱ	-1.874	-0.996	-2.413	-3.221	-2.889	-2.165

Actual inflation for the CR

Year	Month											
	1	2	3	4	5	6	7	8	9	10	11	12
2000	2.1	2.2	2.3	2.4	2.5	2.6	2.9	3.1	3.3	3.6	3.8	3.9
2001	4.0	4.0	4.0	4.1	4.2	4.3	4.5	4.6	4.7	4.7	4.7	4.7
2002	4.6	4.6	4.6	4.5	4.3	3.9	3.5	3.1	2.7	2.4	2.1	1.8
2003	1.5	1.1	0.8	0.5	0.3	0.2	0.2	0.1	0.0	0.0	0.1	0.1
2004	0.3	0.5	0.8	1.0	1.2	1.4	1.7	2.0	2.2	2.5	2.7	2.8
2005	2.8	2.7	2.6	2.6	2.5	2.4	2.2	2.1	2.0	2.0	1.9	1.9
2006	2.0	2.1	2.2	2.3	2.4	2.5	2.6	2.7	2.8	2.7	2.6	2.5
2007	2.4	2.3	2.2	2.2	2.1	2.1	2.1	2.0	2.0	2.2	2.5	2.8
2008	3.4	3.9	4.3	4.7	5.0	5.4	5.8	6.1	6.4	6.6	6.5	6.3
2009	5.9	5.4	5.0	4.6	4.1	3.7	3.1	2.6	2.1	1.6	1.3	1.0
2010	0.9	0.8	0.7	0.6	0.6	0.6	0.8	0.9	1.1	1.2	1.4	1.5
2011	1.6	1.7	1.7	1.8	1.8	1.9	1.9	1.9	1.8	1.9	1.9	1.9
2012	2.1	2.2	2.4	2.6	2.7	2.8	2.9	3.1	3.2	3.3	3.3	3.3
2013	3.2	3.0	2.8	2.7	2.5	2.3	2.2	2.0	1.8	1.6	1.5	1.4
2014	1.3	1.1	1.0	0.9	0.8	0.7	0.6	0.5	0.5	0.5	0.5	0.4
2015	0.3	0.3	0.3	0.4	0.4	0.5	0.5	0.4	0.4	0.4	0.3	0.3
2016	0.4	0.4	0.4	0.4	0.4	0.3	0.3					