Spillover Effect of Unconventional Monetary Policy and International Monetary Policy Coordination

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Since the global financial crisis of 2008, most of the developed economies tried to pursue Unconventional Monetary Policies (UMPs) which created adverse spillover effect to the emerging economies through capital flight, interest rate differential and exchange rate volatility. Lots of Emerging Market leader already raises their voice against those Unconventional policies. According to those issues, Central Bank leader around the globe show the eagerness to coordinate their monetary policies. Though recent monetary policy tightness from FED, negative rate scenario from some developed economies and zero rate policies from ECB doesn't made the coordination attempt successful yet but no one ignore the importance of successful monetary policy coordination. This paper tried to discuss the spillover effect of unconventional monetary policies along with success and failure attempt of monetary policy coordination.

INTRODUCTION

International monetary policy spillovers and monetary policy coordination are two very hot topics these days with dozens of papers published in the last couple of years and many more waiting to be published in the near future. The natural question, which arises is what makes these topics so interesting to study? Despite the vast literature on the topic there are still a lot of open questions. These include: How does monetary policy impact other countries; in particular, through which channels and which economic and non-economic variables are affected. Were measures taken by major central banks during the most recent financial crisis positive or negative for the global economy. Should we coordinate monetary policies and can we effectively do it? What challenges await monetary policymakers in the near future?

In the last decades the world has become a lot more connected place with the international trade component playing an increasingly important role for the GDP of each country. With the level of globalization increasing every year it comes close to mind that actions by individual countries today have an even greater effect on foreign economies than it was the case in the past. Because of that each country carries now an even greater responsibility to account for positive or negative effects that its policies might have on others.

In the past countries have joined forces to fight global turmoil and to restore the balance in the global economy. From an economic perspective coordinated monetary policies should be beneficial for both the global economy and individual countries However, history has shown that there is little if any gain as a result of policy integration. In fact, the welfare maximum, induced by the coordinated actions, is a fragile equilibrium, because each country has an incentive to deviate from the agreement for its individual gains.

It is also unclear whether this Pareto optimum is achievable in the first place, due to uncertainty in the world or due to imperfect or incomplete information.

In the following two chapters we will try to answer some of these question as well as give an idea what the optimal behavior of countries, which try to minimize external spillover effects, should look like.

Monetary Spillovers

Spillovers to other countries as a result of a domestic monetary policy could be both positive or negative with the total effect determined by the contributions of various spillovers channels, discussed in detail in sub-chapter 2.1.[1]

Georgiadis (2015) analyzes the spillover effects of past US monetary shocks as a function of the openness, the economic structure and the vulnerabilities of foreign counties, on real GDP of foreign countries within a vector auto-regression model. He finds that these characteristics have different level of importance as well as different meaning when explaining the magnitude of spillover effects in the context of developed and developing economies. For example, developed countries with preference for a narrower corridor, in which the exchange rate is allowed to fluctuate, are more affected by spillovers. On the other hand developing countries with more flexible exchange rates, which are mostly absent from the global trade picture, also experience larger spillovers. Furthermore, advanced economies are more influenced by US monetary policy compared to developing countries. In general, however, countries with fewer trade barriers and lower tariffs are found to be more resilient to monetary shocks abroad. Further country characteristics, which work towards mitigating monetary spillovers include a more mature financial market, which is simultaneously more restrictive for foreign investors, more flexible exchange rates and a more flexible labor market with fewer regulations and weaker labor unions. However, if a foreign country pursues multiple goals with its monetary policy, such as controlling inflation and pursuing exports driven growth, it might not be able to adequately shield itself from negative spillover effects resulting from a domestic monetary policy.[2]

Wongswan (2009) analyzes the impact of US monetary shocks, proxied by a target and a path surprise, on global equity markets. He defines the target surprise as the difference between the announced and the expected interest rate pursued by the Federal Reserve (FED) and the path surprise as deviations from expected future monetary policies, based on past instances, which are induced by "forward guidance". Unusual about the study is the frequency choice of data, namely five-minute market data, which also allows for studying the response time of domestic and foreign investors to policy changes. Equity markets are found to react differently to monetary policy shocks, yet the direction is unambiguous. For example an unexpected cut of the target rate by 25 basis points leads to an increase of the KLCI (Malaysia) by 0,5%, an increase of the S&P 500 (USA) by 1,75% and an increase of the Hang Seng (Hong Kong) and KOSPI (Korea) by 2,5%. Wongswan also finds that international stock markets are affected mainly by the target surprise and to a lesser extent by the path surprise and following the announcement they move quickly to the new equilibrium, which supports the Efficiency market Hypothesis. Last but not least spillover effects are to a higher extent determined by the degree of financial integration and to a lesser extent by the real economic integration of foreign countries with the USA. [3]

Di Giovanni & Shambaugh (2008) study indirectly the effect of monetary policies on other countries by studying that of interest rate changes in leading (base) countries on the GDP growth of foreign countries. Their sample consists of 160 countries, of which 10 are taken as base. However, the US is the dominant base country in the sample, where interest rate changes in it are relevant for the biggest portion of the sample. Di Giovanni and Shambaugh find that an interest rate increase of 1 percentage point in the base country has on average no significant impact on the GDP growth of other countries in the sample. This finding holds only true when countries with a pegged and floating exchange rate relative to the base country are studied together. While countries with flexible exchange rate relative to the base country remain widely unaffected by an interest rate increase in the base country, GDP growth of countries with an exchange rate fixed to the base country decreases by 0.20 percentage points as a result of an interest rate increase of 1 percentage point in the base country. In other words countries with fixed exchange rates react only to interest rate changes in the country, to which they are pegged, and not to changes in a "world

interest rate". Furthermore, countries with flexible exchange rates do not react at all to changes of interest rate in other countries. Finally Di Giovanni and Shambaugh find that the main channel, through which GDP growth in countries with fixed exchange rate is affected is through higher interest rates in the respective country, while interest rates in countries with flexible exchange rate remain unchanged.[4]

Ammer et al. (2016) find that a strong reaction by the domestic central bank to a negative shock to the goods demand in the home country has a stabilizing effect for both the home and the global economy compared to a weaker response by the domestic central bank, assuming that foreign central banks stay passive. A more aggressive policy causes domestic GDP and domestic imports to fall less significantly as well as pick up faster once the recovery process begins, thus having a positive spillover effect on foreign GDP. However, if the home and foreign countries are at a different stages of the business cycle then a more aggressive monetary policy may cause for example the more booming foreign countries to overheat though higher inflation levels. On the other hand, if the opposite holds true and the domestic economy is overheating, while foreign countries are still struggling, then a decision by the domestic central bank to tighten its policy and fight inflation may actually push foreign countries back into recession.[5]

In general, however, a pro-cyclical (counter-cyclical) monetary policy in the US has a similar effect on both the US and other countries. For example, the negative effect of a stronger foreign currency as a result of a loose domestic monetary policy, resulting in a deteriorated competitive position for the foreign economy is usually outweighed by the additional domestic demand for foreign goods due to the expansionary monetary policy.[6]

Transmission Channels

Ammer et al. (2016) and Lavigne et al. (2014) discuss four spillover channels, which can explain how actions by the home central bank impact other countries. Through the exchange rate channel an expansionary monetary policy in the home country pushes domestic interest rates lower, which leads to a weaker (stronger) home (foreign) currency. By studying this effect in a Mundell-Fleming model one can derive a positive effect on the domestic trade balance and GDP as well as negative respective effects on foreign economies. On the other hand, through the domestic demand (trade flow) channel a loose monetary policy boosts domestic demand for both domestic and foreign goods, which has positive impact on the foreign country, boosting its exports and ultimately its GDP. Through the financial spillover (portfolio-balance) channel a looser monetary policy increases asset prices in the home country and pushes long term bond yields lower. In turn, yield seeking investors shift their capital to more favorably valued assets, thus boosting asset prices and GDP abroad. Finally through the signaling channel a loose monetary policy announcement may be perceived by individuals as a long term commitment of the central bank to lower interest rates, thus lowering the "risk-neutral component of bond yields". This would then lead to carry trades as well as shift capital from the home economy to other economies.[7]

Kawai (2016) argues that in the short run the negative spillover effect, which domestic expansionary policy has on foreign real GDP could be dampened or strengthened as a result of improved or worsened terms of trade for the foreign country (exchange rate channel). Coming from a producer currency pricing in both economies, a stronger foreign currency, would lower the prices of imports in the foreign economy while prices of exports would remain the same. Due to the cheaper imports a basket of goods in the foreign county becomes cheaper, which in turn stimulates real consumption there and partly offsets the negative effect of the reduced real GDP. On the opposite, local currency pricing assumes that prices of foreign currency imports would remain the same while prices of foreign currency exports would fall down. As a result the terms of trade would improve in the home country and worsen in the foreign one causing together with the reduced real GDP in the foreign economy a beggar-thy-neighbor effect. However, in the medium to long run prices adjust (increase) in the domestic economy, which reverts the additional positive/negative effect.[8]

Dornbusch (1976) also shows that exchange rates could initially overshoot the new equilibrium level in a response to an (expected) expansionary monetary policy. In the following periods exchange rates would slowly move to the new equilibrium through currency appreciation, yet the direction of the initial effect would stay the same. As a result of the overshooting the dampening effect of the improved terms of

trade for the foreign country could even outweigh the negative effect of the stronger currency in the short run.[9]

Spillover Effects of Quantitative Easing

On the 15th of September the fourth biggest bank in the US at that time - Lehman Brothers - filed for bankruptcy, sending ripples through the whole world economy.[10] The actions that the Federal Reserve took in a response to prevent further bankruptcies as well as to stimulate the economy can be separated in three distinctive time periods. In the first period, starting shortly after the bankruptcy of the Lehman Brothers, the Federal Reserve introduced new tools, with which it was intending to stimulate the economy. These included an extended credit line for commercial banks with the goal of improving their liquidity and large-scale asset purchases targeting sovereign and sub-sovereign bonds and mortgage-backed securities.[11] In the second period, starting in the fourth quarter of 2010, the FED announced an extension to the first program, according to which it was going to purchase US treasuries worth $600 billion.[12] Finally, in September 2012 the FED announced that it will start purchasing $40 billion worth of mortgage-backed securities per month.[13] These efforts of the FED are types of an unconventional monetary policy and became better known as Quantitative Easing (QE).

Announcements by the FED in regard to QE, didn't lead to an immediate adjustment of the financial markets to the new equilibrium, but the process was rather slow. This leads to believe that the new information wasn't only incorporated in the announcements, but markets were also reacting positively to the higher liquidity as a result of the actions of the FED.[14] During the first phase of quantitative easing capital flowed from emerging market economies (EMEs) towards the US, inflating equity prices in the US, pushing yields of long term bonds there as well as in other economies lower and appreciating the dollar. In the second phase the opposite can be observed with capital flowing from the US economy towards the EMEs. Fratzscher et al. (2013) find that the actions of the FED led to an increase of 5% of the assets under management of funds investing in emerging market assets, in the period between 2007 and 2011. They argue that the amount is relatively low, compared to the total net capital increase of EMEs' funds of 25% in the same period. Therefore unconventional monetary policies by the Federal Reserve were not to such an extend responsible for the magnitude of the capital movements, but were, as Fratzscher et al. suggest, rather strengthening the ongoing effects in the emerging markets, causing larger swings in the capital movement. The additional demand for foreign assets has also put appreciation pressure on emerging market currencies, which worsened their competitive position. The additional liquidity in the EMEs is furthermore blamed for the formation of asset bubbles and overheating of the economy.[15]

In the middle of 2013 the Chairman of the FED Ben Bernanke hinted for the first time of possible unwinding of the quantitative easing program. This took markets by surprise and caused havoc worldwide, because this would have meant an end to the extremely loose monetary policy of the US, leading to an increase of interest rates globally. In the dawn of these events, many emerging countries such as Brazil, India and South Africa, saw capital outflows as a result of risk reassessments, leading to extreme currency depreciations, in some cases of up to 15-20% as well as stock market declines in similar magnitude. However, capital outflows weren't evenly distributed among all emerging economies, but were predominantly determined by macroeconomic fundamentals, such as current account deficit, level of indebtedness and economic growth. Kawai (2016) provides evidence that (during the taper tantrum) countries with "large current account deficits and high inflation" suffered higher currency depreciations compared to counties with strong fundamentals. This view is also supported by Eichengreen and Gupta (2015), which additionally find that countries experienced bigger outflows if they substantially increased their debt, during QE one and two, when credit was cheap. Some countries, also lost a big portion of their foreign reserves in attempts to protect their currency. Geordiadis (2015) also finds that the susceptibility of countries to spillovers was bidirectional with countries, which benefited the most from the quantitative easing, showing the strongest (negative) reactions to tapering talks.[18] Ultimately countries from around the world were blaming the US for the financial turmoil that it caused.[19]

However, the hypothesis that countries with sound macro fundamental experienced less capital outflows and currency depreciation faces also opposition. Eichengreen & Gupta (2015) find no empirical evidence in support of it, but rather attribute the size of the capital outflows to the properties of the country's financial market. Namely larger and more liquid financial markets were better candidates for portfolio rebalancing, compared to frontier markets, because they were associated with potentially lower losses when selling.[20]

Chen et. al. (2012) conclude that quantitative easing by the US stabilized the financial markets around the globe in the wake of the financial crisis by supporting the prices of assets such as equities, corporate bonds and government bonds. However, the spillover effects to foreign counties vary in the long run, in respect to the sign and the magnitude of the effect. This implies that the quantitative easing created a winner-looser situation, with emerging economies mostly carrying the burden. The implications for developed economies are more consistent across countries and can be summarized with higher equity prices as well as higher GDP growth and inflation, though the latter two effects are only half as strong as the effect of the expansionary monetary policy on the US economy. Furthermore credit growth in the developed economies is believed to have stayed within reasonable levels. On the other hand emerging economies show larger spillover effects, which can differ significantly across countries, depending on the "economic and financial structure, policy framework, and capital control and exchange rate regimes". Some of the more prominent negative externalities here are rapid credit expansion, inflationary pressure, and local currency appreciatiation.[21]

Pegging the exchange rate between an emerging market country currency and the dollar or introducing capital controls had negligible effect on preventing spillover effects and in some cases could even increase them. Fratzscher et al. find that the country risk was the driving force behind limiting capital movements. They suggest that the portfolio rebalancing that occurred as a result of QE is a "risk and a flight-to-safety phenomenon."[22]

Major developed and emerging economies nowadays try to cooperate their policies to negate possible adverse spillover effects. We see how in many countries monetary policy is used as a response to foreign policy measures. The world is globalized and no country can stay unaffected by policy changes by other central banks. Spillovers of foreign monetary policies is enormous today. We find evidence for that in many developed and emerging markets. In recent years Brazil claimed that their economy is severely damaged by the policy measures of developed countries. So nowadays coordination of monetary policy has become a prime agenda of many policy regulators and they actively try to cooperate with other central banks. We can ask ourselves why it became so important for the world economy. The answer is that no country, including the United States, should act alone without taking other countries into consideration with funds being as liquid and mobile as they are nowadays.

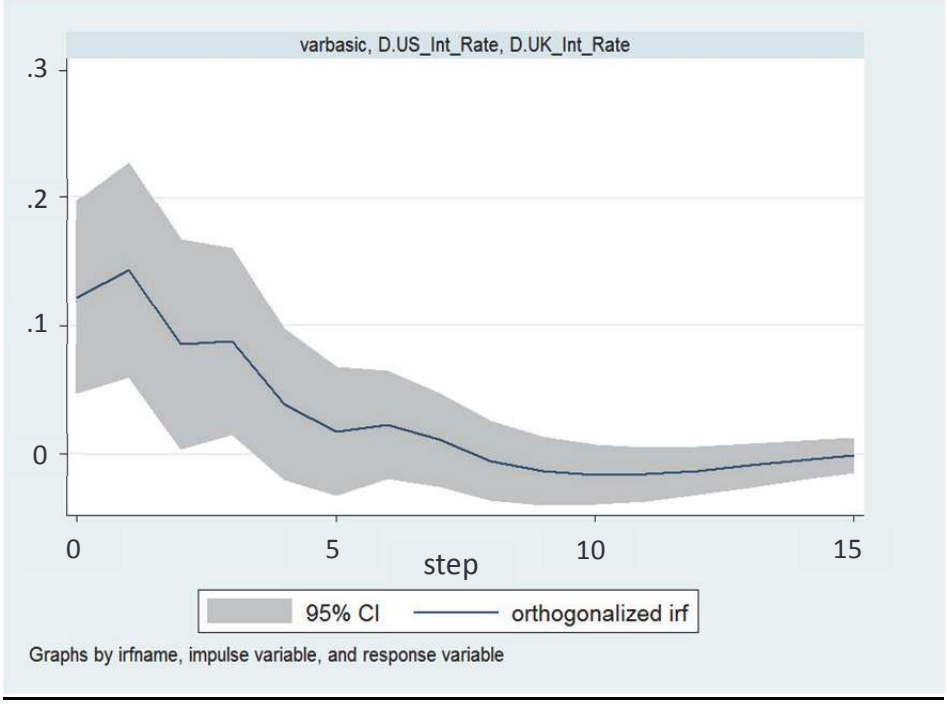
Empirical Analysis

By constructing a Vector Auto Regressive Model we tried to figure out how FED policy create enormous spillover effect on other economy. This VAR(2) consist of-

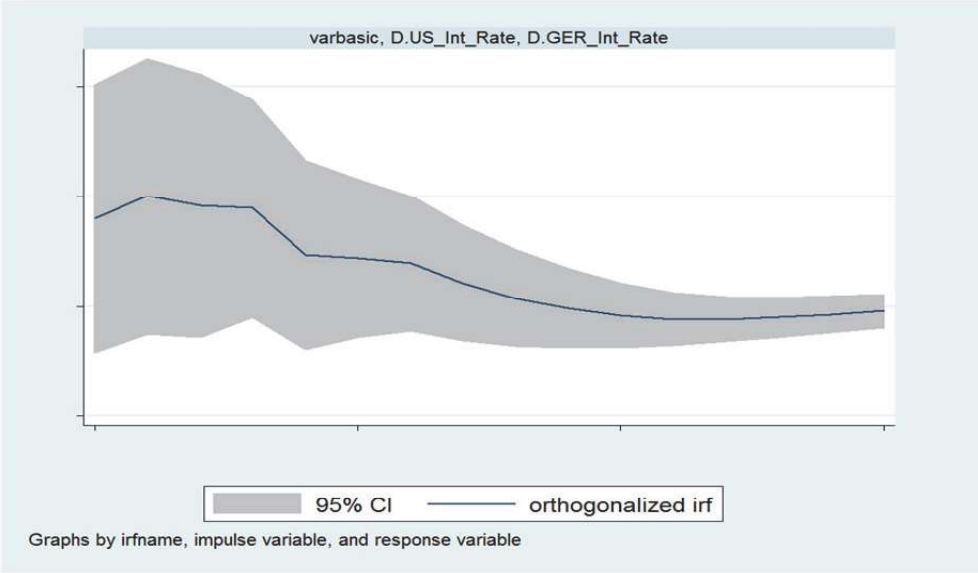
- Federal Funds Target Rate(FD)
- Bank of England Base Rate(FD)
- Short Term Euro Repo Rate(FD)
- World GDP growth
- MSCI AC world(return)
- Citigroup world Government Bind Index(return)

The data is collected for the period of 1988Q2- 2016Q2 and source of data is-“Quarterly data-DataStream)

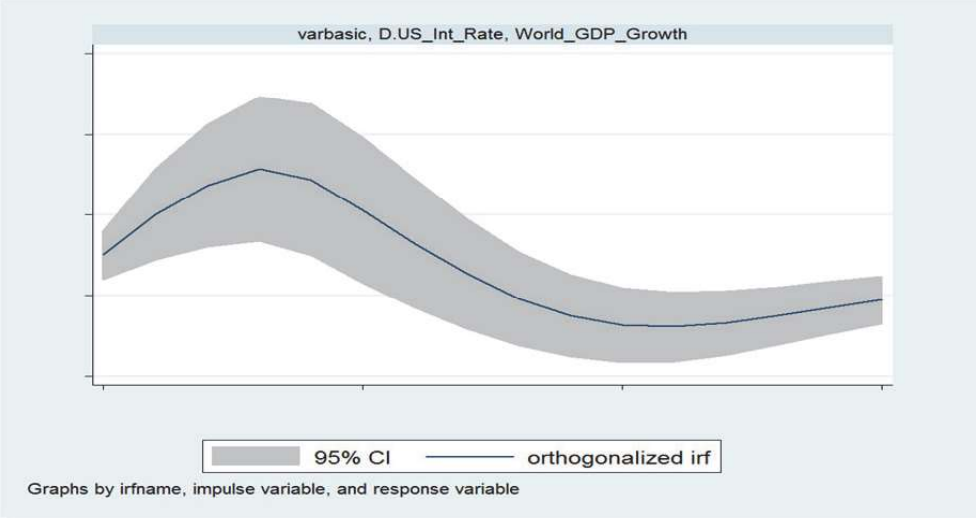
Orthogonalized Impulse Response Functions



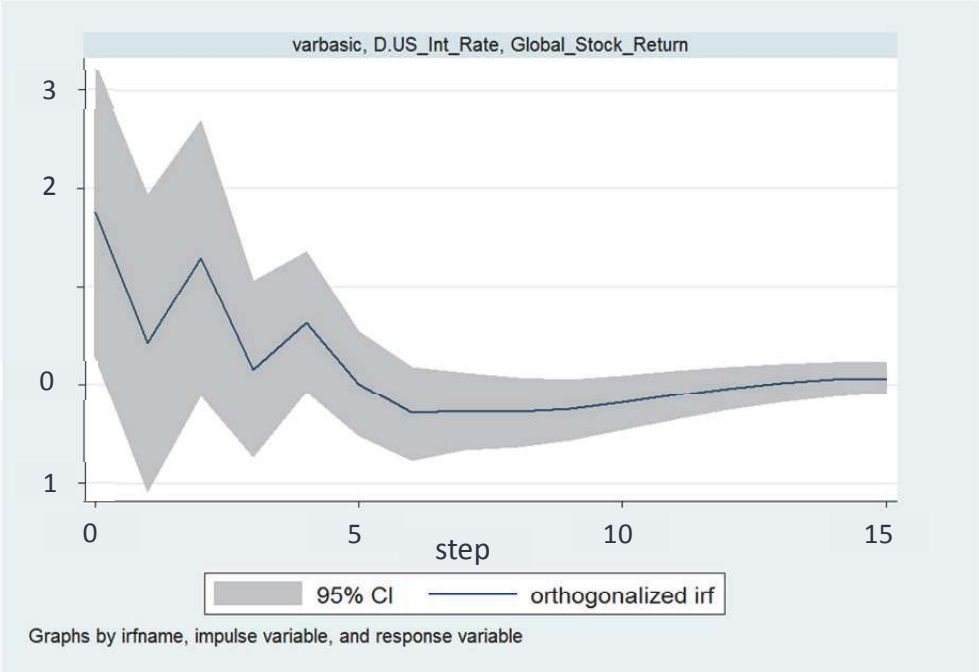
Impulse: Federal Funds Rate
Response: BoE Base Rate



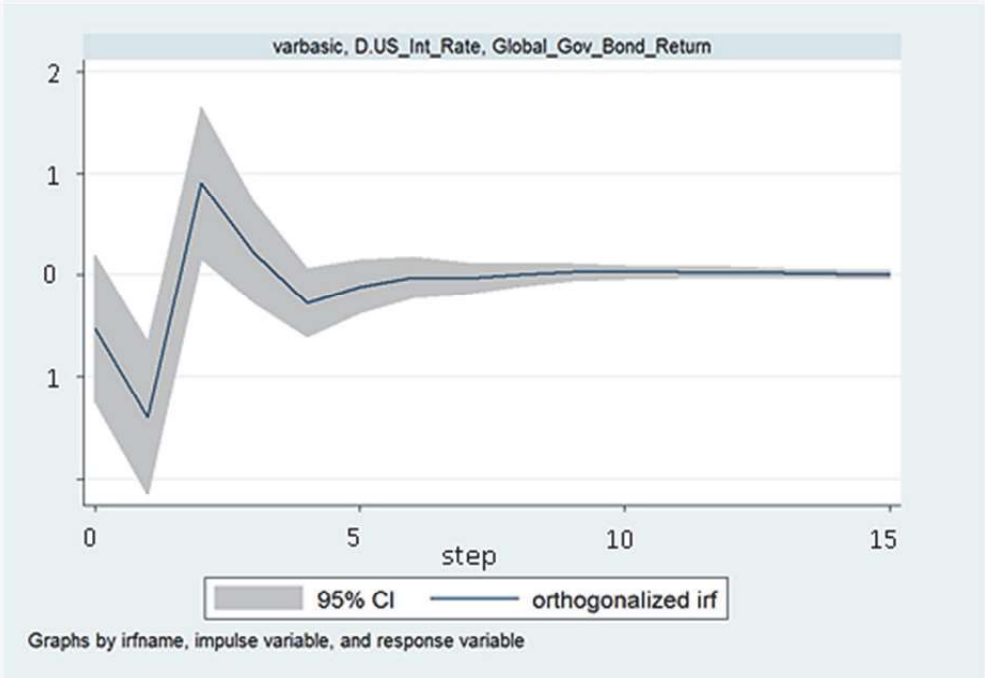
Impulse: Federal Funds Rate
Response: Euro Repo Rate



Impulse: Federal Funds Rate Response: World GDP Growth



Impulse: Federal Funds Rate
Response: MSCI AC World



Impulse: Federal Funds Rate
Response: Citigroup WGBI

Above Impulse response function showing how Federal funds rate affecting others decision making. The impact is enormous since no one can avoid it.

- **Empirical Model 2:**
  - VAR(1) consisting of government bond yields from 12 countries.
  - Weekly data (source: investing.com)
  - 2000 Dec – 2008 May (pre-QE)
  - 2008 Jun – 2015 Oct (QE)

SPILLOVER TABLE (PRE-QE)

	From							
To	US	Germany	UK	...	Philippines	Singapore	Taiwan	**Contribution from Others**
US	98,40	0,08	0,00		0,13	0,01	0,39	1,60
Germany	48,32	48,23	0,01		0,09	0,00	0,26	51,77
UK	44,18	31,38	21,08		0,01	0,01	0,76	78,93
France	45,65	43,88	0,08		0,05	0,02	0,31	92,77
Spain	51,98	24,36	0,02		0,12	0,07	0,26	77,92
Japan	10,64	4,42	0,20	...	0,11	0,63	0,24	16,76
Australia	41,39	8,84	1,45		0,10	0,19	0,86	55,55
India	3,20	1,01	0,52		0,43	0,01	0,32	6,43
Hong Kong	43,83	4,44	0,38		0,95	0,78	0,67	53,93
Philippines	2,61	0,55	0,11		91,35	0,22	0,06	8,65
Singapore	22,39	3,33	0,20		0,56	62,56	0,08	37,44
Taiwan	9,94	0,78	0,40		0,23	1,85	81,81	18,19
Contribution to Others	324,14	123,06	3,36	...	2,80	3,79	4,22	

Adapted from (Diebold & Yilmaz, 2009)

The result showing how economy is affecting by the spillover effect before QE era. Mostly France, Spain along with bigger economy like Germany, Australia was affected by the others.

SPILLOVER TABLE (QE)

	From							
To	US	Germany	UK	...	Philippines	Singapore	Taiwan	**Contribution from Others**
US	92,30	0,45	1,20		0,13	1,69	1,72	7,70
Germany	54,49	41,55	0,23		0,16	0,39	0,47	58,45
UK	56,43	10,70	28,74		0,10	1,10	0,51	71,26
France	34,25	26,56	0,21		0,30	0,40	0,51	68,57
Spain	1,55	1,30	0,10		1,31	0,43	0,55	8,41
Japan	30,31	2,28	0,22	...	0,06	0,69	0,14	37,22
Australia	44,87	2,66	0,42		0,10	1,29	0,79	53,64
India	4,43	1,31	0,18		0,26	0,11	0,29	14,85
Hong Kong	29,41	0,56	1,22		0,57	1,46	0,14	44,43
Philippines	2,38	0,06	1,90		91,95	0,12	0,01	8,05
Singapore	23,49	1,13	0,06		1,00	60,87	0,06	39,13
Taiwan	14,53	0,19	2,04		1,03	0,65	70,59	29,41
Contribution to Others	296,13	47,23	7,78	...	5,01	8,33	5,19	

The result is quite interesting. All economy in Eurozone heavily hammered by spillover effect during QE period. Outside Eurozone the impact is quite low (Ex: India and Philippines).

Comparison between pre-QE and QE

	From US	
To	pre-QE	QE
US	98.40	92.30
Germany	48.32	54.49
UK	44.18	56.43
France	45.65	34.25
Spain	51.98	1.55
Japan	10.64	30.31
Australia	41.39	44.87
India	3.20	4.43
Hong Kong	43.83	29.41
Philippines	2.61	2.38
Singapore	22.39	23.49
Taiwan	9.94	14.53
Contribution to Others	324.14	296.13

MONETARY COORDINATION

HISTORY OF MONETARY COORDINATION

In the 40s and 50s of the 20th century during the first Breton Woods system the Chicago School saw that there is no need to intervene in the foreign exchange market (and to fix the exchange rate) and there is also no need to coordinate monetary policies to stimulate domestic productivity and employment. It's rather sufficient to have a flexible exchange rate system. In the beginning of the 1970s the Bretton Wood system of fixed exchange rates was abandoned and a new first generation game theory model was introduced.[23]

But since most of the countries tried to become independent through international trade, the question arises, whether we should implement policies, which will be beneficial only for the home country or we should think for policies, which in coordination with others would be beneficial for all? Important here is whether countries can really gain from monetary policy coordination? This is a huge question and the debate is still ongoing. Many have argued that the gain from policy coordination is small compared to policies targeted only at the domestic economy.[24] Obstfeld and Rogoff (1995) have shown that the added benefit of monetary policy coordination is small in absolute terms. They have also shown that a policy, which tries to stabilize the domestic economy could also bring global macroeconomic stability. According to an empirically estimated multi nation monetary model central banks have several policy instruments with which they could sterilize any adverse spillover effects induced by the domestic policies of other central banks. The findings are, however, only true under flexible exchange rates, international capital mobility, no arbitrage on the term structure of interest rates, rational expectations, and price and wage rigidities. The model implies an effective rule based policy, which shows that if a respective central bank implements a policy to stabilize the home price and output then there would be little additional gain from

the central banks' jointly optimizing policies. This implication has helped to greatly improve conditions in the Great Moderation period of 1980s and 1990s compared to the 1970s. At the end of this period most emerging economies started following a rule based policy with a target of long run price stability. It is comparable to a Nash equilibrium where one country introduces a new monetary policy and others respond with the same policy so that the outcome is even better than the coordination one.[25]

This is of course not new. Several attempts in the past were made to coordinate monetary policies across countries. The Louvre and the Plaza accords from the 1980s are a classical example of international coordination. In the 1970s due to policies taken by the FED, under the Chairmanship of Paul Volcker, to fight stagflation, interest rates were increased and from there on, as a direct result from the Mundell Fleming model, the dollar kept appreciating. In that time it appreciated by almost 50% against the Japanese Yen, the Deutsche Mark, the French Franc and the British Pound. Due to the rise of the dollar and the lost competitiveness most American producers faced difficulties. The US trade balance has also fallen to a record low in 1985's showing a trade deficit of $122 billion. To prevent the excessive strength of the dollar an agreement was signed between US, Japan, Britain, Germany and France at the Plaza hotel in New York in September 1985, which became known as the Plaza accord. After the agreement the dollar depreciated by as much as 40% against other major currencies. In the following years, however, fears of a global recession aroused due to a now weaker dollar. In a response countries' officials decided that they have to prevent such a scenario from happening and as a result finance ministers and central bankers from around the world gathered in Paris and signed an agreement, which became known as the Louvre accord. This time Canada and Italy were also invited to sign the agreement, but due to disagreements with most of the measures Italy refused to. As a result France agreed to reduce its budget deficit by 1% of its GDP, Japan agreed to cut its interest rate, Britain undertook a loose monetary policy by keeping interest rate low and finally US also promised to reduce its fiscal deficit, reduce governmental spending and keep interest rates low. [26]

DEVELOPMENT OF MONETARY COORDINATION

After the end of Great Moderation period effectiveness of international monetary policy coordination became a major concern again.

After the fall of Lehman Brothers there was a new attempt, this time by the G20 countries, to coordinate their actions. In September 2008 Bank of Canada, Bank of England, the European Central Bank, the Bank of Japan and the Swiss National Bank along with the FED announced that they will undertake coordinated monetary actions to ease pressure from the US short term dollar credit market. FOMC authorized a $180 billion expansion of its temporary reciprocal currency arrangements (swap lines), which resulted in dollar funding of both term and overnight liquidity operations by the other central banks.2[7]

In October 2008 all G7 countries also came in an agreement for joint rate reduction to prevent the global financial crisis and to dampen the serious recession.[28] In a speech by the Fed chairman Ben Bernanke (2008) said:

"The current financial crisis and global economic slowdown likewise have been an occasion for unprecedented international policy coordination, within Europe but also globally. For example, in its regulatory capacity, the Federal Reserve has worked closely with regulators and supervisors from a number of European nations, and we are active participants in the international Financial Stability Forum and the standard-setting bodies operating under the aegis of the Bank for International Settlements. My focus today, however, will be cooperation in monetary policy and, especially, in the meeting of the liquidity needs of our increasingly globalized financial markets"[29]

QUESTIONS ABOUT COORDINATION

Many emerging economies complain that monetary policy coordination is initiated only when advanced economies experience financial turmoil. There really aren't that many examples of a global coordination taking place when emerging markets face a similar situation. In particular after the fall of the

Great Moderation regime many emerging economies were asking the US to think more about the impact of its monetary policy on other countries. This was the case because the actions of the FED severely hurt emerging economy at that time.

Japan also claimed that as a result of unconventional monetary policies in a response to the global recession of 2008 its exchange rate experienced a substantial appreciation, arguing that other countries declared a currency war to them. Between 2012 and 2013 the yen appreciated from 123 to 77 yen per dollar.[8] In a speech in September 2010 the Brazilian Finance minister Guido Mantega also said that the world is in the middle of a currency war, which threatens emerging economies, because it deteriorates their competitiveness.[30] The governor of Swedish Central Bank Ingves also stated in 2015 that the low interest rate policy by the ECB is hurting the Swedish economy by sending it in debt.

Some recent activities of some of the major central banks also created huge tensions in the global markets. For example, last December FED increased its funding rate by 0.25 basis points. After this decision some developed as well as emerging economies started to feel upward pressure on their target interest rate. The Euro area, which was experiencing zero interest rate up until recently started to feel pressure to provide future guidance as a result of FED's decision. Similarly "ECB policy has also generated spillovers particularly on neighboring economies such as Denmark or Switzerland". [31]

All of this events brought new agenda on the table to create a better coordination among the cross country borders, which would be less disruptive for capital flows. We see that there has been some chaos going on. Recent tension between Chinese and Japanese policymakers, pushed other G20 nations to take some initiative in monetary policy coordination.[32]

But concern is whether it is actually possible to create any type of coordination in modern era or would it work well? Sutherland (2002) argues that some gain is possible if there is risk sharing and if the elasticity of substitution between countries is greater than one, otherwise there would be small to no gain. In reality, however, countries are not willing to share the risk and because of that we almost never observe any effective monetary policy coordination.[33]

Cœure (2015) pointed out some actual difficulties about coordination. He listed two factors, which make the implementation of explicit or formalized forms of coordination difficult – the political aspect of coordination and the model and parameter uncertainty.[34]

Ostry & Gosh (2013) pointed out three reason responsible for the failure of monetary policy coordination. To begin with, central banks do not consider trade-offs in regard to their goals. Furthermore, they often disagree on the current economic situation as well as the spillover effects that their policies might create. Finally, countries vary size, which may result in smaller countries that would suffer from coordinated monetary policy, not taking part in the coordination process.[35]

We can look back at two recent failures of monetary policy coordination. The first one is the formation of Multilateral consolation on global imbalance. It was established in the mid October of the 2000 to reduce global financial imbalance by maintaining the robust global growth. The goal was to take some action oriented program, which could reduce global imbalances. The multilateral brought some action on the table, but at the end failed, with participants blaming each other.

The second failure happened when it was suggested to the IMF by the G20 countries to undertake a mutual assessment of the policies. Each member country was required to submit a list with policy measures that it could implement, which after being put under discussion, had to be adopted. But in reality the advanced economies made little effort to adjust their policy framework which resulted in discoordination.[36]

However some recent development regarding G20 nations and emerging economies brought some hope to the global scene. We see some recent development in G20 meetings and some of the big countries declaring that they won't directly intervene in the foreign exchange market and they want a fair coordination.

CONCLUSION

There are four main channels, through which domestic monetary policies may impact foreign countries - the exchange rate, the domestic demand, the financial spillover and the signaling channel. Irrespective of the monetary policy, the sign of the resulting spillover effect could be either positive or negative. This comes from the fact that not all channels move foreign economic indicators in the same direction. However, in the short run spillover effects could be dampened or intensified, depending on the pricing of the goods and the rationality of the market participants. Yet, in the long term markets adjust to the new equilibrium, induced by the policy change.

Empirical evidence shows that developed and emerging markets react with a different intensity to monetary policy shocks abroad. The reaction of individual countries also depends on various economic factors. These include the level of integration and the size of the financial market, the exchange rate regime, the trade activity and the indebtedness of the country. In general, however, domestic and foreign markets react in a similar fashion to a domestic monetary innovation.

Furthermore, it is widely assumed that the actions that the Federal Reserve took in a response to the global financial crisis of 2008 had a stabilizing effect for the global economy. The implications for the global economy were higher equity prices, lower bond yields and higher GDP growth. On the other hand QE led to a worldwide credit expansion and caused some countries to overheat in the process. Premature tapering talks have also increased the volatility in the markets.

Due to the negative spillover effects that monetary shocks can have on other economies as well as the increased effectiveness of coordinated actions of central banks, global policymakers have called multiple times for monetary policy coordination. However many of the attempts in the past ended without achieving the desired goal or with some even ending in the dialogue stage. As a result studies have started casting doubt on the real benefits of monetary coordination and have suggested that an outcome, similar to the outcome of monetary coordination, could be achieved if each country is maximizing its individual welfare.

Some of the reasons why monetary coordination has been mostly unsuccessful so far are model and parameter uncertainty. More specifically there is usually no wide agreement on the specific effects that a possible monetary coordination might have on individual economies as well as the measures that each country should take to achieve the set goals. Countries in general are also not willing to make trade-offs or share the burden of others and are rather more interested in their own wellbeing. Finally, due to size differences, countries that may be affected the most by a (coordinated) monetary policy do not have a say in the process.

ENDNOTES

1. See Ammer et al. (2016).
2. See Georgiadis (2015), pp. 1, 2, 6 and Ammer et al. (2016).
3. See Wongswan (2009), pp. 346, 347, 349.
4. See Di Giovanni & Shambaugh (2008), pp. 342, 347, 356.
5. See Ammer et al. (2016).
6. See Ammer et al. (2016).
7. See Ammer et al. (2016) and Lavigne et al. (2014), p. 25.
8. See Kawai (2016), p. 142.
9. See Dornbusch (1976), pp. 1161-1162.
10. See Board of Governors of the Federal Reserve System (2008).
11. See Fratzscher et al. (2013), p. 4.
12. See Board of Governors of the Federal Reserve System (2010).
13. See Board of Governors of the Federal Reserve System (2012a).
14. See Fratzscher et al. (2013), p. 6.

15. See Fratzscher et al. (2013), pp. 4-6.
16. See Kawai (2016), p. 148.
17. See Eichengreen & Gupta (2015), p. 2.
18. See Georgiadis (2015), pp. 1, 6.
19. See Kawai (2016), p. 146 and Lavigne et al. (2014), pp. 28-29.
20. See Eichengreen & Gupta (2015), p. 2.
21. See Chen et al. (2012), p. 233.
22. See Fratzscher et al. (2013), pp. 6-7.
23. See Canzoneri, Cumby & Diba (2004), pp. 364.
24. See Taylor (2013).
25. See Obstfeld & Rogoff (1995).
26. See Leachman & Francis (1995), pp. 552-555.
27. See Board of Governors of the Federal Reserve System (2012b).
28. See Frankel (2015).
29. See Bernanke (2008).
30. See B. Eichengreen (2013), p. 1.
31. See Cœuré (2015), p. 1.
32. See Cœuré (2015), p. 1.
33. See Sutherland (2002), p. 5.
34. See Cœuré (2015), p. 3.
35. See Ostry & Gosh (2013), p. 2.
36. See Ostry & Gosh (2013), p. 14.

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