Trakya Üniversitesi İktisadi ve İdari Bilimler Fakültesi E-Dergi
Aralık 2014 Cilt 3 Sayı 2 (89-107)

EFFECTS OF US QUANTITATIVE EASING ON CAPITAL FLOWS TO EMERGING MARKET ECONOMIES

Mesut TÜRKAY*

ABSTRACT

As a response to the latest global economic crisis, advanced country central banks started to implement expansionary monetary policies. In this way, they supported the recovery but at the same time injected abundant amount of cheap liquidity into the world financial system. The result was the surge in capital flows to emerging market (EM) economies. Academic literature shows that ultra loose moneteary policies of US Central Bank in the post crisis period increased capital flows into emerging market countries.

Monetary policy normalization process of US that has already started is expected to affect capital flows to emerging markets. Studies indicate that withdrawal of unconventional monetary policies will lower capital flows to EM's. In this period, managing expectations through forward quidance is expecially important. In addition, EM policy makers should be aware of declining global liquidity and be cautious in implementing their policies. As abundant and cheap money will gradually dissepear, they should take structural reforms to the forefront of their agendas.

Keywords: Expansionary Monetary Policy, Capital Flows, Global Liquidity
JEL Codes: E52, E58

* Senior Treasury Expert, Directorate General of Economic Reseach, Republic of Turkey Prime Ministry Undersecretariat of Treasury, mesut.turkay@hazine.gov.tr

Trakya Üniversitesi İktisadi ve İdari Bilimler Fakültesi E-Dergi
Aralık 2014 Cilt 3 Sayı 2 (89-107)

ABD'DE UYGULANAN NİCELİKSEL GENİŞLEME POLİTİKASININ GELİŞMEKTE OLAN ÜLKELERE YÖNELİK SERMAYE AKIMLARINA ETKİSİ

ÖZET

Gelişmiş ülke merkez bankaları, son küresel krize karşılık olarak genişletici para politikaları uygulamaya başlamışlardır. Bu şekilde toparlanmaya destek verirken aynı zamanda dünya finansal sistemine bol miktarda ucuz likidite vermişlerdir. Sonuç olarak, gelişmekte olan ülkelere yönelik sermaye akımlarında artış gerçekleşmiştir. Akademik literatür, ABD Merkez Bankası'nın kriz sonrası dönemde uyguladığı aşırı gevşek para politikasının gelişmekte olan ülkelere yönelik sermaye akımlarını arttırdığını göstermektedir.

ABD'de hali hazırda başlamış olan para politikasının normalleşme sürecinin gelişmekte olan ülkelere yönelik sermaye akımlarını etkilemesi beklenmektedir. Yapılan çalışmalar geleneksel olmayan para politikalarının geri çekilmesinin gelişmekte olan ülkelere yönelik sermaye akımlarını azaltacağını göstermektedir. Bu dönemde, özellikle geleceğe yönelik beklenti yönetimi büyük önem arz etmektedir. Ayrıca, gelişmekte olan ülkelerdeki politika yapıcıların azalan küresel likiditenin farkında olmaları ve politika uygularken ihtiyatlı olmaları gerekmektedir. Bol ve ucuz paranın kademeli olarak azalacak olması nedeniyle politika yapıcıların yapısal reformları ajandalarının ön sıralarına almaları faydalı olacaktır.

Anahtar Kelimeler: Genişletici Para Politikası, Sermaye Akımları, Küresel Likidite
JEL Kodları: E52, E58

Introduction

As a response to the 2007-08 global financial crisis, central banks around the globe implemented unprecedented policies to combat the crisis and support recovery. Their first action was to lower interest rates to almost zero and inject liquidity to the financial system. Afterwards, they started to implement non-conventional policies such as quantitative easing. Among the central banks around the world, Federal Reserve (FED) was very active in this process and they announced three rounds of asset purchases that totaled over $3 trillion. The purpose of these programs was to lower long term interest rates, bolster weak asset markets and encourage spending to stimulate economic activity. They have been partially succesfull in supporting domestic economy.

Whereas the central bank's primary aim was to help the recovery of their own economies, quantitative easing policies also had some unintentional effects on the other economies. This extended period of highly accommodative monetary policies in advanced countries created an abundant amount of international liquidity around the world. Part of this excess liquidity flowed into emerging market economies and this had some negative effects on these countries exchange rate, current account deficit, inflation and competitiveness. Increasing capital flows to emerging market economies as a result of quantitative easing policies of Federal Reserve (FED) produced a credit driven fast growth in these countries. Moreover, financial risks accumulated and structural reform appetite of EM countries diminished due to high growth period.

Implementing quantitative easing policies is the easy part but exit from these expansionary policies is a rocky way. With the tapering talk of Federal Reserve starting in May 2013, volatility became the new normal for financial markets. Countries especially relying on external funding seem to be the most vulnerable in this period. Expected continuation of monetary policy normalization in US poses risks on EM countries.

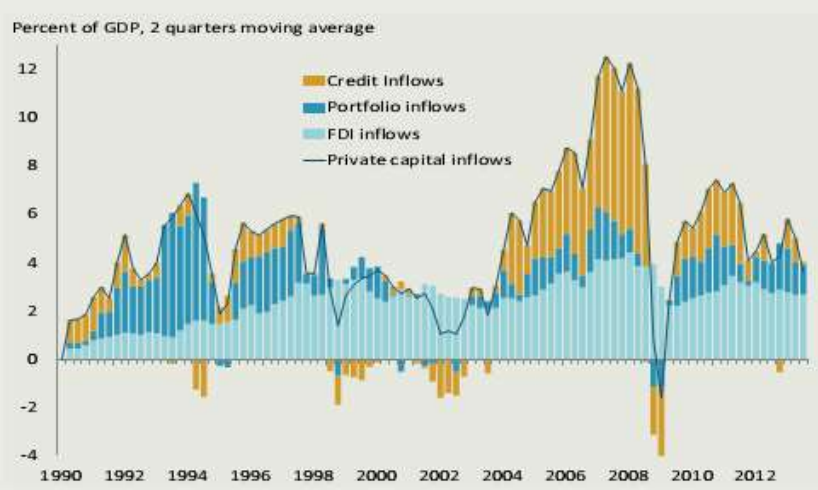
This study aims to analyze the effects of quantitative easing policies and monetary policy normalization in US on emerging market capital flows

in particular. The paper is divided into 6 sections. Section 2 presents some stylized facts about capital flows to emerging markets. Section 3 contains transmission channels of unconventional monetary policy. Section 4 provides a short literature survey on the effects of US quantitative easing on emerging market capital flows. Section 5 describes the effects of FED tapering and expected interest rate hikes on capital flows to emerging markets. Finally, section 6 presents the main conclusions.

1. Some Stylized Facts About Capital Flows to Emerging Markets

Graph 1 shows private capital flows to developing countries. In the 1990's, private capital inflows to developing countries amounted to 4 percent of their GDP on average. During the 2000's, capital flows surged considerably. Before the Great Recession, inflows peaked at about 12 percent of developing country GDP in 2007. With the global crisis, capital flows into emerging markets collapsed and became negative at the end of 2008 and in the beginning of 2009. They again increased in the post crisis period and averaged about 6 percent of GDP between 2010 and 2013 (Worldbank, 2014: 96).

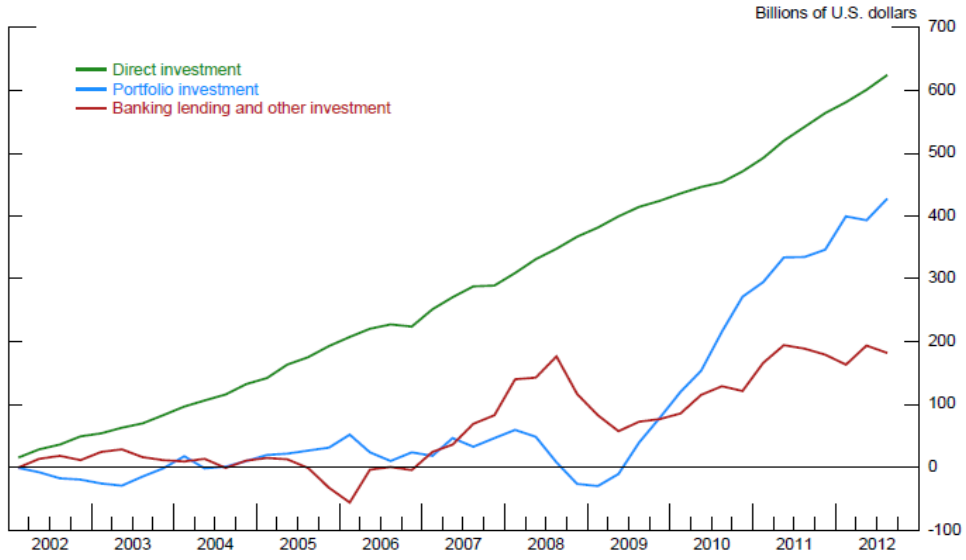
Graph 1. Private Capital Inflows to Developing Countries



Source: Worldbank, 2014: 96

Among the components of capital inflows, foreign direct investment (FDI) was the most stable one. While credit was the driving force of capital inflows before Great Recession, it lost pace after the crisis. Bank lending has weakened after the crisis mainly because of ongoing deleveraging and balance sheet adjustment process of banks in developed countries. On the other hand, portfolio inflows surged. Graph 2 shows cumulative net inflows to emerging market economies. It clearly indicates that post-crisis increase is concentrated in portfolio inflows.

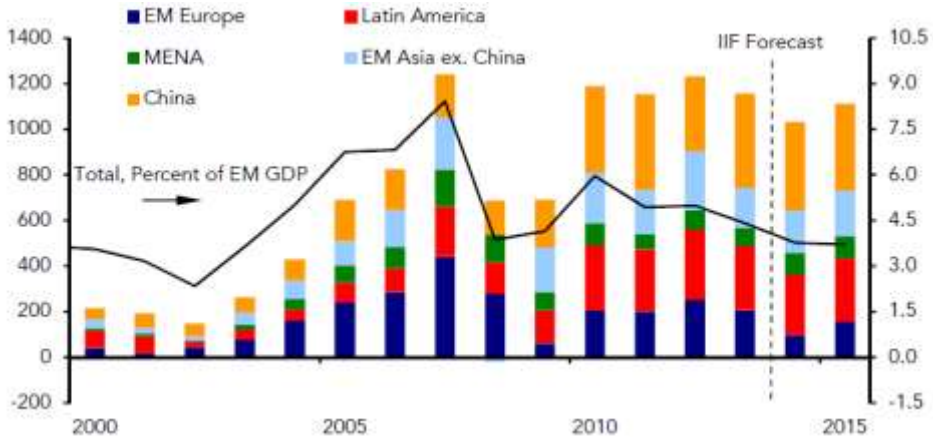
Graph 2. Cumulative Net Inflows to EM Countries



Source: Ahmed and Zlade, 2013: 31

Graph 3 reveals capital inflows in terms of regions. Capital inflows to Emerging Europe surged before the crisis which is mainly in the form of bank lending. In the post crisis period, capital inflows to Latin America and China soared considerably. According to Institute of International Finance (IIF), capital inflows to EM countries is expected to decline in 2014 compared to 2013 and recover in 2015 (IIF, 2014a: 2).

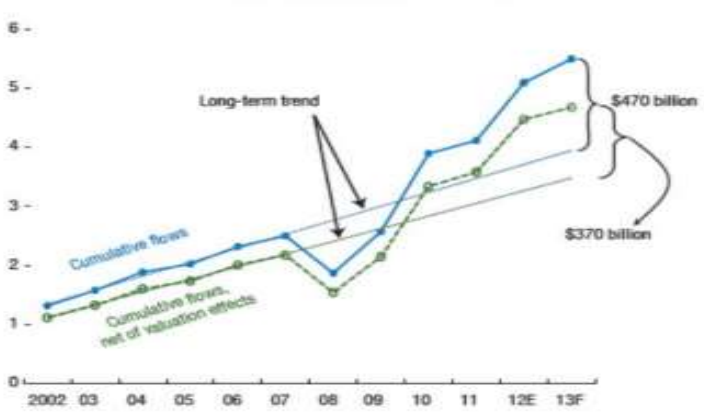
Graph 3. Emerging Market Net Private Capital Inflows ($, Billions)



Source: IIF, 2014: 1

Since the end of 2008, extra loose monetary policies of Federal Reserve and other major advanced country central banks have resulted in excessive amount of capital inflows into the emerging markets. Foreign portfolio investment in emerging market country bonds has risen by a cumulative US$ 1.1 trillion through 2013. These inflows have averaged more than 2 percentage points of recipient country GDP in the last four years. Additionaly, cumulative inflows exceeded long term trend by US$470 billions (Lachman, 2014: 5)

Graph 4. Emerging Market Net Private Capital Inflows ($ Billion)



Source: Lackman, 2014: 5

2. Transmission Channels of Unconventional Monetary Policy

Traditional monetary policy transmission channels include interest rate, asset prices (exchange rates, equity prices) and credit channel (bank lending, balance sheet mechanism) (Mishkin, 1996: 2-17). However, when these channels are ineffective or weak, as it was the case in the period after the latest global crisis, unconventional monetary policies are widely used.

Unconventional monetary policy operates mainly through four channels. First channel is the portfolio balance channel. With quantitative easing (QE) investors substitute long-duration assets for safe long-term government bonds. As a result, stock of risky assets available for investment declines and increasing risk appetite of the investors boosts demand for risky assets (Gagnon et. al. 2011: 6). That is why quantitative easing policies generally increase equity prices.

Second channel of unconventional monetary policy is signaling. Quantitative easing is seen as a signal and commitment that interest rates will be kept low in the coming period and this in turn also lowers long run interest rates through expectations component (Bauer and Rudebush, 2013: 8). This channel also helps to decrease deflation risk and boosts consumer and busi-

ness confidence (Hendrickson and Beckworth, 2013: 2). In addition, asset purchases may also mitigate economic uncertainty.

Another important transmission channel of unconventional monetary policy is the liquidity channel. With asset purchases of central banks, reserves of the banking system increase and liquidity position of banks improve. This decreases liquidity premium, supports lending and also increases demand for assets. As a result, interest rates decline, bank loans and asset prices increase (Joyce et. al. 2011: 116; Krishnamurthy and Vissing-Jorgensen 2011: 5).

Fourth channel through which unconventional monetary policies may affect the economy is the confidence channel. Announcement of a quantitative easing program means that economic activity is weak and this starts flight to safety (Neely, 2013: 24). It also increases confidence of the economic agents by showing that central bank acts to support the recovery and is always ready to serve as the lender of the last resort. In addition, it is also a sign that central bank will do whatever needed for the economy.

These four transmission channels usually operate at the same time. Which channel will dominate depends on the state of the economy, external economic developments and communication policies of the central bank. As it was in May 2013, FED announcements are usually more important than the action itself and may have more effect on financial markets (Fratzscher et. al., 2013: 6). On the other hand, these channels not always operate to affect the economy positively. Sometimes, they may create adverse economic consequences and harm the economic activity.

3. Effects of US Quantitative Easing on Emerging Market Capital Flows: Literature Survey

Since US is the world's largest economy and have the most important reserve currency, policies of US Central Bank (Federal Reserve) will affect the other counries through many channels such as trade, capital flows, financial conditions and confidence (Subramanian, 2014: 1). The literature shows that quantitative easing policies of US so far supported both the local economy and the global economy. However, they also created some adverse

economic conditions, increased volatility in global financial markets and complicated macroeconomic management.

Although the debate about the impact of advanced countries unconventional monetary policies on emerging market capital flows intensified in the last couple of years, there have been only a few empirical studies focusing on this channel. Most of the studies analyse the effects of monetary expansion/contraction on the capital flows to emerging market economies by only using interest rates. Moreover, many of these studies do not cover the post crisis period when unconventional monetary policies are implemented by major advanced country central banks.

Among these studies explaining the effects of monetary policy on the capital flows to emerging market economies, IMF (2007: 85) put forward that capital flows to emerging countries increase by 0.1 percent of GDP when interest rate differential with advanced countries goes up by 1 percent. In another study, IMF (2010: 18) concluded that global liquidity affects portfolio equity investment but does not have any significant effect on bond investment. IMF (2011a: 17) analyzed the effect of rising US 10 years treasury yield on capital flows to emerging markets. The results show that 100 basis points increase in US 10 years treasury rate reduces bond inflows to EM countries about 31 percent. IMF (2011b: 129) showed that capital flows to countries which have more financial exposure to US are affected more by US monetary policy actions. In addition, monetary policy of US affects bond flows more than equity flows. Byrne and Fiess (2011: 14-15) found that US interest rates have an important effect on capital flows to EM countries. Ghosh et. al. (2012: 14-15) try to determine the factors that increase capital flows to EM countries and show that low US interest rates, high risk appetite and attractiveness of the EM countries (pull factors) are particularly important. Fratzscher (2012: 353) argues that the drivers of capital flows depend on the time period under study. He found that global factors (push factors) were significant during the crisis and country specific factors (pull factors) were significant afterwards. Contrary to many other studies, Forbes and Warnock (2012: 248) found that interest rates and global liquidity do not affect capital flows to EM countries but risk appetite is a significant factor.

On the other hand, there are a few recent studies concerning the effect of unconventional monetary policies on emerging market capital flows. Among them, Fratzscher et al. (2012: 24), found out that expanding balance sheet of Federal Reserve increases capital flows to EM funds and also showed that the effect of unconventional monetary policy is smaller than the other factors. According to Ahmed and Zlade (2013: 24), unconventional monetary policies of US have no significant effect on capital flows to EM countries. Nevertheless, they found evidence that with these policies, composition of capital flows changed towards short term portfolio flows. Fratzscher et al. (2013: 5-6) analyzed the effects of first quantitative easing (QE1) and second quantitative easing (QE2) implemented in US. They argue that first quantitative easing was effective to lower long term global bond yields and supported equity prices. But it also caused investors to rebalance their portfolios by selling EM assets and buying US assets. As a result, US dollar appreciated. On the other hand, second quantitative easing program was ineffective to lower global bond yields, increased capital flows to EM countries and led to US dolar depreciation. They conclude that earlier quantitative easing programs were more effective showing that marginal benefits of the programs deteriorated and this is in line with the existing literature (Curdia & Ferrero 2013: 1; Krishnamurthy & Vissing-Jorgensen 2013: 2-3).

Most recently, Lim et al. (2014: 3) employed panel regression to find out the effect of quantitative easing on the capital flows to emerging market economies. They estimate the minimum effect of quantitative easing on EM country gross inflow to be about 3 percent of GDP on average. Using panel regression method, Worldbank (2014: 100) analyzed global and domestic determinants of capital inflows. They found that both domestic and global factors determine capital inflows to EM countries. According to the analysis, global factors such as US interest rates, risk appetite and quantitative easing account for about 60 percent of the surge in capital flows between 2009 and 2013. The remaining 40 percent is explained with domestic factors like countries investment rating, their growth rate and growth differential with advanced countries. They also tried to estimate the effect of quantitative easing programs on capital flows by introducing a dummy variable and found out that about 13 percent of the total variation in capital flows in this period is

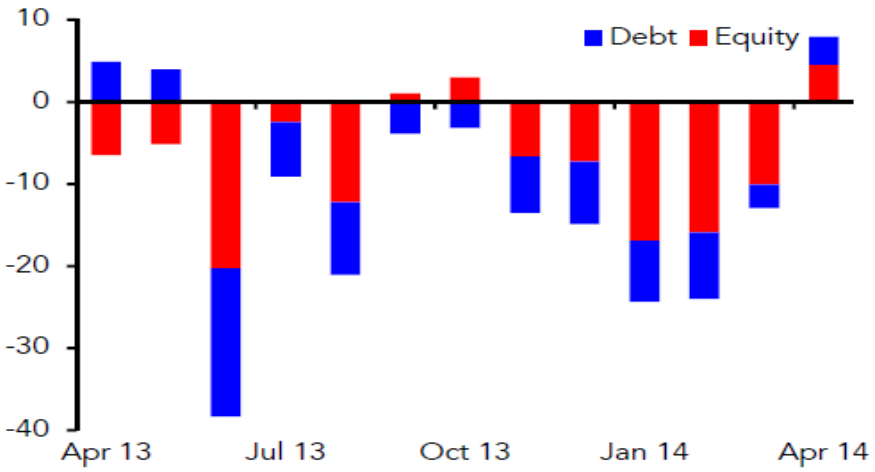
explained by quantitative easing. That means QE programs increased capital flows to EM countries. As another exercise, 3 seperate quantitative easing dummies are added to the model to find the effects of different quantitative easing programs. The results show that the impact of the first quantitative easing is the largest and it declines in the second and third programs. The last program (QE3) is found to be statistically insignificant.

4. Effects of US Monetary Policy Normalization on Capital Flows

In May 2013, Federal Reserve ex-governor Ben Bernanke told in a speech that tapering of the asset purchase program may start soon. This was an important turning point for US monetary policy and altered pricing in financial markets. In this period, global investors decreased their emerging market exposure and flight to quality started. Bond issuance and syndicated loans in emerging markets declined by about 50 percent. Capital outflows from EM financial markets put pressure on equities, interest rates and exchange rates (Worldbank, 2014: 98). Therefore, the experience in summer 2013 shows that expectations about the monetary policy matters and when it changes, capital flows may be affected significantly (Koepke, 2013: 2).

Changing FED policy expectations also increased tension and volatility in financial markets and risk appetite towards EM assets declined considerably. In the period between May and September in 2013, debt and equity net outflow from EM countries was about 73 billion dollars. The amount of debt and equity outlows were about the same. Capital outflows from EM debt and equity funds continued after Federal Reserve started tapering asset purchase program in December 2013. However, there has been a recovery in portfolio flows to EM countries most recently (Graph 5).

Graph 5. Emerging Market Funds: Debt and Equity Net Flows ($ Billions)

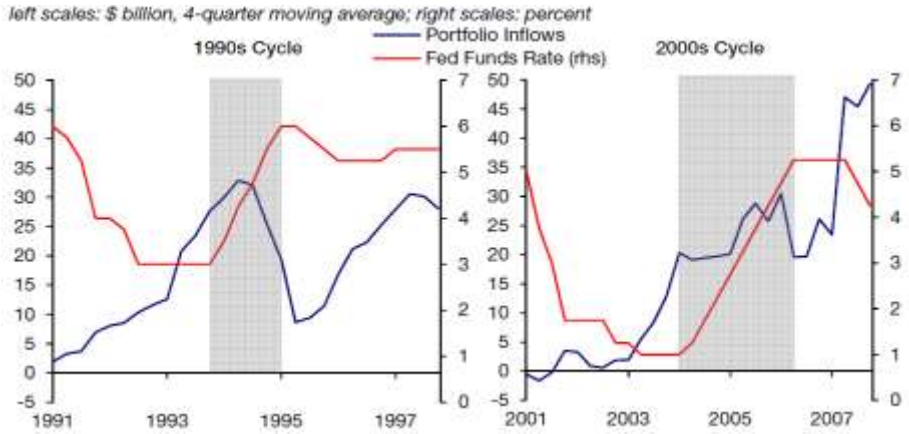


Source: IIF, 2014: 1

An important question going forward is how will capital flows to emerging market economies be affected when Federal Reserve finishes third quantitative easing program and begins to increase interest rates thereafter. There are two opposing forces. On the one hand, increasing interest rates in US means the country will be more attractive for international investors and external financing conditions will be tighter for EM countries. On the other hand, higher US interest rates also mean that there is a strong economic recovery and this in turn supports confidence and growth in other countries. As a consequence, improving global economy will push capital flows to EM countries (Koepke, 2013: 2). Whether monetary policy normalization in US leads to a declining or increasing capital flows to EM depends on the magnitute of these two opposite forces.

Historical evidence is also not conclusive (Graph 6). Capital flows to EM countries were strong when FED interest rate hikes started in February 1994. However, they started to decline with Mexico's tequila crisis. In the period before great recession, there was a positive correlation between FED interest rate and capital flows to emerging markets. Interest rate increases did not affect capital flows to EM adversely.

Graph 6. Portfolio Equity and Bond InFlows to EM During FED Tightening Cycles



Source: Koepke, 2013: 1

There are a few recent empirical studies that present evidence about the effect of FED policy normalization on the capital flows to EM countries. Among them, Koepke (2013: 5) using a regression model, analyzes the impact of FED policies on portfolio inflows to emerging markets. Model results show that the effect of FED policies depends on the pace of exit compared to market expectations. If FED exit is faster than the expectations, the influence on the markets will be more pronounced and there will be capital outflows from emerging markets. On the other hand, a slow FED exit supports capital flows to EM's.

With monetary policy normalization of Federal Reserve, it is expected that capital flows to EM countries will probably decline and there will be a new equilibrium. Worldbank (2014) made a simulation based on panel regression model to analyse the effects of monetary policy normalization on capital flows to emerging market economies. Model results show that, in a gradual normalization of monetary policy scenario, capital flows to emerging markets will fall by about 10 percent by 2016 compared to a no change scenario. This corresponds to 0.6 percent of developing country GDP. In a fast normalization scenario, the effect is more pronounced. The study also

finds that portfolio flows are more volatile and sensitive to FED monetary policy normalization compared to other components of capital flows. According to gradual monetary normalization scenario, portfolio flows are forecasted to decrease by about 33 percent in the first year.

When market participants expect a more expansionary monetary policy, investors are known to allocate more capital to emerging markets (and vice versa). Koepke (2014: 2) has found that US monetary policy expectations is a significant determinant of portfolio flows into emerging markets. The model results show that when markets expectations of FED funds rate change by 1 percentage point, the impact on bond flows to emerging markets is $6-7 billions and $1.2-6.5 billion on equity flows. In the current business cycle, we observed that changing expectations towards tight monetary policy affected capital flows more than the period of easy monetary policies. The model coefficient is 2 times as large for months when expected policy rates increase compared to months when they declined.

Communication is crucial to manage the effects of monetary policy normalization on markets. Exiting too early, too fast and without clear criteria, can be risky since outlook can always change. Tying the pace and timing of monetary normalization to economic and market conditions is beneficial (IMF, 2013: 24). Forward guidance is another component of monetary policy that has gained importance in the last couple of years. Clear forward guidance is useful to manage market expectations of Federal Fund rates. When market expectations are formed and anchored through forward guidance and communication policies, monetary normalization process may be less annoying. This is exactly what happened since the beginning of 2014. Forward guidance and improved communication policies of FED helped markets to price tapering process smoothly. Since market expectations are formed such that tapering process will continue and rate hikes will follow in 2015, volatility in financial markets declined. Therefore, it is of utmost importance to manage expectations.

Table 1. Timing and Pace of FED Exit - Risk Structure

Timing / Pace	Too Early	Neither Early Nor Late	Too Late
Very Slowly	Moderate Risk	Moderate Risk	High Risk
Moderate Pace	High Risk	Low Risk	High Risk
Very Fast	High Risk	High Risk	High Risk

The key challenge for the Federal Reserve is to find the right balance in the timing and pace at which it exits quantitative easing. Table 1 shows the risk levels in different FED exit scenarios. Too early or too fast of FED exit may increase volatility in global financial markets and create risks of strong capital flow reversal which could prove to be disruptive to the global economy. On the other hand, too late or very slow pace of exit could further contribute to financial risks and asset price booms. Therefore, FED exit should be somewhere in the middle. Neither early nor late, neither very slowly nor very fast.

5. Conclusion

As the literature shows, the unconventional monetary policies implemented by advanced country central banks in the post-crisis period increased capital flows to emerging markets and lowered financing costs. As a consequence, asset prices surged considerably and EM countries growth rates picked up supported by massive amount of cheap external funding. This was only one side of the story. On the other side, increasing capital flows as a result of quantitative easing programs caused some problems in EM countries such as the loss of competitiveness, inflation pressures and accumulation of financial risks.

Expansionary monetary policies and quantititave easing programs can not continue forever. In May 2013, we first withnessed the announcement of Federal Reserve that the asset purchase program might be reduced soon and the start of tapering was announced in December 2013. The capital outflows from EM countries in the summer months of 2013 was a signal showing the bumpy path towards monetary policy normalization. Most recent studies

indicate that capital outflows from EM countries is expected as Federal Reserve withdraws expansionary monetary policy. Monetary normalization process that has already started is expected to increase external funding costs of emerging markets and lead to tighter global financial conditions. This new period will create challenges and may increase risks in emerging market economies.

In this period, especially actions and communication policies of Federal Reserve are very important for less volatile and stable capital flows. Timing and the speed of the exit is perhaps the most important factor that must be taken into consideration. Too early, too late, very slow or very fast exit may create problems or even may cause a new crisis. Monetary policy normalization should be a function of economic activity and withdrawal should be stopped or reversed if economic conditions deteriorate.

Forward guidance is another crucial factor for a smooth exit. It may help to prevent adverse effects of the exit on emerging markets. On the other hand, EM policy makers should be aware of declining global liquidity and be cautious in implementing their policies. As abundant and cheap money will gradually dissepear, they should take structural reforms to the forefront of their agendas.

REFERENCES

Ahmed, S. and A. Zlate, "Capital Flows to Emerging Market Economies: A Brave New World?", International Finance Discussion Papers 1081, Board of Governors of the Federal Reserve System, Washington DC, 2013.

Barosso, J. B., Silva, L. P. and A. S. Sales, "Quantitative Easing and Related Capital Flows into Brazil: Measuring Its Effects and Transmission Channels Through a Rigorous Counterfactual Evaluation", Brazil Central Bank Working Paper, 2013.

Bauer, Michael D. and Glenn D. Rudebusch, "The Signaling Channel for Federal Reserve Bond Purchases", Federal Reserve Bank of San Francisco Working Paper, 2013.

Byrne Joseph P. and Norbert Fiess, "International Capital Flows to Emerging and Developing Countries: National and Global Determinants", University of Glasgow Working Paper, January 2011.

Curdia, Vasco and Andrea Ferrero, "How Stimulatory Are Large-Scale Asset Purchases?", FRBSF Economic Letter, August 2013.

Eichengreen, B. and G. Poonam, "Tapering Talk: The Impact of Expectations of Reduced Federal Reserve Security Purchases on Emerging Markets", World Bank Working Paper, Washington, 2013.

Forbes, Kristin J. and Frank E. Warnock, "Capital Flow Waves: Surges, Stops, Flight, and Retrenchment", Journal of International Economics, 88(2), 235-251, 2012.

Fratzscher, Marcel, "Capital Flows, Push versus Pull Factors and the Global Financial Crisis", Journal of International Economics, 88(2), 341-356, June 2012.

Fratzsher, M., Duca M. L. and R. Straub, "A Global Monetary Tsunami? On the Spillovers of U.S. Quantitative Easing", Center for Economic Policy and Research, Discussion Paper Number 9195, 2012.

Fratzscher, M., Duca M. L. and R. Straub, "On the International Spillovers of US Quantitative Easing", ECB Working Paper 1557, European Central Bank, Frankfurt, 2013.

Gagnon, Joseph E., Matthew D. Raskin, Julie A. Remache and Brian P. Sack, "The Financial Market Effects of the Federal Reserve's Large-Scale Asset Purchases", International Journal of Central Banking 7(1) (March): 3-44, 2011.

Ghosh, A., Kim J., Qureshi M. S. and Z. Juan, "Surges", IMF Working Paper, 2012.

Hendrickson, Joshua R. and David M. Beckworth, "The Supply of Transaction Assets, Nominal Income, and Monetary Policy Transmission", University of Mississippi and University of Western Kentucky, 2013.

Joyce, Michael A. S., Ana Lasaosa, Ibrahim Stevens and Matthew R. Tong, "The Financial Market Impact of Quantitative Easing in the United Kingdom", International Journal of Central Banking 7(3) (September): 113-162, 2011.

Institute of International Finance, "Capital Flows to Emerging Markets", IIF Report, May 29, 2014.

Institute of International Finance, "EM Portfolio Flows Tracker", IIF Reseach Note, May 29, 2014.

IMF, "The Quality of Domestic Financial Markets and Capital Inflows", Global Financial Stability Report, September 2007.

IMF, "Global Liquidity Expansion: Effects on Receiving Economies and Policy Response Options", Global Financial Stability Report, Chapter 4, April 2010.

IMF, "Recent Experiences in Managing Capital Inflows - Cross-Cutting Themes and Possible Policy Framework, Staff Paper, 2011.

IMF, "International Capital flows: Reliable or Fickle?", World Economic Outlook, Chapter 4, April 2011.

IMF, "Global Impact and Challenges of Unconventional Monetary Policies", IMF Policy Paper, 2013.

Koepke, Robin, "Quantifying the Fed's Impact on Capital Flows to Ems", Institute of International Finance Working Paper, 2013.

Koepke, Robin, "Fed Policy Expectations and Portfolio Flows to Emerging Markets", Institute of International Finance Working Paper, 2014.

Krishnamurthy, Arvind and Annette Vissing-Jorgensen, "The Effects of Quantitative Easing on Interest Rates: Channels and Implications for Policy", Brookings Papers on Economic Activity 43(2) (Fall): 215-265, 2011.

Krishnamurthy, Arvind and Annette Vissing-Jorgensen, "The Ins and Outs of LSAPs", In Economic Symposium Conference Proceedings, Jackson Hole, Federal Reserve Bank of Kansas City, 2013.

Lachman, Desmond, "International Impact of the Federal Reserve's Quantitative Easing Program", Testimony before the House Financial Service Committee's Subcommittee on Monetary Policy and Trade, 2014.

Lim, J. J., Mohapatra S. and M. Stocker, "Tinker, Taper, QE, Bye? The Effect of Quantitative Easing on Financial Flows to Developing Countries", World Bank Discussion Paper, 2014.

Mishkin, Frederic, "The Channels of Monetary Transmission: Lessons for Monetary Policy", NBER Working Paper 5464, 1996.

Neely, Christopher J., "Unconventional Monetary Policy Had Large International Effects", Federal Reserve Bank of St. Louis Working Paper, 2013.

Subramanian, Arvind, "International Impacts of the Federal Reserve's Quantitative Easing Program", Testimony submitted to the House Committee on Financial Services Subcommittee on Monetary Policy and Trade, 2014.

World Bank, "Capital Flows and Risks in Developing Countries", Global Economic Prospects, Chapter 2, Washington DC, 2014.