

Spillovers and effects on U.S. financial markets of United States unconventional monetary policy

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Keywords: United States unconventional monetary policy, spillover effects, financial markets

Abstract: The review combines over ten papers about United States unconventional monetary policy (UMP) to find out the effects on US domestic financial markets and spillovers to other countries' financial markets. For spillovers, US-to-Asia spillovers it the most and US UMP has negative effects on emerging markets' (EMEs) stock and bonds market. The UMP has the most effects at beginning of quantitative easing (QE) and can help restore EMEs economy. Other authorities and investors would diversify their portfolio according to FED signal. For US financial markets, unconventional monetary policy has greater effects than conventional monetary policy (UMP) and can effectively reduce spreads of bonds. UMP can made FED monetary policy has greater effects and have huge positive impacts on stock markets. The portfolio rebalancing channel and signalling channel can influence stock-bond market relation. For policy implications and limitations, policymakers should notice UMP has greater effects and understand its transmission patterns. Future research can include broader time period and range.

1. Introduction

Before the 2008 economic recession, countries used conventional monetary policy (CMP) to adjust the economy. The most common CMP tool is changing interest rate, and it affects many aspects including investments, borrowing, inflation, asset return. During the 2008-2009 economic recession, many countries have already lowered interest rate to nearly zero and could not lower more and negative interest rate is not attractive as zero interest rate; also, so many countries used unconventional monetary policy (UMP) to restore economy. Some countries, including the United State and some European countries, buy assets and inject liquidity as most common UMP tools.

There are many papers and research about UMP, and this paper gives a summary and analysis of the findings. In 2020, economy is experiencing a severe downturn, so UMP can be helpful with its positive effects on market and people's expectation. How to properly use UMP tools to restore and boost economy becomes especially important currently. The summary of UMP can be an indicator to guide policy makers.

After reading over twenty papers, I find that many papers write about effects on United States stock market, mortgage-based securities, and spillover effects. Among them, papers mentioning spillovers effects concentrate on US-Japan spillovers and US-Asia spillovers. As a result, I divide the main content of this article to two parts: UMP effects inside the United State and how US UMP policies affect other countries.

The entire article contains five parts: section 1 is introduction; section 2 provides a description of UMP effects on US stock and mortgage-based securities; section 3 discusses about US UMP effects on other countries' stock market and mortgage-based securities; section 4 offers a direction of future research and talks about limitations of existing research; and finally section 5 is a summary of this paper.

2. Spillover to other countries

Among all the spillovers to Asia, US-to-Asia is the highest [1]. Both unconventional monetary

policy (UMP) and conventional monetary policy (MPC) can increase US-to-Asia spillover and Japan-to-Asia spillover. Economic recession and deflation in other countries have larger effects on emerging markets (EMEs) than advanced market such as United States and Europe. In 2010 and 2011, Quantitative Easing (QE) policy implemented by the United States causing large spillover effects on EMEs in countries including Brazil and China [2]. Also, US Quantitative Easing (QE) policy significantly influence the relation between US and some Asian market, but subsequently the effects of QE decreases a lot. More stock market liquidity caused by UMP can remarkably increase spillover effects [3]. Federal Reserve Board (FED) balance sheet fluctuation can illustrate EMEs fluctuation and has negative effects on bond and stock market fluctuation and weak effects on real economy. In 2008, the impacts caused by the volatility of spillover were mitigated because US halted MPC [4].

Spillover effects occur when investors diversify their portfolio and buy assets of other countries to diverge risks after detecting increasing risks. Kimiko Sugimoto and Takashi Matsuki used VAR(p) model and generalized impulse response approach to study US UMP spillover effects on four international markets (Japan, the United States, France and Germany) and nine Asia market (China, Hong Kong, Indonesia, Korea, Malaysia, the Philippines, Singapore, Taiwan, and Thailand). They collected daily stock price from sample countries from January 3, 2005 to September 29, 2017. Their results show that, among all global-to-Asia spillover, the US-to-Asia spillover is the largest. Investors in some influential market will decide whether to invest in Asian market according to the information provided by US monetary policy. The global financial liquidity that is brought by US QE policy pour into Asia during the US monetary policy expansion. US-to-global spillback reached the highest after China stock market crashed down in 2015, making Japan-to-Asia spillover nearly the same with Asia-to-Japan spillback. US-to-Asia's and Japan-to-Asia's increasing spillover can be achieved by using UMP and MPC. Asia market are more sensible to external shock. Moreover, the new bill assigned by president Trump have eliminated supervision except for some largest banks, which is likely to increase speculative investors[1].

Apostolou and Beirne used the two-step GARCH-in-mean approach to evaluate how Europe and the United States UMP affect EMEs. For ECB and FED, they collected data from balance sheets between 2003M1–2018M4; for EMEs, they used monthly data on EMEs exchange rate against US dollar and euro, stock market index, EMBI spread, industrial production and consumer price index. Their findings show that FED is very sensitive to FED spillovers and FED balance sheet expansion have negative spillover impacts on EMEs stock and bond market [4].

In addition, Chien-Chiang et al used the DCC-GRACH model and collected weekly price of US and other nine Asia market (China, Hong Kong, Indonesia, Japan, Malaysia, The Philippines, Singapore, South Korea, and Thailand) from 1989 to 2013. They aimed to study the US QE policy spillovers effects on East-Asia. The result is that QE increases the strength of the relation between US and East-Asia market, decreases diversification of assets, and increases efficiency of East-Asia. At the beginning of QE, there is significant returns and spillovers between US and East Asian markets. In these sample countries, Singapore has the closest relation with US, while Indonesia has the weakest relation with US, which may be because most companies in Indonesia are hold or controlled by US and there are many government interventions [3].

Furthermore, Perter Tillmann used Qual VAR model and collected data of industry increasing rate and long-term interest rate for US from Aug 2007 to Mar 2013 and capital flows to Asia and Latin America and EMBI spread for EMEs to study how UMP in US have spillovers on EMEs. The result shows that UMP increase FED's use of unexpected QE to increase hugely for capital inflow to EMEs, net assets price, interest rate and decrease spread of bonds. The paper also compared UMP and MPC and found that they have roughly same effects on bonds spreads [5].

Besides, Chen et al used the error-correction model (GVECM) and they collected six indexes for countries—real economy growth rate, inflation rate, equity price, monetary policy indices, credit growth, and foreign exchange rate—to study US UMP spillovers to both advanced and emerging markets. They found that UMP have different effects on different emerging market, which can explain why there are economy differences in these countries. Also, the results show that US QE

have a sizable and profound effect on global assets price and confidence channel and these effects can be even larger for EMEs. What's more, it was observed that US QE can help some advanced markets recover from economic recession and deflation and emerging market countries restore their economy and contribute their overheat in economy in 2010 and 2011. Other countries would make different monetary policies to response to US economic impacts, which have different effects. For example, China tightened monetary and credit conditions in response to US low enterprises spread, which offset output growth; and in Brazil, it extend the credit conditions to promote monetary and financial expansion [2].

In conclusion, among all the spillovers, US-to-Asia spillover is the largest. US spillover effects reach the highest at the beginning of QE, but latter progressively decrease. Spillovers is not always positive, and it also brings negative effects like it has negative effects on EMEs stock and bond market. QE increasing capital liquidity thus increases capital inflow into Asia, which may be because investors want to diversify their portfolio to reduce risks. Spillovers promote economy of both advanced and emerging markets economy. Other authorities and investors would change their policies and strategies according to the impact and information given by the US. Investors aim to reduce risks and Asian countries aim to keep stability because they are sensitive to external shocks. In emerging market, relative free market is more likely to be affected by spillovers. Under the influence of QE and global financial crisis, Asian market increases their regional connections, which increase exchange efficiency and Japan-to-Asia spillover.

3. United States unconventional monetary policy effects on stock market

In general, unconventional monetary policy (UMP) has larger effects than conventional monetary policy (CMP) [6]. Portfolio rebalancing channel has negative effects on stock-bond market relation, while signaling channel has positive impacts [7]. The United States UMP can decrease the spreads of mortgage-based securities (MBS) [8]. The author Ling Wang studies firms' ability to repurchase stock under unconventional monetary policy conditions [9]. Also, unconventional monetary can have large effects on stock market and make monetary policy have greater effects [10].

Claus et al used the latent factor model and SSR estimates. They collected data from a relatively wide dataset such as 10-year Treasury rate, corporate debt market, safe hole real investment assets like gold, S&P 500 stock price index, REIT total market index, and change rate from 1 February 1996 to 28 January 2016. The result shows interest rate, assets returns, and exchange rate that have stronger responses to UMP than to MPC, which maybe because UMP has bigger shock than CMP. The FED maked strong effects during the financial crisis like decreasing interest rate to near zero bound and implementation of UMP. When they put UMP and CMP shock standardized, they find relation between different markets and shocks—the result shows that 10-year treasury rate and gold still have greater effects on UMP [6]. Balciilar et al used data from S&P 500 index, the 10 year treasury note, the New York Board of Trade Us dollar index from Jan 2016 to Nov 2018. They used the STVAR model to study volatility spillover effects on UMP to S&P 500 index, US 10-year treasury yield, dollar prospect, and production price. The results show after global financial crisis total spillover decreases but increases after QE policy. Authors find that these economic shocks have huge effects on US financial markets, especially stock and bond market. Analyzing FED unconventional monetary policy, authors observed that stock market transfer from net transmitter to neutral position after QE. Moreover, risk spillovers shifting to other markets from bond market enhanced at beginning of QEs [11]

Furthermore, Gokmenoglu et al collected data from S&P 500 price index, 10-year treasury rate to calculate stock and bond returns. They used the augmented Dickey-Fuller and Phillips-Perron test to measure stability. They studied the relation between portfolio rebalancing and siganlling channe and stock and bond. They concluded that portfolio rebalancing channel is a main driving effect to impose a negative and asymmetric impact to stock-bond market relation, while signalling channel have positive and asymmetric effects on stock-bond relation. Portfolio rebalancing channel is an effective way to make US UMP policy have negative effects on stock-bond market relation when

the relation is extremely negative, indicating that investors can diversify their assets so more assets flow to stock market from bond market. This article makes investors notice that they can buy bonds when stock-bond market relation is negative because of portfolio rebalancing channel and then sell out before it goes back to normal [7].

Ling Wang used the OLS regression model and collected FED balance sheet, S&P 500 index, moody and Fitch credit rate-real estate and unemployment rate, which is also the index of credit risk-prepayment that MBS holders give to homeowners, and tranche size from December 2007 to June 2017 to study UMP's effects on Mortgage-Backed Securities (MBS) [9]. Wang found that UMP can effectively stop spreads of MBS and have positive supports on mortgage markets, which can help us better understand how UMP influences assets price and transmission patterns. The author also compared US with Japan and found that Japan provide supports for commercial banks while US directly supports MBS market—they have different economic structures. In another paper of Wang, a deeper of relation between UMP and financial structures was explored. Wang used the Tobit model and the OLS method, collecting data from S&P Capital IQ and collect 3407 American public companies and 1964 sample companies from Japan. For Japan companies, the selected time is FY 2005; for US, the selecte time is FY 2009. By observing the effects of unconventional monetary policy in these two countries from firm-level, Wang discovered that Japan is bank-based and US is securities-based structure. In both Japan and US, companies that have more cash flow and less borrowing have a stronger ability to repurchase stock, which companies that have strong borrowing leverage are less likely to repurchase stock. There is difference between Japan and US companies, free cash flow and less borrowing can have stronger positive effects on US companies, while more borrowing can have more negative effects on Japan companies. These results can be explained by different economic structures, showing that financial structures is a related factor that affects repurchase ability . Eksi et al implemented the Lewbel method and collected data of inflation, product output, production gap, interest rate, stock returns at zero lower bound. They studied how stock market responses to stock market. After using UMP, effects of FED monetary policy increase seven times. S&P 500 price increase from 797.87 in 2009 to 2058.9 in 2014, which are proved by evidences that UMP is main driving force to lead this result. FED buy assets from invests and promote them to buy stock and then increase demand of stock and stock price.

In summary, I can conclude that unconventional monetary policy has a huge effect on financial market. Firstly, UMP can restore economy and make monetary policy implemented by FED have greater effect. UMP can give more liquidity on stock market and increase stock price. Also, it can reduce the spread of bonds. Secondly, UMP has stronger effects than traditional monetary policy. Policymakers can combine both zero lower bond and UMP, which can have a greater effect. Thirdly, different channels can have different effects on stock and bond market, like portfolio rebalancing channel can impose negative effects on stock-bond market relation and signalling channel can have positive effects on stock-bond market relation. Fourthly, financial structure can influence transmission patterns and have different economic effects.

4. Policy implications and limitations

For policymakers, they should notice that unconventional monetary have greater effects on markets compare to conventional monetary policy. Policymakers should understand financial transmission patterns because shocks could lead to financial instability. Also, Asian countries are sensitive to external shocks and risks, so policymakers can implement domestic macroeconomics policies to offset the negative spillovers. Future research can study how different effects on spillovers affect macroeconomics and instability and which policy central bank can use to keep economy stable. For countries, free and open markets are easier to be affected by the United States spillovers and external shocks. Different economic structures, like in US and Japan, would have different UMP effects. For investors, these results provide information for them to predict and make decisions. Investors should diversify their portfolio to face different economic shock.

There are also some limitations regarding the previous literature. Most of papers study effects of QE in the U.S, but they do not measure the impacts of QE in other counties like European countries

and Japan. If future research can focus on QE policy of other countries, we would have a more comprehensive picture of QE policy impacts. Moreover, future research can pay attention to how FED announcement and QE1, QE2 and QE3 connect with each other.

5. Conclusion

This review combines findings from over ten papers studying how the United States unconventional monetary policy influence financial markets domestically and spillovers to other countries. For spillovers papers, most of them focus on Asian financial markets. US-to-Asia spillovers is the most significant and is the highest at beginning of QE. QE also has negative effects on emerging markets' bond and stock market. QE increases liquidity and promotes cash flows into Asia and helps restore economy. Other investors and countries would diversify their portfolio and make policies according to FED announcement and information to keep balance stable. Free market can more susceptible to external shocks. Under QE and global financial crisis, Asian markets become regionally connected. For the domestic impact of US unconventional monetary, UMP has greater effects than CMP and it have impacts on restoring economy. UMP can reduce the spread of bond and increases the effects of FED monetary policy. Different channels can have different effects: portfolio channel can have negative effects to stock-bond relation, while signaling channel can have positive effects.

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