Why the monetary easing under 'Abenomics' has been ineffective in recovery of the Japanese economy? : Integration of the markets between the US and Japan

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Abstract

This paper aims to examine the reason why the monetary easing policy of Quantitative and Qualitative Monetary Easing (QQE) has not been successful in economic recovery in Japan. The analysis based on the Bayesian Vector autoregressive, BVAR) model indicates that the fundamental background of the ineffectiveness of Qualitative Monetary Easing (QQE) could be due to cross-border capital flows between both markets in Japan and the US, which have significantly been integrated especially after the Global Financial Crisis. The abundant liquidity provided under QQE as wel1 as the FRB's Quantitative Easing (QE2,3) has been utilized effectively in the US market, while there is very limited effect on the real economy in Japan. Therefore, monetary policy of QQE should have contributed to recovery of the US real economy and the market, rather than that in Japan.

Keywords: Quantitative Monetary Easing (QE); Quantitative and Qualitative Monetary Easing (QQE); QE 2 &3; Bayesian Vector autoregression (BVAR) Model

JEL Codes E44 E52 F37 GIO G20

Introduction

This paper examines the effectiveness of Bank of Japan (BOJ)'s monetary policy on the financial markets and the real economy in both Japan and the US monetary to evaluate the major policy of 'Abenomics' The analyses are based on the Bayesian Vector autoregressive (BVAR) model from April 2001 to December 2016,

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focusing on the changes before and after the initiation of Quantitative and Qualitative Monetary Easing (QQE) (April 2013 to date). The overall results of analyses in this paper indicate that monetary easing under QQE has not been successful in activating the real economy in Japan, while the BOJ's monetary easing has put significantly positive effects in the US market and economy during the Post Global Financial Crisis period.

The Bank of Japan initiated the Quantitative Monetary Easing Policy (QE) in 2001, terminated in March 2006, while the BOJ continued the 'Zero interest-rate' (ZIR) policy Introduced in 1999. After the Global Financial Crisis, the BOJ initiated significant monetary easing, and introduced 'Comprehensive Monetary Easing' since October 2010, which is followed by 'Quantitative and Qualitative Monetary Easing (QQE), with the program of asset purchase with US$ 1.4 trillion in two years in April 2013, After introduction of the QQE policy, stock prices rose with depreciation of exchange rate of Yen by May 2013. However, it is not clear whether monetary easing policy, especially QQE, has put currency depreciation and stock prices. It should be noted that QQE has not directly increased bank lending for domestic production.

The Federal Reserve Board (FRB) also introduced monetary easing policy with Large Scale Asset Purchases [LSAPS], and its effects on the markets in the US/ Japan have become substantially large, as shown in this paper. It is widely recognized that the Federal Reserve's Quantitative Easing (QE), especially QE2 (Nov. 2010 ~June 2011) and QE3 (Sept. 2012- October 2014), has influenced on the monetary policy in many countries. Such an extremely monetary easing accelerated liquidity supply in the global market though carry trade and other financial transactions. Accordingly, the Japanese market is increasingly influenced by the capital flows under the QE2 and QE3.

This paper examines the effects of BOJ and FRB's monetary easing policy on the Japanese and the US markets, based on the analysis of Bayesian VAR (BVAR) model, including variables such as monetary base (the US/Japan), money stocks [M2] (the US/ Japan), BOJ Current account (including foreign banks' reserve), Government bond of Japan (JGB) yield, call rate. TB rates (2/l0 years), Federal Fund (FF) rate, and the stock prices (US/ Japan), real effective exchange rate (RERR) (the US/ Japan). Bank lending (Japan), industrial production (the US/ Japan), as well as real GDP growth (the US/ Japan) from Sept.2001 to Dec. 2016.

The major findings of the analysis obtained in this paper are as follows: (i) The monetary easing has bi-directionally influenced on the money stocks and monetary base and other variables' in the markets in the US and Japan; (ii) While the

monetary easing under the QQE by the BOJ in Japan has put recovery in the US economy and market, it has not resulted in substantial effects on the real economy in Japan. (ii) The impulse response functions of various variables also indicate that monetary easing has contributed to the money stocks in the US, where asset effects could have worked to increase production and GDP growth; (iii)The increase in money stocks in the US should be due to capital flows under the BOJ's QQE, as well the FRB's monetary easing policy under QE2 as well as QE3.

This paper also shows that the monetary expansion during the period QE2 and QE3 by the FRB has also resulted in massive capital flows in the Japanese market but not contributed to the real economy, since most of the money has been invested in the financial markets. Monetary easing policy, therefore, may not be directly effective in putting positive impact upon the domestic economy and market in Japan. This could be due to cross-border capital flows that have significantly increased especially after the Global Financial Crisis, when monetary easing policies were introduced by major advanced economies, including Japan, the USA and ECB (European Central Bank). The BOJ's extremely monetary easing could have facilitated capital/ financial investment in the US and other markets[1].

The effects of monetary easing policies on the financial market and the real economy in Japan have been studied by several scholars particularly during the Quantitative Easing period (2001 -2006). However, the major past studies have not taken up the aspect of international context, in terms of international capital flows that have put significant impact upon the domestic markets and the real economy, including the analysis on the effects of BOJ's monetary easing policies on the financial markets and economies in the US[2]. Also, there has not been any study on the effects of monetary easing policy of the FRB's extremely monetary easing on the markets in Japan. Therefore, this paper is the first attempt to examine the BOJ's monetary easing policy in the international context.

In this paper, Section I describes the overall monetary easing policy and the

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1. The monetary easing policy of PRB's QE2 also has not been proved as directly related to the US real economy. Martin Feldstein argues that QE2 led to a rise in the stock market which in tum contributed to increasing consumption and the strong performance of the US economy in late 2010 (Statement on 24 February 2011). However. QE2 has put significantly effect on the pressure for currency appreciation and inflation, and the higher commodity prices in the global market while the effects on the domestic economy is not significant. The effect of QE3 is also questioned by Mr. Fischer, Government of Dallas Reserve Board.

2. Some authors have examined the effects of monetary easing by central banks, including the FRB on the markets in other countries by Fratzscher et al (2016) and the spill over of U.S, unconventional monetary policy lo emerging markets by Anayaet al. (2017), as well as the effects of ECB's non-standard monetary policies on non-Euro areas by Falagiarda et al (2015).

outcomes of the economy and markets in Japan, as compared with that in the US. In Section 2 the relevant studies in the past literatures are presented and evaluated by pointing out the different and unique nature of this thesis. After the general introduction on the analytical model (Bayesian VAR) in Section 3. The following Section 4 presents an analysis on the effects of monetary easing on the Japanese and the US markets and real economies through bi-directional ways.

1. Monetary Policy and Financial Market in Japan

1. 1 General Feature of the Monetary Easing Policy

Monetary base, including Bank of Japan (BOJ) Current Account, has increased significantly, especially under the current Quantitative and Qualitative Monetary Easing (QQE), and the amount reached to ¥471 trillion and ¥367 trillion, respectively in September 2017 (Fig.1). The size of the monetary base with 79.4% of GDP and BOJ Current Account with 59.9% of GDP in Japan in 2016, which are much higher than that of the USA with 18.6% and 10.7%, respectively (Fig.2). On the other hand, the US monetary base has already peaked out and decreased since 2015, with the termination of QE3 in November 2014.
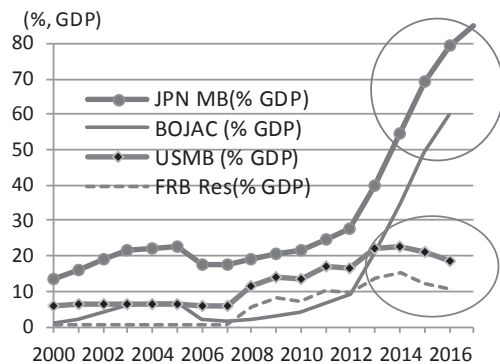
Even under such a monetary easing policy, industrial production in Japan has not increased substantially until today (Fig.3), and monetary base has not always

Fig. 1: Monetary Base/BOJ Current Account & Bank Lending (Japan)
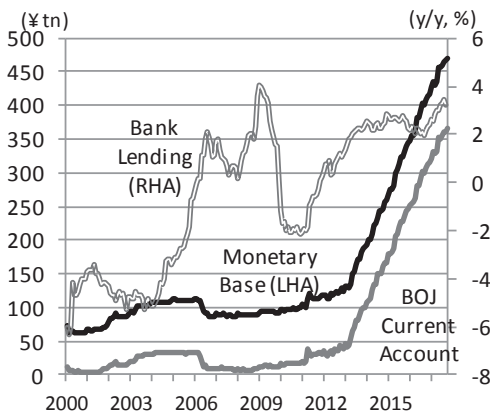
Source: Bank of Japan

**Fig. 2: Monetary Base & Reserve (Japan & USA)**

Note: Fiscal Year (Japan) and Calendar year (USA)
Sources: Bank of Japan, Cabinet Office, FRB, BEA (USA)

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been associated with the stock prices (Fig.4). The significant rise of stock prices in Tokyo in spring 2013 might be the result of investors' expectation of the Japanese authority's stance in the monetary policy which might have caused depreciation of Yen, rather than the actual change in the monetary base[3].

Fig. 3: Monetary Base & Industrial Production (Japan)
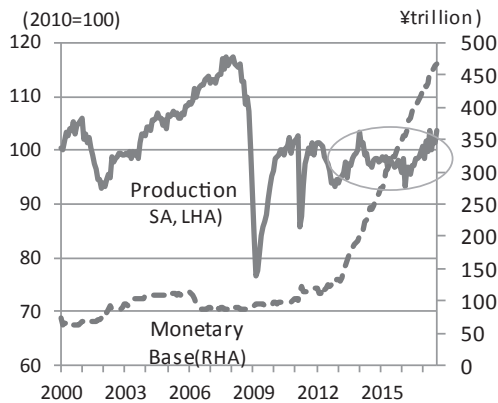
Sources: Bankfo Japan, IFS database (IMF)

Fig. 4: Stock & Production (Japan)
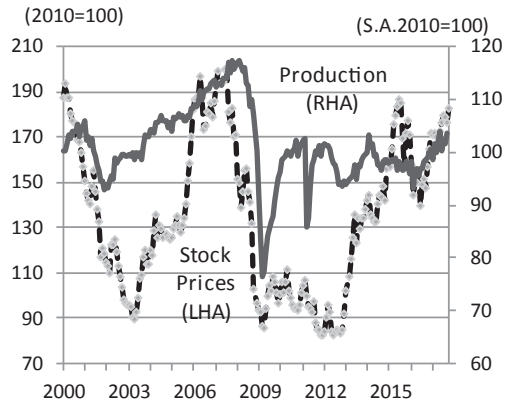
Sources: Bank of Japan, IFS database (IMF)

The bank lending has not increased substantially, despite of massively increased monetary base since 2013[4]. This could be partly explained by the fact that bank lending to the productive sector has not increased; irrespective of increase in the banks' BOJ current account (Fig.5). It should be also noted that It is cannot be claimed that monetary easing under QQE has facilitated Yen's depreciation that could sustained Japanese firms' export competitiveness. This is because the Euro Crisis (or GIIPS crisis) peaked out in late 2012, so that concentration of global portfolio investment in Japan, which resulted in Yen's appreciation, had been

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3. Fukuda (2011) argues that foreign banks in Japan may utilize the excess reserve of the BOJ Current Account and call market for short-term investment in the monetary / financial market, not in lending to manufacturing industry. Kikuchi (2013) suggested that under the excessive monetary easing, liquidity could be used for 'speculative investment'. He also maintained that monetary easing in fact provided 'Hedge Funds' with important resources for financial investment.

4. Foreign banks may mobilize the resources delivered in the Japanese market, and they transfer the money to the Headquarters to be lend to 'Hedge Funds' that trade stocks in the Tokyo market which accelerated the exchange of yen to dollars. Depreciation of yen would cause the stock prices higher in recent years, since it would enlarge the yen denominated corporate profit. Kikuchi (2014) claims that tapering of the QE3 would require further continuation of BOJ's QQE policy.

terminated as foreign investors diversified their portfolio at that period Monetary base (MB) has no significant association with the real effective exchange rate (Fig.6).

The background of insignificant association between the domestic money stocks (M2) and monetary base as well as REER could be accounted for by the fact that capital flows have increased significantly which have influenced on the market in Japan in recent years. In the case of Japan, share prices cannot have asset effects on the domestic economy like the US economy, since the majority of household in Japan cannot afford to hold stocks and other securities, due to substantial decrease in the average household income in the past decades.

Fig. 5: Lending & Production (Japan)
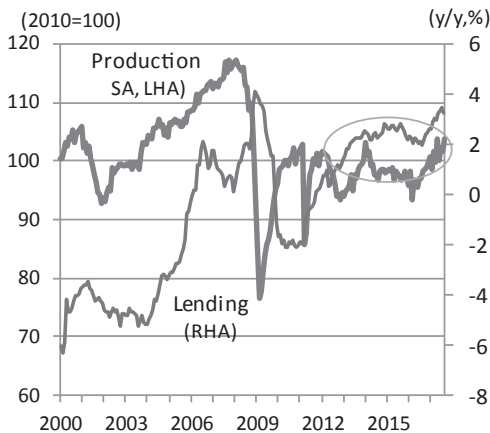
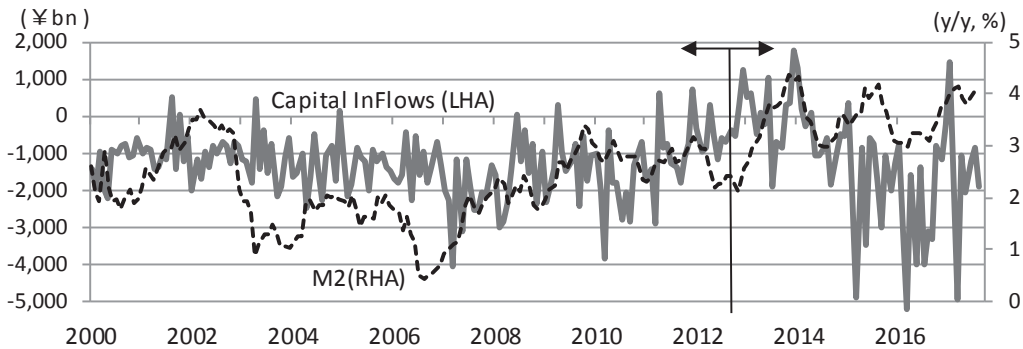Sources: Bankfo Japan, IFS database (IMF)

Fig. 6: Monetary Base & REER (Japan)
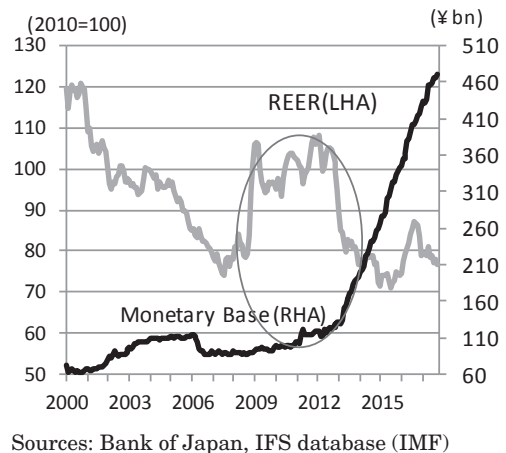
Sources: Bank of Japan, IFS database (IMF)

It is shown by the fact that the changes in M2 have closely correlated with capital flows (Fig.7). It is necessary, therefore, that monetary policy should be analysed in the context of capital flows that put significant effects on the effectiveness of domestic monetary policy in Japan. In this regard, it is shown that the changes in M2 have closely correlated with capital flows, especially after September 2008. It should be noted that growth of M2 and capital flows has been negatively correlated since April 2013, when the QQE was introduced. It could imply that net financial outflows have closely associated with reduced domestic banks' money stock, which indicates that domestic financial resources have directly been influenced by capital movement especially transfer of capital and financial resources to foreign markets in accordance with the monetary expansion under the QQE.

Fig. 7: Capital Flows (Net) and M2 (Japan)

Note: The figures show the net capital inflows Source: Bank of Japan, (IFS) database (IMF)

This could indicate that money stock held in the domestic financial sector is negatively correlated with the net capital inflows that originated from liquidity in the global market. Thus, money stock in Japan is now closely linked to the overseas market, under the regime of fully liberalized capital market. Accordingly, the abundant liquidity under the QQE should have been flown out to the US market, where the abundant money could be utilized for financial and economic activities. It is necessary, therefore, that monetary policy should be analysed under the context of capital flows that put significant effects on the effectiveness of domestic monetary policy in Japan.

1. 2 The US Market and Foreign Banks' BOJ Current Account

The BOJ's monetary policy has been associated with the global markets, especially the US market, as shown in Fig.8. It indicates that foreign banks' reserves at

Fig. 8: US Share & BOJ Foreign Banks' Current Account
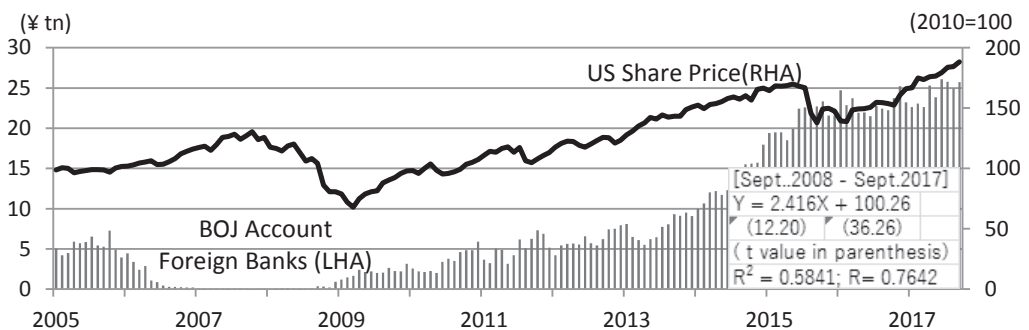
Source: BankofJapan, IFS database (IMF)

the BOJ Current Account are possibly utilized for financial investment globally. Particularly, foreign banks' BOJ Current Account put substantial impact upon the US market since 2008. This implies that foreign banks' BOJ current account reserves might have been utilized for financial investment in the US and global market.

1. 3 Performance of Monetary Easing in the US

Monetary easing policy in the US after the Global Financial Crisis seems to have achieved better performance in terms of stock prices and production in the US market and economy, as compared with that in Japan (Fig.9,10). This could be caused by the fact that the US economy is influenced by asset effects of the stock prices, which indicates close correlation between the stock prices and monetary base.

In this paper, it is shown that the US monetary easing policy, including QE 2 and 3, has put positive impact upon the productive activities, as well as economic growth in the USA, which has been contributed by the massive money supply from Japan in the following sections.

Fig. 9 : Monetary Base & Ind. Production (USA)
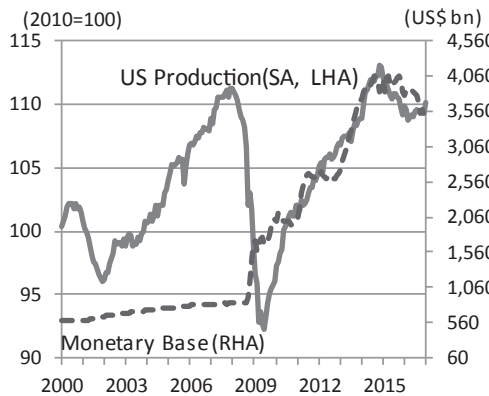
Source: FRB, IFS) database (IMF)

Fig. 10 : Monetary Base & Stock Price (USA)
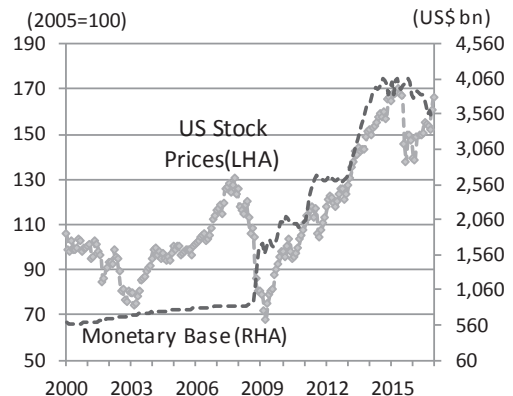
Sources: FRB, IFS database (IMF)

2. Research on the Effects of Monetary Policy on the Economy and market in Japan

Several studies have been undertaken on monetary policy and its effects on the Monetary/financial market as well as the real economy in Japan, but past studies

have focused mostly on the period of BOJ's Quantitative Monetary Easing [QE] (April 2001 - March 2006), and very few studies have examined the effects of monetary easing policy after the 'Lehman Shock' (2008), including the BOJ's Comprehensive Monetary Easing (CME) and the current QQE Policy Phase Since April 2013.

Some studies suggest that QE (2001 - 2006) in Japan put the bond yield lower and had certain effects on the maturity and yield curve of the Japanese Government Bond (JGB), thereby stabilizing the market[5]. However, the other studies, including Shiratsuka, et al. (2010) have proved that the effect of QE on the real economy was insignificant[6]. Major analyses based on VAR models on the monetary policy in Japan were initiated before Quantitative Monetary Easing (2001-2006), including the by Teruyama (2001), which shows monetary policy had become ineffective, but the period of the analysis was confined to the analysis in the 1990s. Other studies based on the VAR models are basically analyses on the Quantitative Monetary Easing (QE) Policy period (2001 -2006).

Harada and Masujima (2008) pointed out that the Quantitative Monetary Easing (2001 -2006) was effective in the real economy through the asset effects of stock market, based on the VAR model. Honda, Kuroki and Tachibana (2010) also show the effectiveness of monetary easing policy during 2001-2006 by adopting variables of CPI, industrial production, call rate. BOJ Current Account, Nikkei stock prices, and industrial production, based the VAR models. On the other hand, Nakashima et al. (2017) claims that under the Quantitative Monetary easing during 2001 ~2006 the quantitative easing shocks had contractionary effects, while qualitative easing shocks had expansionary effects on the real economy.

All these Studies mainly dealt with the first generation of Quantitative Monetary Easing (QE) during 2001 -2006. Therefore, it cannot be justified to claim that the current QQE as an effective tool to be effective for the real economy, since the magnitude of monetary base under the QQE cannot be comparable in its size to that under the during the QE (2001-2006), which was much smaller in that period,

Some studies analysed the monetary policy during the period after the Global

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5. Okina and Shiratsuka (2004) and Baba et al (2006) indicated that the monetary easing policy did lower the yield curve of the government bond (JGB) with longer period, but the effects on the price levels and the real economy were limited. Ugai (2006) also suggested that the monetary easing had some effect in terms of lower risk premium during the QE period (200 1 -2006). ,

6. Shirastuka et al. (2010) also pointed out that the QE policy might put expectation of monetary easing policy to be continued among the private sector, but the effect on the real economy is limited

Financial Crisis, including the study by Honda and Tachibana (2011) which extended the covered period from 1996 to March 2010, with dummy variable for the period of Quantitative Monetary Easing (2001-2006). They claim that monetary policy was effective in increasing industrial production through the route of stock market. Honda (2014) also maintained that 'non-traditional' monetary easing policy has worked for the real economy through several channels, including asset effects[7]. On the other hand, Arai (2016) pointed out that magnitude of' estimated pass-through of monetary shocks to stock prices and the exchange rate in Japan is substantially smaller than that in the US during the period 1998-2013.

However, these studies cannot be regarded as analyses on the real effects of QQE since April 2013 until today. In addition, the monetary easing since 2013 has not directly linked to stock prices in Japan, as shown in the analysis of this paper. Noguchi (2013a, b) maintains that monetary easing policies in Japan have not resulted in positive effect on the real economy.

Miyao (2016, 2017) claims that the monetary easing policy under the current QQE was effective, based on the VAR model with impulse response functions by comparing the period before and after November 2012, covering the periods March 2001 - March 2012 and March 2001 - March 2015. However, the results shown in his argument cannot be persuasive, with respect to the effectiveness of QQE. In fact, the size of monetary easing policy under the QE (2001-2006) was smaller than that of QQE, and the effects on the market and the real economy are quite different from that under the current QQE[8].

Therefore, the results of previous studies may not be valid for evaluation of the 'true' effectiveness of monetary easing that has significantly increased in the post Global Financial Crisis (2008), especially under the QQE. In this respect, Ohta (2013, 2014a, 2014b) already suggested that non-traditional BOJ's monetary easing policy has not put significant effects on the real economy, and the domestic fi-

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7. Honda (2014) maintains the effectiveness of asset effects in Japan, however, the monetary easing since 2006 has not directly linked to stock prices in Japan, as shown in the analysis of this paper.

8. The GDP growth converted to monthly basis used by Miyao also should be dealt cautiously, since it would make incorrect results in those VAR analyses. It should be noted that Comprehensive Monetary Easing (CME) by BOJ [Oct. 2010-March 2013] is included during this period, and that the magnitude and volume of QQB is so different in scale. In fact, the CMP was more effective than that under the QQE in terms of interest rate policy on the market. See Ohta (2013, 2014b). Also note that the analysis includes some variable of GDP converted in to monthly basis from quarterly figures, and it would be very uncertain and not effective variable to be applied in such an analysis like VAR model. Thus, the robustness of the analysis by Miyao is not very sold.

nancial market, which is very volatile and affected by short-term capital flows.

Some authors have examined the effects of monetary easing by major advanced central banks, including unconventional quantitative monetary easing policies of the FRB and ECB. Fratzscher et al. (2016) have analysed the effects of US monetary easing (QE1, 2, 3) based on multiple regression models, while Anaya et al. (2017) analysed the spillover of U.S. unconventional monetary policy to emerging markets with global structural VAR model. The analysis based on VAR by Kucharcukova et al. (2016) also indicated that the monetary easing of ECB has not put significant effect on output in the six non- Euro EU countries. However, there is no study on the effects of Japan's monetary easing on the domestic and the US market economy during the QQE period, including the Post QE3 period (since Nov. 2014), and also the effects to and from the Japanese and the US economy and markets. Therefore, this paper is the first attempt to analyse the effects of monetary easing policy of QQE on the Japanese and the US economies and markets in both directions.

The overall result of the analysis in this paper which covers the period from September 2008 to December2016 shows that monetary easing policy in Japan has become increasingly ineffective in controlling the domestic market, and that it has become more difficult for BOJ to put positive effect on the real economy in Japan through monetary easing, including the current QQE under increasing international capital flows. The abundant liquidity provided by BOJ is not effectively utilized for productive investment even under the extremely easy monetary policy in Japan. In this regard, the BOJ's QQE has been effective for the US, but not for recovery of the real economy in Japan.

3. Bayesian VAR (BVAR) Model and Analysis on Monetary Policy

3. l General Explanation of the Analysis

To examine the above-mentioned issues, the analysis based on Bayesian Vector autoregressive (BVAR) model, will identify the overall ineffectiveness of recent BOJ's monetary easing policy and increasing association between the Japanese and the US market.

This section is devoted to explanation on the BVAR model for the analyses on the effects of monetary policy on monetary and capital/ financial market, foreign exchange, as well as the real economy in Japan in the next section (Section5). The effects of US monetary easing on the US domestic and the Japanese markets are

also examined in Section 6.

The whole period (Sept. 2008- Dec. 2016) is divided into the following periods:

(ⅰ) Before and after the Post-Global Financial Crisis Period [April 2001 – August 2008, September 2008 – March 2013 (including the period of the first QE (2001-2006) by BOJ and quantitative monetary easing both by BOJ (CQE and QQE) and FRB (QE1-3)

(ⅱ) BOJ's Quantitative and Qualitative Monetary Easing (QQE) [April 2013 – December 2016] (incl. period of 'Phase 1[Apr.2013-] & 2[since Nov.2014])

(ⅲ) FRB's Quantitative Easing (QE 1, 2, &3 by FRB) [September 2008 – October 2014]

(ⅳ) Post-QE period] BOJ's QQE 'Phase 2' [November 2014 – December 2016]

The above period of the Post-Global Financial Crisis includes analyses on the effectiveness of US monetary easing policy (especially QE2 and 3) until October 2014 (Periods iii) and the Post QE3 since November 2014 (Period iv).

The variables for the analysis in this paper are listed as follows:

Variables	Abbreviation	Frequency	Construction	Sources
Japan				
BOJ Monetary Base	JPN MB	Quarterly/Monthly	log	Bank of Japan (major data series)
Bank of Japan Current Account	BOJ AC	Quarterly/Monthly	log	Bank of Japan (major data series)
Foreign banks' reserve, BOJAC	Fresv	Monthly	log	Bank of Japan (major data series)
Call Rate	Call Rate	Monthly	%	Bank of Japan (major data series)
Money Stocks (Japan)	M2	Quarterly/Monthly	log	Bank of Japan (major data series)
Government Bond Yields (JPN)	Yield	Monthly	%	International inancial Statistics (IFS) database
Real Effective Exchange Rate	REER	Monthly	Index, 2010=100	BIS effective exchange rate indices (Narrow indices)
Stock Prices	JPNShare	Monthly	Index, 2010=100	IFS database (IMF)
Bank Lending	Lending(y/y)	Monthly		Bank of Japan (major data series)
Industrial Production	Prod	Quarterly/Monthly	S.A. 2010=100	IFS database (IMF), Ministry of Economy & Industry
real GDP	JPNGDP	Quarterly	S.A. 2010=100	IFS database (IMF), Ministry of Economy & Industry
USA				
The US Monetary Base	USMB	Quarterly/Monthly	log	IFS database (IMF), Federal Reserve Board (FRB)
The US Money Stock (M2)	USM2	Quarterly/Monthly	log	IFS database (IMF), FRB
Real Effective Exchange Rate	USREER	Monthly	Index, 2010=100	BIS effective exchange rate indices (Narrow indices)
Fedenral Fund Rate	FF	Monthly	%	Federal Reserve Board (FRB)
T-Bill yield (10 years maturity)	TB10Y	Monthly	%	Federal Reserve Board (FRB)
T-Bill yield (2 years maturity)	TB2Y	Monthly	%	Federal Reserve Board (FRB)
Stock Prices	USShare	Monthly	Index, 2010=100	IFS database (IMF)
Industrial Production (US)	USProd	Quarterly/Monthly	S.A. 2010=100	IFS database (IMF)
real GDP	USGDP	Monthly	S.A. 2010=100	IFS database (IMF)

3. 2 Bayesian VAR (BVAR) Model

This study is based on Bayesian VAR models covering GDP growth rate, financial market indicators (money market rate, money stock [M2]), foreign exchange market (real effective exchange rate), manufacturing production index. The difference between BVAR and standard VAR models lies in the fact that the model parameters are treated as random variables, and prior probabilities are assigned to them. The Bayesian vector autoregressive (BVAR) model is used to avoid problems of collinearity and over--parameterization that often with the use of VAR models.

In this analysis, empirical Bayesian method, in which a prior distribution, is estimated from the data. In this process of estimation, automatically selected variables with tighter priors (based on Litterman /Minnesota) are adopted when the model involves many unknown coefficients relative to the available data. BVAR model could be used to estimate the response to some shock variables, which would be the case in point: one of the periods covered is relatively short: between November 2014 to December 2016 under the 2nd phase of QQE. It should be also noted that those period that should deal with not only monthly but quarterly data in estimating the effects on GDP growth in this paper. The models used in the following sections are as follows:

The first shock is provided by the monetary policy instruments (variables), against other variables which include:

（ⅰ）Industrial production (Prod); GDP Growth (Index: 2010=100, seasonally Adjusted, quarterly) in JPN & the US[9].

（ⅱ）Monetary Base (Japan and the US); BOJ Current Account (BOJAC); Foreign Banks' reserve of BOJ current account (FRESV), Money stocks (M2, Japan and the US)

（ⅲ）Real Effective Exchange Rate [REER] (Japan / US); average Japanese Government bond yield (Yield) and Call Rate; Treasury –Bill rate (10Y, 2Y); FF rate, and Stock Prices [Share] (Japan / US).

The order of each variables of the BVAR model is determined by the shock of the monetary policy and the impact on the market and the real economy. The based on BVAR Model uses each variable as a level. The order of the lag is one time for each equation.

（ⅰ）Model 1: Effects of monetary easing on the real economies in Japan and the US
Variables: Monetary Base (MB) [JPN & the US]; BOJAC; Money Stock (M2) [JPN & US]; Industrial Production [Japan & the US;] GDP growth (Japan & US) [Quarterly]

（ⅱ）Model 2: Effects of BOJ's monetary easing on the US market and the real Economy Monetary Base (MB)/ BOJAC/FRESV; US Monetary Base (USMB); US Money Stocks (USM2); Treasury bill yield of 10 years maturity (TB10Y); Treasury bill yield of 2 years maturity (TB2Y); FF rate (FF); US stock Prices (US Share); US Industrial Production (US Prod)

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9. 12 The variables and their sources are shown in the table at the end of the main text.

(ⅲ) Model 3: Effects of the US monetary easing on the market and the economy in Japan USMB; USM2; USREER; TB10Y/2Y; US Share; US Prod; JPN MB/ BOJAC]/ FRESV; M2; Call Rate (Intrate); JPN REER; JPN Share; JPN Prod)

4. Evaluation of the Effects of Monetary Easing Policy on the Market and Real Economy in Japan and the US

The analysis in this section is to evaluate monetary easing policies in the US and Japan by comparing those periods before and after the Quantitative and Qualitative and Qualitative Monetary Easing (QQE). The results suggest that BOJ's monetary easing policy instruments have not given positive effect on the real economy, and had very limited impact upon the domestic lending and industrial production in Japan, while the Quantitative Easing (QE) by the FRB has relatively been successful in putting Positive effects on the US economy and the market.

It is quite possible that the monetary easing in the US was not only strengthened by the FRB's QE, but also through abundant liquidity provided by Japan's extremely easy monetary policy. This could be caused mainly by capital flows that have been taken place in the Japanese and the US markets, especially after the Global Financial Crisis (2008).

This section will discuss on increasing integration of the markets between the US and Japan in terms money flows that have significantly influenced on the Japanese and US economies and markets in recent years. The analysis is based on the (Bayesian) VAR model with impulse response functions during the post-Global Financial Crisis. The FRJ's monetary easing under the QE2 & 3 US might have put some impact on the stock market through the asset effects, which has worked for the recovery of the US economy.

4. 1 Association between Japan and the US in the real economies.

In the first part, the effects of monetary easing policies on the real economy in terms of GDP growth and industrial production in the US and Japan are analysed. The periods includes Comprehensive Monetary Easing and Quantitative and Qualitative Monetary Easing (QQE) by the BOJ. The periods are divided into two periods, namely, 'Pre-Global Financial Crisis' (2001Q2-2008Q2) and 'Post Global Financial Crisis (2008Q3-2016Q4). Although the US FRB initiated QE2 from November 2010 to June 2011, and the QE3 ended in October 2014, the periods are divided into two periods, namely, from 2001-2008(Q2) and 2008(Q3) to 2016.

4. 1. 1 Impulse Responses

As shown in Fig.11-1 and11-2, monetary easing has not resulted in recovery of the real economy in terms of industrial production and GDP growth in Japan, while monetary easing through money stock (M2) in Japan has significantly contributed to the industrial production as well as GDP growth in the US since the Global Financial Crisis (2008-2016). Thus, monetary easing policy by the BOJ might be one of the important factors for successful recovery of the US economy and market while it has not contributed to economic recovery in Japan.

Fig. 11-1: Japan/ US Impulse Response to Monetary Base & Money Stocks (2001Q2-2008Q2)
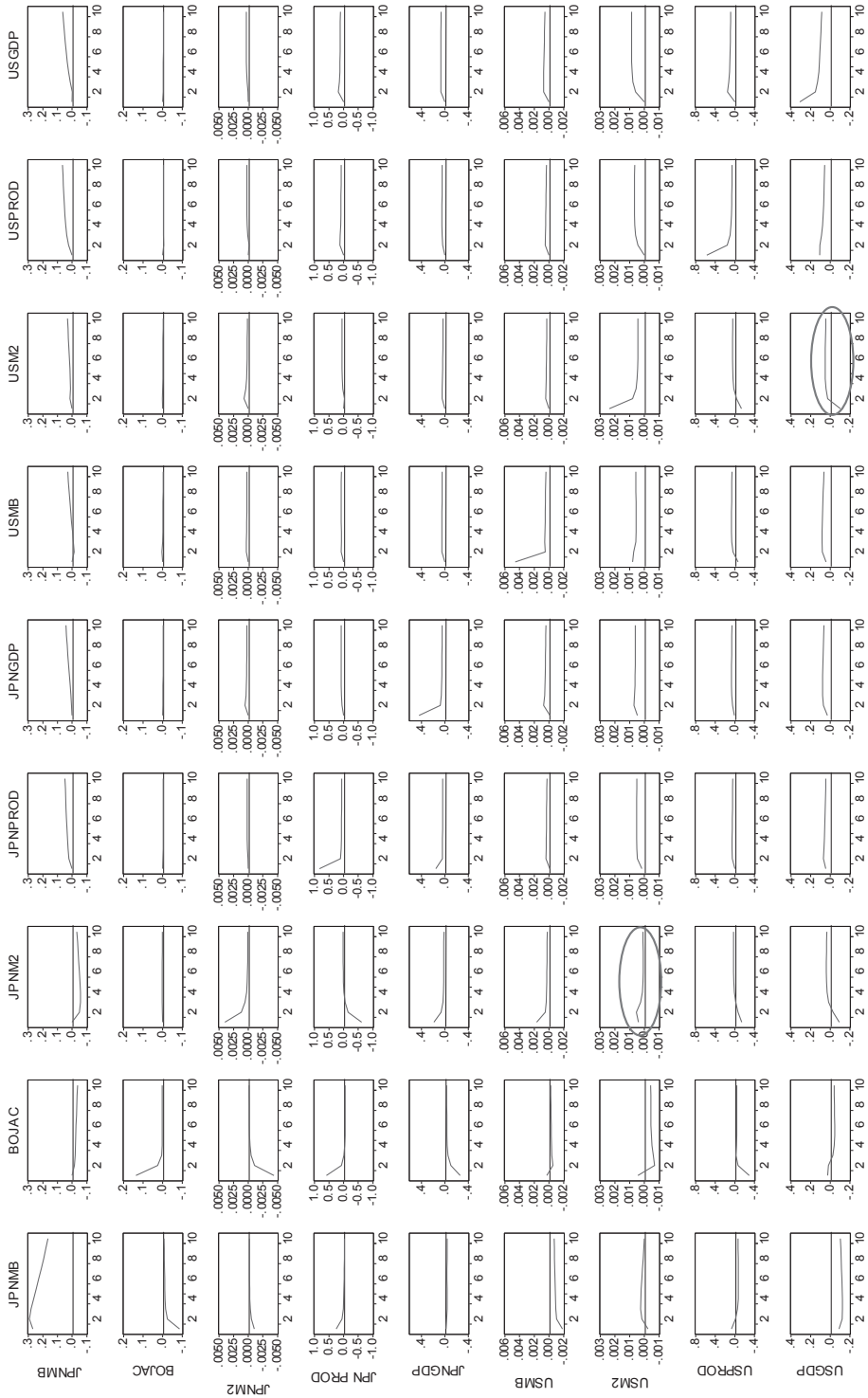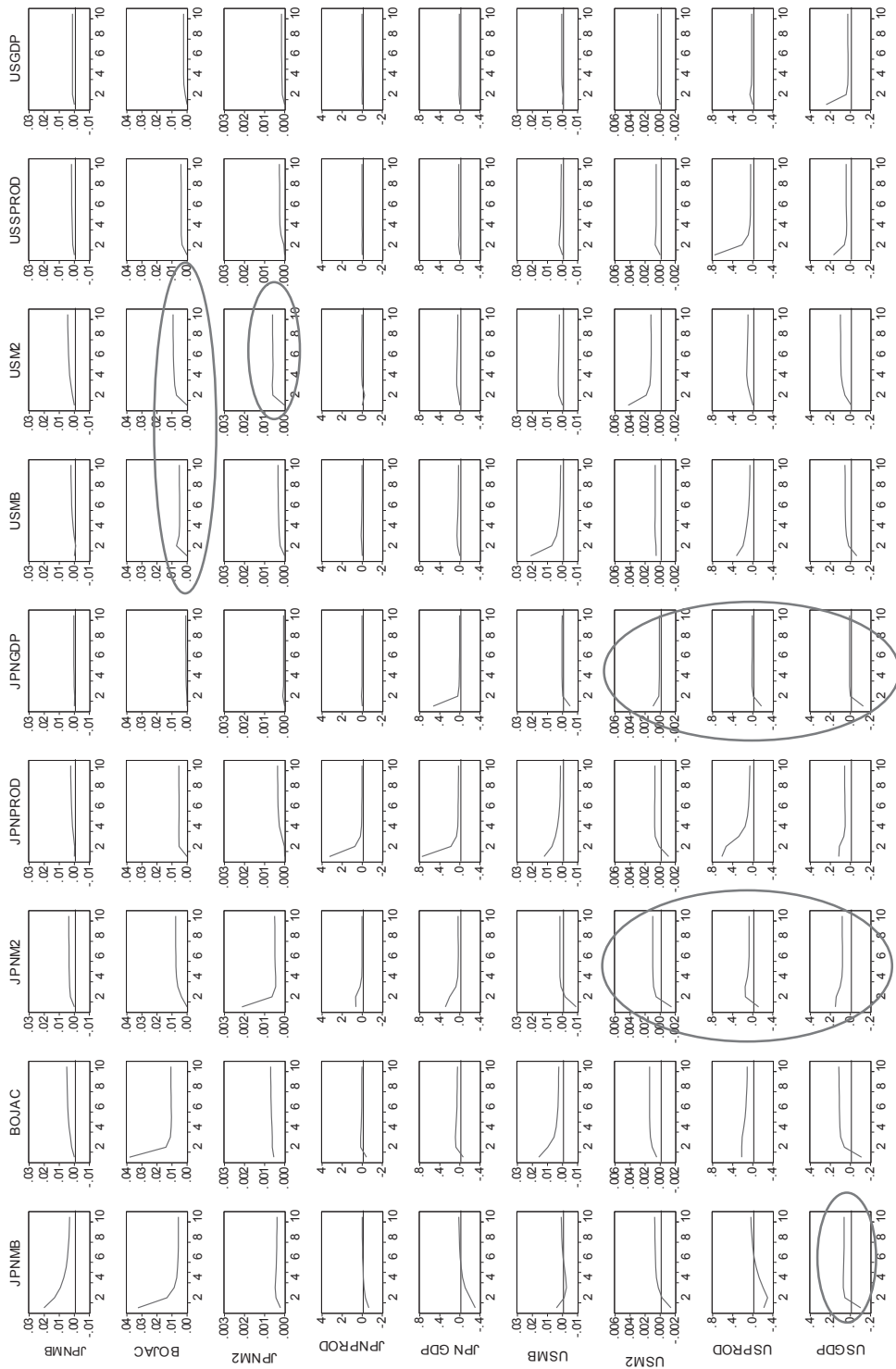
Fig. 11-2: Japan/ US Impulse Response to Monetary Base & Money Stocks (2008Q3-2016Q4)

4. 1. 2 Variance Decomposition; Effects of monetary easing on GDP growth

The variance decomposition of GDP growth in Japan shows that there were not substantial effects of monetary easing of Japan on the real growth in Japan, especially during 2001-2008 (Table 1). The monetary base (MB), together with money stock (M2), increased their share of decomposition in GDP growth in Japan during 2008-2016, but they have not contributed to the growth significantly in general.

Table 1: Variance Decomposition (GDP growth in Japan)

200Q21-2008Q2	Period	S.E.	MB	BOJAC	JPNM2	JPNPROD	JCPNGDP	USMB	USM2	USPROD	USGDP
	1	0.56	0.13	21.51	10.69	7.47	60.20	0.00	0.00	0.00	0.00
	2	0.59	0.43	22.41	10.76	7.29	56.10	0.67	0.56	0.37	1.41
	9	0.69	2.46	18.60	8.55	7.45	45.04	4.02	2.41	3.60	7.89
	10	0.70	2.68	18.23	8.34	7.47	44.09	4.30	2.54	3.89	8.46
2008Q3-2016Q4	Period	S.E.	MB	BOJAC	JPNM2	JPNPROD	JCPNGDP	USMB	USM2	USPROD	USGDP
	1	1.02	9.25	0.51	7.95	55.10	27.20	0.00	0.00	0.00	0.00
	2	1.08	11.93	0.94	10.60	51.87	24.37	0.16	0.08	0.04	0.01
	9	1.12	12.28	3.07	10.76	48.64	22.47	0.95	1.56	0.21	0.05
	10	1.12	12.24	3.23	10.78	48.43	22.35	0.99	1.68	0.24	0.06

Notes: logarithm for MB, BOJ current account, M2 (Japan & the US), and index for real GDP and production.
Sources: Author's calculation based on IFS (IMF), Bank of Japan, FRB.

On the other hand, BOJ's monetary expansion has contributed to the GDP growth in the US especially during the post Global Financial Crisis period (3rd quarter of 2008 to 4th quarter of 2016). As shown in Table 2, the share of variance of BOJ's current account (BOJAC) and M2 increased from 2.6% and 3.2% during 2001 Q2-2008Q2 to 20.8 and 18.3% during 2008Q3 – 2016Q4, respectively. It should be also noted that money stock (M2) in the US market has increased the share of decomposition in the same period, as compared with the period before the Global Financial Crisis (2001 - 2008). This result indicates that Japan's money

Table 2: Variance Decomposition (GDP growth in the USA)

200Q21-2008Q2	Period	S.E.	MB	BOJAC	JPNM2	JPNPROD	JPNGDP	USMB	USM2	USPROD	USGDP
	1	0.38	5.99	0.46	6.11	1.44	0.54	1.26	7.87	8.20	68.13
	2	0.45	11.28	0.46	4.63	3.33	2.61	3.91	5.64	10.91	57.21
	9	0.74	22.02	2.51	3.19	4.81	7.80	8.80	5.05	10.22	35.63
	10	0.77	22.51	2.64	3.19	4.83	8.00	8.97	5.06	10.10	34.70
2008Q3-2016Q4	Period	S.E.	MB	BOJAC	JPNM2	JPNPROD	JPNGDP	USMB	USM2	USPROD	USGDP
	1	0.41	6.59	7.53	13.44	7.87	10.33	2.39	0.05	16.80	35.00
	2	0.46	6.47	7.50	19.87	11.80	8.08	2.02	1.37	14.72	28.19
	9	0.70	8.92	19.95	18.67	9.63	3.63	4.30	13.05	8.67	13.19
	10	0.73	8.93	20.83	18.43	9.49	3.36	4.50	13.88	8.32	12.28

Notes: logarithm for MB, BOJ current account, M2 (Japan & the US), and index for real GDP and production.
Sources: Author's calculation based on IFS (IMF), Bank of Japan, FRB.

supply to the US market has significantly contributed to the GDP growth in the USA.

4. 2 Effects of the BOJ's Monetary Easing on the US Market/ Economy

In this section, impulse response functions based on BVAR model are used to examine the impact of BOJ's monetary easing on the US market. The variable used for the analyses are basically monthly data.

The impact of monetary expansion of the monetary base and BOJ current account on the US market has become very large in terms of the response of US money stocks. As shown in the Impulse Response Functions of the US market to BOJ's Monetary Easing during the whole period of 2008-2016 (Fig. and Table3)[10], the shock of increase in the BOJ current account, including foreign banks' reserves (Fresv) as well as M2 has positive influence on the US monetary base (MB) and M2. The responses of US market variables are generally larger and significant during the period from September 2008 to October 2014 as compared with that before QQE by BOJ.

Japan's Money stock (M2) had put significant positive impact upon the US market and economy during the period Sept.2008-March 2013 (Pre QQE), This trend continued and became more apparent during the period of QQE and the FRB's QE period (Sept.2008 ~ Oct. 2014)[11] : the response functions of US share price and industrial production to the BOJ's MB, Current Account (BOJAC), and M2 show positive effects on the real and financial market in the USA. Monetary easing under the Phase II of BOJ's QQE (Nov.2014-Dec.2016) has put significantly positive effect on the money stock (M2) in the US market, and that the real positive effect on production could be from the M2 expansion indirectly in the US market.

Thus, the BOJ's monetary easing has significantly contributed to the abundant supply of liquidity (MB and M2) in the US, which should have been one of the major factors for increased production and growth in the US during the period. It could imply that through the channels of private banks account, several financial investment activities are undertaken, originally from the BOJ current account.

Therefore, abundant liquidity provided by the BOJ should have been utilized for investment in the US market since the Global Financial Crisis. Particularly, the BOJ's monetary easing has surely put impact upon the money stock (M2) in the

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10. The table 3 & 4 show the coefficients and t-values of response functions, while the Fig. 15 and 16 show the actual graphs of the responses
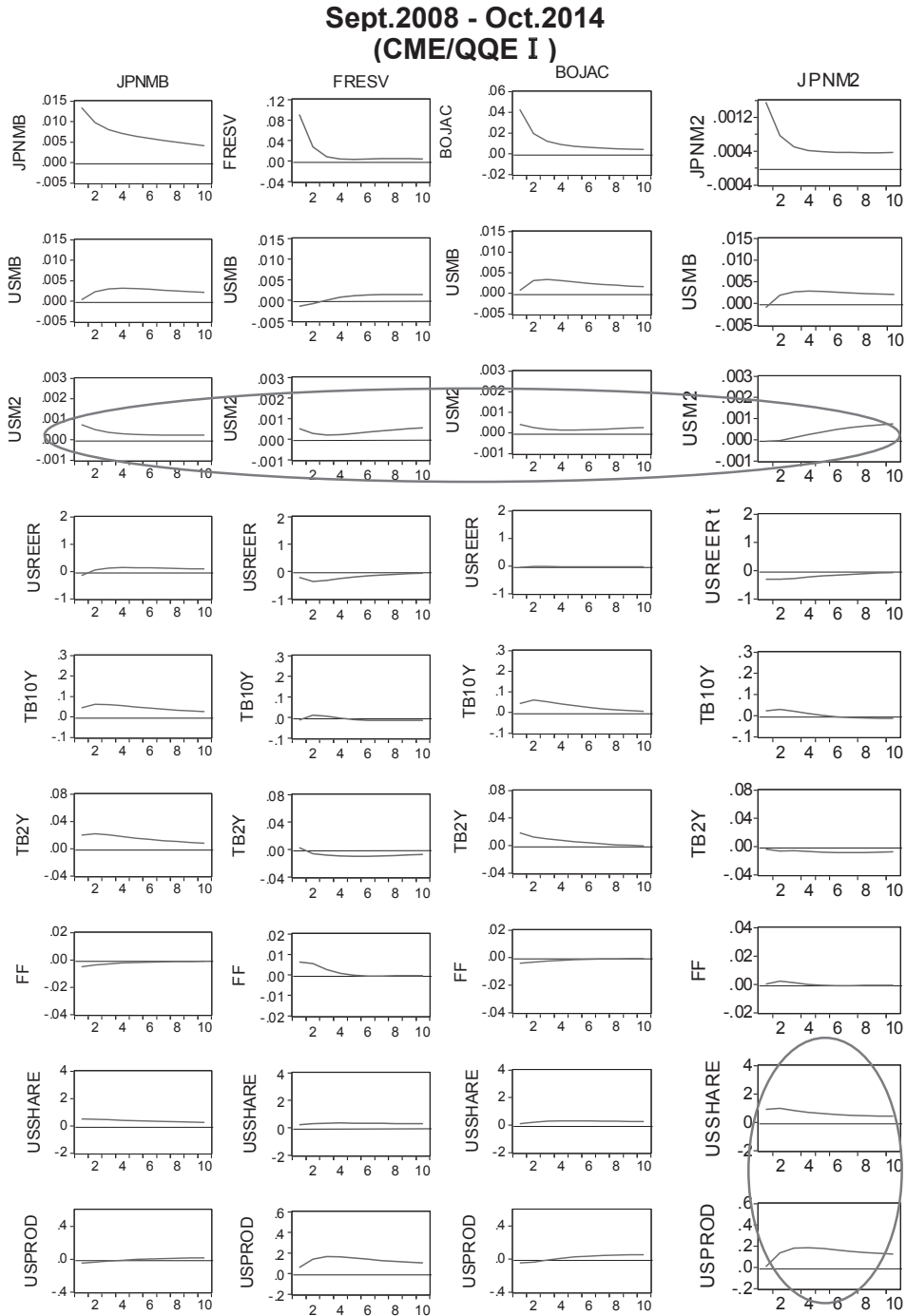
11. Due to short period, the period from April 2013 to October 2014 is not calculated on the analysis based on the BVAR model here.

Fig. 12-1: Impulse Response of the US to MB /BOJAC/FResv/M2 in Japan (2008-13)
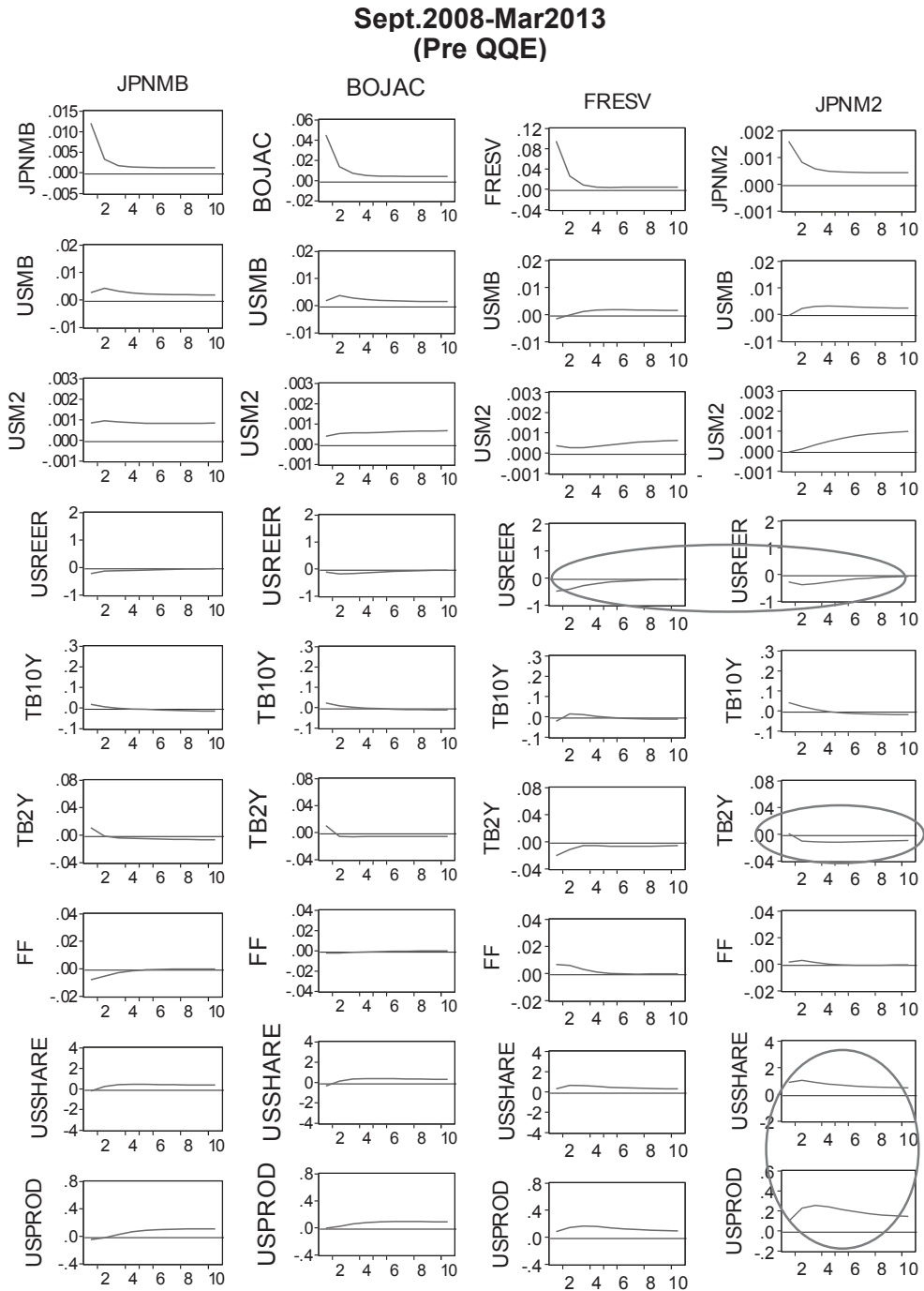
Sept.2008-Mar2013
(Pre QQE)
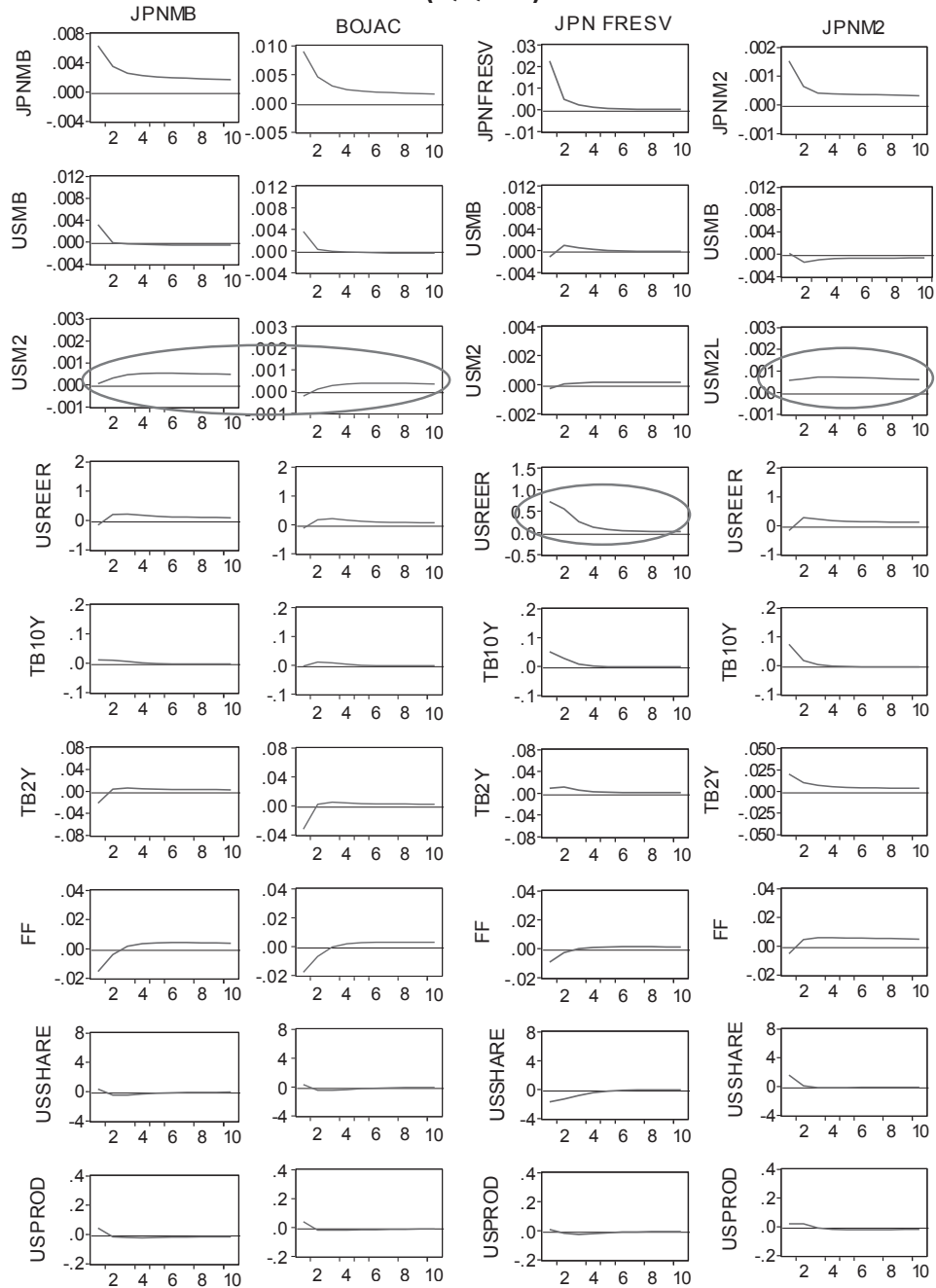
Fig. 12-2: Impulse Response of the US to MB /BOJAC/FResv/M2 in Japan (2008-14)

Sept.2008 - Oct.2014
(CME/QQE I)

Fig. 12-3: Impulse Response of the US to MB /BOJAC/FResv/M2 in Japan (2014-16)

Nov.2008 - Dec. 2016
(QQE Ⅱ)

US market. Therefore, it could be stated that it is BOJ's monetary easing that contributed to the money stock expansion for effectively worked for the US market.

4. 3 Effects of the US Monetary Easing on the Japanese market/ Economy

As shown in the previous section, the BOJ's monetary easing has contributed to the US market and economy, while it has been ineffective in recovery of the economy in Japan. In this section, the effects of monetary easing by the FRB on the Japanese market will be examined to show that monetary easing under the QE has not influenced on the real economy but only in the financial market in Japan. The period FRB.'s QE (Sept. 2008 - October 2014 and the 'Post-QE3' (Phase II of QQE, Japan) period from November 2014 to December 2016.

The US monetary easing had strengthened with the introduction of QE2 and QE3 until October 2014, and as a result, liquidity though private banks have increased for financial investment in the market, but the US M2 had even negative effect on the industrial production in Japan during Sept.2008-0ct0.2014, while US MB put negative impact on the stock prices in Japan during the QE3 period[12]. On the whole, the US monetary base and M2 had significant effects on the impulse responses of Monetary Base and BOJ current account in Japan during 2008-2014 (Fig.16)[13].

It could show that during November 2014 and December 2016 foreign banks' (including the US banks) current account (including the US banks) current account reserve is no more a major source of investment in the Japanese market, but direct investment from the US banks / financial institutions through private banks' money stocks (M2) should have increased in the securities and stock trading during the period. The US MB and M2 also had significant effects on call rate and JGB yield, respectively. This would indicate that FRB's monetary easing (especially QE2 and 3) has significant impact upon the money supply in Japan, while there is no positive effect on stock prices nor industrial production.

During the period from November 2014 and December 2016 (post-QE3 period, Phase 11 of QQE), the impulse response functions of the MB in Japan to the US MB

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12. This could be confirmed from the fact that the increased investment in the Japanese market (See Akai et al [2016]). The money flows from the US monetary base could have changed in the process of 'tapering' of FRB's QE3, stated in the FOMC in September 2014, The causality. from the Japanese market could be more apparent in such a situation.

13. The monetary and financial market conditions have been changed since the latter part of 2014, including the end of QE3. so that the impulse response functions are different in results between the period 2008-Oct.2014 and Nov. 2013-2016.

has become insignificant, while the USM2 still put significantly positive effect on M2 in Japan. This could indicate that the US banks' investment in financial instruments have continued to be active through Tokyo market. On the other hand, there is no positive response to industrial production nor stock prices in Japan during the period.

Fig. 13: Impulse Response of the Market & Economy in Japan to the US Monetary Base
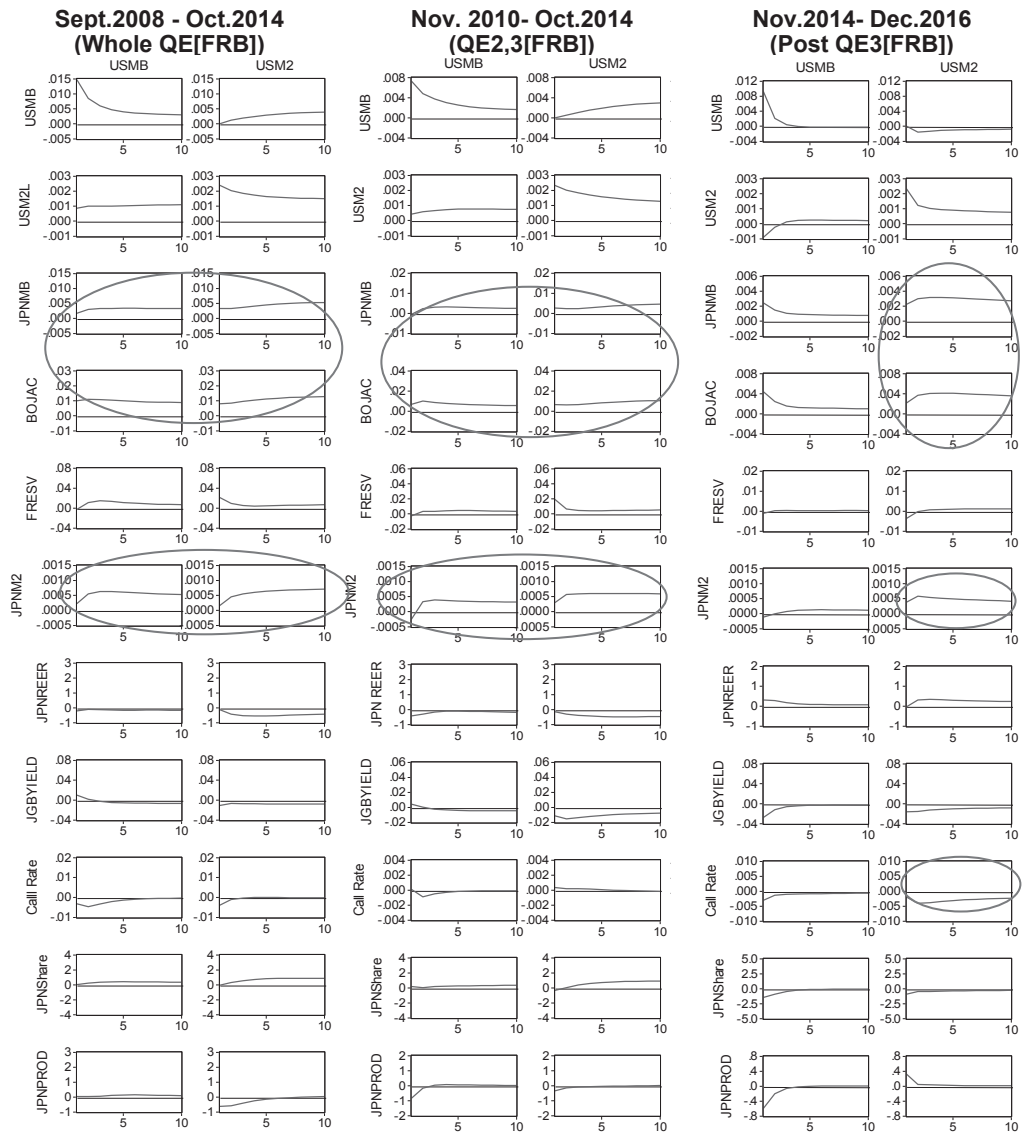
The above results of impulse response functions of both the Japanese and the US markets suggest that the monetary easing policy in both countries has played an important role in international capital flows, including carry trade between the US and Japanese market. While the BOJ's QQE has put significant positive effects on the US market and the economy possibly through the asset effects, the FRB's monetary easing under the QE2 &3 US might have only limited impact on the financial market, not the real economy in Japan.

4. 4 Monetary Easing Policy and its Impact on the Markets in the US and Japan

The effects of monetary easing of BOJ and FRB on the Japanese / US markets and economies in the Post Global Financial Crisis are summarized in Table 3.

The periods are divided into four periods: (i) Sep.2008-Mar.2013 [Pre QQE]; (ii) Sept.2008-Oct.2014 [QE 1. 2, 3]; (iii) Nov. 2014-Dec.2016 [Post-QE3].

The monetary base, including the BOJ's current account, have not been effective for recovery of the real economy in Japan especially during the period of QQE, On the other hand, BOJ's monetary easing policy under QQE has facilitated massive capital flows which could be utilized for the US market and the real economy especially during the Post-QE3 period since November 2014. Thus, the BOJ's monetary easing policy have influenced positively on the US capital / financial market and production activiti.es significantly.

On the other hand, the US monetary easing and money stock influenced only on the Japanese monetary and financial market but contributed to the real economy in Japan in recent years.

Table 3: Japan & the US: Impulse Response to Monetary Easing Policy : BVAR [Monthly]

Sept.2008 - Mar.2013	JPNMB	BOJAC	BOJAC	Fresv	JPNM2	USMB	USM2	USREER	TB10Y	TB2Y	FF	USShare	USProd
JPNMB						○							
BOJAC						○							
Fresv								▲				○	○
JPNM2	○											○	○
USMB	○	○			○								○
USM2	○	○			◎				▲			◎	○
USREER									▲				▲
TB10Y			▲					▲		○	▲		
TB2Y			▲				○						
FF						▲		○					◎
Share					○		○				○		◎
Prod	○					○			▲	▲	▲	○	
Sept.2008 - Oct.2014	JPNMB	BOJAC ○	BOJAC	Fresv	JPNM2	USMB	USM2	USREER	TB10Y	TB2Y	FF	USShare	USProd
JPNMB						○		○	○	○			
BOJAC						○		○					
Fresv								▲			○		
JPNM2				○									
USMB		○	○		○								
USM2	○	○			○							○	○
USREER	○	○											
TB10Y	○	○											
TB2Y	○												
FF				▲									
USShare	○				○								
Prod					○								
Apr.2013.4-Dec. 2016	JPNMB	BOJAC	BOJAC	Fresv	JPNM2	USMB	USM2	USREER	TB10Y	TB2Y	FF	USShare	USProd
JPNMB							◎	○		○			○
BOJAC						○	◎	○					○
Fresv						○	○	○					○
JPNM2							○	○					
USMB	○			○					○		▲		○
USM2	◎	○		◎	◎						○		
USREER				○	○							▲	
TB10Y						○							
TB2Y								○					
FF						○	▲	▲					▲
USShare													○
Prod				○		○			▲			○	

Notes: ◎ and ○ denote positive responses, with the former significant degree. ▲ negative responses.
Sources: Author's calculation based on the database of IFS (IMF), Bank of Japan, BIS, METI (Japan)

Concluding Remarks

This paper analysed the effect of monetary easing policy on the markets and the real economies in Japan and the USA, based on the Bayesian VAR models between 2008 and 2016, covering the period of the Comprehensive Monetary Easing (2010-2011), as well as the Qualitative and Quantitative Monetary Easing (QQE) Policy (2013 - to date) in Japan and the QE (October 2008 - October 2014) in the USA.

Monetary easing policy in the post Global Financial Crisis, especially the

BOJ's QQE, has not been successful in an economic recovery in Japan. The results of analyses indicate that the BOJ's current monetary easing policy has not been effective for the industrial production nor GDP growth, which has clearly shown the fact that the major policy of 'Abenomics' has failed in recovering the Japanese economy.

On the other hand, the FRB's monetary easing under the QE2 &3 might have put some impact on the financial market, including monetary base and money stock as well as the US stock market, where the asset effects have possibly been worked for the recovery of the real economy in the USA, while it is not seen in the Japanese market. Thanks to the massive money supply from Japan, the US economy could recover from the severe setback and stagnation after the Financial Crisis and sustained 2-3% growth in the past years, while Japan has suffered from stagnation of the economy. This could be one of the reasons why the BOJ's monetary easing policy has become ineffective in stimulating the real economy in Japan. The monetary easing policy under the QE2 and QE3 by the FRB might have been a strong factor for the recovery of the US economy, while it should have facilitated financial investment in Japan through carry trade, it has not contributed to the real economy in Japan during September 2008- October 2014.

As the above analysis demonstrate, the financial markets in the US and Japan have become more integrated each other under increasing international capital flows. Particularly, the money stock and foreign banks' reserve of the BOJ current account have had significant association with the capital / financial market in the US, where abundant liquidity could have been utilized in the US market.

With regard to some political implementation of QQE policy in Japan, the 'exit' of the FRB's QE3 in October 2014 should have put some pressure on the BOJ's continuation of the current QQE policy, as a 'safety net' of global money supply. The ineffectiveness of monetary easing in Japan has shown the fact that under the current completely free capital account regime, the abundant liquidity provided by the. BO'J may not be utilized fully for productive sectors but mainly for short-term and speculati.ve investment in the financial sector in both Japan and the USA.

Given the fact that the BOJ's QQE has contributed to the recovery of the US economy and market after the Global Financial Crisis, the QQE should now be ceased. This is because the money provided in the market has not contributed to the original purpose: recovery of the domestic economy in Japan. The extremely easing monetary policy has not only been failed in the economic recovery in Japan, but also has resulted in deterioration of the balance sheet of BOJ which should make the confidence in the BOJ lost in the future.

In view of the ineffective monetary easing under the QQE, capital account and financial control / management could be considered to regain effectiveness of monetary policy which should not be based on quantitative monetary easing but more rest on interest rate policy (not continuing current 'minus' interest Policy at the BOJ Current Account) and attain independence on the domestic monetary policy in Japan[14]. Since monetary policy has been unsuccessful in recovering the economy, the government should take several important economic policies to stimulate the economy, including 'true' reforms of labour market to raise the general level of lower and middle-income households for expanding domestic consumption, which should contribute to economic recovery with sustainable growth rate in Japan[15].

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15. Ohta (2017) shows that introduction of more progressive tax system should have positive effects on total consumption thereby raising growth rate in Japan.

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