

Impacts of Quantitative Monetary Easing Policy in the US and Japan on the Thai Economy*

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Abstract

The Financial Crisis of 2007-2008 led to recession in the US in 2009. Thailand's exports declined in 2009, because of the high exposure of Thailand's exports to USA and Japan. Although Thai financial institutions were mildly affected by the global financial crisis, the Thai stock market was primarily affected by capital outflows and pessimistic sentiment. Unconventional monetary policy conducted in the US and Japan in response to recession affected Thailand's capital flows, interest rates, exchange rates, and the stock market prices. The massive injection of dollar liquidity brought about booms in Thailand's asset markets, strengthening the Thai baht, and complicating the conduct of Thailand's monetary policy. The Bank of Thailand might want to prevent baht appreciation by using low interest rate policy to discourage capital inflows. But this easy monetary policy can rekindle inflationary pressure and propagate asset bubbles. In addition, after output and employment recovery in the US, the fear of the Fed's policy reversal create uncertainty and liquidity risks.

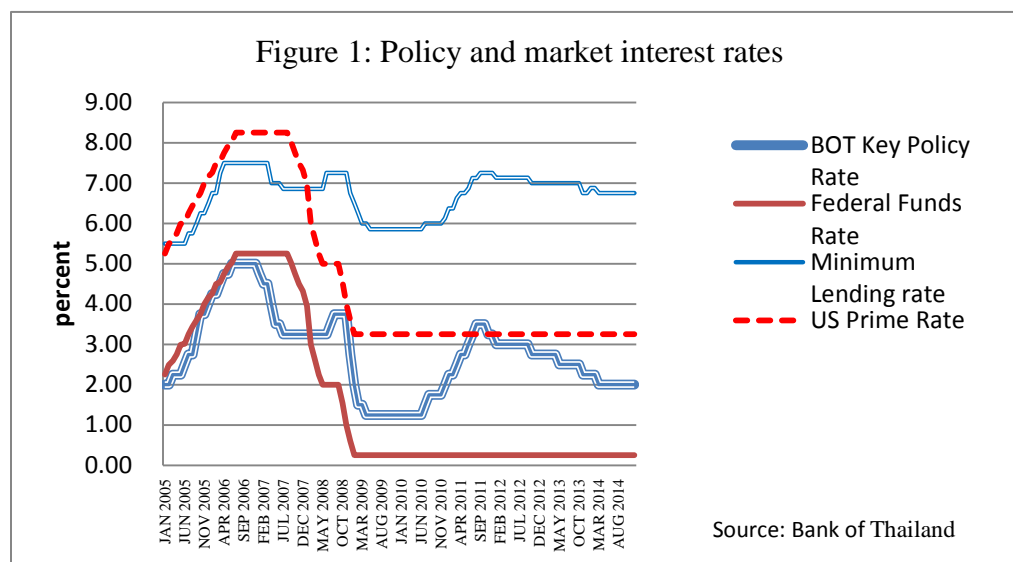
The paper compares and contrasts the impact of unconventional monetary policy conducted by the Fed and the BOJ on the Thai economy. The relative impact of QE policy in both countries depends on export market exposures and linkages in trade and financial transactions between Thailand and the two countries. In the short run, the impact on output can be expansionary or contractionary, depending on the impact on the baht exchange rate against the USA and the yen. In the long run, when the QE exerts its expansionary impact on output in the US and Japan, Thailand's manufactured output and exports Thailand can be stimulated.

The conclusion is that that a small and relatively open economy such as Thailand is vulnerable to monetary policy shocks by unconventional monetary policy in USA and Japan. Allowing exchange rates to restore external disequilibrium can mitigate the impact of external monetary policy shocks that might lead to capital inflows or instigate capital flight.

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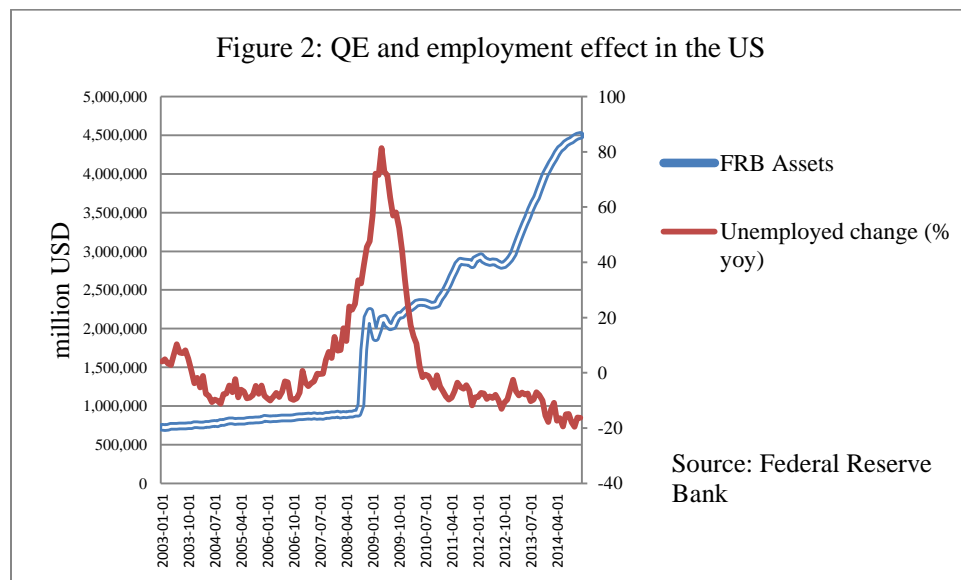
1. The conduct of anti-cyclical monetary policy

It is well-known that the lag effect on output of monetary policy is long and variable. In many cases, monetary policy is carried out too late and too little to cope with changing environment. To increase the effectiveness of monetary policy, the information and decision lags must be minimized. When experiencing temporarily external shocks, a gradual approach to monetary policy adjustment is preferable to a sudden shift of monetary policy stance.



The Fed aggressively cut the federal funds rate right after experiencing the sub-prime crisis. Because of the linkage between short-term and bank lending interest rates, the US prime rate subsequently declined after the Fed took easy monetary policy stance (Figure 1). There was a constant gap between the Federal funds rate and the prime lending rate. Unlike interest rate adjustments in the US, Thailand's Minimum Lending Rate (MLR) did not follow closely with the BOT's monetary stance, signalled by changing the key policy interest rate. Because of the loose connection between the short term on long term interest rates, monetary policy in Thailand is not as effective as the Fed's influence on the US financial sector. The federal funds rate was maintained at 0.25 percent from January 2009 to December 2014. The massive injection of liquidity through purchase of corporate bonds by the Fed began in 2008. The Bank of Thailand started tightening monetary policy by raising the key policy rate in May 2010 from 1.25 percent to 1.50 percent. The rate hike peaked at 3.5 percent in August 2011. As a result, the interest rate differential between domestic and foreign markets was widening, encouraging capital inflows. With ample liquidity in the Thai money markets, the MLR did not decline by the same proportion as the BOT's interest rate cut. The MLR declined by 0.75 percent despite the 1.25 percent cut in the key policy rate. The gap between the prime rate and the MLR was widened from 2.75 percent in April 2007 to 3.5

percent by the end of December 2014. Keeping the long duration of a large interest rate gap complicates the BOT's conduct of monetary and exchange rate policy. The unwarranted fear of baht depreciation and the under-estimation of recession probability precluded the BOT from engaging in timely monetary easing to spur growth. By February 2015, the BOT's key policy rate remains at 2 percent, despite easy monetary policy stance employed in more than 10 countries since the begging iof 1015. The centra banks in Singapore, Indonesia, and India, Australia, and Canada have already cut their policy rates to prevent capital outflows.



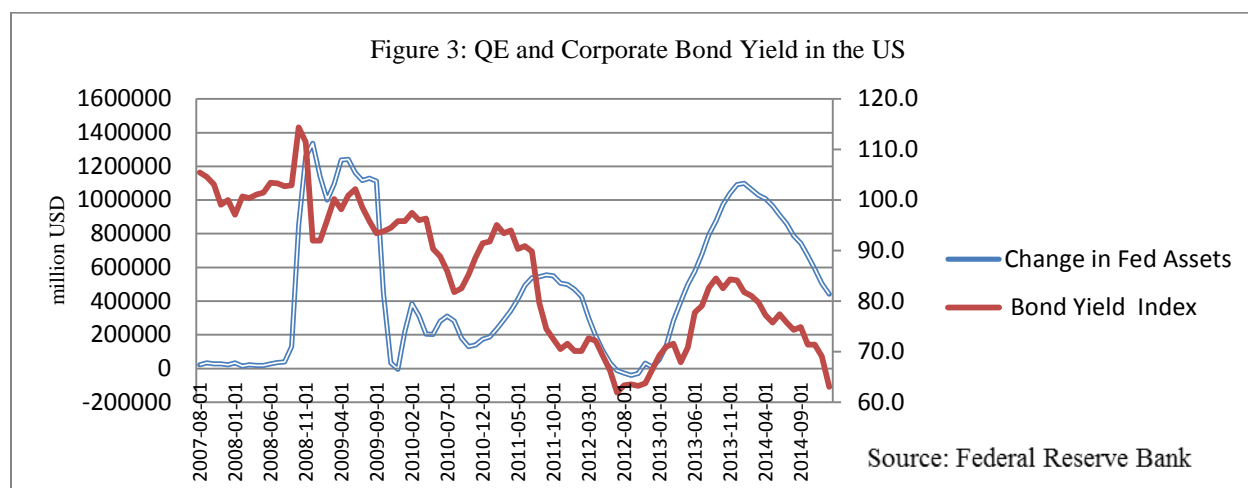
After realizing that conventional interest rate cuts cannot resuscitate the economy from the global financial crisis, the Fed started embarking on unconventional monetary policy by purchasing corporate bonds in the US markets. The percentage increase in the number of unemployed rose by 80% (y-o-y) at the trough of the recession in April 2009 (Figure 2). Since then the percentage increase in the number of the unemployed slowed down and finally reduced by the beginning of 2010. The recovery of the US economy was well under way.

Chung *et al.* (2012), employed the Fed's FRB/US macroeconomic model, found that the Large Scale Asset Purchases (LSAP) reduced long-term interest rate by 50 basis points and raised the real GDP by three percent and inflation rate was one percent higher than if the Federal Reserve had not carried out the program. Thus the asset purchases prevented deflation in the US. The main unemployment rate (U-3) declined to 5.6 percent in January 2015. The long duration of unemployment has discouraged those who were looking for jobs and decided to drop out from the labor markets. As a result, the broader unemployment rate (U-6), which includes those who are underemployed, discouraged workers, and part-time workers, remained as high as 10 percent, during the same corresponding period. There is a question whether the recovery is still fragile as consumption spending and residential investment still remain weak. Furthermore, the question arises about the consequences of the Fed's Quantitative Contraction (QC) after the Fed unloads its assets from the balance sheet, and whether the reversal of the Quantitative Easing

(QE) will lead to global adjustment of capital flows. Capital flights might lead to another round of foreign exchange crisis if the QE measures are abrupt and unanticipated.

The cost of capital depends on the borrowing cost. The Fed can affect the user cost of capital by changing the long-term interest rate. Aside from affecting the lending cost by influencing the short-term interest rate, the Fed can alter the long-term interest rate through unconventional monetary policy through the so-called “operation twist,” which implies simultaneously selling short-term bonds and buying long-term bonds. In the process, there is no change in the Fed’s total assets, as the proceeds from selling bonds are used to buy long-term bonds, forcing the decline in long-term yield and the increase in short-term yield. The yield curve has become flatter because of the operation twist. Consequently the lower cost of capital can induce higher capital spending.

The Fed’s total assets increased, resulting in an increase in the price of corporate bonds, which in turn leads to lower bond yields in the US corporate bonds (Aaa) as shown in Figure 3. From December 2010 to August 2012, the US corporate bond yield had declined by 40 percent. When the Fed began the third round of QE in early 2013, the corporate bond yield resumed its declining trend in September 2013. Thus there is a lag effect of liquidity injection on the bond yields for about 10 months, implying that the impact on the real sector is longer than three quarters.

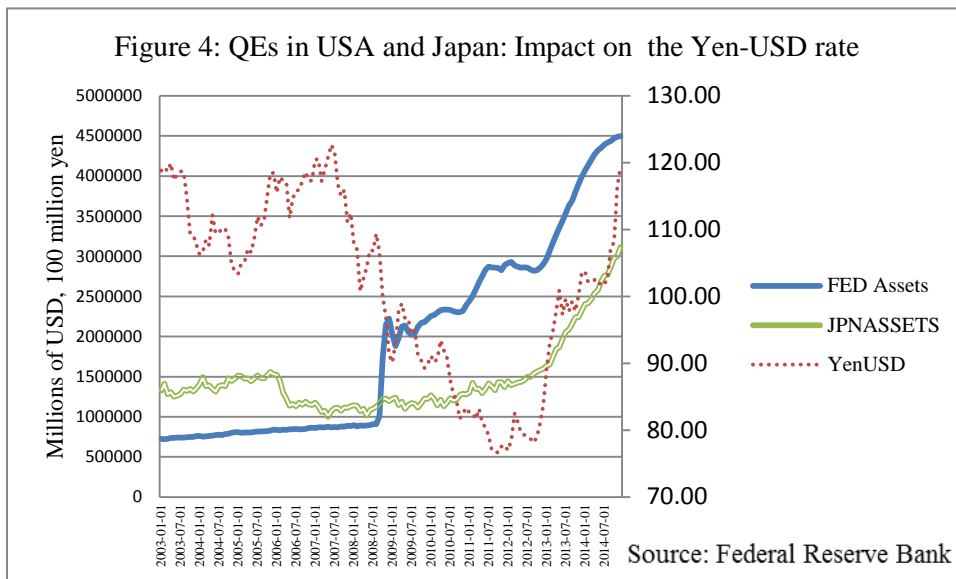


Breeden *et al.* (2012) construct a counterfactual path of bond yields to estimate the impact of QE. They find the evidence that the 2009-2010 QE program significantly lowered government bond yields, through portfolio balance channel, by 50 percent basis points. According to Joyce *et al.* (2011), over the period March 2009 and January 2010, the BOE spent 200 billion pound, representing 14 percent of annual GDP, on government securities. The evidence indicates that QE purchases financed by the central bank money have had significant impact of the British economy. Baumeister and Benati (2010) investigate the macroeconomic impact of lower long-term bond spread during 2007-09 recession period. They conclude that a compression of the long-term yield spread has a powerful effect on output growth and inflation. Their counterfactual

simulations illustrate that unconventional monetary policy actions in the US and UK averted deflation and output collapses.

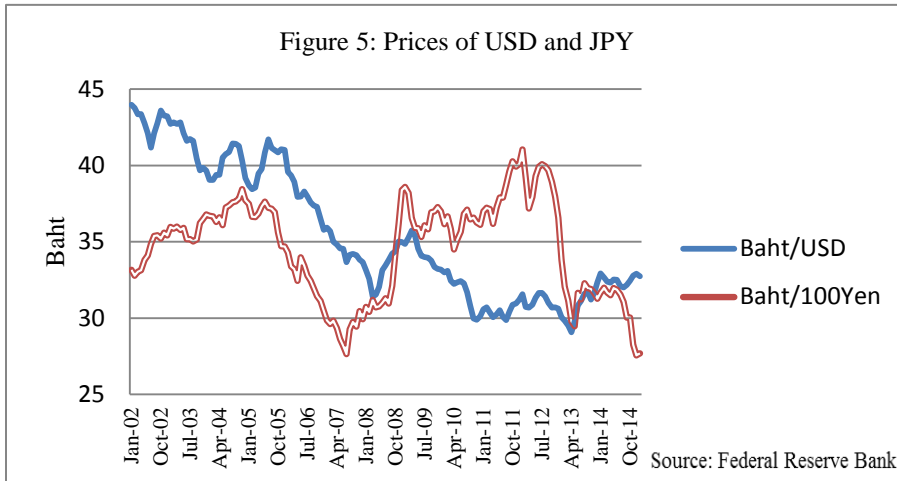
2. Consequences of the QE on Thailand’s exchange rates and exports

Large injection of USD to the world liquidity led to the appreciation of the yen and other Asian currencies. The appreciation of the yen against other Asian currencies increases their exports if their export markets largely depend on the Japanese market. Moreover if the quantitative easing causes output expansion in the US and in Japan, the income effect from expanding these two economies can boost exports in Asia. On the other hand, if export market depends heavily on the US market, the substitution effect caused by the appreciation of the domestic currency against the US dollar will mitigate the expansionary income effect of the QE.

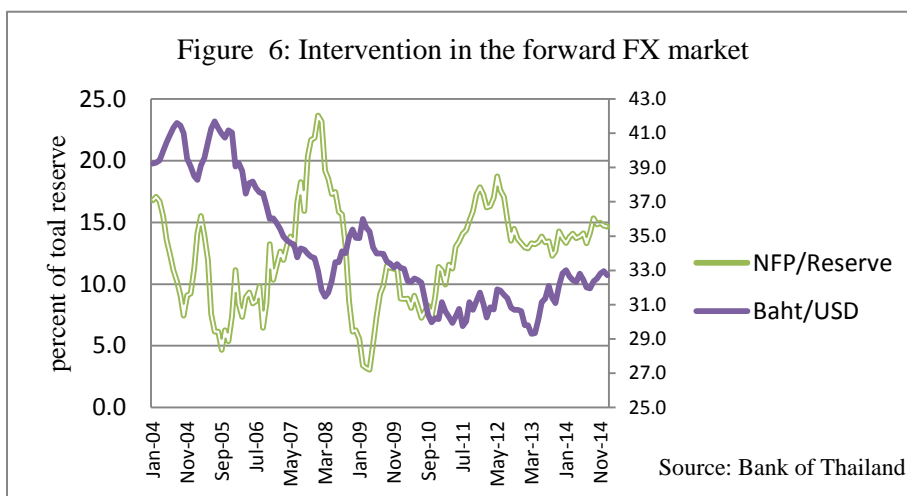


At the trough of the US recession, the Fed’s assets expanded substantially (Figure 4). The BOJ also took similar measures, albeit to a lesser extent, leading to expansion of BOJ’s assets in line with the Fed after 2010. The massive injection of money supply by the Fed led to the Japanese yen appreciation against the dollar. In 2012, the yen-dollar exchange rate reversed the appreciating trend after the BOJ aggressively injected liquidity in the Japanese financial market. The yen rebounded in May 2012 from 80 yen to the dollar to 119 yen at the end of 2014. Utilizing monthly data from June 2004 to December 2014, the Granger Causality Test was performed to test the relationship between the percentage change of the Fed’s total assets and the yen-dollar rate. It is found that the Granger causality runs from the QE to the yen dollar rate, not the other way round. With 118 observation, the hypothesis that percentage changes in the Fed’s total assets does not Granger cause the yen-dollar exchange rate was rejected with the 0.02 level of significance. When contemplating the QE, the Fed was mainly concerned with economic recovery rather than the value of the dollar.

Because Thailand's international trade is conducted mainly in the USD, the Quantitative Easing (QE) and Quantitative Contracting (QC) have significant impact on the Thai baht. In general, the price of the dollar in terms of baht trended downward from 2002 to 2015, while the price of the yen in terms of baht fluctuated more than the dollar (Figure 5). The reason behind this is that the BOT has intervened heavily to stabilize the baht-dollar exchange rates, trying to slow down the appreciation of the baht, in order to prevent export shortfalls caused by the rapid baht appreciation against the USD. The ratio of the baht/USD and the baht/yen exchange rates simply echoes the fluctuations in the yen/dollar exchange rate (as shown in Figure 4), which is the outcome of the asset expansion of the Fed and the BOJ.

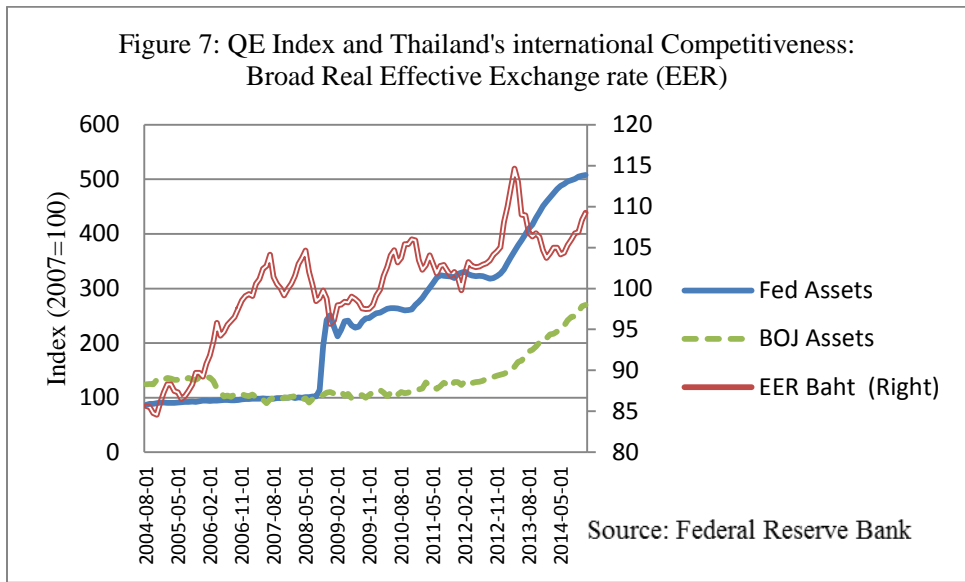


When the baht appreciated against both currencies simultaneously in 2005/2006 and 2013, the impact on Thailand's export sector was substantial in terms of the loss in international competitiveness. As the baht appreciated, the BOT intervened heavily in spot and forward markets. The share of Net Forward Position (NFP) in total international reserves increased more to 24 percent in 2008 (Figure 6) when the baht appreciated against the USD in June 2005 from to 41.3 baht to 31.5 baht in March 2008, representing a 31 percent rate of appreciation. As the QE liquidity injection slowed down, the baht depreciated a bit before started climbing again to the new high of 29.3 baht in April 2013, prompting the BOT to intervene once again in the forward market.

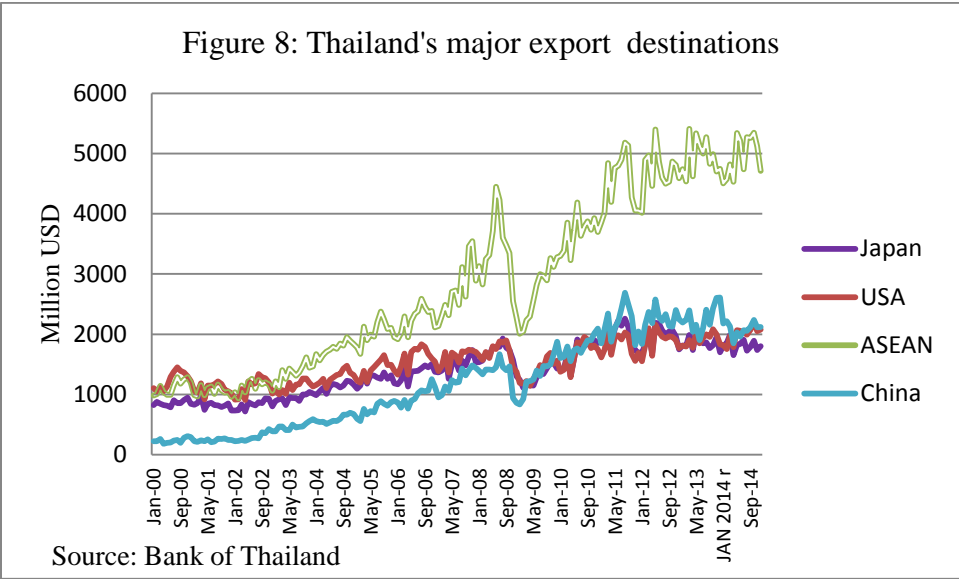


Even if the BOT succeeded in slowing down the appreciation, the BOT paid a substantial price in terms of foreign exchange losses as long as the dollar trended upward. In the long run, firms may get complacent, knowing that the central bank will bail them out when the exchange rate turns again them. This kind of moral hazard will not take place unless the Bank of Thailand refrains from market intervention.

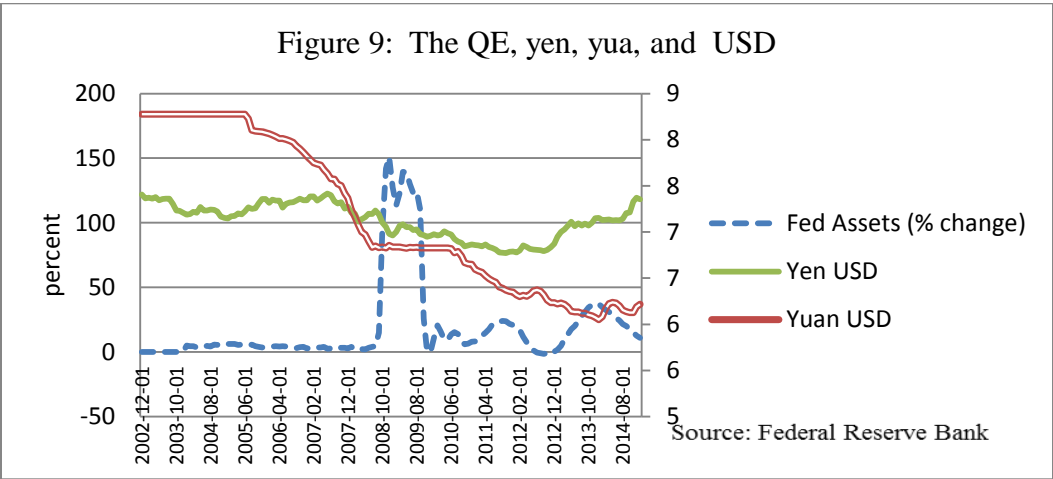
By expressing the value of the assets purchased by the Fed and BOJ in terms of an index (2007=100), we can see the relative strength of the QE of the two central banks (Figure 7). The Fed has been more aggressive than the BOJ in terms of asset expansion. Consequently, the broad effective real exchange rate of the Thai baht appreciated considerably by the sheer force of the QE in 2008, causing the Broad Real Effective Exchange Index (EER) of the baht appreciated by 15 percent by April 2014. In case of the US, Warburton (2013) find the evidence that the trade weighted dollar was affected by the interest spread, which tracks quantitative easing, although unexpected changes in national financial conditions, the federal funds rate, and the velocity of money account for more variation in the trade-weighted index of the dollar.



The loss of international competitiveness of Thailand's trade sector can be seen in the sluggish growth of Thailand's exports to the US, Japan, and China (Figure 8). The global financial crisis has already caused a substantial decline in Thailand's exports in 2009; the adverse consequences from the QE exacerbate the export decline. Figure 8 also indicates that Thailand's exports did not perform poorly in ASEAN markets. Similarly to the Thai baht, other ASEAN's currencies also appreciated against the US dollar after the QE programs. Nevertheless, Thailand's exports to this region remained flat between 2012 and 2014.



The poor performance of Thailand's exports can partly be attributed to the expansion of the USD that caused substitution effect away from Thailand's products. Those Thai firms with export-oriented strategy suffered more than domestic oriented firms. They ran lower level of capacity utilization, thereby discouraging them to undertake new capital investment despite the benefits from baht appreciation that cheapened imported capital goods. Viewed in this light, QE programs have a far reaching impact on investment and long-run productivity growth.

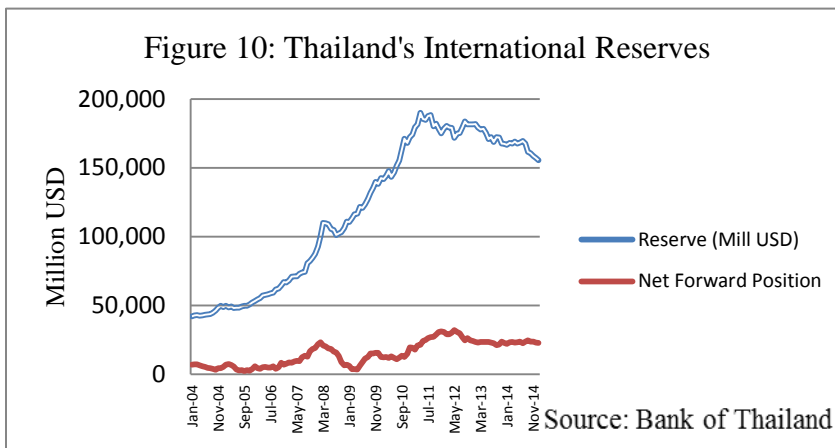


When the renminbi appreciates against the dollar, China's exports slow down. In turn, a decelerating growth of output in China transmits to lower demand for exports from Thailand. The second round indirect impact of QE works through income effect when China's economy experiences growth slowdown because of currency appreciation. Hence the fear of a sudden yuan depreciation and another round of currency war if China need to stimulate its export-driven economy.

3. Impact on Thailand's asset markets

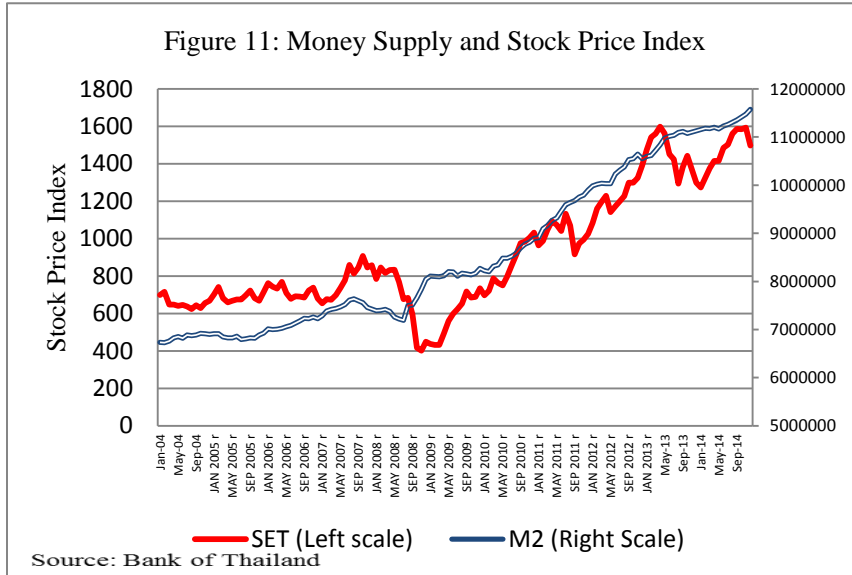
The Federal Reserve's monetary policy actions since 2008 have affected long-term interest rates through quantitative easing. Kiley (2014) identifies the comovement between interest rate and equity prices caused by monetary policy changes. A decline in long-term interest rate induced by monetary policy statements associated with zero bound on the short-term interest rate has a positive impact on equity prices prior to 2009. Furthermore, the impact of the QE can also be transmitted into equity prices in emerging economies.

Thailand's level of international reserve reached the all-time high at 181 billion USD in May 2011, thanks to the capital inflows as repercussions from the QE (Figure 10). The rising internainal reserves implies that the BOT continued buying the USD to prevent the baht from appreciation. Since then, the BOT stopped buying the dollar and started selling the dollar to prevent the baht from depreciation. As a result, the level of the international reserve declined gradually as the baht depreciated to almost 33 baht to the dollar at the end of 2014. Because the BOT intervenes regularly in both directions, the fear of floating prevails in the mindset of monetary authorities.

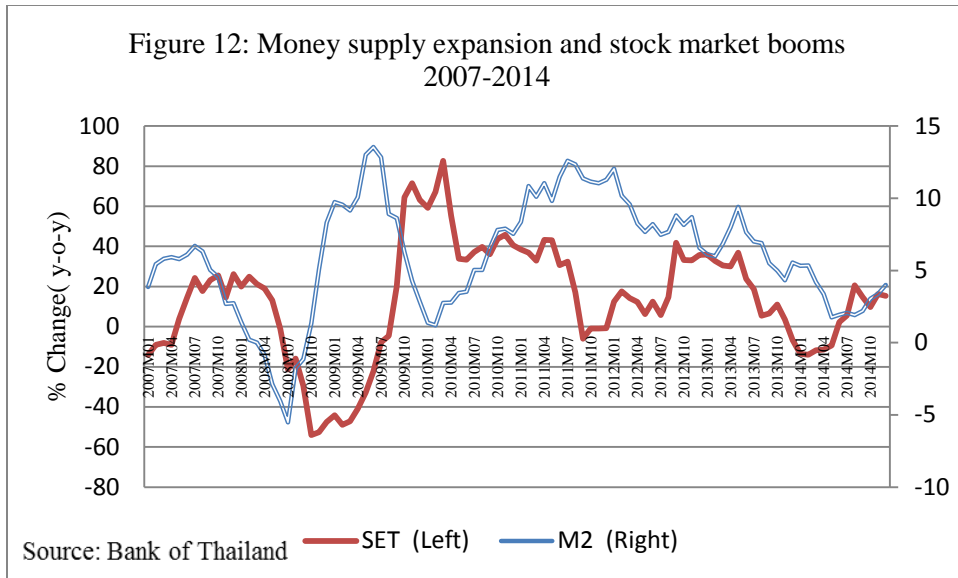


Because it is difficult to find an optimum level of foreign exchange rate to satisfy external equilibrium conditions, to stimulate exports and to simultaneously maintain price stability, continued intervention in the foreign exchange markets can complicate the conduct of monetary policy which has to focus on adjusting interest rate policy instruments. The rising amount of

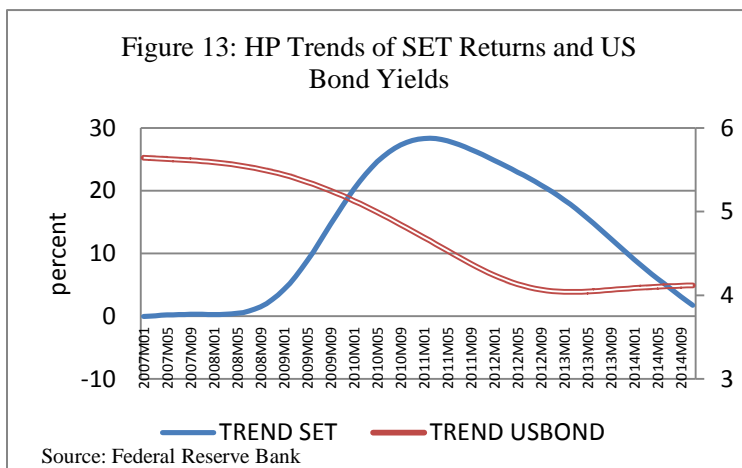
international reserve prior to the global financial crisis, which continued into the QE episodes imply rapidly enlarging the monetary base and money supply in emerging economics.



Thailand’s stock prices rose in line with the expansion of money supply (Figure 11). Since the economy experienced growth slowdown, interest rates from bank deposit remained at low levels, making it more attractive to invest in the stock market. The rate of return from investing in the stock market and the expansion of money supply are related (Figure 12). The rise in the stock prices in Thailand is partly due to investor sentiment driven by the share prices in the Wall Street. Thus the QE conducted in the US has direct and indirect impact on Thailand’s stock market. Other Southeast Asian stock markets also rose in line with Dow Jones Index as the region has become more closely related to each other as well as to trading activity in the Wall Street.

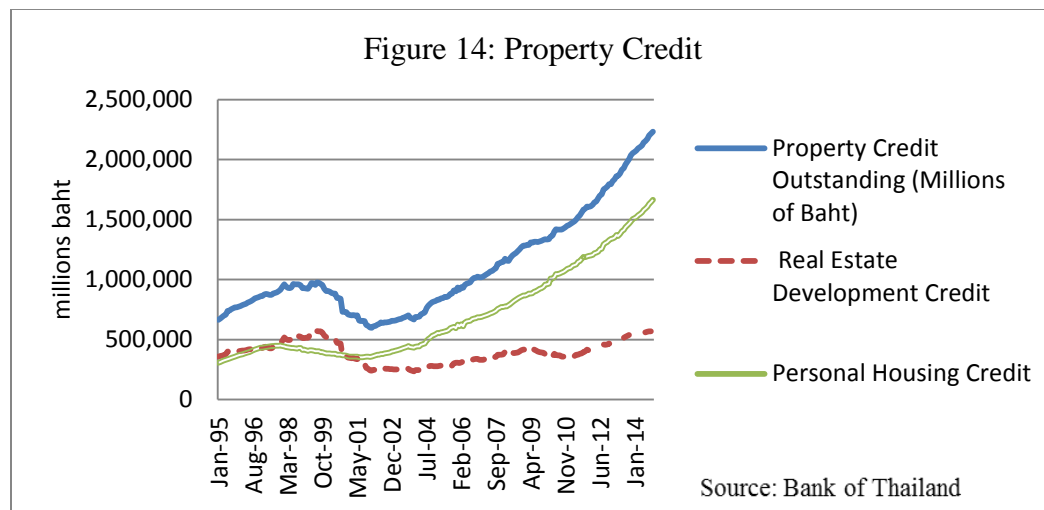


Using the 94 observations from January 2007 to December 2014, the hypothesis that growth rate of M2 Granger causes the stock market returns cannot be rejected at a very high level of statistical significant. And the causation runs both ways. This evidence indicates that enlarged money supply leads to rising stock market prices (Figure 12). Had the BOT not intervened in the foreign exchange market, the money supply would not have grown at this very high rate that subsequently led to asset price appreciation. But the stock market prices are also determined by capital inflows. The QE in the US dampened the rate of return from investment in corporate bonds, making it attractive to shift portfolio investment outside the US.



The cyclical components of stock prices, which caused by arrivals of random good and bad news, can be removed from actual values by Hodrick- Prescott (HP) filter. The HP trend of annual rate of return in Thailand's stock market and US corporate bond yields are shown in Figure 13. The substantial gap between the two rates of returns bode well for portfolio investment in Thailand. The low and declining yield from the US bond markets make Southeast Asian stock markets attractive and hence more capital inflows and rapid appreciation of the Asian currencies. Other asset prices are also affected by these capital inflows. The continued appreciation of the baht would make Thailand's assets become even more attractive. The portfolio investment from abroad further caused appreciation of the baht.

Rising asset prices in the property sector leads to expansion in bank credit and vice versa (Figure 14). The steady rising level of property credit for real estate development and personal housing perpetuate asset price bubbles, which are aggravated by speculation.



The amount of bank credit expanded to the property sector has been astronomically high, compared to the credit level during the period of Asian Financial Crisis in 1997-1998. Excessive credit growth in the non-trade sector causes relocation of resources to non-traded sector, while the export sector is shrinking. The situation is akin to the Dutch disease, when the real exchange rate appreciates, shifting resources from the traded sector to the non-traded sector. Seen in this light, the impact of QE in high-income countries has a profound macroeconomic impact on emerging countries like Thailand.

Unlike the instantaneous impact of QE on exchange rates, the QE impact on output is not transmitted immediately as the pass-through effect on output is slow. The expansionary impact of quantitative easing is felt through credit availability and balance sheet effects. It takes considerable time lags before consumption and investment expenditures adjust higher. Financial

structure, household debts, and trade structure in the US differ from Japan's. It is likely that the short-run and long-run impacts are dissimilar in terms of directions and the magnitudes of the impacts.

Table 1 summarizes of QE effects on the direction of the baht exchange rates and output effect in the short run and long run. Expansion of the Fed's assets leads to baht appreciation against the USD, while the BOJ's asset expansion causes the baht depreciate against the yen. Because the BOJ's assets increase, it tends to alter the dollar-yen exchange rates. When the yen depreciates against the dollar, and if the BOT prefers baht appreciation against the dollar, it implies that the baht depreciates against the yen.

Table 1: Summary of the Effects of QE

	Nominal Exchange rates	Output Effect (Thailand's output)	
		Short run	Long run
FED	Appreciation (Baht/USD)	-	+
BOJ	Depreciation (Baht/Yen)	+	+

Thailand's manufacturing output would respond negatively (positively) to baht appreciation (depreciation) because the manufacturing sector's output is driven by export demands. In the short run, the impact of QE is transmitted via substitution effect through exchange rate changes. In the long run, when output and employment increase in the US and Japan, we would observe an increase in Thailand's output caused by rising demand for Thailand's manufactured goods. There is also a positive indirect output effect from network trade expansion when these two economies import more goods from other ASEAN countries.

4. Quantifying the QEs impacts: A VAR model

Casual empiricism cannot be used to answer the questions regarding to the impact of QE on the Thai economy. A Vector Autoregressive model has been widely used to analyze the impact of QE. Harada and Masujima (2009) employ a vector auto regression (VAR) model to answer the question whether an increase in monetary base raises aggregate output in Japan. Their model indicates that the impact of QE is primarily transmitted through the channels of asset prices and bank balance sheets. Their findings reveal that Japan's monetary policy has been effective in easing prolonged economic downturn. In Kapetanios *et al.* (2012), the effects of the Bank of England's purchases of assets are captured by using three different VAR models. The results indicate that QE has a peak effect on output and the price level around 1.5 percentage points. Sinclair and Ellis (2012) argue that the impact of QE in various countries can be different, depending on structure of the economy and the fiscal policy response. Since the world's financial markets are closely linked, the underlying drivers of movement of bond yields are not just

domestic factors. In the UK context, international factors dominate local development in UK bond price movement, but not to the complete exclusion of domestic factors. A caveat that must be borne in mind when evaluating the impact of QE is to realize that a small open economy, abstracting from the impact of global movements in financial markets can leave to very different conclusions. Menon and Hee Ng (2013) use Global Vector Auto regression to examine the impact of quantitative easing in the Eurozone. Although direct impacts are small, a further shock can lead to a much larger adjustment in risks and asset valuations. There is a real possibility that vulnerability in the Southeast Asian region increases following massive inflows of capital and build-up of debt, related to successive bouts of QE in the US and Japan. Joyce *et al.* (2012) point out that the Western economies remains weak and sluggish, indicating that, even if the QE programs work, it need to be supplemented by other measures, since the recessionary forces have been very strong.

The earlier conjecture of the impact of QE on the Thai economy shown in Table 1 has to be scrutinized by employing Thailand's monthly data on key macro variables. A Vector Autoregressive (VAR) model is constructed with this objective. The model includes the Fed's total assets, BOJ's total assets, the baht-dollar and the baht-yen exchange rates, the BOT's key policy rate, the Stock Exchange of Thailand price index (SET), Thailand's exports, manufacturing production index (MPI), and the BOT's coincident index. The data are obtained from the Fed, BOJ, and the Bank of Thailand. The coincident index provided by the BOT captures five economic activities in real terms: manufacturing output, imports, domestic automobile sales, value added taxes, and debit to demand deposits. In effect, the coincident index provides an approximation of monthly GDP series. Monthly data of 144 observations from March 2003 to December 2014 are used to obtain model estimation results.

The impulse response functions of Thailand's key macro variables to shocks in the Fed's and BOJ's total assets are reported in Figures 15 and 16, respectively. A shock in the expansion of Fed's total assets creates a boom in Thailand's stock market after a year of depressive market (Figure 15). This can be due to the lag effect of quantitative easing on American corporate bond yields and the announcement effect of the QE that primarily created market pessimism in the aftermath of the sub-prime crisis. As the yield curve became flatter, it became more attractive for portfolio investors to look for high returns in foreign stock markets. The accumulated response of the stock market becomes positive after one year of QE program. The baht immediately appreciates against the USD and continues appreciating throughout the second year after the QE operation. As expected, Thailand's exports decline sharply to its trough within 10 months, albeit at a declining rate. The shape of the decline and its recovery of manufacturing output and economic activity (captured by coincident economic index) follow the same pattern as exports. We can conclude that QE launched by the Fed has a contractionary impact on the Thai economy in the short run and the medium run. If the QE programs have not generated sustainable recovery in the US economy, which can enhance consumption expenditures and investment spending, the long run expansionary impact on Thailand's and output will be difficult to take place within 18 months (Figure 15).

In the case of BOJ's asset expansion, rather than shocking the VAR model with the Fed's asset innovation, there is a booming impact on the Thai stock market (Figure 16). The baht depreciates against the yen and exports and manufacturing output expand. The Bank of Thailand adjusts its key policy rate downward in a similar manner as when the BOT responds to the Fed's QE. The BOJ's asset acquisition has expansionary impact on Thailand's exports and economic activity. Unlike the impact of the QE by the

Fed, the stimulus impact of the BOJ's asset purchases holds as long as the baht keeps on depreciating against the yen.

In sum, the short run impact of QE can be expansionary or deflationary depending on its impact on the exchange rate and monetary policy reaction of the Bank of Thailand, which includes its intervention in the foreign exchange market to maintain stability of the baht-dollar exchange rate. This implies that the BOT has to allow the baht to depreciate against the yen as long as the BOT prefers stability of the baht-dollar exchange rate.

5. Concluding remarks

If the export engine of growth is damaged by the appreciation of the baht against the dollar, fiscal policy must be employed to counteract economic downturn. Given political instability and the loss of investor confidence, expansionary fiscal policy is less effective when undertaken during the absence of consumer confidence. The military coup in May 2014 rules out the use of fiscal policy to offset the fall of exports, because of the interruption in the fiscal budget process. As a result, Thailand's exports barely grew in 2014 and GDP growth rate declined from 2.3 percent in 2013 to 0.7 percent in 2014. Notwithstanding the economic slowdown, the stock market and property prices are booming, thanks to capital inflow from other parts of the world. One has to ask if Thailand is approaching the Minsky moment.

One of the adverse consequences of the QE conducted in industrial countries is the loss of Thailand's competitiveness due to real exchange rate appreciation. Thailand has shifted its resources from the traded to the non-traded sector, which is buoyant by capital inflows. The Dutch disease has eroded the international competitiveness of Thailand's export sector. Thailand's macroeconomic policy response to the adverse impact of the QE is too little and too late. The large interest rate differentials still remain. As long as the baht continues to appreciate against the dollar, the export sector will not be able to stimulate growth and produce a V-shaped recovery as it used to revise export growth during the Asian Financial Crisis. Furthermore, macroprudential policy must be urgently implemented to prevent a property bubble burst.

Figure 15: Impact on the Thai economy: QE operation by the Fed

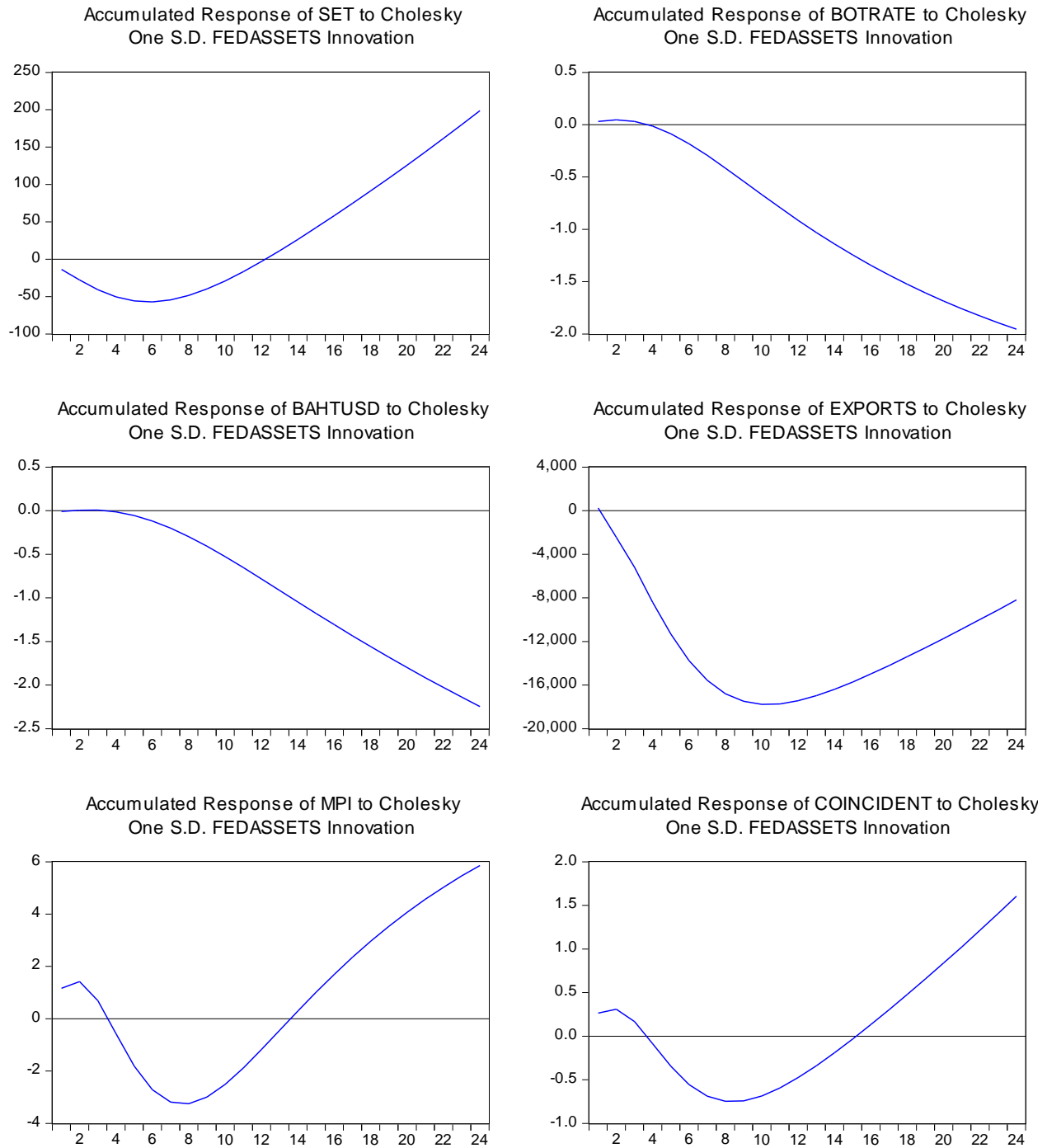
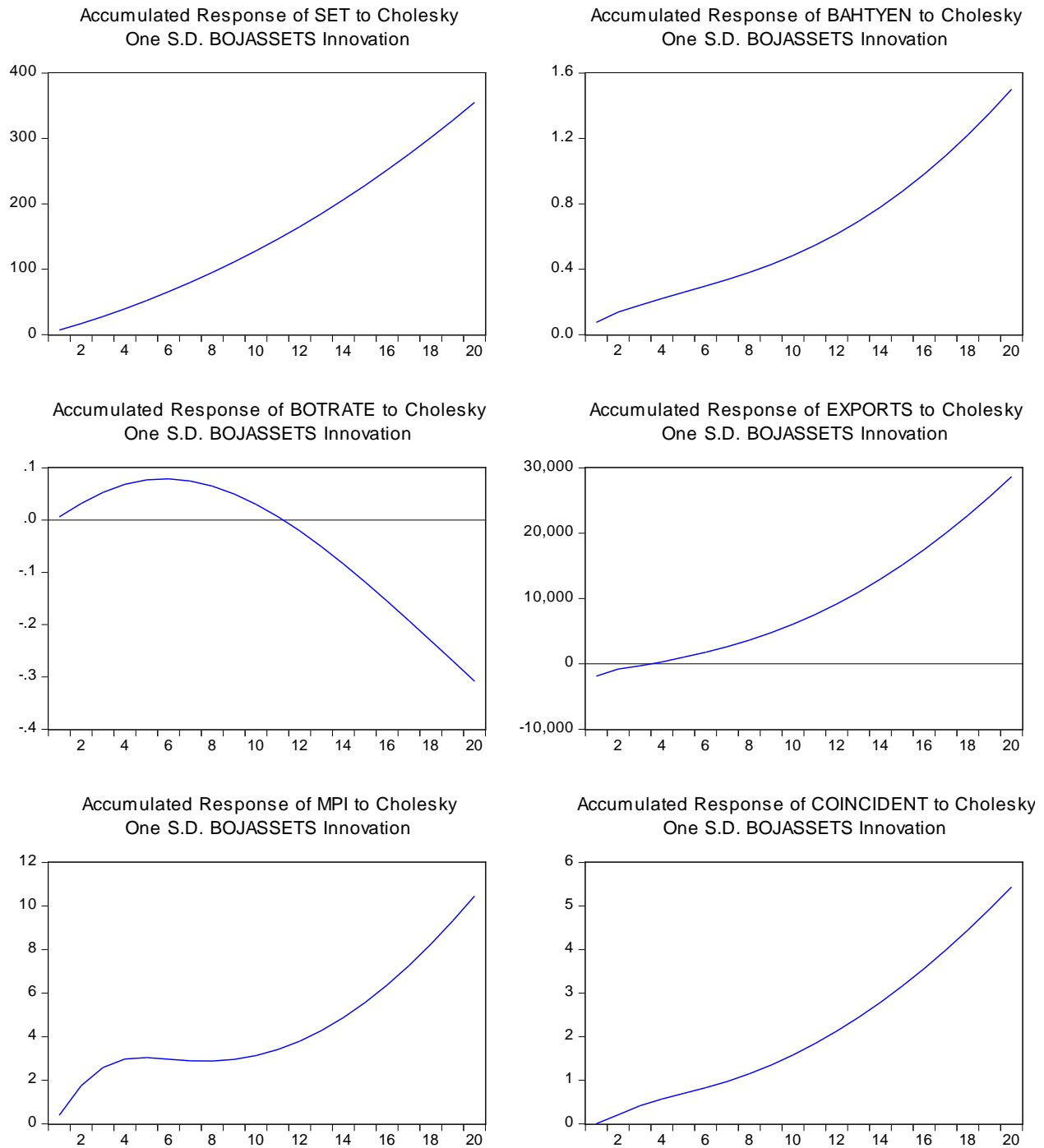


Figure 16: Impact on the Thai economy: QE operation by the BOJ



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