

Effects of U.S. Unconventional Monetary Policy and Implications for QE3

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Summary ●●●

- ▶ On August 20, 2012, the Federal Reserve announced a third round of quantitative easing (QE3), and interest is mounting as to the significance and influence of this policy.
 - This study analyzes the effects of US unconventional monetary policies implemented during the global financial crisis, such as quantitative easing, Operation Twist, and the Federal Reserve's policy commitment regarding the course of short-term interest rates. Moreover, it discusses the significance and implications for the QE3.
- ▶ Up to now, unconventional US monetary policy actions have improved the condition of US financial markets and lowered long-term Treasury yields, mortgage-backed security (MBS) rates, and corporate bond yields.
 - The effects of the first round of quantitative easing (QE1) were the most influential, while the effects of the second round (QE2) were only about a third as potent as QE1. The effects of Operation Twist were minor compared to QE2.
 - QE1 resulted in lowering yields on 10-year Treasury securities by 128.6 basis points (bp) and MBS yields by 136bp. QE2 caused 10-year Treasury yields to drop by 42.93bp and MBS yields by 37.25bp.
 - The effects of the quantitative easing policy on the stock market and foreign exchange market are not statistically significant.
- ▶ The effects of QE3 are expected to be less than the previous two QE programs.
 - Up to now, QE3 has lowered 10-year Treasury yields by 8bp and MBS yields by 32.3bp.
- ▶ The implementation of the QE policy in major advanced economies may cause so-called excess global liquidity problems.
 - Global liquidity expansion may result in instability in foreign exchange and international commodity markets.

1. Introduction

■ The U.S. Federal Open Market Committee (FOMC) announced a third round of quantitative easing (QE3) on September 13, 2012.

- The FOMC announced their plan to launch an open-ended MBS purchase program at a pace of \$40 billion per month, until the substantial improvement of the labor market.
- QE3 differs from the first two rounds of QE in that the end date is not fixed, and differs from QE2 in particular in the point that MBS purchases are its focus.
- Through the recently announced QE3 as well as the previously implemented Operation Twist, the FOMC will purchase \$85 billion worth long-term securities each month, by the end of the year.
- Moreover, the FOMC stated its commitment to maintain current near-zero interest rates (0.00~0.25%) at least through mid-2015.
- Previously, the FOMC had stated that it would maintain near-zero interest rates only until the end of 2014. The recent announcement thus extends the plan to maintain the current federal funds rate by half a year.

■ This study analyzes the effects of US unconventional monetary policy actions taken from 2008 to the present and examines the significance and implications for QE3.

- The unconventional monetary policies include quantitative easing, policy commitment in regard to short-term interest rates, and Operation Twist. This study analyzes the status and effects of each program.
- Based on an analysis of the effects of unconventional monetary policies from 2008 to the present, this study projects the likely significance of QE3.

2. Principles of Unconventional Monetary Policy

■ After the global financial crisis, US policy interest rates dropped to practically zero, and the FRB began expanding monetary easing through unconventional monetary policies.

- Since December 2008, the US has maintained the policy interest rate between 0.00% and 0.25%, which is practically zero.
- When the policy interest rate is zero, additional monetary easing through traditional monetary policies is impossible. Therefore, instead of adjusting interest rates, monetary easing through unconventional monetary policies becomes more prominent.

- Unconventional monetary policies aim to stimulate the economy by additionally lowering long-term interest rates when short-term interest rates are at the zero lower bound.

- Another important purpose of these policies is to prevent deflation.

■ **Unconventional monetary policies include quantitative easing, policy commitments targeting short-term interest rates, and Operation Twist.**

- QE is a policy used by central banks to decrease longer-term interest rates by purchasing financial assets from the market.

- QE was first implemented in Japan from 2001 to 2006, at a time when interest rates were close to zero.

- The US has already conducted two rounds of QE policies, QE1 in 2008 and QE2 in 2010, and announced QE3 on September 13, 2012.

- The policy commitment regarding short-term interest rates aims to maintain a certain level of short-term interest rates over a specific period of time, thus lowering longer-term interest rates by bringing down market expectations for future short-term rates.

- According to the Expectations Hypothesis, the long-term rate is determined by market expectations for the short term rate.

- During the global economic crisis, the FRB promised three different periods in which it would maintain the current level of zero interest rates.

- Operation Twist is a plan to lower long-term interest rates for a central bank by selling short-term securities and purchasing longer-term securities, while still maintaining the same level of the central bank's total assets.

- Operation Twist was first implemented the US in 1961 during the Kennedy administration and it was re-launched by the FRB in 2011 during the global financial crisis.

■ **Unconventional monetary policies have generally earned positive reviews in that they have successfully lowered long-term interest rates and stabilized the financial market. However, there is controversy regarding their ripple effects on the real sectors.**

- A number of empirical studies have concluded that the Federal Reserve's unconventional monetary policies were helpful in lowering long-term interest rates.

- In analyses undertaken by D'Amico and King (2010), Gagnon *et al.* (2010), Wright (2012), and Hamilton and Wu (2011), all concluded that US unconventional monetary policies lowered long-term interest rates during the global financial crisis.

- Hancock and Passmore (2011) concluded that the Federal Reserve's MBS purchases removed substantial risk premiums embedded in mortgage rates.

- Swanson (2011) analyzed the effects of Operation Twist in 1961 and explained the drop in long-term interest rates that resulted from the policy's implementation.

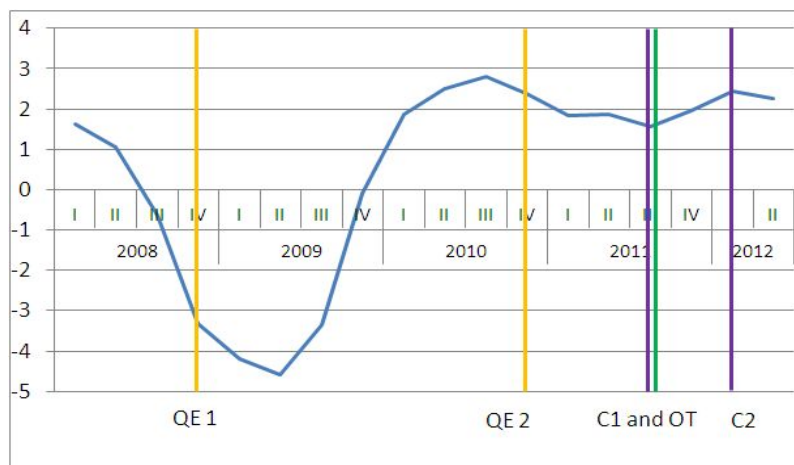
- However, the effect of quantitative easing on the real economy is still under debate.
 - It has been pointed out that the recovery speed of the US employment and housing markets remains too slow despite the active QE program.
 - In this sense, it is worth noting that there have been disputes even among FOMC members regarding the implementation of QE2 and Operation Twist.
- In addition, concerns have been raised regarding the adverse effects of unconventional monetary policies.
 - These policies may be a burden to the US economy when implementing an exit strategy after recovery.
 - The volume of money put into the market also may lead to global liquidity expansion, weakening the dollar and raising oil and commodity prices.

3. U.S. Unconventional Monetary Policies after the Global Financial Crisis

- The FOMC implemented its zero-interest rate policy and QE1 in December 2008 with the onset of the global financial crisis brought on by the subprime mortgage crisis.
 - Real US GDP from the last quarter of 2008 dropped to -3.3% (YOY), while the CPI inflation rate was at -0.02%, implying deflation (Figs. 1 and 2).
 - In particular, easing housing-market pressure became the most pressing issue, as it was hit most directly by the subprime mortgage crisis.

Figure 1. US Real GDP Growth Rate

(Unit: %, year-on-year)



Note: QE1 and QE2 refer to the first and second rounds of quantitative easing (QE), respectively.

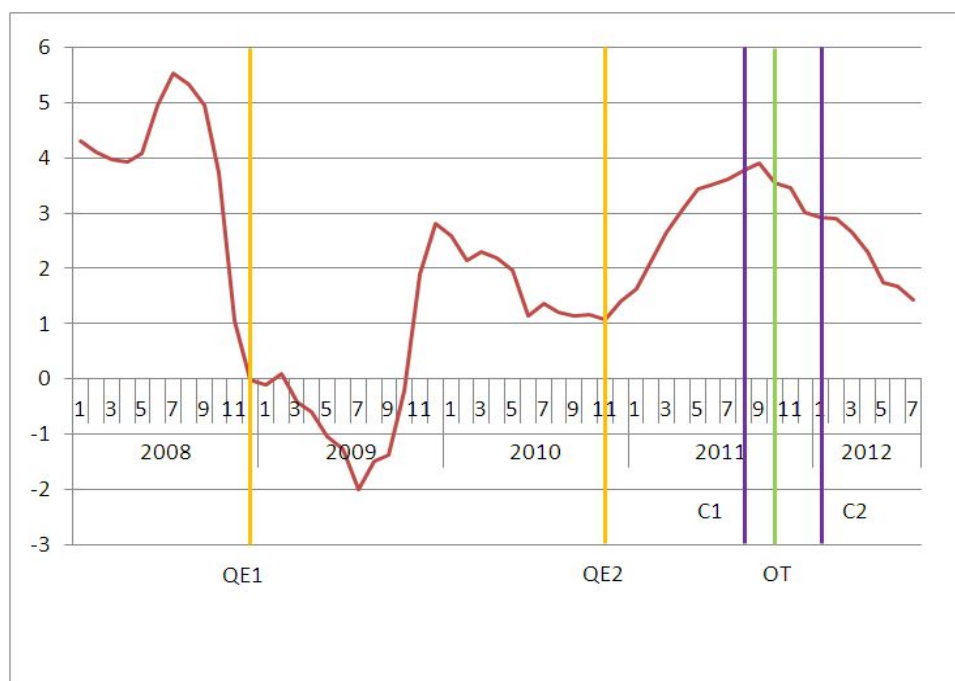
OT indicates Operation Twist, and C1 and C2 refer to the two policy commitment periods.

Source: FRB.

- Therefore, QE1 included a plan to purchase up to \$300 billion in Treasury securities on top of the maximum \$1.25 trillion of MBS and \$200 billion in agency securities.
 - The FRB purchased agency securities, such as Freddie Mac, Fannie Mae, and Ginnie Mae, as well as MBS to directly inject liquidity to the housing market.
- QE1 concluded in March 2010.

Figure 2. US CPI Inflation

(Unit: %, year-on-year)



Note: QE1 and QE2 refer to the first and second rounds of quantitative easing (QE), respectively.

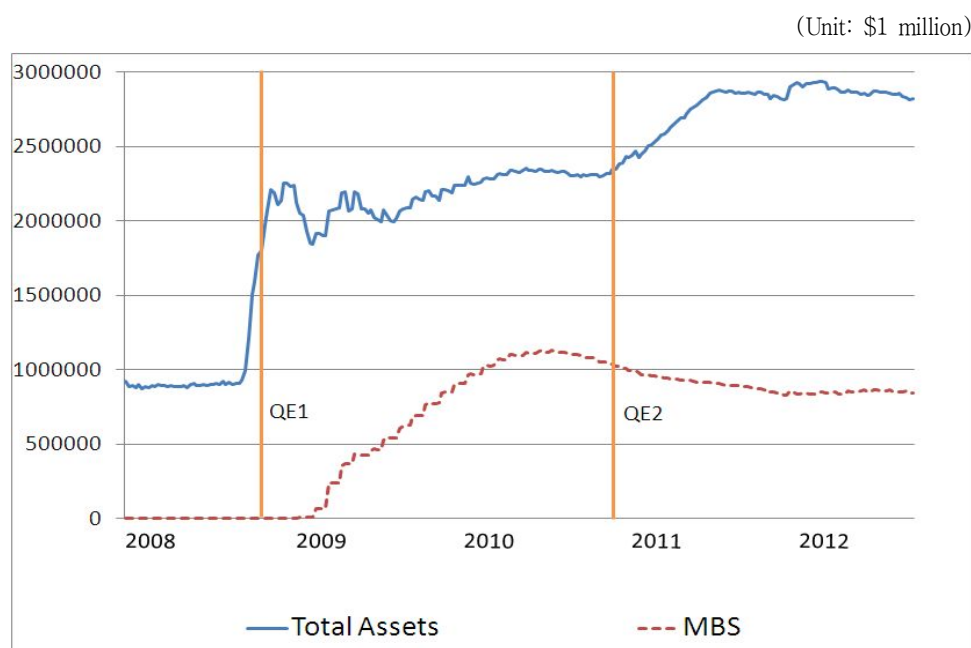
OT indicates Operation Twist, and C1 and C2 refer to the two policy commitment periods.

Source: FRB.

■ In November 2010, when the US economic recovery was slowing down, the FRB implemented QE2.

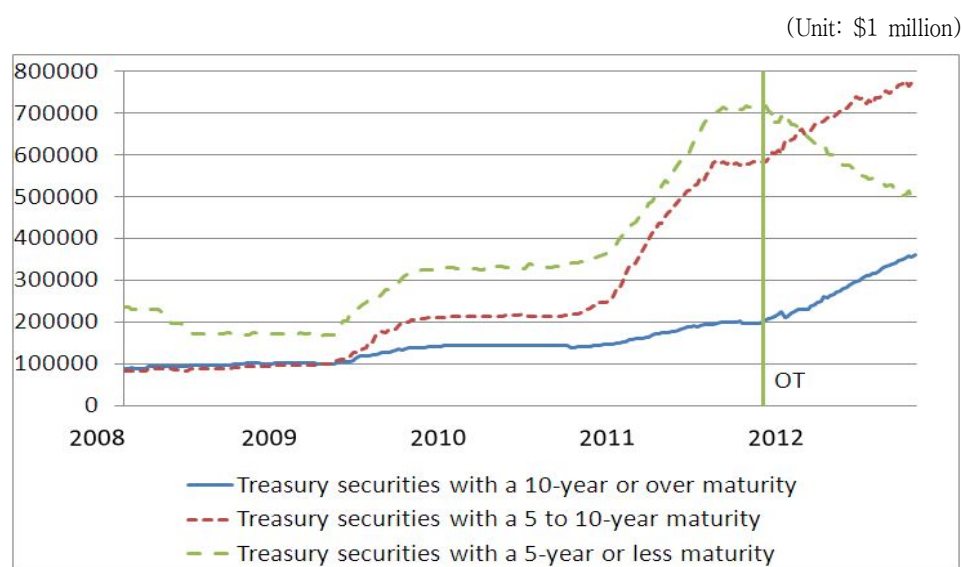
- While the US economy had shown positive growth in the first quarter of 2010, culminating in a 2.8% growth (year-on-year) in the third quarter, thereafter, the growth rate declined. In addition, the CPI rate, which recorded a high of 2.3% in March 2010, dropped continuously to 1.1% in November 2010.
- In an FOMC meeting held on November 3, 2010, the Federal Reserve decided to purchase \$600 billion of long-term Treasury securities by the second quarter of 2011.
 - The controversy regarding QE2 created a split in the FOMC. At the meeting to decide on implementation of QE2, one-third of the Federal Reserve Board and Federal Reserve Bank presidents (6 out of 18) opposed the measure.
 - Ultimately, the FRB announced its plan to purchase \$70 billion of longer-term Treasury securities each month for the following 8 months.

Figure 3. US Federal Reserve Board Assets



Note: QE1 and QE2 refer to the first and second rounds of quantitative easing, respectively.
Source: FRB.

Figure 4. US Federal Reserve Board Treasury Securities by Maturity



Note: OT refers to Operation Twist.
Source: FRB.

- Through two rounds of QE, the US Federal Reserve increased its assets over threefold (Fig. 3).
- The Federal Reserve's balance sheet amounted to about \$900 billion before the global financial crisis, but exceeded \$2.8 trillion as of August 2012.

- The composition of the Federal Reserve's assets has changed greatly as well. Prior to the financial crisis, the FRB had never owned MBS; however, a vast sum of MBS was purchased during QE1, and now comprises 30% of its total assets.
- After concluding QE1, the Federal Reserve's total assets continued to increase, whereas its share of MBS began to decrease.
- o Unlike QE1, in which the FRB focused on acquiring \$1.25 trillion of MBS, only Treasury securities were purchased during QE2.

■ **After the end of QE2, concerns over the slowdown of economic recovery continued to be raised. As a result, Operation Twist was implemented.**

- In the third quarter of 2011, concerns over the possibility of a double-dip recession were raised due to discussions on fiscal retrenchment and a drop in the S&P credit rating for the US.
- o On August 3, 2011, S&P downgraded the US credit rating from AAA to AA+.
- At the FOMC meeting on September 21, 2011, the committee decided to implement Operation Twist and sell off \$400 billion worth of Treasury securities with remaining maturities of 3 years or less, while purchasing an equal amount of Treasury securities with remaining maturities of 6 to 30 years.
- o Three of the Federal Reserve Bank presidents opposed Operation Twist due to worries over inflation.
- As shown in Fig. 4, among the FRB's assets, the share of short-term Treasury securities with remaining maturities less than 5 years decreased significantly, while the share of long-term Treasury securities with maturities of more than 5 years continued to increase.

■ **The US Federal Reserve made policy commitments in August 2011 and January 2012 to define a time frame for maintaining near-zero policy interest rates.**

- In the FOMC statement from August 9, 2011, the committee specified a time frame for the policy, changing the clause they had maintained on keeping the near-zero federal fund rate "for an extended period" to "at least through mid-2013."
- o In this statement, the committee judged US economic growth as being slower than expected and confirmed an increasing danger of economic decline.
- In the FOMC statement from January 25, 2012, the committee further extended the end date to maintain near-zero interest rates "at least through late 2014."
- o The FOMC explained their decision as a result of low rates of resource utilization and reflective of a subdued outlook for inflation over the mid-term.

4. Effects of U.S. Unconventional Monetary Policy: an Event Study Analysis

■ US unconventional monetary policies to now, and QE1 in particular, have been effective in driving down long-term Treasury security yields.

- Tables 1 to 3 illustrate the results of high frequency event study analysis, an analytical method used by Swanson (2011).
- In accordance with Efficient Market Theory, this analytical method assumes that financial markets reflect knowledge of all the current information regarding unconventional monetary policies on the day such policies are announced.
- Three kinds of events are considered: the FOMC's announcements on unconventional monetary policies; speeches delivered by the chairman of the FOMC; and the release of meeting minutes by the FOMC. For QE1, there were five instances of these events. For QE2, there were seven instances; for Operation Twist, three; and for policy commitments, two.
- The results in Tables 1 to 3 show the sum of all changes in interest rates and indices on the aforementioned event days.
- QE1 lowered the 10-year Treasury yield by 128.6bp; QE2 lowered it by 42.9bp; and the policy commitment, by 35.53bp.
- Operation Twist lowered the 10-year Treasury yield by 15.69bp, which is similar to the effect of Operation Twist in 1961, as estimated by Swanson (2011).
- In addition, yields on two-year treasuries increased, as the Federal Reserve sold short-term treasuries, which was also observed by Swanson (2011).

Table 1. Effects of US Unconventional Monetary Policies on Long-term Treasury Security Yields

(Unit: bp)

Event	2-year Treasury Note	10-year Treasury Note
QE1	-64.60	-128.60
QE2	-21.18	-42.93
Operation Twist	7.29	-15.69
Policy Commitment	-13.63	-35.53

Source: FRB.

■ US unconventional monetary policies were effective in driving down MBS and corporate bond interest rates, illustrating the direct easing effects of the policies on private sector financial markets (Table 2).

- QE1 and QE2 lowered MBS interest rates by 136bp and 37.25bp each, respectively.

- Operation Twist and the FOMC's policy commitments both lowered MBS interest rates by 26.9bp and 14.35bp each, respectively.
- QE1 lowered corporate bond interest rates, but QE2 had no such effect.
- The impact of policy commitment on lowering interest rates for corporate bonds was relatively minor compared to its effect on lowering Treasury yields.

Table 2. Effects of US Unconventional Monetary Policies on MBS Interest Rates and Corporate Securities

(Unit: bp)

Event	MBS	Agency Security AAA	Agency Security BAA
QE1	-136.00	-86.00	-76.00
QE2	-37.25	14.00	20.00
Operation Twist	-26.90	-20.00	-29.00
Policy Commitment	-14.35	-8.00	-8.00

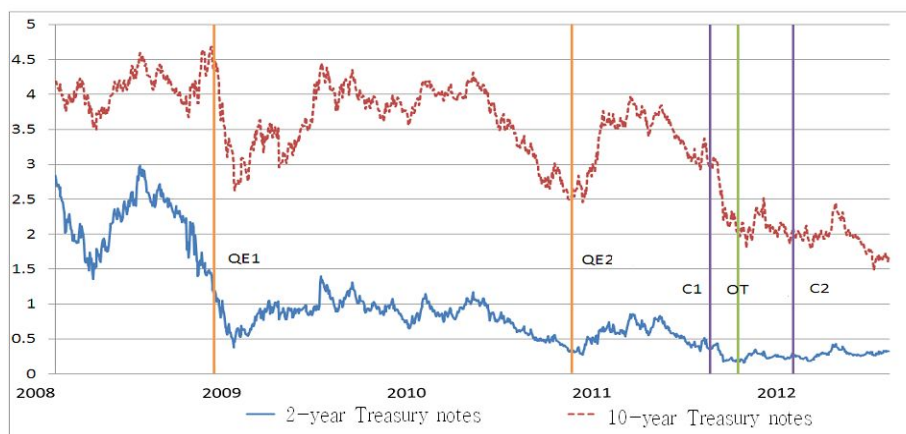
Note: The MBS interest rate is the average of Freddie Mac and Fannie Mae's 30-year mortgage interest rates.
Source: Bloomberg; FRB.

■ US long-term Treasury yields and MBS interest rates were significantly reduced after the implementation of unconventional monetary policies.

- The yield on 10-year Treasury notes was near 4% at the beginning of November, 2008, but dropped to 1.6% on August 30, 2012.
- MBS interest rates stood at 6% at the beginning of November 2008, but dropped to 2.4% on August 30, 2012.

Figure 5. US Treasury Securities Interest Rates

(Unit: %)



Note: QE1 and QE2 refer to the first and second rounds of quantitative easing (QE), respectively.
OT indicates Operation Twist, and C1 and C2 refer to the two policy commitment periods.
Source: FRB.

Figure 6. US MBS Interest Rates



Note: QE1 and QE2 refer to the first and second rounds of quantitative easing (QE), respectively.

OT indicates Operation Twist, and C1 and C2 refer to the two policy commitment periods.

Source: FRB.

■ During the implementation period of unconventional monetary policies, stock prices generally increased, though this cannot be solely attributed to the impact of these policies.

- Stock prices rapidly declined after the subprime crisis, but began to rally from the beginning of 2009 and have continued to increase overall.
- Unconventional monetary policies are considered to have influenced liquidity expansion of the stock market, but it is difficult to point such policies as the only factor behind the increasing stock prices.
- Table 3 analyzes the effects of the events on the US and Korean stock markets. Consistent with previous assertions, this event study analysis cannot find consistent evidence that unconventional monetary policies increased stock prices.

Table 3. Effects of US Unconventional Monetary Policies on the Stock Market

(Unit: Index)

Event	Dow Jones Index	KOSPI
QE1	-145.83	65.37
QE2	-3.6	24.06
Operation Twist	-142.85	9.84
Policy Commitment	511.13	-108.37

Note: Considering the time difference between Korea and the US, the KOSPI of the day following the event was used in the analysis.

Source: Bloomberg.

Figure 7. Dow Jones Index

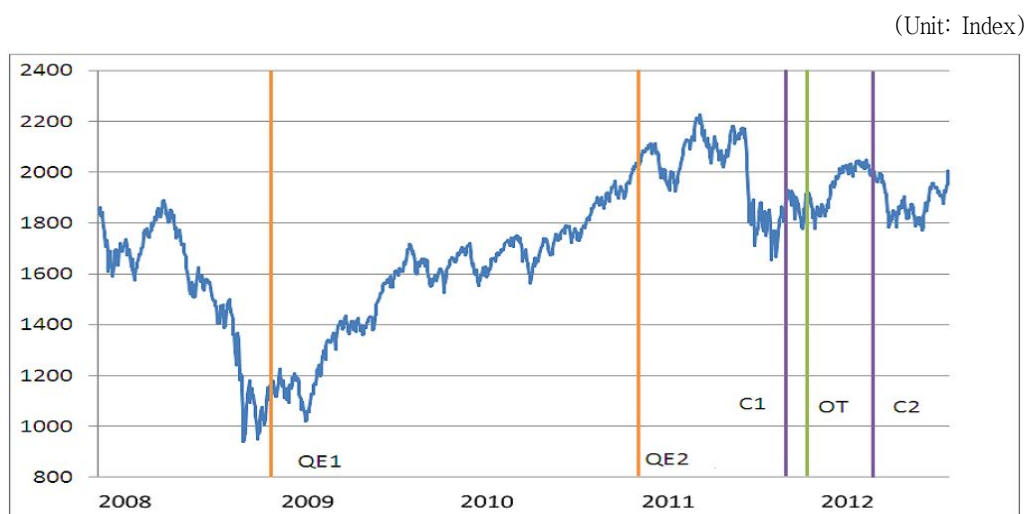


Note: QE1 and QE2 refer to the first and second rounds of quantitative easing (QE), respectively.

OT indicates Operation Twist, and C1 and C2 refer to the two policy commitment periods.

Source: FRB.

Figure 8. Korean KOSPI



Note: QE1 and QE2 refer to the first and second rounds of quantitative easing (QE), respectively.

OT indicates Operation Twist, and C1 and C2 refer to the two policy commitment periods.

Source: FRB.

■ Despite the concerns that the US dollar might weaken due to QE, the USD/EUR exchange rate actually remained at a similar level to that before the implementation of unconventional monetary policies (Fig. 9).

- As both the global financial crisis and European financial crisis raged on, the demand for relatively riskless US dollars sporadically increased.
- Additional depreciation of the dollar might have been limited due to the implementation of unconventional

monetary policies in not only the US but also the UK, the Euro zone and Japan.

- The KRW/USD exchange rate increased to 1,500 KRW per USD at the beginning of the global financial crisis in early 2008, and the Korean won continued to appreciate. This can be interpreted as part of the process of returning to the balance prior to the financial crisis, and it is therefore difficult to consider this a change that resulted from the weakening dollar (Fig. 10).

Figure 9. USD/EUR Exchange Rate

(Unit: USD/EUR)



Note: QE1 and QE2 refer to the first and second rounds of quantitative easing (QE), respectively.

OT indicates Operation Twist, and C1 and C2 refer to the two policy commitment periods.

Source: Bank of Korea.

Figure 10. KRW/USD Exchange Rate

(Unit: KRW/USD)



Note: QE1 and QE2 refer to the first and second rounds of quantitative easing (QE), respectively.

OT indicates Operation Twist, and C1 and C2 refer to the two policy commitment periods.

Source: Bank of Korea.

■ Previous unconventional monetary policies were successful at easing financial markets by lowering interest rates, but its impact is gradually diminishing.

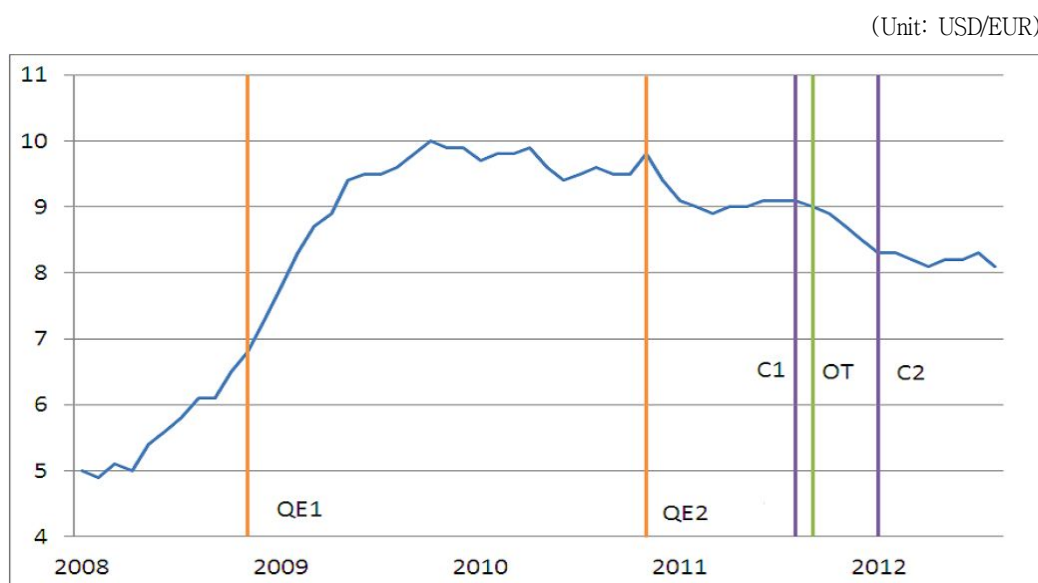
- The effects of QE1 were most significant, while the effects of QE2 were about one-third as potent. The effects of Operation Twist were even less significant than that of QE2.
- This reduced effect results partly from the gradual reduction in the scale of total asset purchases, and partly because of the lack of room for further decline as there already is a significant decrease in market rates.

5. Prospects and Implications for QE3

■ QE3 was implemented mainly due to the delayed recovery of the US employment and real estate markets.

- The US unemployment rate once rose to 10% on October 2009, but dropped to 8.2% by August 2012. However, the overall recovery rate slowed in 2012 (Fig. 11).
- The US housing market's recovery rate also began to decline from the middle of 2011. The Federal Reserve aims to revive the housing market through QE3 and MBS purchases.

Figure 11. US Unemployment Rate

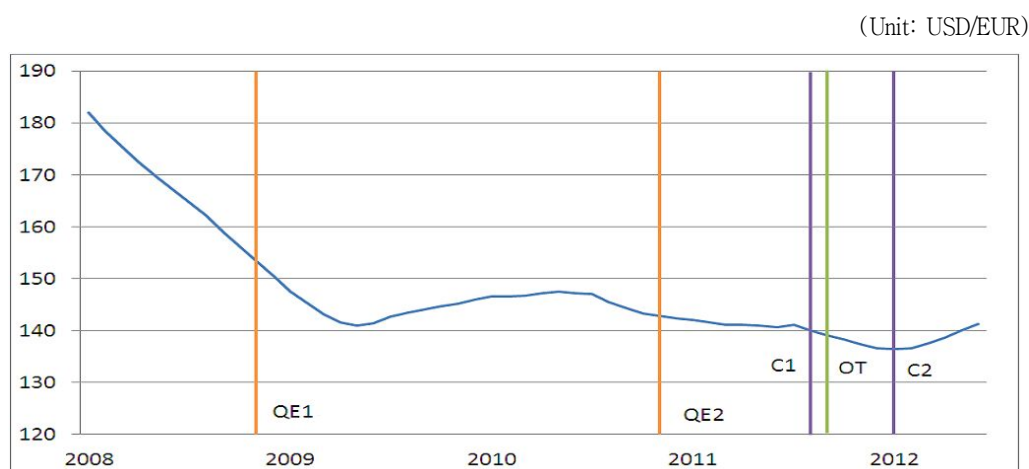


Note: QE1 and QE2 refer to the first and second rounds of quantitative easing (QE), respectively.

OT indicates Operation Twist, and C1 and C2 refer to the two policy commitment periods.

Source: FRB.

Figure 12. S&P Case-Shiller Home Price Index



Note: QE1 and QE2 refer to the first and second rounds of quantitative easing (QE), respectively. OT indicates Operation Twist, and C1 and C2 refer to the two policy commitment periods.

Source: FRB.

■ QE3 is expected to be less effective than the previous two rounds of QE. It is aimed at boosting consumption and investments by improving consumer sentiment.

- US 10-year Treasury yields dropped to 1.6% in August 2012, while long-term expected inflation has exceeded 2%; thus, the effective real interest rate is already negative. Therefore, additional decreases in Treasury yields through QE3 will be limited .
- Rather than expecting long-term interest rates to fall, as they had through the past two rounds of QE, the Federal Reserve seems to have implemented QE3 in order to control uncertainty in the market and boost recovery of the real economy.
- Table 4 illustrates changes in 10-year Treasury yields and MBS interest rates through the two events related to the announcement of QE3. The change in 10-year Treasury yields was only 8bp.
 - As QE3 is focused on MBS purchases, MBS interest rates have dropped significantly, by 32.3bp.
 - The decline in these rates is significantly less than the effects of the past two rounds of QE.

Table 4. Effects of QE3-Related News on the US Financial Market

(Unit: bp)

Event	US 10-year Treasury Security Yield	US MBS Interest Rate
FOMC Chairman Ben Bernanke's Speech in Jackson Hole, WY (2012, 8, 31)	-6	-8.35
FOMC Announced QE3 (2012, 9, 13)	-2	-23.95
Total	-8	-32.3

Note: 1) The MBS interest rate is the average of Freddie Mac and Fannie Mae's 30-year mortgage interest rates.

2) On August 31, 2012, FOMC Chairman Ben Bernanke gave a speech in Jackson Hole, WY, hinting that QE3 was ready for implementation when necessary.

Source: FRB; Bloomberg.

■ The end date for QE3, which is not yet fixed, will be determined according to the improvement speed of the unemployment and inflation rates.

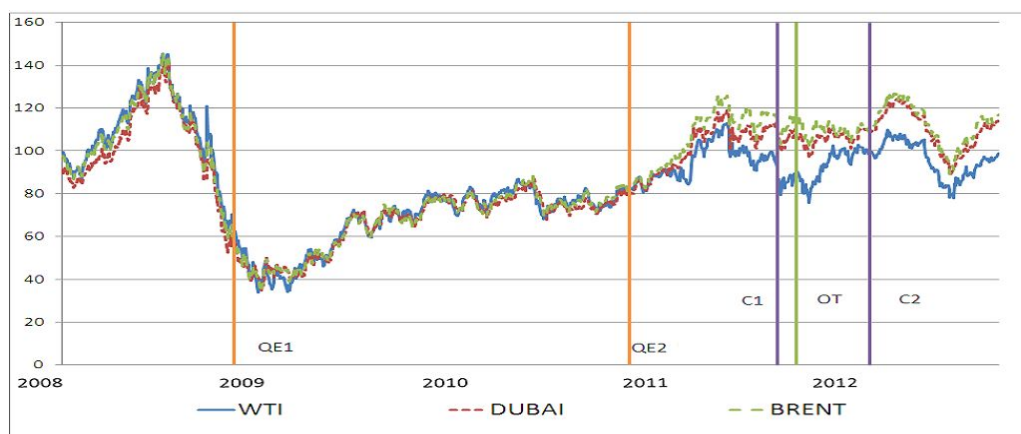
- On January 25, 2012, the Federal Reserve announced a long-term inflation target rate of 2%. If the inflation rate, therefore, greatly exceeds the target range, the Federal Reserve will react through by implementing its exit strategy.
- In September 2012, the Federal Reserve predicted that personal consumption expenditures (PCE) inflation would remain between 1.7% to 1.8% in 2012 and between 1.6% to 2.0% in 2013, still below the target inflation rate.
- Since the Federal Reserve announced that the end date for QE3 would be determined when the job market has sufficiently improved, it is highly likely that QE3 will end when the unemployment rate achieves long-term balance, 5.2~6.0%.
- In September 2012, the Federal Reserve predicted the unemployment rate to hover in the 8.0 to 8.2% range for 2012 and the 7.6 to 7.9% range in 2013. However, if the unemployment rate shows more rapid improvement, this could also signal the end of QE3.

■ Global liquidity is expanding due not only to QE3 but also the Outright Monetary Transactions (OMT) by the European Central Bank and the extension of quantitative easing of central banks in the UK and Japan. As this situation can cause uncertainty in the foreign exchange market and a rise in global commodity market prices, caution is deemed necessary.

- As all major advanced economies have implemented monetary expansion policies through quantitative easing, it is likely that the appreciation pressure on the currencies of emerging countries will increase.
- Moreover, excess global liquidity may cause instabilities of international commodity prices, including oil.

Figure 13. World Oil Prices

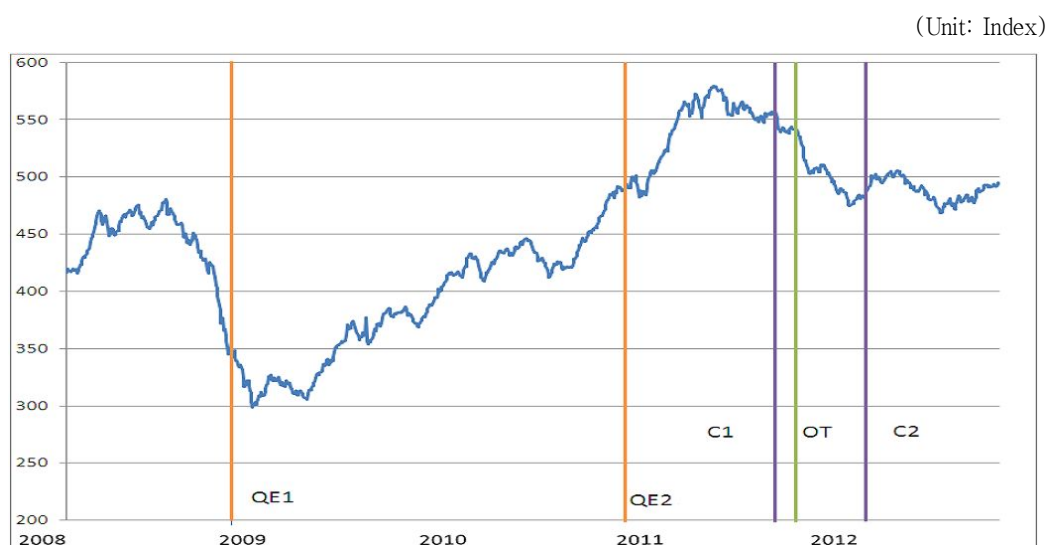
(Unit: USD per barrel)



Note: QE1 and QE2 refer to the first and second rounds of quantitative easing (QE), respectively. OT indicates Operation Twist, and C1 and C2 refer to the two policy commitment periods.

Source: Bloomberg.

Figure 14. Commodity Research Bureau (CRB) Index



Note: QE1 and QE2 refer to the first and second rounds of quantitative easing (QE), respectively. OT indicates Operation Twist, and C1 and C2 refer to the two policy commitment periods.

Source: Bloomberg.

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