Comparative Analysis and Impact of Conventional and Non-Conventional Monetary Policies on USA and Japan's GDP Growth Rate During Financial Crises

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ABSTRACT

This article talks about how central banks step up and take measures to keep economy at bay by using fiscal and monetary policy measures. We here examine the effects of conventional monetary policy measures when the economy goes for a toss and also measure the effectiveness of it on economy. The article also talks about the non-conventional monetary policy measures like Quantitative Easing which is being used when conventional measures like interest rates fail to work. We compare the effect of both the measures and see the effectiveness in revival of the economy. The unconventional monetary policy measures were only taken in the developed countries like Japan, UK, USA etc. Prior research suggests that these measures have helped the economies to come out of the crisis. This paper has the examples of Japan and USA in this paper. The reason being, that Japan was the first country to implement Quantitative Easing, so we will have a broader timeline to understand the effects of QE on the growth rate of the country. USA is also taken into consideration because the world relies on the US dollars and if there's a change in US dollar, the effects could be felt all around the globe. So, to understand the effects of QE more effectively, the USA is taken into account.

Introduction

The study aims at finding out the nuances of Quantitative Easing on the economies like Japan and USA. We also compare the results with conventional monetary policy measures and then come to a conclusion. We have heard lot about conventional monetary policies. When the economy goes into a recession the central bank tries to use conventional monetary policy measures like cuts in the interest rates. When these rates reach the level next to zero and when there is no more room to cut the interest rates anymore and there is no sign of recovery yet. We use unconventional monetary policies then. Unconventional Monetary policy have many tools under it like Quantitative Easing, also called as (QE). It is used when the interest rates reach near zero levels. It basically focuses on buying of securities by central bank of the particular country. The security being bought can be anything. It is basically done, keeping in mind to stimulate the money supply in the economy which is short of it due to the financial crises which stays ahead of them. It is done when conventional monetary policies fail to perform i.e. the basis parentage point cuts in the interest rates. This is done to increase the borrowing as it is cheaper to borrow money now in the economy than it was earlier. It is done keeping in mind to expand the economy, as people do not have that much money which they had before. Central banks give them an incentive to borrow the money from the commercial banks by lowering the interest rates, i.e. almost zero interest rates or sometimes even a negative interest rate. When these policies fail to have a significant impact on the economy, QE comes into the picture.

Research Objectives:

- To ascertain the reason as to why even after many rounds of QE in modern economies like USA, it didn't lead to hyperinflation.
- To find out the impact of QE on GDP growth rate for USA and Japan.

Expected Benefits of Research:

The study done here will be around quantitative easing and its impact on an economy. The purpose of non-conventional monetary policy tools is to stimulate growth back in economy when rest of the measures have failed. We will be finding out how QE can be done in the future, if needed without the fear of the economy spiraling into hyperinflation. We will also study the human behavior as we will be taking the changes in expectations of an investor when the news of QE, is announced. Changes in yields of the bonds shall also be noticed during the announcement of QE.
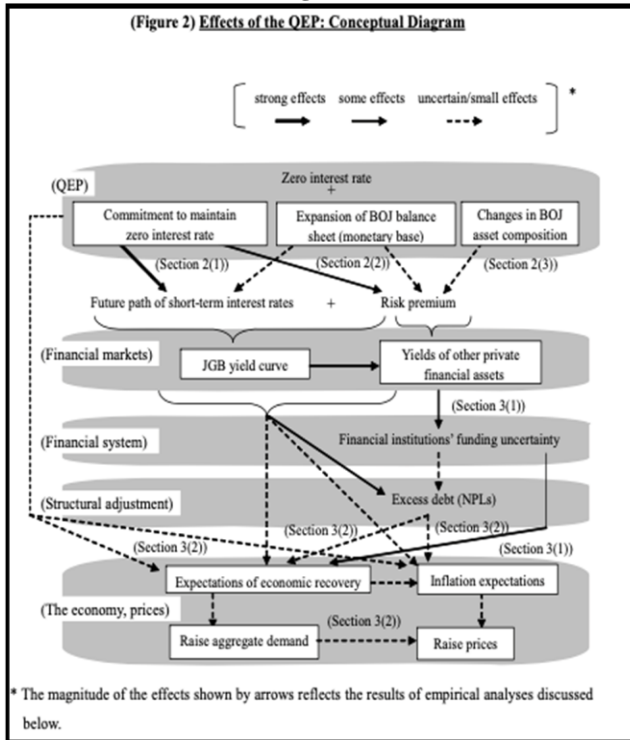
Hypothesis:

- H_0: There is a significant impact on inflation, post Quantitative Easing process.
- H_1: There is no significant impact on inflation, post Quantitative Easing process.

Literature Review:

QE practice in Japan:

Figure 1

Source: Effects of the Quantitative Easing Policy: A Survey of Empirical Analyses - Hiroshi Ugai (2006)

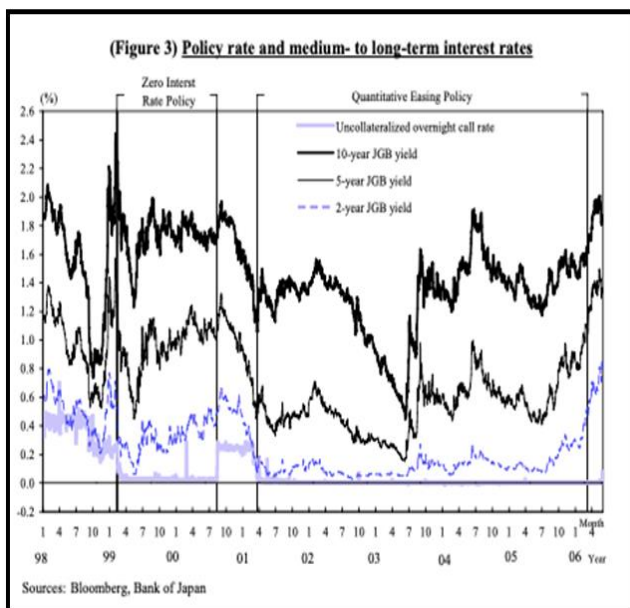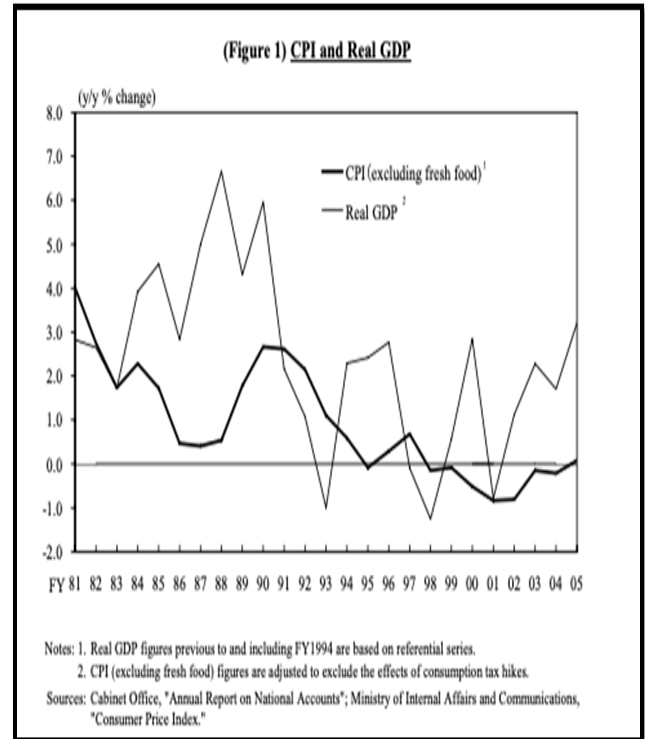**Figure 2 Source: Effects of the Quantitative Easing Policy: A Survey of Empirical Analyses - Hiroshi Ugai (2006)**

Figure 3

Source: Effects of the Quantitative Easing Policy: A Survey of Empirical Analyses - Hiroshi Ugai (2006)

From the above graph (Figure 3) we can clearly see the condition of Japan's economy, their CPI inflation was negative for a really long time, i.e. they were facing a problem of deflation for a really long time. With the measures taken up by the Bank of Japan they were able to come out of deflation for a short period of time, that's why they had to do many rounds for Quantitative Easing.

According to one source, it was first implemented there in 1990's after showing slight improvement after years of recession, the Japanese economy was devastated by East Asian Financial Crisis as well as by its domestic financial policies. The demand for both investment and consumption shrank severely, and a great number of large-scale financial institutions went bankrupt in quick succession. In March 1998, the Bank of Japan announced the implementation of a zero-interest-rate policy; however, the effects were not significant enough to stop deflation, (Lu, 2103). Conventional monetary policies using interest rates as a regulatory approach proved ineffective, and the need for implementing nonconventional monetary policies became urgent. In March 2001, the Bank of Japan announced its intent to implement QE. Since that time, there have been periods when both the zero-interest rate policy and the QE policy have been temporarily suspended and quickly reinstated. The last (i.e., the ninth) QE policy was given on October 30, 2012, or, in other words, the bank of Japan's present policy despite everything consolidates QE and a zero-financing cost strategy with the benchmark loan cost somewhere in the range of 0 and 0.1 percent. However, judging from their long-term performance, these QE policies have nothing to recommend them. Since the speculative bubbles burst in the 1990s, the Japanese economy has remained in a persistent general downturn. The "lost

decade" grew into the "lost 20 years"; nothing has improved, and now the entire country is suffering from deflation and a lack of employment opportunities, (Lu, 2013).

According to the author, the Japanese experience proves that even though the country is implementing coordinated policies regarding financial deficits, zero interest rates and QE, this approach cannot restore the economy's health. QE has proven incapable of improving the economic outlook; instead it has led Japan into an abyss of long-term deflation. However, we can still gain two useful theoretical lessons from the practice of QE in Japan: (1) the Japanese economy would have performed worse without QE; (2) the quantity theory of money, which is widely regarded as the leading monetary theory, has been disproved. (Lu, 2013)

QE practice in USA:

The American subprime mortgage crisis broke out in the summer of 2007. In September 2007, the Federal Reserve tried to stimulate economic growth by decreasing the interest rate from a starting point of 5.25 percent. America's third largest investment bank, Lehman Brothers Holdings Inc., declared bankruptcy on September 15, 2008. According to one source (Lu, 2013) it signaled the beginning of the global financial crisis. By the end of 2008, the interest rate was at its lowest level in history, between 0.00 and 0.25 percent. The unemployment rate at that time was as high as 7.4 percent and it kept increasing. Even with a zero-interest rate, the Fed was unable to increase employment and control inflation with the usual price-based monetary policy instruments. In order to rescue America's crumbling real estate corporations and financial institutions, as well as stabilize the financial system and stimulate economic recovery, the Fed had no choice but to turn to a non-conventional quantity-based monetary policy, namely QE. On November 24, 2008, the Fed announced that it would purchase USD 100 billion in bonds, as well as USD 500 billion in asset-backed securities. The main purpose of the policy was to inject money into the financial system so that banks would not have to recover the liquidity through loans, thereby stabilizing the banking system (Lu, 2013). With this policy, the Fed hoped to stop the free fall of the American financial system and stimulate an economic recovery. By the end of QE1 in March 2010, the Fed had purchased USD 1.25 trillion in mortgage-backed securities, USD 300 billion in US treasury bonds and USD 175 billion in institutional securities—around USD 1.725 trillion in total. Thus, the Fed's balance sheet was increased from USD 880 billion to USD 2.3 trillion. QE1 was useful in a specific way in keeping the American monetary framework from crumbling. From June to December 2009, the Bank of New York, Goldman Sachs Group, J. P. Morgan Chase and Co. also, Citibank all reimbursed the help assets to the administration, which implies that during the execution of QE1, all the budgetary establishments in Wall Street that were going to fail recuperated. Notwithstanding, because of the way that money related organizations are still during the time spent de-utilizing, and in light of the fact that the monetary patterns are as yet unsure, budgetary foundations are hesitant to allow advances, and along these lines, their liquidity isn't being moved into credit and subordinate

spending for the genuine economy. In this way, it is hard to advance venture and utilization, and the US unemployment rate stays stuck at an inadmissibly elevated level. The unemployment rate in America expanded from 7.4 percent toward the finish of 2008 to in excess of 10 percent during the final quarter of 2009. It diminished somewhat after 2009, however was still as high as 9.6 percent in October 2010.

Figure 4
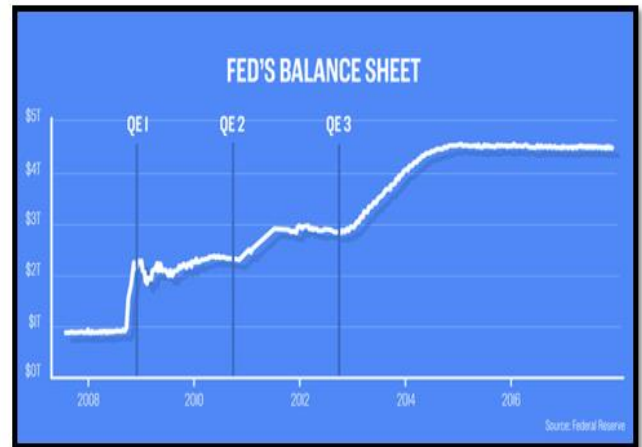
Source: Federal Reserve

Figure 5
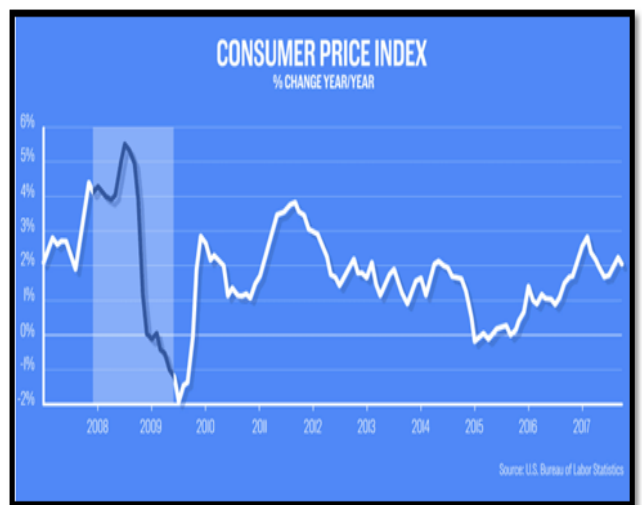
Source: Federal Reserve

Figure 6

Source: Federal Reserve

Figure 7

Source: Federal Reserve

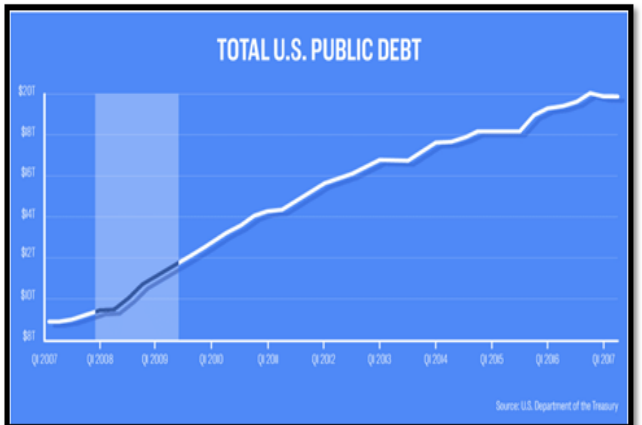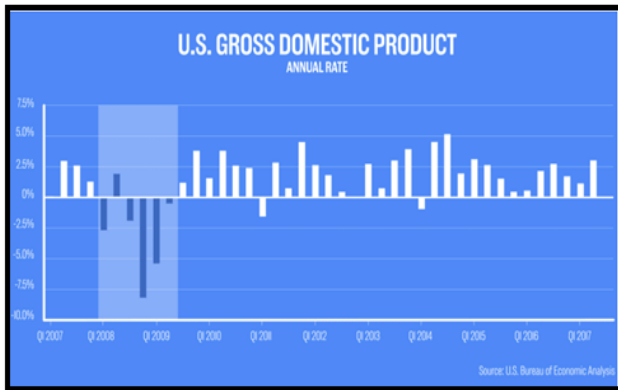During the second round of QE policy (QE2), from November 2010 to June 2011, the Fed purchased USD 600 billion in long-term Treasury bonds. QE2 had a clear purpose: to speed up the slow recovery of production and employment rates in America.

Data Analysis:

As we are doing analysis for two countries namely: USA and Japan who implemented Quantitative Easing during the time of Crisis. We will be comparing both the countries on the basis of:

- Time before QE was implemented in both the countries and the effect of conventional monetary policy i.e. Interest Rates on the economy's inflation.
- Time after QE was implemented in both the countries and effect of conventional and non-conventional monetary policy measures on both these economies.

Japan:

The QE was used first in Japan ever in the year 2001. Before that the country was trying to cope with the deflationary pressures by using Conventional Monetary Policy Measures I.e. Interest Rates set up by the Central Banks, here it is Bank of Japan (BOJ). They tried ZIRP (Zero Interest Rate Policy) to get the economy back on track but it did not work and hence they had to switch to QE. They have been practicing QE ever since 2001 to try and get back the economy back on track.

Pre QE-Era for Japan (1984 -2000)

Year	Inflation Rate	Interest Rate	GDP Growth Rate
1984	2.26%	5.00%	4.50%
1985	2.03%	5.00%	5.23%
1986	0.60%	3.63%	3.33%
1987	0.13%	2.54%	4.73%
1988	0.68%	2.50%	6.79%
1989	2.27%	3.17%	4.86%
1990	3.08%	5.40%	4.89%
1991	3.25%	5.63%	3.42%
1992	1.76%	3.69%	0.85%
1993	1.24%	2.31%	-0.52%
1994	0.70%	1.75%	0.99%
1995	-0.13%	1.02%	2.74%
1996	0.14%	0.50%	3.10%
1997	1.75%	0.50%	1.08%
1998	0.67%	0.50%	-1.13%
1999	-0.34%	0.50%	-0.25%
2000	-0.68%	0.50%	2.78%

Figure 8

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.598222492
R Square	0.35787015
Adjusted R Square	0.266137315
Standard Error	0.019580893
Observations	17

Source: Excel

To understand the effect of interest rates and inflation on the GDP growth rate of Japan, we conducted a multi linear regression where, Y (dependent variable) is the GDP growth rate and X (independent variable) is the inflation rate and the interest rate prevailing in the market. So, when we conduct the linear regression our Adjusted R^2 comes out to be 0.266 which means that 26.6% of the values fit the regression analysis model, which is not that much of an influence on the dependent variable. There are many other factors that are connected to the GDP growth rate of a country as every economy is open to all and is

interconnected. So, every new event in the market has a direct or an indirect influence on the growth rate of the economy.

Post QE-Era of Japan (2001-2006)

Year	Inflation Rate	Interest Rates	GDP Growth Rate
2001	-0.74%	0.23%	0.41%
2002	-0.92%	0.10%	0.12%
2003	-0.26%	0.10%	1.53%
2004	-0.01%	0.10%	2.20%
2005	-0.28%	0.10%	1.66%
2006	0.25%	0.25%	1.42%

Figure 9

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.946528556
R Square	0.895916307
Adjusted R Square	0.826527178
Standard Error	0.003319995
Observations	6

Source: Excel

Bank of Japan was the first one to implement the Quantitative Easing in the year 2001. They took this spur growth in the economy as the ZIRP (Zero Interest Rate Policy) wasn't working to bring in growth. They tried the combination of QE and ZIRP to revive the economy which they weren't able to since quite a long time. So basically, for the analysis, I've divided the QE into two parts. (i) When QE 1 was conducted & (ii) When QE 2 was conducted. So, QE 1 which happened between 2001-2006. To see the effect of the QE on the Growth rate, we conducted a multi linear regression on both the dependent variable (Y) and the independent variable (X). So here the dependent variable is the GDP growth rate and the independent variables are Interest rate and Inflation rate. The adjusted R^2 came out to be 0.826 which means 82.6% of the values fit the regression model analysis and it the underlying measure i.e. QE, indeed had a significant effect on the increase of growth rate over these years. The measure seemed to work as the BOJ was expecting it work like. Things started getting worse when the financial crisis hit the world economy and there was a need for urgent measures to revive the economy

USA:

They first used QE when the financial crisis hit the world economy and low interest rates did not seem to work for them. They used it for the first time in the year 2008. They wanted to the money to flow in the economy as credit post the financial crisis, so they termed it as credit easing. The

analysis done here is divided into two parts (i) Pre-QE Era (1984-2007) and (ii) Post-QE Era (2008-present).

Pre-QE Era of USA (1984-2007)

Year	Inflation Rates	Interest Rates	GDP Growth Rate
1984	3.90%	8.25%	7.20%
1985	3.80%	7.75%	4.20%
1986	1.10%	6.00%	3.50%
1987	4.40%	6.75%	3.50%
1988	4.40%	9.75%	4.20%
1989	4.60%	8.25%	3.70%
1990	6.10%	7.00%	1.90%
1991	3.10%	4.00%	-0.10%
1992	2.90%	3.00%	3.50%
1993	2.70%	3.00%	2.80%
1994	2.70%	5.50%	4.00%
1995	2.50%	5.50%	2.70%
1996	3.30%	5.25%	3.80%
1997	1.70%	5.50%	4.40%
1998	1.60%	4.75%	4.50%
1999	2.70%	5.50%	4.80%
2000	3.40%	6.50%	4.10%
2001	1.60%	1.75%	1.00%
2002	2.40%	1.25%	1.70%
2003	1.90%	1.00%	2.90%
2004	3.30%	2.50%	3.80%
2005	3.40%	4.25%	3.50%
2006	2.50%	5.25%	2.90%
2007	4.10%	4.25%	1.90%

Figure 10

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.592214705
R Square	0.350718257
Adjusted R Square	0.2888819
Standard Error	0.012167014
Observations	24

Source: Excel

The time before the QE was implemented in USA, only conventional monetary policy measures were being used to keep the economy under control. For data analysis here, we have run a Multi linear regression on dependent variable (X) i.e. the GDP growth rate and independent variables being (Y) Interest rates and the inflation rate prevailing in the economy. As we are using Multi Linear Regression, we look on the Adjusted R^2 value to define the quality of the model. Here, the Adjusted R^2 came out to be 0.2888, which means that 28.8% of the values fit the regression analysis model, which is not that much of an influence on the dependent variable. That means that there are many other factors which contribute to the GDP growth rate apart from the inflation rate and the prevailing interest rate.

Post QE-Era (2013-2019)

Year	Inflation Rate	Interest Rate	GDP Growth Rate
2007	0.06%	0.72%	1.65%
2008	1.38%	0.67%	-1.09%
2009	-1.35%	0.30%	-5.42%
2010	-0.72%	0.30%	4.19%
2011	-0.27%	0.30%	-0.12%
2012	-0.06%	0.30%	1.50%
2013	0.34%	0.30%	2.00%
2014	2.76%	0.30%	0.37%
2015	0.79%	0.30%	1.22%
2016	-0.11%	0.30%	0.52%
2017	0.47%	0.30%	2.17%
2018	0.98%	0.30%	0.32%
2019	1.00%	0.30%	0.65%

Figure 11

SUMMARY OUTPUT	
Regression Statistics	
Multiple R	0.360762527
R Square	0.130149601
Adjusted R Square	-0.337312999
Standard Error	0.007405369
Observations	6

Source: Excel

As the recession hit many economies post financial crisis due to housing market bubble burst in USA in 2008. It affected the world because every economy is interconnected these days and also US Dollars is the main currency through which every country makes its transactions. So, when the effects of the crisis started hitting Japan, they further thought of doing QE as they did earlier to revive the economy. BOJ started with QQE (Qualitative and Quantitative Easing) in the year 2013 keeping in mind the effects will the same as it was before. But it wasn't the case for Japan. All it did was just reduce the effects of Financial Crisis on its economy. It did not revive the economy like in the period of (2001-2006).

We ran a Multi linear regression to test the same. The dependent variable being, the GDP growth rate (Y) and independent variable being Inflation Rate and the Interest Rate. The adjusted R^2 came out to be -0.337 i.e. there is very low significance of the GDP growth rate with the prevailing interest rates and the inflation rate even after QE was conducted. All it did was that it increased the monetary base of the BOJ and provided a relief for a very short period of time. Bank of Japan have to look into a different measure now if they want to revive the economy from very low growth rate. QE has short term effects on the economy and can't be used often like the much conventional monetary policy, i.e. cutting down of the interest rates.

Conclusion:

In the end we can say that QE (Quantitative Easing) was somewhat effective and its effects diminished when its use became normal for bailing out the economy. It was feared that QE will eventually lead to very high inflation over the long run but this didn't happen because these the economies were already into a problem of severe deflation. The inflation has remained low despite a large buildup in the balance sheets of Japan and USA mainly because of the money multiplier effect. So, this measure just bailed out the economy out of the phase of deflation and got them into the minimal inflation zone. QE increased the balance sheet size of these economies (Japan and USA) very drastically. This measure has not been applied in most of the countries and its full effects are yet to be seen as only limited number of countries have used this tool to revive their economy. This tool proved the quantity theory of money wrong. Also, as the US dollar is the currency in which most of the transactions take place all around the globe, so if any impact on the US economy has a minor/major setback for rest of the world depending on the severity of the crisis. That is why the major economies of the world got affect post Financial crisis of 2008 in USA. This measure is effective only if the transmission channels are effective and QE as a tool cannot be used alone. It has to be supported with low interest rates or zero interest rates to spur the growth back in the economy. Central banks are yet to find out the long-term solution for boosting the economy, QE works as short-term measure which brings in growth for small period of time and the economy is back to where it was post QE. QE also increases the broad money which increases the balance sheet size of the central banks. Increasing the money supply faster than the growth in real output will cause inflation. The reason is that there is more money chasing the same number of goods. Therefore, the increase in monetary demand causes firms to put up prices. Therefore, this tool should be used as a last resort to bring back the economy on track.

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