



US in Liquidity Trap – What are the options?

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In his October-2010 speech, Chicago Fed President Charles Evans created a stir saying US economy is in a “bona fide liquidity trap”. He added Fed’s dual mandate of inflation and employment is seeing large misses with underperformance in both parameters. St Louis Fed President James Bullard, in a research paper shows US economy currently is closest to Japanese situation in 1990s. A series of speeches by US policymakers and economists have followed discussing options ahead for US economy. The speeches of Fed Board members and Regional Fed Presidents show a wide divide over future Fed policy and possible options.

Given the above context, this paper reviews the developments in US economy and discusses the policy options. It also draws experiences from Japan’s crisis in 1990s and compares it with the current crisis in US. The essence of the paper is though there are number of policy choices under a liquidity trap situation, implementing them is very difficult. There are number of criticisms of each option and the impact of the policies is also uncertain. Bank of Japan tried number of strategies which have been also been tried by Fed (and other central banks) in this crisis, but it did not have the desired effect. This is what led to Japan’s lost decade of low growth and deflation.

A very similar scenario is emerging for US economy. Fed Chairman Bernanke authored many papers criticizing Japanese policymakers for letting a crisis become a prolonged one. One of his papers was scathingly titled - Japanese Monetary Policy: A Case of Self-Induced Paralysis. It is an interesting play of history that Prof. Bernanke helms the Fed at the most important time for US economy. It will be interesting to see whether US economy also undergoes a lost decade or Bernanke has a few more magic tricks.

I. US Economy Showing False Dawns

The financial crisis started with US economy in August 2007. It exacerbated to become a global financial crisis in September 2008 after Lehman Brothers collapsed. The governments and central banks responded and took measures to mitigate the impact of the global shock. The aggressive policy stimulus showed results as world economy started showing signs of recovery by second quarter of 2009. Financial market indicators stopped declining and risk spreads narrowed to pre-crisis levels. As economy showed signs of recovery, Federal Reserve officials (and policymakers worldwide) started debating exit policies. At that time, the broad message was Japan’s policies were not successful as they were not aggressive enough. Despite initial similarities, US managed to ease the crisis much sooner than Japan.

However, in 2010 economic outlook took a U-turn. First it was the European crisis which took the financial markets by storm. As European crisis started to ease around June-2010 it was said that the global crisis is over. The prediction was again wrong as US economy started to weaken. The reason was overall stimulus started by US Government and Federal Reserve came to an end. Fiscal stimulus programs like cash for



clunkers and housing tax and Federal Reserve's several easing programs ended as their term got over. Overall most broad parameters of economic development started declining. What went wrong?

Here again, come the lessons from Japan (refer Box 1 for more details). In Japan there were three such recoveries which prompted policymakers to cut back on stimulus. And each time the economy relapsed into recession. BoJ Governor Shirakawa in a speech (2010) remarks:

Whenever some signs of recovery were observed in Japan, expectations that the economy would finally escape from stagnant conditions and enter a full-fledged recovery were rising. Based on such Japan's experience, I attempted to draw public attention to the risk of falling into false optimism by using the phrase of a "false dawn," when we saw some signs of economic recovery in advanced economies in the spring of 2009.

We see similar situation in US (and other economies) as well. The stimulus started showing results which was mistaken to be signs of complete recovery. As the tenure of the stimulus ended, the economy again started to weaken.

II. Liquidity Trap, Deflation and Zero Interest Rate – A Vicious Spiral

The reason for Japan to keep relapsing and US now is that this recession is of a different kind. It is a recession which leads to a situation which economists term as liquidity trap.

Liquidity trap is a situation in which central banks cut policy rates to zero (near zero) and no further stimulus can be provided. The situation arises because of a severe recessionary shock which forces a central bank to cut rates sharply to touch zero percent levels. This zero percent level is then called as Zero Interest Rate Policy (ZIRP) of the central bank.

In this situation, what also happens is deflation expectations start to build up. The crisis leads to substantial slack in the economy which pushes prices lower. If inflation goes below zero in this situation it is also called as deflation. The expectations of deflation set in a similar vicious circle like seen in the case of hyperinflation. As people expect prices to lower, they defer consumption. Then it impacts businesses via the Fisher equation:

$$\text{Nominal Interest Rate} = \text{Real Interest Rate} + \text{Expected Inflation}$$

Nominal interest rate is in the rate which central banks operate. In economic theory, investment happens at real interest rate which is lower after accounting for expected inflation. In normal times, say nominal interest rate =5% and expected inflation=2%, then real interest rate =3%.

However in ZIRP, nominal interest rate = 0 and expected inflation plays a significant role (Table 1). If expected inflation >0, things are still manageable. However, if expected inflation <0, real interest rates become positive. As real interest rate > nominal interest rate, businesses stop investing as well. Hence, both consumption and investment decline in ZIRP and economy remains stagnant/depressed unless the trap is over.



| | Nominal Interest rate | Expected Inflation | Real Interest Rate |
|------------------|-----------------------|--------------------|--------------------|
| Normal Times | 5 | 2 | 3 |
| In ZIRP | | | |
| If inflation > 0 | 0 | 2 | -2 |
| If inflation < 0 | 0 | -1 | 1 |

In US so far, inflationary expectations have remained around 1.5% - 2%. In a recent paper by Jens Christensen of San Francisco Fed (TIPS and risk of deflation, Oct 2010), the author points out deflation risks remain very low. His analysis shows probability of deflation in US is about 5.3%. Infact, positive inflation expectations have been the saving grace for Fed in this crisis, though concerns still remain as core inflation for September-10 was noted at 0.8% and continues to decline. Research also shows that inflation expectations follow the current inflation trend. If current trend, continue to show lower inflation, inflationary expectations could also trend lower.

III. Policies in Liquidity Trap

In liquidity trap, conventional economics principles don't apply. Paul Krugman remarked on his blog:

"Virtue becomes vice: attempts to save more actually make us poorer, in both the short and the long run. Prudence becomes folly: a stern determination to balance budgets and avoid any risk of inflation is the road to disaster. Mercantilism works: countries that subsidize exports and restrict imports actually do gain at their trading partners' expense. For the moment — or more likely for the next several years — we're living in a world in which none of what you learned in Econ 101 applies."

Let us understand the policies under liquidity trap. We will limit our discussion to US policies and compare with Japan whenever needed.

- **Fiscal Policy:** This was first suggested by Keynes as a remedy to the liquidity trap situation in Great Depression. He actually coined the term Liquidity trap. His advice was that the government can always stimulate the economy in a liquidity trap by simply printing money. The other options to stimulate via fiscal policy are increasing government expenditure, cut taxes, specific programs for housing etc. In this crisis, most governments coordinated fiscal stimulus to ease severe pressures after Lehman fallout. A combination of fiscal tools was used- cutting taxes, increasing government expenditure, specific program like cash for clunkers etc.

Initial success of fiscal policies ushered in a huge debate amidst economists on whether these policies are useful. In a way this crisis has resulted in revival of fiscal policy economics and research. Before this crisis, fiscal policy and its effectiveness were pushed to sidelines before this crisis. Fiscal austerity and controlling budget deficits have been seen as an integral part of a macroeconomic policy framework. Hence, to ask governments to stimulate an economy was severely criticized. Depressions and recessions were considered a relic of the past. Even if a



recession happened it was not usually very severe and central banks managed to ease the situation by just lowering rates. The power of central banks and monetary policy just grew overtime.

However, as this crisis proved to be the most severe since Great Depression and turned the earlier logic onto its head, suddenly economics of depression and liquidity trap came into limelight. As not much research has happened in this area, there is also not a very clear understanding of the fiscal policy channels.

The same sets of problems were seen in Japan as well. As Japan entered the recession with a higher debt ratio, it was conscious not to rely on fiscal policy. The Japanese government passed some fiscal programs but as economy recovered it rolled back the stimulus. Adam Posen a noted economist on Japan (also a Bank of England MPC member), points out that fiscal policy worked in Japan whenever it was tried. But as it was a case of too little, nothing much can be made from Japan's fiscal policies in its recession. Unlike lot of literature on BoJ policies, we don't have much research on fiscal policy.

There is tremendous disagreement over whether fiscal policies were useful in easing 2007-09 crisis. Alan Blinder (of Princeton University) and Mark Zandi (of Moody's) opine that fiscal policies were useful in preventing the second depression in US. John Taylor (of Stanford University) says that the fiscal stimulus was not useful. Some have criticized US fiscal policy as the unemployment rate is much higher despite the fiscal policy. To this policymakers have responded saying had it not been the fiscal stimulus the final numbers would have been much worse.

Others like Paul Krugman (of Princeton University) say the first fiscal stimulus was too small given the large recessionary shock. He was one of the first economists to say US was in a liquidity trap after Lehman collapsed. He has gone on to add that unconventional monetary policy (discussed below) does not help as under ZIRP both cash and T-bills have zero yield. So exchanging them will not help as people just hold onto the cash.

Other form of debate has looked at the value of fiscal multiplier i.e. say if government cuts taxes worth \$1 or increases government expenditure by \$1, what is the impact on economic activity? Does it increase or decrease? As per US President's Council of Economic advisors fiscal multiplier is around 1.5 and has raised GDP in Q2 2010 by around 2.7%. Congressional Budget Office's estimates range the multiplier around 1.0 to 2.5. Robert Barro (of Harvard University) and John Taylor (of Stanford University) have criticised this fiscal multiplier analysis and their estimate is below 1. They say it is not a multiplier at all!

The fiscal multiplier debate extends to whether tax cuts led to a higher economic activity or rise in government expenditure led to a higher economic activity. In this crisis as interest rates are zero and there is high uncertainty, people might save on taxes and hence tax cut based fiscal multiplier is lower than government expenditure based fiscal multiplier.

As research on fiscal policy is still ongoing, we will only get to know the findings later. For instance, some economists have also started looking at fiscal policy in global liquidity trap. All these are new areas for fiscal policy research.

- **Unconventional Monetary Policy:** As interest rates touch zero, central bank needs to adopt policies other than lowering interest rates. These policies have been widely referred to as Unconventional Monetary Policy. These came into limelight through research of Milton Friedman



on Fed policies in Great Depression. He said as central banks have monopoly over money supply, they can always stimulate the economy even if interest rates touch zero. In other words, there is nothing like liquidity trap. Fed Chairman Bernanke has been a leading proponent of Friedman's ideas and has advocated a number of tools central banks can adopt under ZIRP. Fed has implemented some of these tools and others are being discussed.

- **Credit Easing:** This was the first set of unconventional policy implemented by Fed. In this Fed just reallocated its asset portfolio. It replaced risky assets from the market with Treasury bonds in its balance sheet. There was no increase in money supply and balance sheet via this operation (Table 2). The idea behind this option was to reduce risk spreads and encourage market-making in markets where trading had collapsed.

| Liabilities | Assets |
|--------------------|---|
| Capital | Treasury Bonds ↓ |
| Currency | |
| Bank Reserves | Risky Assets Mortgage assets, Commercial Papers etc) ↑ |

Fed started many programs under this option - Commercial Paper Funding Facility (CPFF), Primary Dealer Credit Facility (PDCF) and Term Securities Lending Facility (TSLF) etc. Early research shows that these programs were successful in their objectives. John Taylor (of Stanford University) criticized the Fed policy of targeting specific markets. He said targeting specific markets is in the domain of US Treasury. By targeting a few sectors, Fed has expanded the ever-widening financial markets safety net leading to rise in moral hazard. Government policy of targeting certain industries is called industrial policy. Prof. Taylor framed Fed's monetary policy as Mondustrial Policy.

Meanwhile, in August-2010 FOMC meeting Fed has decided to maintain the amount of its balance sheet. Fed will hold constant its holdings of securities at their current level by reinvesting principal payments from agency debt and agency mortgage-backed securities in longer-term Treasury securities. This is also a variant of its credit easing policy and reallocates assets from mortgage assets to US Treasuries. Fed's balance sheet has become a very important tool in this crisis.

- **Quantitative Easing:** This began after Lehman collapsed in September 2008. Fed's focus shifted to pumping money in the economy. Hence, Fed expanded its balance sheet by increasing bank reserves and buying assets from the proceeds. As a result balance sheet expanded significantly. Fed assets jumped from USD 907 billion on 3-Sep-08 to USD 2.2 trillion on 12-Nov-08. They are currently at USD 2.31 trillion. Bank reserves jumped from USD 10 billion on 3-Sep-08 to USD 859 billion on 31-Dec-09 and are at USD 1 trillion currently.



| Liabilities | Assets |
|--------------------|---|
| Capital | Treasury Bonds ↑ |
| Currency | Risky Assets (Mortgage assets, Commercial Papers etc) ↑ |
| Bank Reserves ↑ | |

The idea behind QE was to increase money supply in the economy. More money could lead to more output and help reduce widening unemployment as well. Higher money would also lead to higher inflation expectations and prevent US economy from going into a deflation spiral. Then as Fed continued to buy mortgage backed assets, it would continue to prevent risk spreads from rising. Early research shows first phase of QE helped lower interest rates by about 13-14 bps for USD 400 bn of purchases (Table 4).

| <i>Studies by different economists/firms</i> | <i>Estimated Impact (in bps)</i> |
|--|----------------------------------|
| Macroeconomic Advisers | 13 |
| Gagnon et al (NY Fed Study) | 13 |
| Hamilton-Wu | 14 |
| <i>Source: Meyer (2010)</i> | |

This tool was also criticized by economists saying Fed has compromised its independence by buying government bonds. As US is running huge deficit, Fed agreeing to buy these bonds is akin to monetization of US deficit. Even in Japan's case, BoJ was reluctant to buy Japanese Bonds for the same reason.

Within Fed, St. Louis Fed President James Bullard prefers to use this option going forward.

- **Communication:** Central bank communications have emerged as a very important tool even before the crisis. Communications have become highly transparent with central banks guiding financial markets over the future policy moves. In this crisis, Fed (and other central banks) used this tool. FOMC statement has been saying that Fed is “likely to warrant exceptionally low levels for the federal funds rate for an extended period.” This gives a forward guidance to the markets that Fed will continue to maintain easy policies for an extended period of time.

The economists are divided over the effectiveness of this tool. Preliminary research by San Francisco Fed economists show that the strategy was effective in lowering risk spreads. But on the other hand, St Louis Fed and Minneapolis Fed Presidents have criticized the usage of this language. They say by agreeing to keep low rates for an extended period Fed is fuelling expectations of deflation and sluggish economy.



- **Inflation Targeting:** Fed has tried the above tools and there have been mixed results of their impact. Economists have debated other tools for central banks under ZIRP. Inflation targeting is one such tool.

In this, Fed decides to target a range/point of inflation. Bernanke in a recent speech comments that the preferred inflation estimate of FOMC members is around 2% (core PCE inflation). So Fed can announce that it will now target inflation of 2% and maintain easy policies till inflation reaches 2%. The idea is that it guides the market that Fed will maintain easy policies till inflation reaches 2%. It also leads to rise in inflationary expectations.

However, there are issues with this option as well. Japan tried this tool but was not very effective. Then most economists forget that for a central bank to become an inflation targeter there will be amendments in the Federal Reserve Act. As it becomes a political event, it is always difficult to implement. It would require consensus from political parties and lead to multiple hearing at Senate and House of Representatives level. Moreover, Frank-Dodd act has already added number of responsibilities to Fed's mandate. To push another round of talks on changes in Fed's role may take much more time.

- **Price Level Targeting:** This is a variant of inflation targeting. It is being proposed aggressively by Chicago Fed president – Charles Evans.

In inflation targeting, the target is inflation rate and if a central bank misses the target nothing can be done. Say it promises an inflation of 2% every year for 5 years to ease deflation pressures. However, as economy is depressed and monetary policy works with a lag, in the first year the target is 1%. Market participants would not deem this as credible and it could again re-scale its expectations. For this purpose, price level targeting has been proposed. Under this, a price index (say CPI) would be targeted and it would be promised to raise it by say 8% for next 5 years. In this case, even if Central bank misses target in first year, it would be deemed as credible by market participants as target is price level over 5 years and not just the inflation rate.

Evans shows that if Fed follows his rule, core inflation is 2.2% in 2011 and 2.9% in 2012. The issues with this are the same as inflation targeting and it is also difficult to execute and communicate. Only Sweden has tried this in Great Depression and research showed it was successful.

- **Exchange Rate targeting:** The Central Bank in coordination with government can take measures to depreciate the home currency. This would lead to more expensive imports and lead to higher inflation. This would also push up demand as exports become cheaper compared to other countries.

This policy was suggested to Japan when it was the only economy in liquidity trap. Now with several countries in the same trap, this option cannot be tried. As it is the world economy is already under threat from currency wars and possible rise in protectionism. Hence, this option is ruled out.



- **Buying Foreign Assets:** The government can issue government bonds and purchase foreign exchange assets. This will send the signal to markets that if central bank/government raise rates in future to manage inflation it will incur balance-sheet losses. A higher interest rate would lead to appreciation of the domestic currency and depreciation of foreign currency leading to losses in foreign investment assets.

Again this option cannot be tried as central banks are under criticism for buying their own government bonds. Buying foreign bonds does not apply in the current macroeconomic situation.

- **Nominal GDP targeting:** This is being suggested by an economist Scott Sumner. In this Fed starts to target the growth rate of GDP and stimulate the economy till the gap between potential and actual GDP is narrowed. FOMC members discussed this option in the Sep-2010 meeting.
- **Money financed fiscal stimulus:** The above options look at fiscal policy and monetary policy as stand-alone policies. However, as per Laurence Meyer (former Fed Board member and now Managing Director of Macroeconomic Advisers) the most powerful tool under ZIRP is fiscal stimulus accommodated by central bank. In this case, government starts fiscal stimulus which is financed by Fed using quantitative easing. Fed Chairman Bernanke himself suggested this option to Japanese policymakers. Meyer in a recent research paper even shows that a payroll tax holiday for two years financed by Fed will lead to lower unemployment by 2% by 2012 and 2013. Inflation also rises by 0.5% by 2013.

Even in Japan, the policies were best seen as impacting when the two – fiscal policy and monetary policy worked together. But then, same set of criticisms apply here as seen for QE and fiscal policy. Economists never like the idea of an independent central bank aiding a government borrowing program. Even within government policymakers, there is a divide on the usefulness of this policy.

IV. Liquidity Trap Economics: Academics vs. Practice

In 1999, Boston Fed organized a conference on low interest rate policy. US based economists criticized BoJ policies in the conference. Kazuo Ueda, Member of Bank of Japan on hearing all the suggestions and criticism remarked what have become immortal words:

I must say that one of the most important messages of the conference has been: do not put yourself into the position of zero rates. I tell you it will be a lot more painful than you can possibly imagine.

In another speech (Japan's Liquidity Trap and Monetary Policy, September 29, 2001) Ueda highlights how Bank of Japan tried all the suggested ideas but still was not able to ease the situation. The deflation pressures and liquidity trap persisted in Japanese economy. Infact, deflation was around 1% in mid-1990s and with a zero nominal interest rate, the real interest rates were equal to around 1% (. The real interest rates were not as high as in the case of Great Depression of around 10%) and should have led to some recovery but it only got worse. There was slight upwards movement in inflation expectations in 2001 and 2006 which was undone with US crisis in 2001 and now in 2008. Just like Ueda, similar points were made by Kunio Okina, Director, Institute for Monetary and Economic Studies, Bank of Japan (Monetary Policy under Zero Inflation: A Response to Criticisms and Questions Regarding Monetary Policy, 1999).



So, there may not be liquidity trap as we know it. Central Banks have many options to stimulate the economy when in ZIRP, but the tools have not been very effective. In Both US and Japan - overall economic activity hardly picked up. Banks hold on to the reserves and don't lend, consumer sentiment hardly picks up and investment activity remained sluggish.

V. Concluding Thoughts - What next for US?

Adam Posen a leading Japan expert, has said in multiple papers that Japan could have avoided the prolonged recession by following old-fashioned Keynesian macroeconomics. He says Japanese economic situation was some sort of strange condition but a text-book recession. The policymakers should not have pressed exit buttons as economy showed some growth and pursued active stimulating policies. Above analysis also shows there are multiple options but economists and policymakers are too divided on the effectiveness of the policies. Hence, there is a policy trap.

In the US case, QE looks like the only option as other unconventional policies may take time and some are not even practical at this point of time. Hence, the expectations for QE2 have risen. QE1 was successful as markets were dysfunctional. Now, with markets in a much better shape, similar success of QE may not be repeated. Fed members are divided over whether QE2 will be any successful. Some economists say as markets have already factored in QE2, the treasury yields have already eased by around 50-60 bps. Hence, any announcement will not help lower yields any further.

In fiscal policy, the recent experience has not been good. Despite its usefulness in patches, it has mostly been criticized for letting gains pass on to the Wall Street.

The best solution would be a coordinated fiscal and monetary policy. The government starts more fiscal stimulus and Fed helps finance the stimulus using QE2 (as suggested by Meyer). The stimulus should be on programs which lead to more income in the hands of the people and lead to spurt in investment. But given the political reality, any further passing of fiscal stimulus looks like a remote possibility. The political impasse in US also complicates the problem.

The global economy is also in a quagmire. In the beginning of the recession, there was coordination and cooperation amidst both central banks and governments. It is much fractured now with each policymaker interested in its own economy. This may be right for domestic economy but not necessarily for Global economy. Some economies like UK and other European economies are consolidating their public finances leading to cut in overall global demand. Others like China continue to maintain undervalued exchange rates which do not help other economies gain on external front. As China is a large economy, it could help other economies by revaluing its currency and taking a larger volume of import. But none of this is happening. Hence, global policies are also not helping US overcome its problems. They are only complicating it further.

Given all this policy framework, Fed and QE2 remains the only possible option as of now. Fed is likely to start another round of QE2 in upcoming monetary policy on November 2-3 2010, but not many gains can be expected from the program.



Box 1: Japan in 1990s vs US in 2007 crisis

How the crisis started

The history of Japan's crisis goes back to Plaza Accord/Agreement signed in 1985. It was an agreement between the governments of France, West Germany, Japan, the United States, and the United Kingdom, to depreciate the U.S. dollar in relation to the Japanese yen and German Deutsche Mark. There were two reasons for the dollar's devaluation. First, U.S. current account deficit had reached 3.5% of the GDP and needed to be reduced. Second, U.S. economy was emerging from a serious recession that began in the early 1980s and needed a boost from the external sector.

As a result, Yen appreciated significantly (around 51% between 1985-87). As Japan was an export driven economy, the economy slumped into a recession. The recession led Bank of Japan to lower rates and pursue expansionary policies, which then led to surge in asset prices in particular property prices. The rise in asset prices led to the asset bubble which burst around 1989. The crisis took Japanese by a surprise as its economy and financial markets were doing so well. (Ronald McKinnon of Stanford University advises China not to let Renminbi appreciate for the same reasons).

Comparing this to US, we can immediately draw some similarities. US slipped into a recession in 2001 prompting Fed to lower rates. Further, on fearing Japan style deflation Fed kept low rates for a prolonged period of time. This led to build up of a bubble in housing and credit markets which finally burst in 2007 leading to the worst global recession since Great Depression.

Hence, in both crisis we see low interest rates as an important factor. The low interest rates were in turn because of previous recession. The low interest rates led to search for higher yield with most investment going into real estate markets. The search for higher yield meant taking bigger risks which produced super profits in good times and disaster in bad times. In both cases, first financial system collapsed which then led to a severe recession in overall economy.

In fact, there is quite a lot of similarity in how crisis became severe in both the countries. In Japan the crisis started around 1989 but worsened in 1997. In 1997, Sanyo securities defaulted in money-markets and failed. This led to adverse movements in money markets and a larger player Yamaichi securities was under stress. Bank of Japan (BoJ) intervened and provided support to Yamaichi ordering its orderly resolution. The liabilities of Yamaichi were shifted to BoJ's balance sheet and it prevented what could otherwise have been a global shock. However, if there were complex securitizations like seen in 2007 crisis, may be an international spillover could still have occurred.

Again, one cannot miss the parallels with US. Just replace Sanyo with Lehman and Yamaichi with AIG and one gets a similar story. Lehman defaulted in money markets and filed for bankruptcy. Seeing the probable impact, Fed intervened and saved AIG which was under severe stress. Though, Lehman fallout led to a severe global crisis but if AIG had failed as well, it would have been far worse. In case of Japan as exposure to Japan was not as much and global linkages were not as strong as in the case of US, a global crisis was averted. Then even in Japan, there were four big securities firms and same was the case with US having four large investment banks as well!



Policy responses

One big difference was the pace of policymakers' reactions to the emerging economic situation. In this US had a distinct advantage as they learnt few lessons from Japanese mistakes. As Japan did not have any such precedent barring Great Depression, they were slow to wake up to the risks. Kiyohiko G. Nishimura, Deputy Governor of the Bank of Japan in a speech (2009) comments on the pace of response. He says in the initial stages of the crisis, one month in the development of the US crisis seemed to be equivalent to three months in the development of Japan's. The pace accelerated later and it now appears that one US month is equal to five or six months in Japan of the 1990s.

The policy response was faster as the 2007 crisis was far more complex and interconnected than Japan's crisis. So, talking lessons from Japan and the current complexity, the response was much faster. Nishimura also compares Japanese policies in 1990s and US policies in 2007. He compares the policies from the time house prices started to fall. In Japan prices started falling in Q4 1990 and in US in Feb 2007. Table 5 clearly shows that US was much faster to respond to the crisis than Japan. If we also add unconventional monetary policy (discussed later), US started Credit Easing within 12 months and Japan started its quantitative easing after nearly 11 years in 2001.

| | Japan | US |
|---|-----------------|---------------------|
| First Mon Policy Rate cut | After 6 months | After 6 months |
| First Fiscal Stimulus | After 18 months | After 12 months |
| Zero Interest Rate Policy | After 8 years | After 21 months |
| Financial Sector Policy (Bank capitalization etc) | After 7.5 years | After 1 yr 7 months |
| <i>Source: Nishimura (2009)</i> | | |

There are other differences as well. US is predominantly a market-based financial system with large percentage of financial intermediation happening amidst non-bank players like investment banks, mutual funds etc. Japan is a more bank-based system with large percentage of financial intermediation happening in banks. Hence, initial Fed policies were towards rectifying the distortions in various kinds of markets – real estate mortgage-backed securities (RMBS), commercial papers etc. BoJ on the other hand focused largely on banking system.

| | Bank lending (% of GDP) | Outstanding Bonds of Private Sector (% of GDP) |
|---------------------------------|-------------------------|--|
| US | 63 | 168 |
| Japan | 136 | 94 |
| Euroarea | 145 | 81 |
| <i>Source: Shirakawa (2009)</i> | | |



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