On Economic Theory and Recovery of Financial Crisis

Shujie Yao and Jing Zhang

School of Contemporary Chinese Studies

University of Nottingham

Abstract: There are many studies on financial crisis in the literature but few have suggested a clear economic theory to explain why crises may happen and why economic recovery may take different shapes. This paper presents a new economic theory to explain the formation of a crisis and why a major crisis may take a long time to recover. It suggests that asymmetric psychological reaction of market players to gains and losses is the principal cause of a crisis and responsible for a prolonging recovery. Three different shapes of recovery, V, U and L, are defined and explained. During the current financial crisis, some countries such as China and India may have a V-shaped recovery, some countries such as the UK and the US may have a U-shaped recovery. An important policy implication is that effective macro-economic policies should be designed to smooth market movements and implementation of such policies has to be counter-cyclical rather than pro-cyclical.

JEL: E32, E44, E58, G18

Key Words: Financial crisis, asymmetric reaction to gains and losses, economic recovery

---

Shujie Yao, professor of economics, head of School of Contemporary Chinese Studies, internal fellow of GEP, University of Nottingham, special professor of Xi'an Jiaotong University, e-mail, Shujie.yao@nottingham.ac.uk. Jing Zhang, lecturer of Chinese studies, School of Contemporary Chinese Studies, University of Nottingham, e-mail, j.zhang@nottingham.ac.uk.
This paper is prepared for the 2nd China Conference of GEP at UNNC, Ningbo, China, 10-11 November 2009.

The current financial crisis

The current financial crisis was triggered by the failure of the US subprime mortgage market. By September 2008, many large financial institutions in the US and the EU revealed massive losses. Four largest US investment banks collapsed and many gigantic commercial banks such as Citigroup, Bank of America, RBS and Lloyds required colossal support from the US and British governments to survive.

The collapse in the banking system rapidly affected the real economic sectors, resulting in deflation, sharp reduction in trade, industrial production, share and commodities prices, and employment. The total collapse of people's confidence became the most vital threat to the world economy and its recovery.

Increasing globalisation in the past decades implies that the current world financial crisis has affected every single economy in the world and the recovery of the world economy will require concerted efforts of all countries to rescue their own economies but at the same time not to resort to trade protectionism.

The on-going crisis is the most serious in world history since the 1930s great depression. In response to this crisis, quick and massive rescue efforts have been made by the G20 economies through reducing interest rates, quantitative easing and stimulus investments.

Many countries have adopted a set of monetary and fiscal policies immediately after the outbreak of the financial crisis. Subsequently, some countries also announced huge stimulus packages although the effects of the rescue efforts still remain unclear. In addition, 'the global crisis requires a global solution'.[1] Leaders of G20 have met three times in Washington, London and Pittsburgh since the last quarter of 2008, aiming to bring the world economy out of recession.

There are many reports, commentaries and studies on the causes, consequences and rescue efforts of the crisis but few studies have focused on the economic theories about the crisis and its recovery. Many people point their fingers at bankers and financial regulators for their greed and complacence about the potential dangers of excessive investments and lending activities. However, these activities of banks and regulators were supported by various

[1] "The Global Plan for Recovery and Reform", G20 London Summit Declaration, 2 April 2009.

existing economic and investment theories, some of which have successfully been crowned with the prestigious Nobel Prize in economics, including the mathematical model developed for trading financial derivatives.

When the crisis strikes the world, no single theory could predict why it took place so suddenly after the world economy had enjoyed more than 15 years of successful growth. People were still arguing that the booming housing and stock markets would not end up in tears as interest and inflation rates were low shortly before the crisis. Central bankers in the US, the UK, the EU and other advanced economies were just busy focusing their monthly meetings on adjusting interest rates in order to meet inflation targets. They believed that they must have found a solution to maintain macro-economic stability if they just made a right decision on interest rate alone to keep inflation on track. As a result, governments believed that low inflation and interest rates were the ultimate instruments of a free market economy to sustain growth without suffering from booms and busts, let alone a crisis. Unfortunately, it was precisely because of this seemingly 'successful monetary policy' that had helped bringing the entire world economy to its knees.

In retrospect, it is no easy task to come up with another new economic theory that can predict, let alone prevent the occurrence, or re-occurrence, of world financial crisis. However, economic analysts should not try to avoid responsibility and should instead think harder on why existing economic theories have failed to serve the purposes. This paper is a first attempt to develop a new theory that may in part explain why an economic crisis takes place and why it may take a long time to recover. It is suggested that economic development cannot be relied on any single mathematical or economic model, but one should seriously consider the outcome of many people acting 'seemingly irrationally', causing unexpected results which cannot be easily modelled and simulated.

We suggest a new economic theory defined as 'the asymmetric psychological reaction of market players to gains and losses'. Market players include individual investors, consumers, firms and government officials. The asymmetric reaction of market players to gains and losses is the principal cause of a market bubble (or a crisis). It is also the principal reason why full recovery from a crisis is prolonging.

An important policy implication of this theory is that macro-economic policy, including the setting of interest rates and taxation, should be as counter-cyclical as possible to avoid building up a market bubble, or a crisis. One possible explanation for the current financial crisis may have been due to many monetary policies which were either pro-cyclical or at best semi-pro-cyclical for about ten years before the crisis. Banks and the entire financial system were left alone to take excessive risks without government intervention. The whole system was driven by greed and speculation by corporate management without duly considering the interests of investors and consumers.

Asymmetric reaction to gains and losses: a new theory of financial crisis

Traditional economic models are mostly based on the assumptions of rational behaviour of individuals and efficient markets. However, many individuals, be they consumers, investors, or firms, are irrational in the real world. In addition, many markets are not efficient in adjusting to new equilibriums. Individual irrationality can lead to the following results:

- ***Market players tend to take excessive risk when the economy is booming, and be overcautious when the market is low.***
- ***Different reactions to booms and busts are defined in this paper as the asymmetric psychological reaction of individuals to potential gains and losses. In other words, people care less for the same amount of gains from a booming market than for the same amount of losses from a collapsing market.***
- ***The reaction to gains can lead to excessive investments and risk-taking, causing a market bubble or crisis.***
- ***The reaction to losses can lead to extreme short term market volatilities, resulting in a prolonged recovery from a major crisis.***

This asymmetric reaction to booms and busts is principally explained by human economic psychology on gains and losses. People derive utility or happiness from financial gains and disutility or unhappiness from financial losses. Akin to financial gains or losses which can be quantified, happiness or unhappiness as a result of gains or losses can also be quantified. Let U_i denote the utility of an individual, be it an investor, consumer, or a firm, which can be

defined in equation (1) assuming it is a function of gains (G), losses (L) and a set of other variables $\tilde{Z}$.

$$U_i = F(G_i, \quad L_i, \quad \tilde{Z}_i) \qquad (1)$$

The asymmetric reaction of human economic psychology to gains and losses arise from the following fact: the additional level of happiness derived from a certain unit of gains (e.g., \$1,000) tends to be smaller than the additional level of unhappiness caused by the same unit of losses (also \$1,000). The marginal utility (happiness), MH_i, is positive but it tends to decline as successive units of gains are made. Mathematically, the first-order derivative of happiness with respect to gains is positive, but its second-order derivative is negative. This can be expressed in (2).

$$\frac{\partial U_i}{\partial G_i} = MH_i > 0, \qquad \frac{\partial^2 U_i}{\partial G_i^{\,2}} = \frac{\partial MH_i}{\partial G_i} < 0 \qquad (2)$$

To attain more happiness, driven by greed and speculation, investors need to invest aggressively once more and more gains are made when the market is high. If the majority of investors behave in the same way, the market will be overheating. If no timely and decisive policies are taken to cool down the market, a crisis is likely to emerge. A crisis is like a market bubble, but it is different from a single market bubble in the sense that it may be caused by many market bubbles, e.g., housing, stock and financial markets, at the same time.

Once all the bubbles burst simultaneously or in short sequence, usually triggered by the weakest or most vulnerable market sector (e.g., the US sub-prime mortgage market), individuals immediately start to run off the market once they are making losses. The speed they run off the market depends on how much losses they make and where the losses have come from. The more losses they incur, the faster they run. Losses coming from original investment capital have significantly more powerful impact on investors than losses taken from previous gains. If most investors start to make losses from their original investment capital, the market is deemed to collapse as investors' confidence is completely lost. As a result, the burst of a market bubble becomes a market crisis.

This market behaviour can be explained by a simple utility function of unhappiness in reaction to financial losses. The marginal unhappiness with respect to losses is not only positive but also increasing in response to successive units of losses. Mathematically, both the first-order and second-order derivatives of unhappiness to losses are positive. This can be expressed in (3).

$$\frac{\partial U_i}{\partial L_i} = MUP_i > 0, \qquad \frac{\partial^2 U_i}{\partial L_i^{\,2}} = \frac{\partial MUP_i}{\partial L_i} > 0 \qquad (3)$$

Where MUP_i is the marginal unhappiness of investor i. L_i and U_i are defined before as loss and utility respectively.

Expressions (2) and (3) represent the asymmetric reaction to gains and losses, or to happiness and unhappiness. They can be used to explain the occurrence of the current financial crisis and its prolonging recovery.

In addition to normal economic factors that lead to excessive risk-taking and lack of effective regulations, human psychology is an important driving force in developing bubbles in the financial and housing markets, according to authors of behaviour finance, such as Odean (1998), Shiller (2000), and Shleifer (2000). Psychological phenomena identified by these behavioural economists include cognitive dissonance, optimism or overconfidence, and framing. Some analysts suggest that there is no perfect arbitrage and classify all deviations from the actual price as asset bubbles (Brunnermeier, 2001). If the deviation is not significant, then it is a rational bubble, while the separating condition represents an irrational bubble (Blanchard, 1979).

Individuals' psychological reaction does not only affect the market bubble and its burst, but also have impact on the length of recovery after the crisis following the bubble's collapse. Previous evidence in housing market crash and bearish stock market shows that it usually takes more time to recover from a collapse than to develop a bubble or a bullish market. This phenomenon is perfectly explained by our theory that investors react asymmetrically to gains and losses, which can further be illustrated in Figures 1.

When investors make gains of one unit, say $1,000, they can derive an addition to their happiness measured by a. In contrast, when they make a loss of $1,000, they develop a sense

of unhappiness measured by b. Due to asymmetric reaction to gains and losses, b>a, despite the amount of gains and losses in nominal dollars is identical, i.e., $1,000.

Therefore, the marginal happiness (MH) caused by "one unit of gains" is significantly less than the marginal unhappiness (MUH) caused by "one unit of losses", i.e., MUH>MH. More importantly, marginal happiness to successive units of gains diminishes but the marginal unhappiness to successive units of losses increases. This asymmetric psychological reaction to gains and losses can explain the market phenomenon shown in Figure 2.

Figure 1 Asymmetric reaction to gains and losses

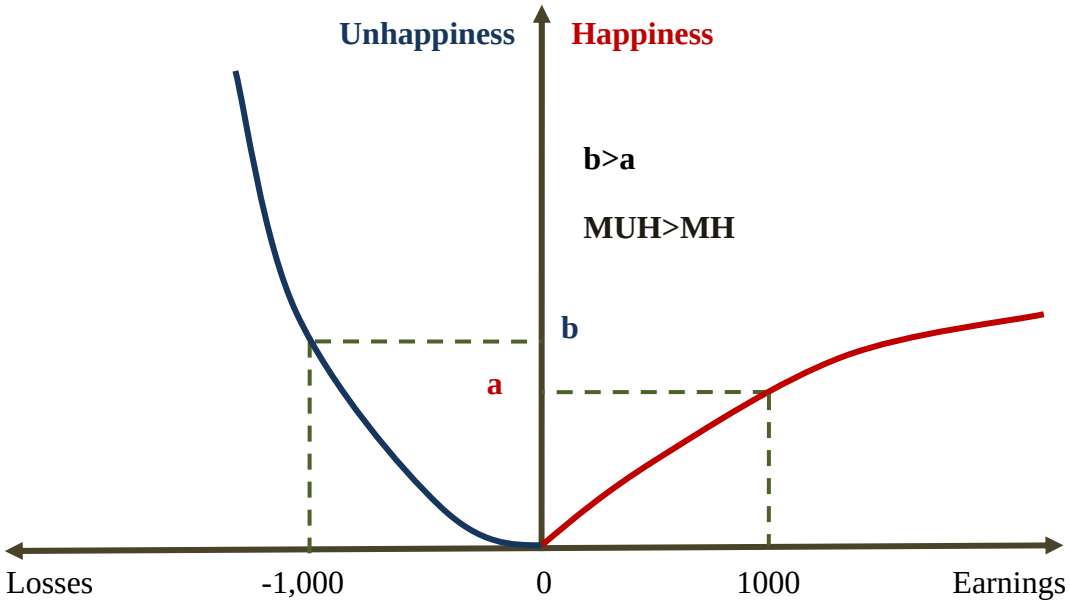
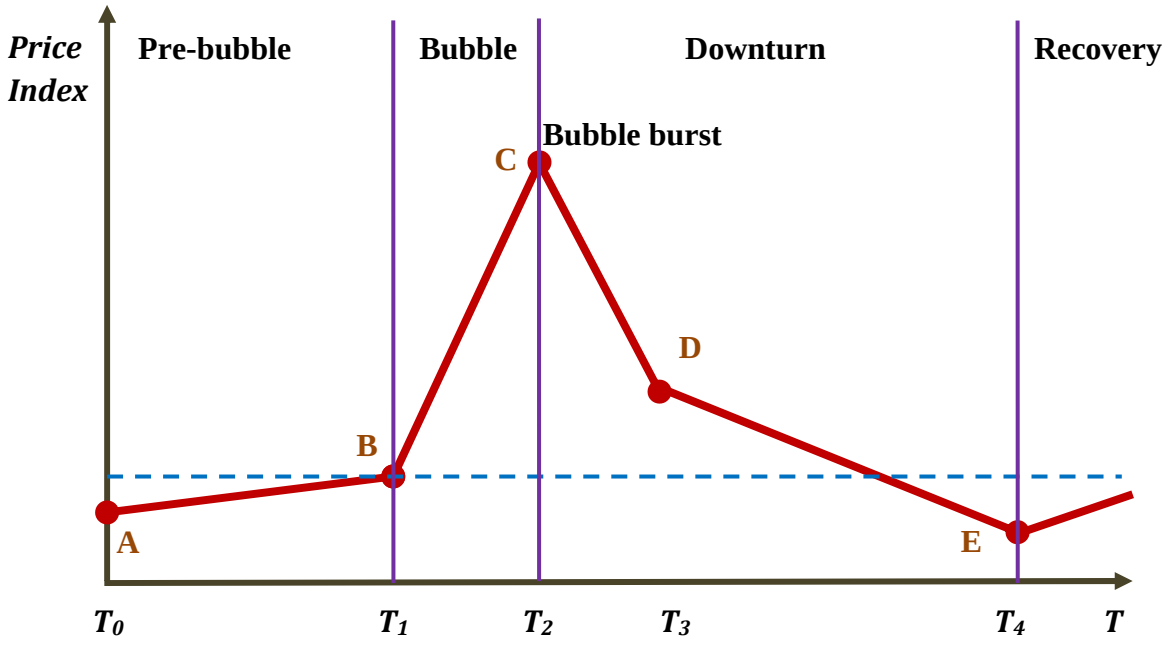


Figure 2 Evolution of market bubbles, crisis and recovery



When there is a relatively long period of gains in the market (from T_0 to T_1), investors may feel confident of the price increase in the future and tend to take "bigger risks" by investing more because they are not "really happy" even though they may have made a lot of gains, explained by the diminishing marginal happiness arising from gains as shown in expression (2). It is also in part driven by greed and speculation on the future bullish market prospects (Yao and Luo, 2009).

As a result, the market bubble grows bigger and faster, driving prices to peak at point C in a relatively short time (from T_1 to T_2). As the bubble becomes too big and the prices too high, the prevalent market conditions suddenly fail to sustain the market bubble and prices at their high levels. At this point, even if there is a small event in the market system (e.g., the subprime mortgage market failure in the US) will trigger a massive bubble burst, causing the entire economic system to collapse as shown at T_2.

Once the bubble bursts, market prices, be they stock or housing prices, decrease dramatically within a very short time, say from C to D, or from period T_2 to period T_3, during which investors start to run away quickly from the market. This is because investors are afraid of making further losses if they stay in the market or make new investments.

The current financial crisis is an excellent example of how the bursts of many market bubbles can lead to a major world crisis.

The first bubble bursts in the stock markets around the world. The world's major stock indexes dropped between one-third (London and New York) to 65% (Shanghai) during 2008 (Table 1).

Table 1 Major stock market falls in 2008

Market	Falls	Market	Falls
New York	33.8%	Singapore	49.2%
London	31.3%	Sydney	41.3%
Paris	42.7%	Hong Kong	48.3%
Frankfurt	40.4%	Shanghai	65.2%
Mumbai	51.9%	Tokyo	42.1%

Source: http://news.bbc.co.uk/1/hi/business/7805644.stm.

The collapse of the stock markets was due to poor news on the huge losses of some world-class financial institutions such as AIG and RBS as shown in Table 2.

Table 2 AIG and RBS Group

	AIG	RBS Group
Employees	116, 000 (2008)	170,000 (2008)
Losses	Q4 2008: $61.7 billion 2008 in total: $99.29 billion	2008: total loss: £28 billion £325 billion toxic assets out of £1 trillion (80% overseas)
Market value	From $150 bn to $1.2 bn.	From £75 billion to £4.5 billion
Share price	$70.13 (09-10-2007) to $0.33 (27-03-2009)	£7.24 (20-02-2007) to £0.10 (19-01-2009)
Impact	$2 trillion financial products, $ 1 trillion insuring 12 large banks; 94% of Fortune 500 properties; 74 million customers in the world.	The second largest banking group in the UK and Europe (at its peak); the fifth largest in the world by market value.
Government rescue	$150 billion in total; could go to $250 billion	73% state ownership
Bonus	March 2009: $165 million in executive bonuses	Cutting from £2.5 billion in 2008 to £340 million in 2009

The impact of the crisis on the world economy as a whole is sharp contraction in prices, production and services, leading to dramatic slowdown of economic growth in many countries, including the largest economies in the world. GDP growth rates in the developed countries slowed down from the fourth quarter of 2007, turning to negative growth from the first (some from the second) quarter in 2008.

Financial crisis affected global economic growth via the following channels. First, industrail prodution dropped considerably due to steep decline in wealth and demand. Table 3 reports the percentage changes in industrial production in the US, the UK, the Euro Zone, Japan and China from September 2008 to May 2009, with both monthly and annual comparisions.

Table 3 Percentage changes in industrial production

Economy	Sep-2008	Oct-2008	Nov-2008	Dec-2008	Jan-2009	Feb-2009	Mar-2009	Apr-2009	May-2009	Jun-2009
On a month-on-month basis										
US	-4.0	1.3	-1.3	-2.3	-2.1	-0.8	-1.8	-0.7	-1.1	
UK	0.1	-2.5	-2.2	-1.8	-2.6	-0.7	-0.3	0.1	-0.6	
Euro Area	-2.1	-2.2	-2.9	-3.1	-2.7	-2.6	-1.4	-1.9		
Japan	1.1	-3.1	-8.5	-9.8	-10.2	-9.4	1.6	5.9	5.9	
China	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	
On a year-on-year basis										
US	-6.4	-4.7	-6.5	-8.9	-10.8	-11.3	-12.5	-12.7	-13.5	
UK	-4.0	-7.1	-8.6	-10.3	-12.4	-13.3	-12.6	-12.4	-11.9	
Euro Area	-2.3	-5.9	-9.1	-12.4	-16.5	-19.1	-19.3	-21.6		
Japan	0.2	-7.1	-16.6	-20.8	-31.0	-38.4	-34.2	-30.7	-29.5	
China	11.4	8.2	5.4	5.7	N/A	11.0	8.3	7.3	8.9	10.7

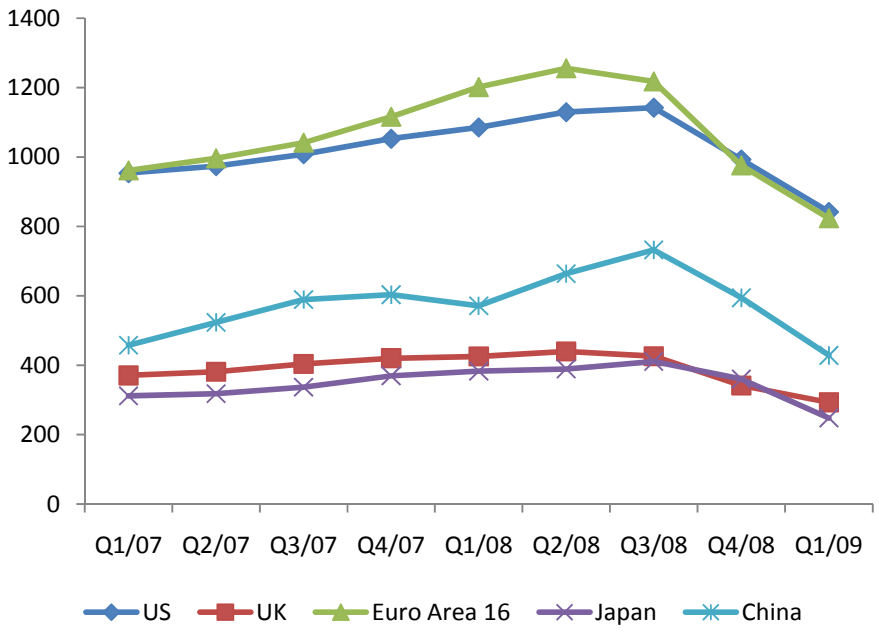
Notes: values for the UK are constructed by authors based on the "Index of Production" various months, ONS. Values for China are the percentage changes of industrial value added, seasonally adjusted.
Sources: Federal Reserve Statistical Release, US; Office for National Statistics, UK; Eurostat; Ministry of Economy, Trade and Industry, Japan; and National Bureau of Statistics, China.

Except for China, industrial prodcution in these countries has been falling sharply, although the falling rate has slowed from the second quarter of 2009. US Federal Reserve reported that US industrial output in March 2009 fell to the lowest level since December 1998 and UK ONS reported that UK industrial output suffered its sharpest fall since 1968. China's industrial production grew at 5.3% in the first quarter 2009 and 8% in May compared with the same period in 2008, but such a growth rate is the lowest in the past ten years.

Sharp contraction in global trade and FDI flows are another key problem of the crisis. Due to shrinking demand and production, exports and imports of the largest economies in the world

all show significant decline in trades and investments after September 2008 (Figure 3). China suffered the first trade decline after its accession to WTO in 2001. UNCTAD data revealed that global FDI and cross-border mergers and acquisations also declined dramatically in the fourth quarter of 2008 and the fall continued into 2009. FDI inflows dropped by 54% during the first quarter of 2009 compared with the same period in 2008.

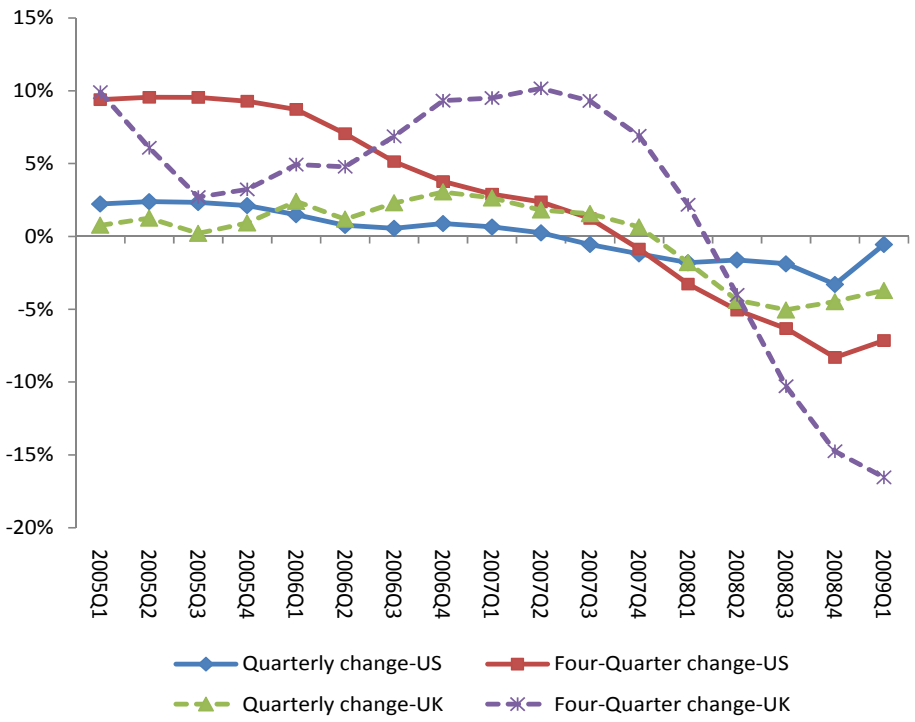
Figure 3 Values of trade 2007Q1-2009Q1 ($billion)



Sources: Bureau of Economic Analysis, US; Office for National Statistics (ONS), UK; Eurostat; Ministry of Finance, Japan; and National Bureau of Statistics (NBS), China.

The crisis hit the housing market hard in the UK and the US. House prices started to fall steadily from 2006 in the US, contiuing to fall in 2009. In the first quarter of 2009, the house price dropped 7.14% compared with the same quarter a year earlier. The situation in the UK is even worse. Average house price in the first quarter of 2009 dropped by 16.5% compared with the same period in 2008 (Figure 4).

Figure 4 Housing Price Change in US and UK, 2005Q1-2009Q1



Note: Seasonally adjusted house price change; US: measured in purchase-only index; UK: measured in average house price.
Source: Federal Housing Finance Agency (FHFA), US; Nationwide, UK.

The contractions in prices, production and services have led to the collapse of many firms, leading to massive unemployment in all countries. By June 2009, the UK unemployment rate rose to 7.8%, rising from 6% in one year. The US unemployment rate rose from 6% in 2008 to over 9% in September 2009. In China, over 3.5 million rural migrant workers did not go back to the cities in the first half of 2009 after going home for the Chinese Spring Festival. Over 3 million univeristy graduates could not find jobs. The official unemplyement rate (urban regiestered uemeplyment) rose from 4% to 4.3%, but unofficial unemeployment estmated by independent researchers may be as hgih as 9%.

The sequential flows of poor statistics in industrial production, GDP, employment, house prices and stock markets imply that many bubbles are bursting simultaneous, but the principal reason behind these collapses was due to the loss of confidence by all market players, be they investors, consumers, firms and governments. As a result, consumers start to restrain or postpone their spending in goods and services. Firms reduce investments and employment.

Governments cut public spending despite the stimulus packages. Banks tighten their lending criteria and reduce credit circulation in the market.

This collapse of confidence can also be explained by our theory. It suggests that in a crisis situation, the marginal unhappiness caused by consecutive units of losses is not diminishing; instead, it is increasing as shown in expression (3), in sharp contrast to the diminishing marginal happiness derived from gains. In particular, it is not uncommon to observe that investors will not take any risk at all when their losses reach a certain level despite in the long term that taking certain risk in a crisis situation may lead to huge gains when the market starts to recover.

This psychological reaction is also reflected in the behaviour of the post-crisis recovery process as the following logic explains why a recovery from a crisis may take a long time. Because most investors endured massive losses during the crisis, they are particularly sensitive to even a small amount of gain or loss.

If most investors become excessively risk-averse, the entire market starts to collapse. The consequence is a long and painful process of an economic recovery, as seen from period T_2 to period T_4 in Figure 2. When the confidence of investors comes back, the economy starts to pick up again, but due to the painful experiences during the crisis, investors are excessively cautious as to how quickly and how much will be invested not to miss the gaining opportunities while at the same time to avoid making large losses again.

The typical market reaction of investors in a post-crisis situation is that they are willing to invest if the chance of winning is much bigger than the chance of losing, reflecting the asymmetric reaction and economic psychology in different situations. Such investors are also quick to take profits if they make a short term gains. This short-term behaviour suggests that the market will inevitably endure extreme short term volatilities, which in term, will prolong the time to reach new market equilibrium, or a full market recovery to its normal condition.

Inflated market volatilities can be best demonstrated in the stock markets. In a normal year, the daily share price changes are typically within the range (-1% to 1%). In a crisis situation, when people are highly sensitive to losses and gains, the absolute daily price changes can easily go beyond 1%, 2%, or even 3%.

We use FTSE100 and Dow Jones Industrial Indexes as two examples. All the trading days of these two markets are divided into five half yearly periods: first half of 2007 (H1-07) to first half of 2009 (H1-09). The total numbers of trading are 630 and 628 respectively in London and New York. In each period, the trading days are grouped into four categories: absolute daily price change >3%, between 2% and 3%, between 1% and 2% and less than 1%.

The crisis started from the second half of 2007 and reached its peak in the second half of 2008. The first half of 2007 can be regarded as a normal market condition and the second half of 2008 the most unusual condition. The first half of 2009 can be regarded as an initial period of post-crisis recovery.

Based on our theory of financial crisis and recovery, it is expected that more market volatilities will be observed during the crisis and its recovery process than during a normal market condition. This can be testified and illustrated in Figures 5 and 6 which respectively represent relative volatilities of FSTE 100 and the Dow Jones Industrial Index. In a normal market condition (e.g. first half of 2007), about 90% of all the daily absolute changes in both markets were less than 1%, and few were more than 3%.

In contrast, when the markets are in crisis, price volatilities increase sharply. In the second half of 2008, for example, only one-third of all the daily absolute changes were less than 1% and about 22% (London) to 28% (New York) of the daily absolute changes were more than 3%. After passing through the peak of the crisis, market volatilities subsided but were still significantly greater than in a normal market condition. In the first half of 2009, for example, between 42% (New York) and 52% (London) of daily absolute changes were less than 1%. There were still many daily absolute charges greater than 3%.

The huge daily price changes (ups or downs) reflect the volatile psychology of investors during and after the crisis. Investors understand that there are ample opportunities to buy shares cheap and make huge potential gains but their confidence is easily washed away by any negative news in the market. This phenomenon can be explained by their over-sensitive reaction to potential losses, or by their readiness to take profits to make up their huge losses incurred during the crisis.

The over-sensitivity to losses and readiness to take profits imply that the recovery process is painful and prolonging. It also explains why it takes a much longer time to recover to long term equilibrium than to reach a short term high (bubble).

Figure 5 Relative frequency of trading days by absolute daily % changes (FTSE100, first half 2007, H1-07, to first half of 2009, H1-09)

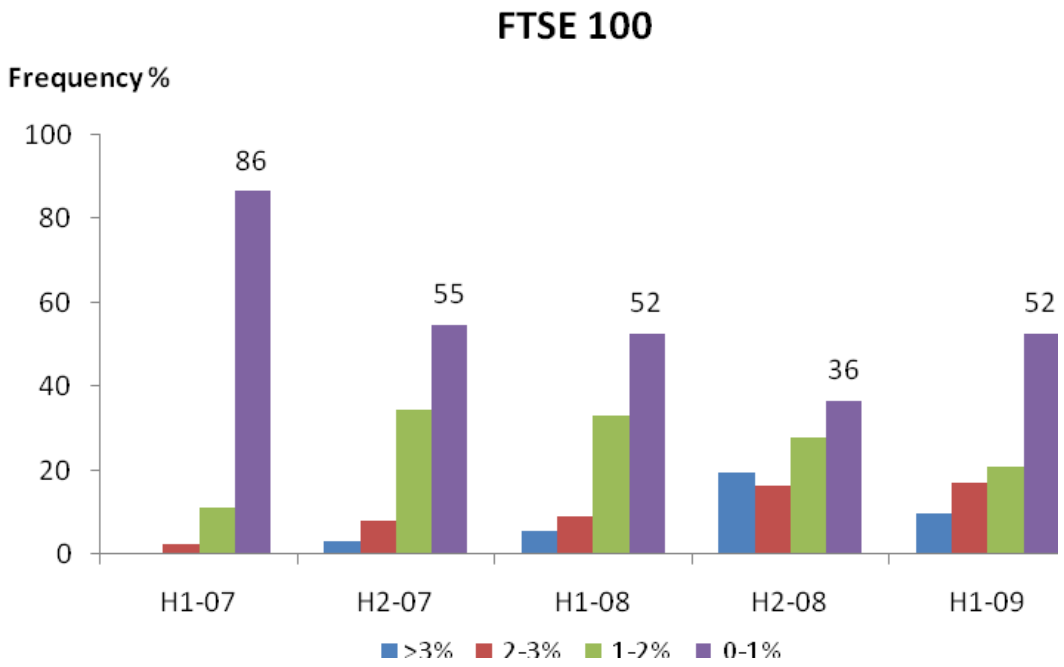
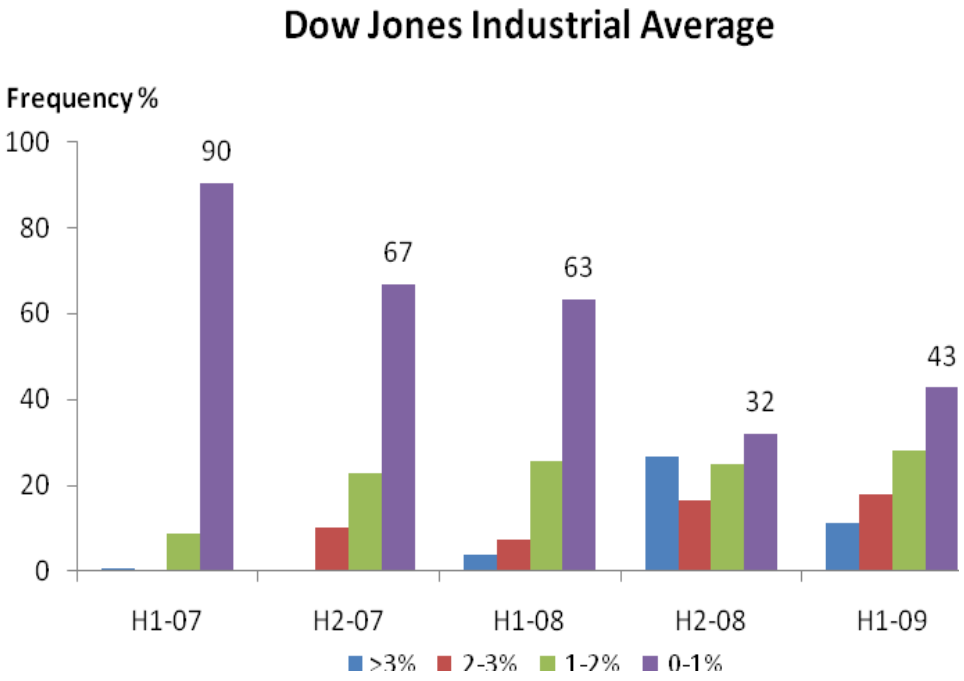


Figure 5 Relative frequency of trading days by absolute daily % changes (Dow Jones Industrial, first half 2007, H1-07, to first half of 2009, H1-09)



Economic recovery: V, U and L shapes

According to the length of crisis, economic recovery can be broadly classified into three shapes: V, U and L (People's Daily Online, 2009). A number of other recovery shapes have been discussed and proposed in many recent commentaries about the current financial crisis, such as W-shape and narrow-U-shape, among others. W-shape and any other shapes cannot be considered as a typical shape of recovery because the V, U, and L shapes are inclusive enough to accommodate any pattern of recovery. Indiscriminative use of any other shape without a clear definition does not help people understand the recovery process of crises. For instance, in the long term, a W-shape is effectively a U-shape or L-shape, and a narrow-U shape is effectively a V-shape.

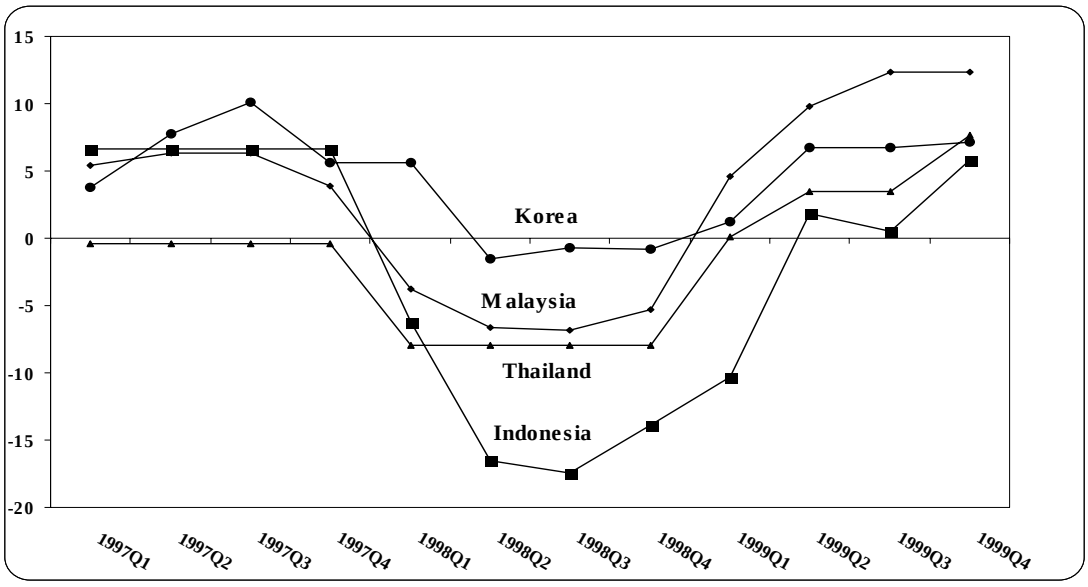
The reason why there are so many proposed shapes of recovery is because no one has provided clear definitions to different shapes of recovery and their intrinsic relationships. As a result, it is imperative that we give clear definitions to the different shapes of recovery below.

- V-shaped recovery. A V-shaped recovery means that economic downturn is sharp but the recovery is also sharp and short, taking less than two years to reach the pre-crisis growth level or surpass the previous market peak.

- U-shaped recovery. A U-shaped recovery means that the crisis is sharp but the recovery is slow and may take between two to four years to reach the pre-crisis growth level or surpass the previous market peak.
- L-shaped recovery. An L-shaped recovery means that the crisis is sharp and severe, and the recovery is slow and prolonging, requiring more than four years to reach the pre-crisis growth level or surpass the previous market peak.

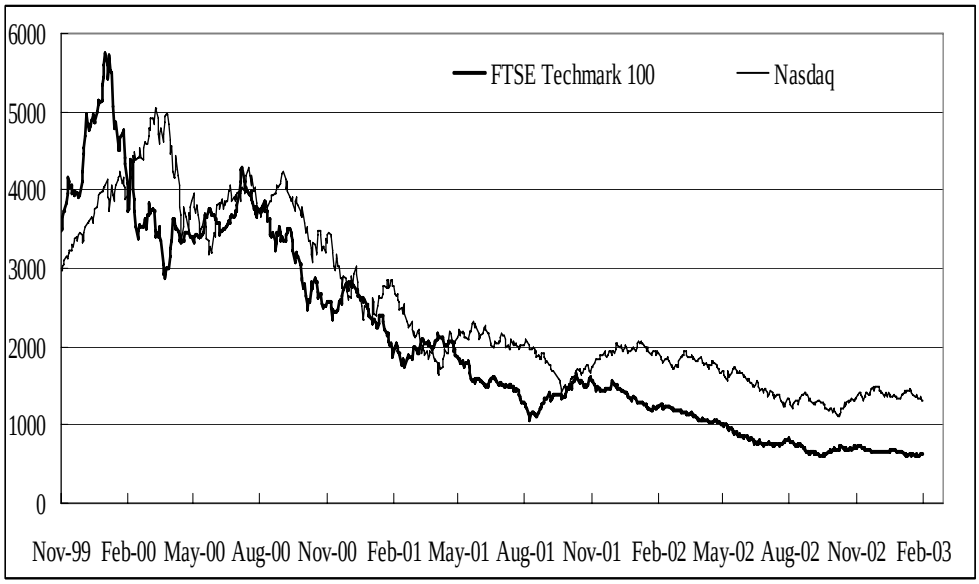
The economic recovery of Korea and Malaysia during the Asian Financial Crisis in 1997-98 was typically V-shaped (Figure 3). In both countries, negative GDP growth lasted between 3-4 quarters. It took six quarters to reach their pre-crisis growth level. The economic recovery of Indonesia and Thailand took a U-shape, taking more than two years to reach their pre-crisis growth levels.

Figure 3 GDP growth rates of crisis economies in Asia, 1997-99
(source: Yao and Zhang, 2003)



A typical L-shape recovery can be found in the UK's Techmark 100 and the US's Nasdaq stock market indexes as shown in Figure 4. It both cases, after peaking in February 2000, they have not recovered to their previous peaks for nine years. In fact, both indexes have been fluctuating at less than half of their levels reached in early 2000.

FIGURE 4 Nasdaq & Techmark 100 Indexes: 1999-2003



Source: http://finance.yahoo.com. Yao and Luo (2009).

A V-shaped recovery usually takes place if a crisis is caused by an unexpected shock, be it internal or external, or by sudden changes of macroeconomic policies so that the crisis represents a short-term structural adjustment in an economy or a particular market (e.g., stock or housing). As a result, the crisis is relatively harmless or innocuous. The 1994 Mexico economic crisis and the 1997 Asian Financial crisis were both triggered by the sudden changes in exchange rates but they were effectively contained within a certain geographical continent without spreading to other parts of the world. Consequently, the affected economies were able to recover quickly thanks to a stable external environment.

A U-shaped recovery takes place if the crisis is triggered by several factors rather than a simple shock. A good example was the UK housing market downturn and the recession of the UK economy in the early 1990s. The reasons for the economic recession included tightening monetary policy and the aborted participation in the European Exchange Rate Mechanism (ERM) which reduced aggregate domestic demand. The subsequent collapse in the housing market and the loss of confidence of investors were also important factors that lengthened the recovery process. The UK house prices took about 10 years to re-attain their pre-recession level.

The L-shaped recovery usually takes place if the crisis is severe, rendering the economy or market into a long decline and stagnation. Factors causing this kind of crisis are complex and comprehensive. A typical example was Japan after its economy was hit by a crisis in 1989-1990, due to the huge bubbles developed in the housing and stock markets before the crisis. The burst of those bubbles had led to a prolonged stagnation in the Japanese economy for 15 years. Before it fully recovered, it was hit by the current world financial crisis, making its future direction of recovery highly uncertain.

Based on the theory of asymmetric reaction to gains and losses, we suggest that the recovery of some industrialised economies from the current financial crisis will be U-shaped. For example, the UK's GDP contracted by 0.7% in the second quarter of 2009, marking the fifth consecutive quarterly decline from the second quarter of 2008. [2] Although it is predicted that it will return to positive growth from the third quarter in 2009, it will not be able to resume to the normal 2% or more annual growth rate until 2012, implying that economic recovery of the UK is likely to be U-shaped.

The US reported a GDP growth rate of -1.0% in the second-quarter of 2009. It was the fifth quarter of negative growth in the previous six quarters. As a result, the US is also likely to have a U-shaped recovery.

Japan, France and German reported GDP growth rates of 0.9%, 0.3% and 0.3%, respectively, in the second quarter of 2009, ending their recession from the previous four quarters. However, the one-quarter positive growth does not mean that these economies can assume a V-shape recovery as they are unlikely to reach their pre-crisis growth rates in two years from the start of the crisis. In addition, the entire Euro-zone still had a negative growth of 0.1% in the second quarter of 2009, marking its fifth consecutive quarterly growth.[3] It may take a few more quarters for France, Germany and the Euro-zone to reach their pre-crisis growth level. As a result, the Euro-zone will also assume a U-shaped recovery at best.

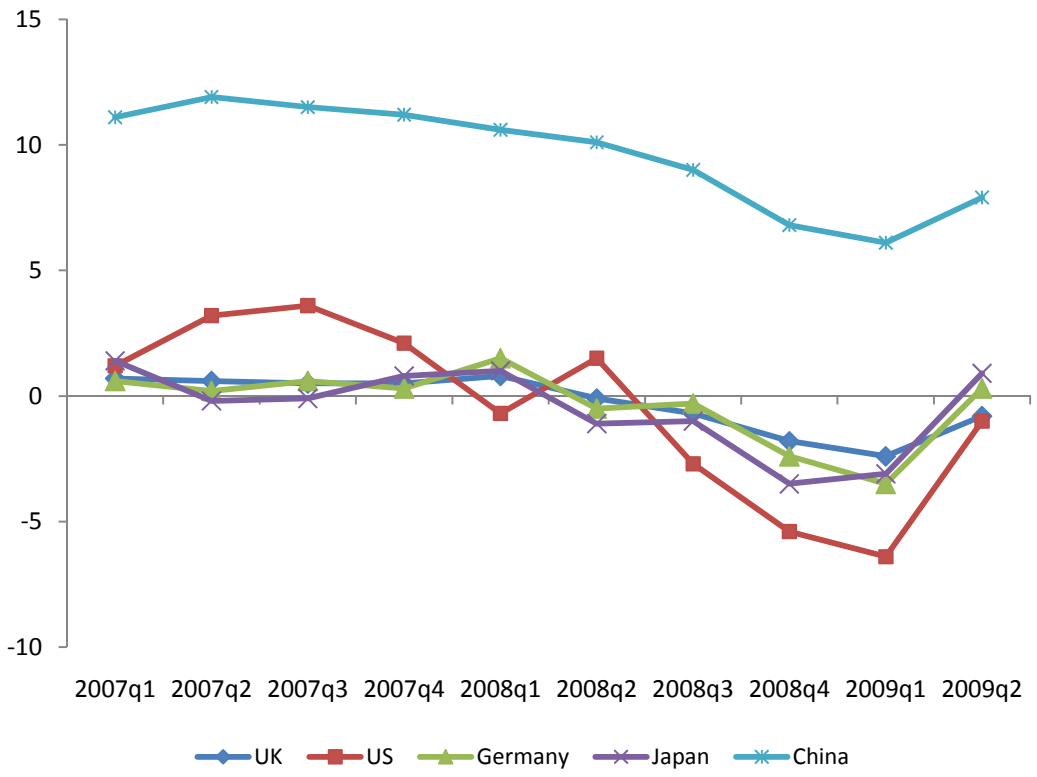
[2] http://www.fin24.com/articles/default/display_article.aspx?Channel=Markets_Currencies&ArticleId=1518-1783_2545802&IsColumnistStory=False.

[3] http://news.bbc.co.uk/1/hi/business/8198766.stm.

In contrast, the two largest emerging economies, China and India, have not recorded a negative growth rate in any quarter during the crisis. Their growth has slowed down considerably but the absolute level of growth is still high by international standards. In other words, these countries have been affected by the crisis, but they are not in crisis themselves. In addition, their growth is likely to demonstrate a V-shape recovery. China in particular may have bottomed out from the second quarter of 2009 as its growth was 7.9%, compared to 6.1% in the first quarter of 2009, 6.8% in the last quarter of 2008 and 9% in the third quarter of 2008. If growth from the third quarter of 2009 is higher than 8%, China will be able to attain a V-shaped recovery in its growth momentum.

Figure 5 shows the quarterly growth rates of the world's largest economies from the first quarter of 2007 to the second quarter of 2009. The economic crisis started in the US from the last quarter of 2007 and in Japan, the UK and Germany from the second quarter of 2008. The real slowdown of the Chinese economy did not start until the third quarter of 2008. The figure does not show the exact shape of recovery for each country but it is clear that apart from China, the US, Japan, Germany and the UK cannot assume a V-shape recovery based on our definitions. The exact shapes of the recovery will not be clear until some consecutive quarterly positive growth rates are reported from the second half of 2009 to 2010.

Figure 5 Economic recession and recovery of major economies
(Sources: Statistical authorities of relevant countries)



Conclusions and policy implications

The current world financial crisis started in the US from the last quarter of 2007 when the subprime mortgage market collapsed. In retrospect, the failure in subprime mortgage acted like a puncturing needle for many market bubbles not only in the US but also in many other countries. These bubbles were developed for more than one decade in the housing, stock, financial services and banking markets.

Many studies have examined the causes, consequences and rescue efforts over the last two years. The main causes include the lack of regulation in the world financial and banking system, trade imbalances between the developed and less developed countries and a long period of fast growth and prosperity in the world economy.

However, few authors have studied the economic theory of financial crisis apart from those in behavioural finance. In addition, a lot of debates have focused on the recovery path. In other words, people have debated on whether the crisis will have a quick recovery, or a long one.

The various shapes of recovery are used to describe the complexity and length of the recovery process.

One main contribution of this paper is to present a new economic theory, that is, the psychological asymmetric reaction of people to gains and losses, to explain why a single market bubble, or an economic crisis, may be developed. An economic crisis is considered to be caused not by a single market bubble, but by a few market bubbles at the same time. As the world economy has become more globalised, market bubbles developed in some major economies can be inflated to cover other economies in the world. When the bubbles burst, the whole world will be affected.

The current crisis is a perfect example. The housing, stock and banking bubbles were developed in the US and Europe but the whole world was affected because the US was the largest economy and the growth engine of the world economy. When the US was in trouble, all other countries were affected. In addition, many European economies and Japan were also in trouble, making the entire world in an extreme difficult situation.

Asymmetric reaction of individuals to gains and losses explains why a market bubble can be developed quickly. In good years when markets are high, most people tend to make financial gains through, for instance, rising house and equity prices, or other investment returns. Investors derive happiness through financial gains but the marginal happiness diminishes as more gains are made. To derive more happiness, and in part driven by greed and speculation, they have to take more risk by investing more. As most people do the same, the market is inflated, or the bubble is formed.

The same economic theory can explain why economic recovery from a global crisis is prolonging. This is because in a crisis situation, people have lost confidence in the economy, including consumers, investors, firms and even governments. Confidence cannot be easily recovered because most people behave rather ‘irrationally’ in the sense that they tend to overestimate potential losses due to the inevitable law that marginal unhappiness caused by consecutive units of losses is increasing rather than diminishing. After certain level of losses, people are hesitant to make any investments at all even if in the long term investments in a depressed market can potentially earn high returns.

This economic theory has important policy implications. The role of state and government is to help improve people's confidence through various interventions in the economic system. For instance, the current rescue packages proposed by the G20 governments are an important instrument to boost people's confidence and prevent the whole world economy from collapsing. Nationalisation and insurance of toxic assets of large commercial banks, quantitative easing, reduction of interest rates, and investments in public projects are just the many rescue efforts implemented by various central banks and governments.

However, the rescue efforts are short term policies to reduce the impact of the crisis in the national and world economies. In the longer term when the crisis is over, central banks and governments have to think hard why things had gone so badly before the crisis. New reforms have to be designed and implemented so that past mistakes are not repeated. In terms of public policies, it is important to emphasise the following aspects:

- Reducing the impact of 'collective irrationality'

The development of market or economic bubble is due to excessive risk taking and structural imbalances. As a result, state policies should aim to reduce and discourage excessive risk taking when market conditions are good. For instance, the adjustment of interest rate should be as counter-cyclical as possible. Stricter regulations and financial control should be implemented before the market starts to boom. More state support and more relaxed regulations should be implemented before the market is about to bust.

The most difficult task is how to predict when the market is about to boom or bust. The biggest mistake of central banks and governments made before the current financial crisis was that few people noticed that after almost 15 years of economic prosperity that the whole world economy was suddenly brought to its knees.

The Bank of England was still refusing to cut interest rate in the first half of 2008 while the US economy was already in deep trouble and the Federal Reserve had dramatically cut the US base rate. The only reason why the Bank of England did not quickly cut interest rate was because inflation rate was high (significantly more than the 2% target level set by the government). However, the high inflation was driven by food and oil prices, not by over production or consumption in the system. In addition, there was clear sign that the US subprime problem started to badly affect the UK banking system.

In retrospect, the sluggish response of the Bank of England to cut interest in early 2008 was due to its inability to correctly assess the health of the UK economy. As a result, macro-economic policies cannot be triggered on time to smooth the boom and bust.

The Bank of England may have complained that its ability to respond quickly to the market is constrained by a number of institutional problems. For example, the treasurer and the financial service authority are other public agencies that are responsible for regulating the economic system. If all the public authorities have different opinions and assessments, it will be difficult to act effectively and quickly. In addition, the leverage that can be used by the central bank is limited. Before the financial crisis, the only policy instrument that could be used by the central bank was interest rate, but setting interest rate alone could not have sufficient power to change people's behaviour and confidence in a crisis situation.

The above discussion implies that two policy reforms must be done. First, the government should create a single authority to regulate the market. Second, more attention should be paid to spot and predict the development of potential market bubbles and make sure that effective policies are adopted to stop the development of such bubbles by cooling people's expectation.

References

Blachard, O. J., 1979, "Speculative Bubbles, Crashes, and Rational Expectations", *Economic Letters*, Vol. 3(4), pp. 387-389.

Brunnermeier, M. K., 2001, *Asset Pricing under Asymmetric Information: Bubbles, Crashes, Technical Anaysis and Herding*, Oxford University Press, Oxford, UK.

IMF, 2009, "Contractionary Forces Receding But Weak Recovery Ahead", 08 July 2009, available online:- http://www.imf.org/external/pubs/ft/weo/2009/update/02/index.htm [Accessed 16 July 2009].

Odean, T., 1998, "Volume, Volatility, Price and Profit When All Traders are above Average", *Journal of Finance*, Vol. 53(6), pp.1887-1934.

People's Daily Online, 2009, "Recession: V, U, or L- shaped?", 02 Febuary 2009, avaialbe online:- http://english.people.com.cn/90001/90778/90858/90864/6601782.html [Accessed 01 March 2009].

Shiller, R. J. 2000, *Irrational Exuberance*, Promceton University Press, Princeton, New Jersey, USA.

Shleifer, A., 2000, *Inefficient Markets: An Introduction to Behavioural Finance*, Oxford Univeristy Press, Oxford, UK.

UNCTAD, 2009, "Global FDI Flows Halved in 1st Quarter of 2009, UNCTAD Data Show; Prospects Remain Low for Rest of Year", 24 June 2009, available online:- http://www.unctad.org/Templates/Webflyer.asp?docID=11666&intItemID=2983&lang=1 [Accessed 13 July 2009].

http://money.cnn.com/2009/05/07/news/companies/stress_test_announcement/index.htm

http://news.bbc.co.uk/1/hi/business/7967825.stm

China Daily, 2009, "China's housing market recovers", 07 July 2009, available online:- http://www.chinadaily.com.cn/china/2009-07/07/content_8389574.htm [Accessed 16 July 2009].

The Sydney Morning Herald, 2009, “China's stock market overtakes Japan's”, 16 July 2009, available online:-http://business.smh.com.au/business/chinas-stockmarket-overtakes-japans-20090716-dmfa.html [Accessed 16 July 2009].

Yao, Shujie (2007) Can China really beocme a superpower? Public lecture at the University of Nottingham, the UK.

Yao, Shujie (2009), Hear the drgon roar as China surges, *Daily Telegraph*, 25 May, p.M11.

Yao, Shujie (2009), China emerges as a big business power on its 60th birthday, Policy Commentary, China Policy Institute, School of Contemporary Chinese Studies, University of Nottingham.

Yao, Shujie and Zhongyi, Zhang (2003) Openness and economic performance, a comparative study of China and the East Asian newly industrialised economies, *Journal of Chinese Economic and Business Studies*, 1(1):71-96.

Yao, Shujie; Dan Luo (2009), The economic psychology of stock market bubbles in China, *The World Economy*, 32 (5), 667-91.

Yao, Shujie; Minjia, Chen (2009), Review of China’s economy in 2008, Policy Papers, China Policy Institute, School of Contemporary Chinese Studies, University of Nottingham.