The Causes and Effects of the Subprime Mortgage Crisis

A comparison between *US* and *UK*

By

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Abstract

At the start of 2009, the subprime mortgage crisis resulted in a downturn in both the US and the UK economies. The purpose of this research is to examine the causes and effects of the subprime mortgage crisis, looking at the process of securitization and how it took part in this recession. During the period of 2000, economic growth resulted in the burst of a housing bubble. The housing market kept growing, with real estate prices increasing at a quick rate. Near the beginning of 2000, when the economy was about to enter an economic slump after the stock market crash, the US government's easy monetary policy created requirements for the real estate bubble. However, according to the regression analysis performed in the paper, it seems like the drop in interest rates did not have an effect on the recession in the US and the UK. The low interest rates created easy credit conditions and more subprime borrowers entered the market. Even though the subprime mortgages were of great risk, this current economic downturn wouldn't have occurred if the banks didn't sell billions of collateralized debt obligations which included subprime mortgages to institutions. Therefore, the monetary policy of the Fed is considered to be a smaller cause of the crisis and securitization as the main problem. This paper also included a comparison of the subprime mortgage crisis and their effects on both countries, the US and the UK.

Key words: Banking, financial crises, and welfare.

1. INTRODUCTION

The subprime mortgage crisis, which took place in 2007, has affected financial systems in the US and many other countries of the world. By the end of 2008, the economies of the European countries had declined. The causes behind the crisis revolve around lending loans to inappropriate borrowers and inserting into the financial system a large amount of mortgage-backed securities (Franzini, 2007). The research paper examines the preconditions of the crisis.

Economic growth allowed more people to afford buying a house. The housing market had been growing until 2006, mortgage rates kept declining and real estate prices kept rising. Customers with low incomes, bad credit or lack of history appeared who are called subprime borrowers. Some of them were not able to qualify for a mortgage in the past. Lending organisations realized that house prices were increasing and people were able to repay the loans that they borrowed. They also realized that when more loans are made, the lender receives more money. Lending institutions wanted to get more customers to make more loans by offering them terms like no or a small down payment, which seems attractive. People who could not afford a house before were now eligible for a loan based on new conditions as buying a new house became simple. Banks further attracted customers by providing them with low interest rates during the first 2 or 3 years while primary deposits didn't have to be large. The property purchased could be then refinanced and customers now would make monthly payments based on adjustments (Franzini, 2007).

This however resulted in a moral hazard problem because lending institutions recognized that this system of refinancing mortgages would only go on, providing that the price of houses increase. Because borrowers could now afford those monthly payments, they were expected to meet the initial obligations on the loans. However once refinancing took place and there was a rise in adjustable mortgage rates, a high risk of default existed.

The lending institutions wanted to reduce the risk related to subprime mortgages so they spread it between a huge numbers of investors. As a result, the subprime mortgages were financed by banks and by securitization process (Trimbath, 2009; Bible, 2009).

Securitization refers to the process of converting assets into securities. Mortgage backed securities were formed when subprime mortgages were pooled together. They are sort of asset-backed security that is secured by the mortgage. They are classified from low risk to high risk. A lower possibility of defaults by all subprime borrowers enabled investment banks to give out collateralized debts with ratings up to AAA (Strier, 2008). Yet this research discuses that because issuers of securities paid large credit rating agencies like Moody's and Standard and Poor's, high ratings were attained (Strier, 2008).

Most of the population in the US and the UK were affected by the global financial crisis. First, because credit conditions became tight: a growing number of homeowners are at risk of losing their homes in the future, an increasing number of people lose their jobs which results in rising unemployment and refinancing a home becomes impossible. Second, the risk was not only limited to mortgages, many collateralized debt obligations (CDO's) which are aimed at collecting money from investors to buy assets with, bought bonds that were collateralized with subprime mortgages. Default rates rose on all kinds of debt. Owners of collateralized debt obligations who suffered losses were not only lenders and hedge funds but also pension funds and corporations. Third, the subprime mortgage crisis has led the US and the UK economies to an economic slowdown witnessing a decrease in gross domestic product, which cuts down national and individual incomes of many households (Amadeo; Stewart, 2009).

1.1 Aims and Objectives

The aim of this project is to reveal the means through which the US mortgages market led to an economic recession and to assess their effects quantitatively. The objectives of the research are:

- To examine the subprime lending process and the laws that provoked growth of subprime lending.
- To review the causes behind the economic crisis and the theories that explains it economically.
- To determine the functions of the financial institution participating in the subprime crisis;
- To assess the effects and consequences of the crisis.

2. LITERATURE REVIEW

2.1 Property Market Investment

In the property market, different buyers exist and individuals obtain property for quite a few reasons. Real estate is bought for living in, for a vacation home, for the allocation of wealth or for a risky investment that could generate profits (speculation). Therefore buyers are divided into groups such as investors, speculators or consumers. All of them affect the market for housing and add to the total demand for real estate. Economic activity fluctuates over time. When expectations are optimistic, the markets are driven upwards and there is growth. This lasts until a peak is reached after which economic activity begins to gradually decline. This period consequently faces pessimist expectations of the future. At a point, when the markets arrive at a trough, the economy will then start to recover again. Those four stages mentioned form a business cycle. They go on and on in any capitalist economy (Hafer, 2005; Glasner, 2009; Baumol, 2007). Similarly, the housing market works in the same way as cycles. However with the business cycle, the phases are not equal. Even though the patterns are similar, the duration of every phase could be different. The US housing market collapsed in 2007, which resulted in a recession in the national economy. From the viewpoint of Tkacz and Wilkins (2008), information is contained about the prices of real estate, which can be a good predictor of GDP. They argue that the housing market can actually change a business cycle phase in the economy so this prediction is possible and in fact the US economy had experienced this when the housing market collapsed. However it can be claimed that other factors increased the outcome of the housing market break down. And these factors will be explained in details in the research. Not all researchers supported the results of Tkacz and Wilkins (2008). For example Stock and Watson (2003) state that property prices (or any other asset) cannot accurately predict economic growth since the relationship between them differ largely in different countries. The relationship between asset prices and GDP is very strong in some countries with output determined according to property prices. In other countries however, this relation is not really related making it very hard to make predictions. Stock and Watson (2003) came to this inference according to their observations of 7 countries and 28 economic variables. On the other hand Gauthier et al (2004) disagree with Stock and Watson (2004) arguing that the house prices could be an indicator of economic growth or economic downturn in the future. But their results are still different from Tkacz and Wilkins (2008) who claimed that property prices include all the information needed to predict inflation levels and GDP.

The housing market in US had endured a rapid growth until the subprime mortgage caused a recession. The question is could the property market expect a crisis? It is important to discuss some of the theories that influenced the events of 2007 and justify the reasons behind the subprime mortgage crisis.

2.2 Explaining the Crisis theoretically

It was said earlier that capitalist economy is likely to develop in cycles. Schumpeter (1939) studied the idea of business cycles in the histories of Germany, UK and US. The model included 4 types of business cycles in which their length was different. The biggest business cycle consisting of 50 years long is composed of smaller business cycles. Schumpeter argued that the innovation of a state comes from the entrepreneurs. When an innovation is presented to the public and they willingly accept it, economic growth takes place. Demand rises and as a result the economy endures an economic boom. When businesses go to the market to obtain some profits, the booms will end. Over time, profits will be negligible and the capitalist society will be transformed to a socialist because intellectuals will support this change. Therefore according to Schumpeter, capitalism does not encourage innovations and because the main concern of capitalist systems is to increase profits, crises result. (McCraw, 2006; Andersen, 2005).

The availability of subprime loans allowed people with bad credit history to own a house. Financial institutions wanted to increase their profits through offering more loans even though they were aware that these loans were risky. Some of the subprime loans were sold and re-packaged into structured investment vehicles. The investor's increasing ambition for profit making made them ignore any risks involved which resulted in a global financial crisis. Minsky (1977) stated that during a period of economic boom, companies are loaded with debt. The government decreases the level of interest rates to encourage investment and spending. Companies continue borrowing until they reach high levels of debt, which stops them from investing further.

As a result the financial system becomes weak. The borrowers start refinancing their loans when interest rates decline by obtaining more loans and the difference gets reinvested. When prices of assets rise, refinancing becomes achievable. But when interest increases to stop inflation from rising, there is a slowdown of investment activity and businesses will need to pay the debts made at time of growth. The housing market collapses while stock market prices fall because assets such as property start to get sold (Wolfson, 1986). Therefore as seen, the financial crisis that took place in 2008 could be justified by the cyclical housing market and economy, and how fragile the capitalist system is, which creates a crisis at times of economic boom. In the following sections, the causes and the mechanism of the crisis will be explained.

2.3 Lending in the Housing Market

When households or investors want to buy a house, they go to financial institutions in order to take out a mortgage loan. Current mortgage rates are the main factor, which affects the activity of the housing market. With low mortgage rates, transactions increase in the property market, this raises the demand for houses, therefore increasing their prices. The main concern of the banking institutions is to repay the mortgage loans rather than to just receive interest on those loans. So the first thing that the banking institutions look at is the individual's credit history since this will allow them to identify the risk of non-repayment. In 1977, the US government enacted a Community Reinvestment Act. This Act was the beginning of subprime lending (DiLorenzo, 2008). It was intended to encourage low-income families to buy a house. However the loans became more risky because these families had bad credit history. DiLorenzo (2008) blamed the Community Reinvestment Act for the subprime mortgage crisis. He argued that the Act initiated a new layer of customers that had low credit history and low income that made them more likely to default especially if there are new shocks to the economy.
According to Gordon (2008), the banks had the option to provide loans to subprime customers. The Act did not oblige the banks to do so. Nevertheless, many banks still served the customers because they wanted to obtain more profits especially

at a time of economic boom. Also banking institutions concluded that the risk associated with lending subprime customers weren't high because property prices had been increasing. Lenders were determined to use auctions in order to sell property if there is a default, in this way they would get repaid. This is related to what was said before, that capitalist systems result in financial crises because of profit making. Banking institutions did not consider that prices of assets could fall and they believed the risks involved was not that high (Gordon, 2008). Many subprime mortgages did not have fixed rates. Lots of them were adjustable in the sense that lending institutions could control the interest rates (increase monthly payments) depending on economic conditions. This raises the risk of default as monthly payments may change unexpectedly. Default occurs among the subprime borrowers because they are constrained according to their budgets, unlike the middle class who have no problem with the increasing monthly payments (Johnson and Neave, 2008). Therefore it could be said that adjustable mortgages was one of the reasons that caused the crisis.

Gorton (2009) argues that banks proposed different conditions to subprime and prime borrowers. The reason was that the latter were able to pay large amounts of down payments as well as having a good credit history. As a result of this, better payment arrangements such as fixed mortgages were introduced to them. Subprime borrowers however, had a bad credit history and were unable to pay the initial deposits required to buy a house. Thus payment arrangements such as adjustable mortgages were proposed to them (Farris and Richardson, 2004; Zigas et al, 2002). Yet, it could be argued that the financial crisis would not have spread to other countries and affected them if the financial institutions and banks had not introduced conditions to subprime borrowers. So, subprime borrowers are not only responsible for the crisis.

2.4 The Role of Institutions in the Financial System

Financial institutions created a number of transmission mechanisms. Investments in US asset-backed securities made that possible. Mortgage-backed securities were sold to national and foreign investors with collateralised debt obligations. Because of the defaults occurring in 2007 and 2008, these securities were worth less (DiMaggio, 2007; Lander et al, 2008; Whalen, 2008).

Two types of institutions exist in order to carry out transactions involved in subprime mortgages. One type is commercial banks and lending institutions, which serve customers privately, and the other type is an investment bank that serves corporate customers. When the property market was increasing, commercial banks promised its lenders high earnings whilst making an effort to increase its group of customers. This can be achieved by giving mortgage loans to customers who were not able to take out a loan before. But because the market was increasing, commercial banks found a way to take advantage of that. Since they couldn't give out loans to subprime borrowers with normal conditions (because the risk will be excessive), lenders proposed a system, which let subprime borrowers obtain a short mortgage loan at an interest rate that, could be afforded. Borrowers would have to refinance the property purchased after the period ends and obtain another subprime loan. This will keep going on until borrowers make full payments of the property (Aalbers, 2008; Gorton, 2009).

The disadvantage of this system was that it was dependent greatly on increases in house prices. It is not hard to refinance the loans borrowed in the future when the prices of property rise. This is because the borrower can take a bigger loan amount to pay off their preceding debt. In fact, Minsky (1977) predicted this exactly when he talked about how fragile the capitalist system is. In order to cover the previous debts, investors borrow. Minsky (1977) insisted that this would definitely result in a financial crisis.

It can be argued that the system formed by lenders would be ideal as long as property prices constantly rise and more families would be able to buy a house. From the period 1998 to 2006, subprime loans did not have any problems. The reason is that property prices kept increasing (Bhardwaj and Sengupta, 2008).

Commercial banks and lenders didn't want to endure the risk of subprime mortgage loans on their own so they were financed by a process called securitization. This is when investment banks come in the picture. Subprime mortgage loans were pooled by those financial institutions and created new securities backed up by mortgages. Subprime and prime mortgages were assorted together so as to lessen the risk of the securities (Gorton, 2009).

2.5 Credit Rating Agencies

Credit rating agencies are companies, which provide credit ratings to debt securities. These companies according to Strier (2008) had significantly influenced the mortgage crisis, although this influence was not looked at properly at the beginning. He discusses that the relationship between the investment banks, which distribute CDO's, and credit rating firms is one of a conflict of interest.

CDO's which held tranches of Residential Mortgage Backed Securities (RMB's) were sold by investment banks to investors like pension funds. The ratings on these CDO's were AAA, somewhat like those on US Treasury Bonds so CDO's were obtained for this reason (McDonald and Hughes, 2009). As a result, they were thought of as safe investments that are long termed. Strier (2008) claims that if the investors knew about the risk involved, they would not demand CDO's as much. Also if securities were speculative, their demand would decrease.

There is a possibility of ratings to go wrong which can be explained using two essential theories. One theory assumes that rating firms underrated the real risk of subprime mortgages, which caused errors. The credit rating agencies disputed over the idea that they didn't reduce the ratings since property was

collateral. So in this case if borrowers did not pay back the loans, property was sold by auction (Strier, 2008).
Another theory that Strier (2008) stresses on is that the biggest credit rating firms sold ratings to institutions that issued bonds and in return obtained their commissions from them. Conversely the smaller rating firms obtain their commissions from investors (Strier, 2008). With that theory in mind, a topic of concern is raised regarding the subprime crisis, namely corporate governance.

2.6 Corporate Governance

Corporate governance is a group of laws and policies that affect the actions of firms. It guarantees that firms make decisions that are fair and that does not abuse the stakeholder's rights. During the beginning of 2000, the corporate governance in the US had failed to operate properly resulting in scandals in large corporations such as WorldCom and Enron. Companies like these hid major finances from shareholders. Because of this reason, entities were created to remove liabilities from the balance sheets and accomplish risky behavior (Arbogast, 2008; Baker, 2003).
Again the corporate governance's failure was apparent in such firms as Standard and Poor's and Moody's in 2007 and 2008. The managers' excessive indulgence led to investors that use these credit firm's services to be defraud. As indicated by Strier (2008), corporations overstated the ratings of CDO's. He gives the subsequent proofs: in the US credit rating firms changed from compensation of subscribers to compensation of issuers of bonds. This resulted in different conflicts of interest. This change happened because the fees of the subscribers were not enough to pay for the expenditures that the rating firms paid for specialists. Also the rating firms consulted investment banks on the CDO's arrangements in addition to obtaining commissions from them (Strier, 2008). As might be expected this results in conflicts of interest. Rating firms tend to satisfy the issuers of

the CDO's or else they would lose those customers who resulted in bringing profits for them (Strier, 2008).
Levitt (2007) argued that from evaluating the revenue that Moody receives, it could be observed that the consultancy fees on CDO's in 2006 comprised about 40% of the total revenue. From the financial times, Calomiris and Mason (2007) contrasted CDO's default rate with corporate bonds where both had quite the same ratings provided by Moody's (Baa) before 2005. Some attractive results were seen. The default rate on CDO's on average was 24% while it was only 2.2 % on corporate bonds. Since Moody's give Baa ratings to each security, these facts support the hypothesis that CDO's were overrated by rating firms to keep profitable customers. This implies that the corporate governance has failed to do its job properly.

This paper will use a regression analysis that shall illustrate the effect of the subprime mortgage crisis on the gross domestic product. This research will measure the effect on the USA and UK.

To measure properly the effect of the crisis, some indicators will be used. These are unemployment, housing prices, interest rates, and balance of trade and share price indexes. The data used will cover the period from 1991 to 2009. Both countries will be compared to find which one was affected the most from the crisis. Even though the subprime mortgage crisis has its roots in the United States, the United Kingdom seems to have undergone worse consequences than the United States itself.

3. METHODOLOGY OF THE RESEARCH

3.1 Research Design

This paper gives a quantitative analysis of the causes and effects of the subprime mortgage crisis. From the literature review, the most important concepts that cantered on the financial crisis have been talked about. In order to measure the effect of the subprime mortgage crisis on the UK and the US's economies, various indicators will be estimated in the analysis part in details. Data for UK and US will be represented in figures and charts so that any changes in trends occurring will be observed especially in 2008 when the crisis first began.

A method based on deductive reasoning was used to examine the causes of the crisis. From the observations, an assumption was made that the Federal Reserve System was one of the major factors that started the crisis. It is indisputable to argue that the main causes of the crisis were the large amounts of subprime lending between lending organizations and banks, securitization processes and rating agencies that provided preference ratings to securities that had high risk. These were talked about in the literature review section. In this part of the analysis, one possible reason which will be looked at that could have started the catastrophe and resulted in an economic downturn in the UK and the US is the US monetary policy.

The research will use regression analysis in order to find the quantitative relation between changes of interest rates in US and the existing decline of GDP. The approach indicates that the relation between interest rates in US and UK GDP also needs to be measured. Mumtaz and Surico (2009) proposed this existing relation. If this proposition is established for the UK and the US, the US government's monetary policy is going to be considered one more factor that contributed to the crisis.

3.2 Data Collection and Sampling

A significant stage in the research paper was data collection and sampling. Because this research paper is quantitative, aiming to study the causes and effects of the subprime mortgage crisis, data statistics is required to carry out a regression analysis as well as creating figures and charts to show various trends in macroeconomic measures.

It is extremely vital to make sure that all of the information is consistent. So in order to do that, sources were properly chosen when quantitative or qualitative data were collected (Saunders et al, 2007; Dees, 2000). According to Dochartaigh (2002), it is usually better to use data published than data viewed online. Nevertheless if sources were brought carefully from the Internet, they can present some reliable numerical data. The statistical data in this project was mainly brought from government agencies like the Bureau of Economic Analysis (2009) and the Office for National Statistics (2009). The extent of the study however indicates that more data was required which cannot be acquired from government agencies. For example some data such as stock market and exchange rates were brought from MSN Money (2009) and Yahoo! Finance (2009), which is considered other, recognized sources.

In the research paper, the use of sampling was vital because it helped in evaluating the data collected. In the sample, the period began with the 1st quarter of 1991 till the 1st quarter of 2009. When lag figures were applied some changes were made. The period was reduced from 1993 to 2009 in these situations. However this range of time gave enough observations to carry out a regression.

3.3 Methods Used

Regression is used in the paper to examine the hypothesis that monetary policy in the US could have an effect on the worldwide recession especially that in the UK. It is believed that the subprime mortgage crisis first started when the borrowers began to default. This failure to make payments was created as a result of not being able to refinance the adjustable mortgages when prices of properties were declining. Because mortgage and interest rates are correlated with each other, any alteration in US monetary policy influences both the property and the mortgage market.

According to Mumtaz and Surico (2009) the GDP of UK and economic growth are affected by foreign short-term interest changes. In this research paper, the regression analysis carried out will examine the hypothesis that the efforts undertaken by the US monetary policy to soothe the economy was transmitted to affect the UK.

First the interest rates effect on the economic growth of the US is going to be estimated and after that the effect on the economy of the UK will be tested. For the two tests, the dependent variable is going to be GDP. Since GDP assesses economic growth, you can tell whether there is an economic growth or fall. The independent variable will be the base rate index because it is considered to explain GDP.

As stated by Kendall and Stuart (1961) regression does not tell any causal relation between the independent and dependent variables. It demonstrates that changes in the independent variable affect the dependent variable. The idea of a causal relationship exists only by theory and consistency.

According to economic theory, the monetary policy affects the economy's total output especially when the interest is reduced, businesses are motivated to increase their investment and people spend more, therefore GDP increases. On the other hand when interest rates increase, spending and investments decline and therefore GDP drops (Sloman, 1997:600-612). Therefore by theory, causality exists between GDP and interest rates. In addition, testing will allow present how monetary policy changes affect economic growth and how long it will take when the economic indicator responds interest rate changes.

Ordinary Least Squares will be the method for using regression. First by using the t-statistic test, the coefficients estimated will

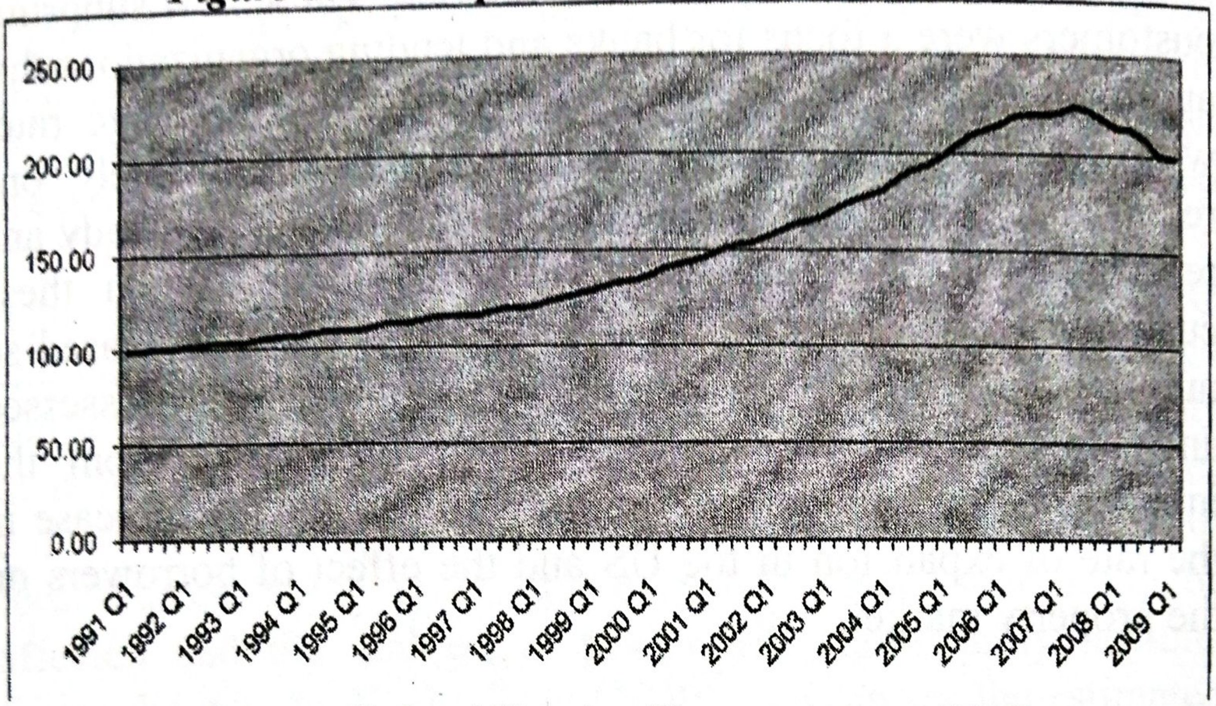
be tested for significance. At 5 % significance level, for the coefficients to be significant, the test probability should be less than 0.05. The division of the statistical coefficient estimate on the coefficient standard error computes the t-statistic. Because present interest rates aren't supposed to impact present GDP (as it usually takes a while for changes in interest rates to be responded by the economic indicators), the base rate of the Fed's successive lags will be the independent variables of both countries' GDP. Current GDP will be affected by the lag with the largest coefficient. The results will be evaluated to the times at which actual changes occur in outputs of both countries.
If the US interest rate changes did not result in changes in UK's GDP by a matching time lag of that proposed by the results of the regression, the assumption that the monetary policy of the US conveyed the recession to the UK should be rejected. With this situation, an argument can be formed that the housing bubble which was a consequence of the mortgage crisis was mainly why the economy of the UK collapsed and the US monetary policy were not able to stop or start it.

4. Findings and Analysis

4.1 Prices of US Houses

In the literature review it was stated that the credit crunch in the US resulted from a few factors. The two main reasons were securitization and subprime mortgage lending. Different circumstances were given to subprime borrowers than the primary customers when obtaining their loans. Financing subprime loans particularly relied on house prices. Because the customers weren't able to afford mortgages based on fixed rates, adjustable rates were offered and refinancing had to frequently take place. Because refinancing is sensible only when prices of assets increase, subprime borrowers depended greatly on the prices of houses. Whilst prices were increasing, there was no need to be concerned. But what if the prices of the houses stop increasing and start declining? The following graph demonstrates in 2007 this behaviour occurred.

Figure 1: House price Index in US (199q1 = 100)

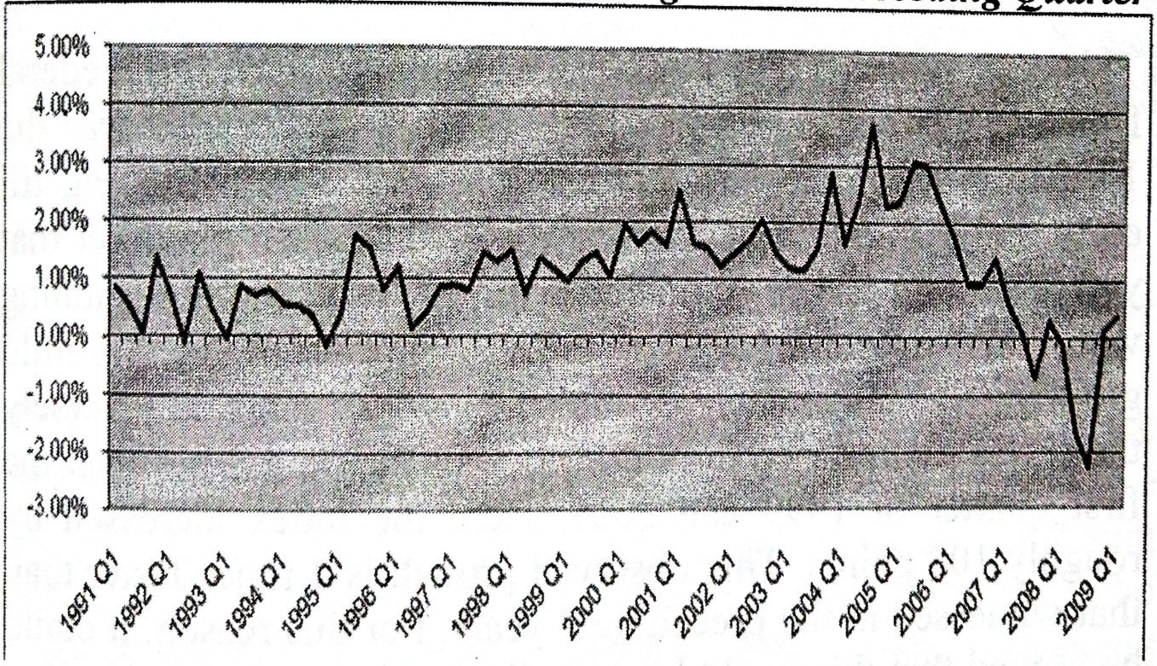


Source: Federal Housing Finance Agency (2009)

This US house price index was computed by the Federal Housing Finance Agency (2009). The base point used was the 1st quarter of 1991. The real estate market was increasing till early 2007. In addition, the growth of the housing market that year had been larger compared with earlier periods. Beginning with the 1st quarter of 1991 to 1998 for instance, there was mild growth. The index increased by about 25 points. Conversely there was a large rise in house price in the period between the first quarter of 1999 and 2007. Here the index increased by roughly 100 points. This observed growth is 4 times faster than that witnessed in the preceding 7 years. For this reason, it could be argued that this could be an indicator for a growing housing bubble.

Speculations stimulate housing bubbles. When there is possibly high income on investments received either as capital gains or rent, opportunities in speculation occur. Because of the rising demand for houses, the prices of property kept increasing. This demand was strengthened more when subprime borrowers started entering the property market. Before that, subprime borrowers were not eligible to buy a house. Yet since there was an expansion in the economy, real estate prices were increasing and other investors were handling the risk. These new subprime customers were a focus for banks and lending organizations that applied particular offers to request adjustable mortgage rates with reasonable payments made every month. Merely one requirement was made: the adjustable rate cannot be steady and refinancing of the real estate must be made. When these customers began to enter the market, the demand increased so much driving property prices up so that those who possessed any property can receive high levels of income from the investments they made. In Figure 2 you can see the increase in the rate of expansion in the US and the effect of borrowers on the property market.

Figure 2: Price of House Index Changes in the Preceding Quarter

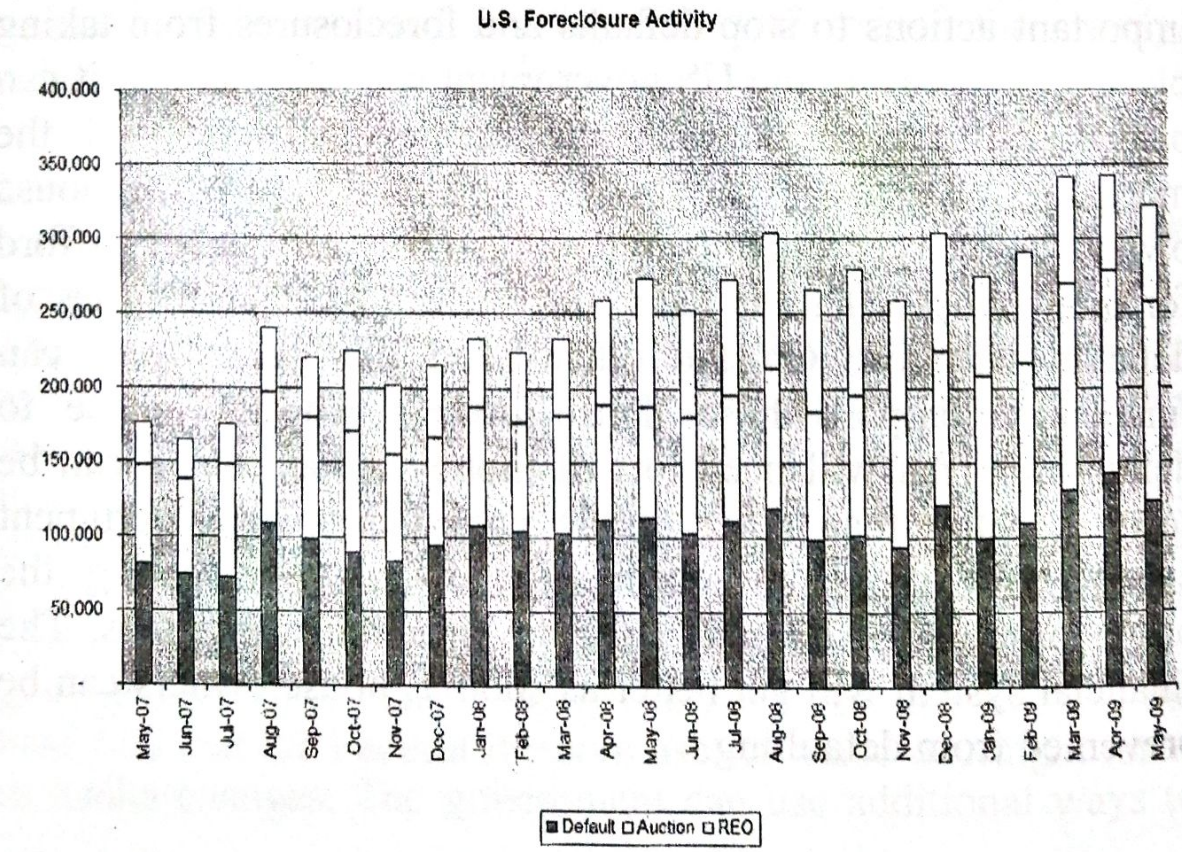


Source: Federal Housing Finance Agency (2009)

From 1991 till 2000 the quarterly average increase of the prices of houses didn't grow above 2%. The start of 2000 till the 1st quarter of 2007 presented a larger rise in comparison with the previous years. Because lots of subprime borrowers began entering the market in 2000 a property bubble was created.

The prices of houses are an important variable in evaluating the subprime crisis as well as assessing the current downturn. An argument could be made that if house prices had kept on increasing, subprime borrowing would have been a lot higher. It is not easy to know whether the recession could have been prevented. In the beginning of 2007 the house values started declining. According to the theory of supply and demand, the reduction in house prices took place when the house supply exceeded the house demand. When more mortgages defaulted and therefore real estate had to be sold (foreclosure), the supply of houses started rising. This does not impact the house prices but when there are a huge number of defaults and lots of foreclosures taking place, the property market will likely be affected and the real estate prices will significantly decline. Given the data by Realty Trac (2009), one can see the estimated number of houses that are foreclosed every month from 2007 till 2009. Here are the results:

Figure 3: The Amount of Houses Foreclosed in the US

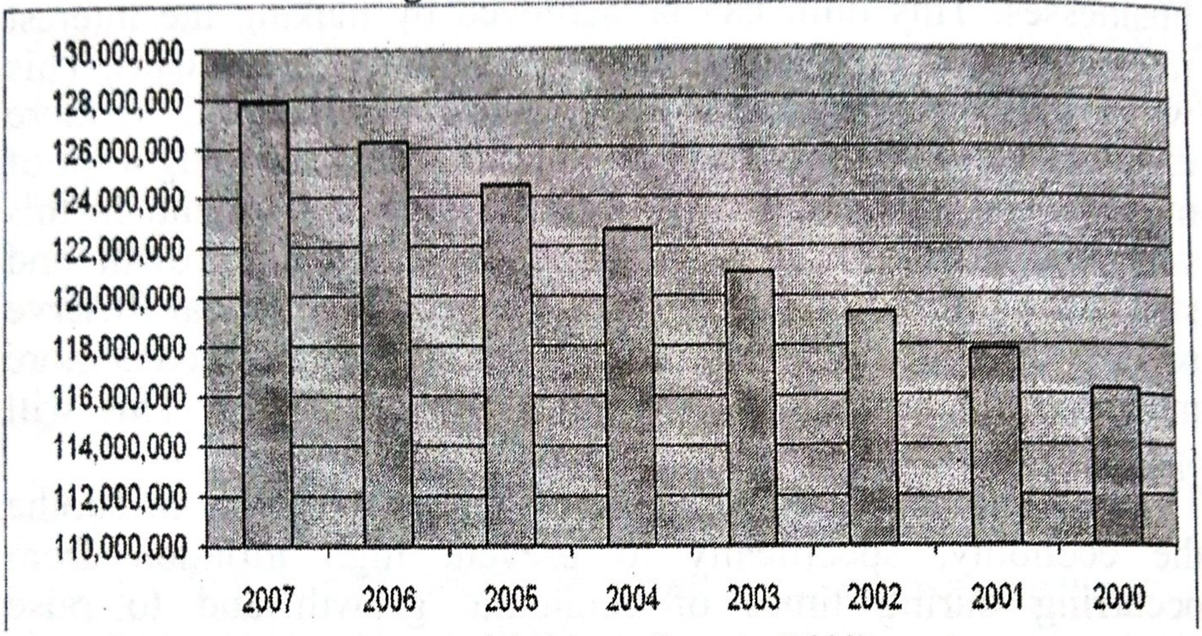


Source: Realty Trac (2009)

From the figure above, it can be seen there is a negative relation between the number of US house foreclosures from 2007 till 2009 and the house price index. It was said before that prices of houses in the US began to decrease in 2007, while from the figure above; the number of US foreclosures seemed to have doubled from June 2007 to November 2008. Since the property market crisis in 2007, two years have passed by where the number of foreclosures carried on increasing. The number of foreclosures had hit the highest point in April 2009 at 341,000 houses, which is over double the amount when the crisis was initiated in 2007. As long as the foreclosures remain increasing, nothing can be said about the recovery in the property market. Because the crisis happened in the housing market, the US government will have to fight this problem instead of saving banks that broke down. If the problem still persists and more defaults take place, then financial organizations will undergo more damage and so the government will have to interfere in order to inject more cash in the economy. When fighting the origin of the problem, house owners will have to be saved at the beginning before banks are. The US government needs to take important actions to stop defaults and foreclosures from taking place. One measure the US government can adopt is that it can pay the difference between the market collateral and the mortgages. Because prices of US houses dropped, the house owners held larger amounts of debt than they can actually afford for their houses. This is risky since it can produce a series of defaults later on. On the other hand the government can financially support those house owners who are close to defaulting. This will need lots of money though but it can be seen as better than other rescue packages since government expenditures is planned primarily towards overcoming the origin problem of liquidity in these financial institutions. The financial system will get better as soon as house owners can be prevented from defaulting.

In 2000 when there was a boom in the housing market, the house prices were increasing as well as the availability or the supply of new houses. This trend is presented below:

Figure 4: US house supply



Source: US Census Bureau (2009)

If the total supply of houses is high today, the prices of houses will probably not increase in prospect. The extra 12 million houses, which emerged in 2000 till 2007, raised the supply. After defaults end, a rise in the demand for houses will take place however the prices will not increase that rapidly because there are already lots of houses available in the market.

4.2 Interest Rates

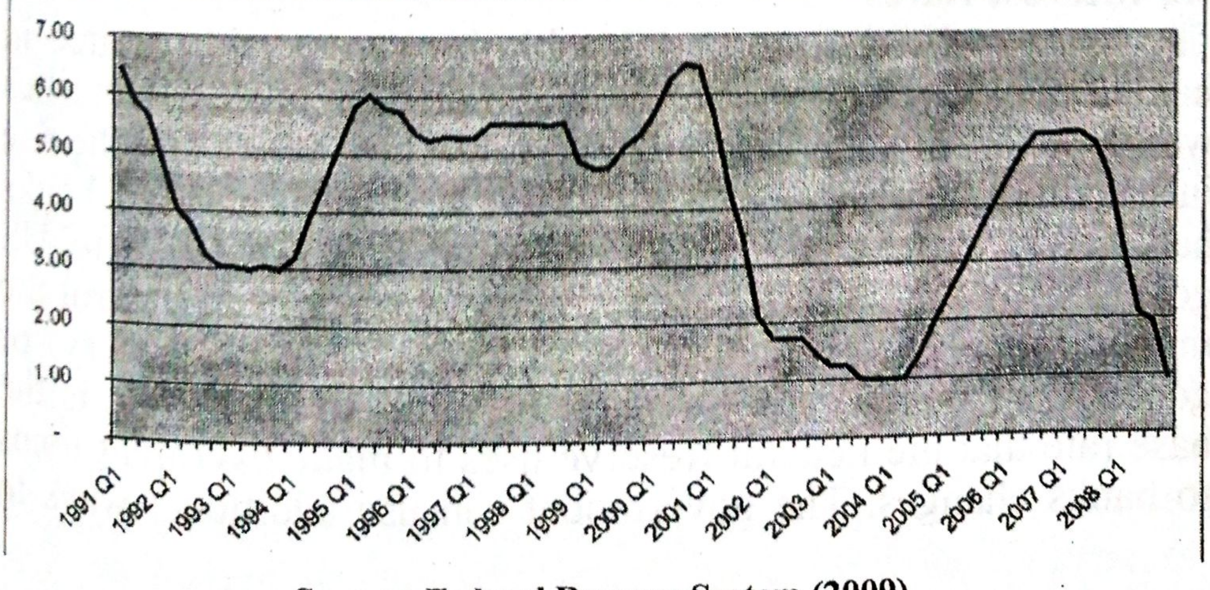
The reason why the property bubble broke out and resulted in institutional investors holding lower mortgage backed securities was the entry of subprime borrowers into the market and the rise in speculation. However, speculation had occurred and banks had begun to lend money to subprime borrowers due to US government's monetary policy. The government can control the money supply by a number of ways. First, treasury or government bonds can be bought or sold. Another thing is the base rate that the Federal Reserve uses to make overnight loans to banks changes. The government can use additional ways to change the money supply; however the base rate will be stressed on the most in the analysis.

The government can increase the base rate, which will result in more expensive loans being made to banks, and consequently also limit the number of loans given to individuals and businesses. This limit can be achieved by making the interest rates higher on mortgage interest rates and business loans. This will make consumers spend less because the credit will be more expensive and so they won't be able to afford spending a lot of money. Also businesses will decrease their investment. In this way, the government can hold back economic growth and steady the inflation rates. In contrast, when the Federal Reserve reduces the base rate, banks and so can cheaply take loans more money could be lent to individuals and businesses. This will speed up economic growth.

The government's monetary policy makes an effort to soothe the economy, specifically to prevent high inflation from occurring during times of economic growth and to raise employment levels in the periods of decline. Nevertheless it would be reasonable to claim that monetary policy could weaken the country due to the time lag occurring between interest rate changes and changes in for example inflation, spending, unemployment, and investment. An argument of this irregularity will be discussed that it contributed to the financial crisis.

The following graph illustrates the US base rate changes in 1991 to 2009.

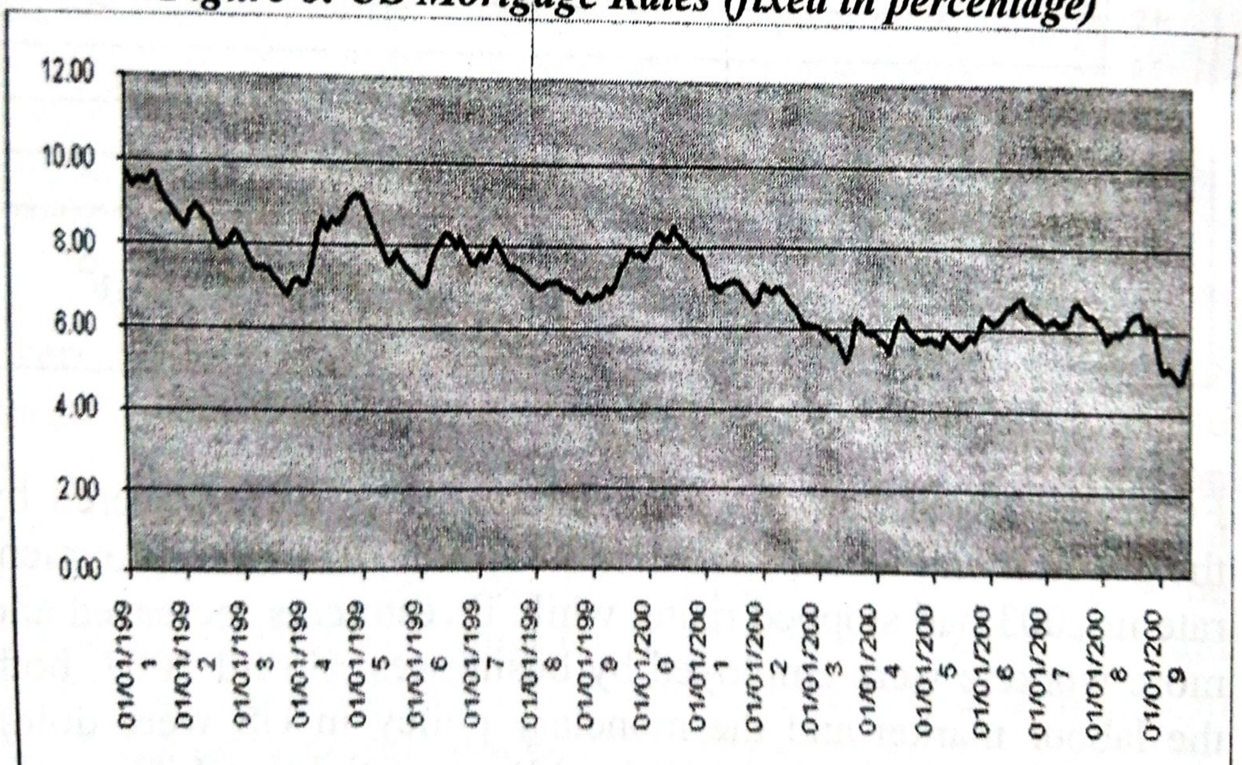
Figure 5: US Fed's Base Rate



Source: Federal Reserve System (2009)

The phase from 2000 to 2009 is important to look at and should be carefully analyzed. Following the stock market crash and the scandals that took place with large companies like WorldCom, the US government created a cheap credit policy in 2000, which could be seen as a way to raise economic activity. In one year, the base rate was reduced from 6.5% to lower than about 2%. This gave the chance for banks to obtain low cost loans from the Federal Reserve. By lending individuals and households, the banking system generated more money in the economy. More buyers were attracted to the property market leading to significant growth in house prices by force of increased demand. Transmission of the crisis could be looked at a comparison of figure 5 with figure 6.

Figure 6: US Mortgage Rates (fixed in percentage)

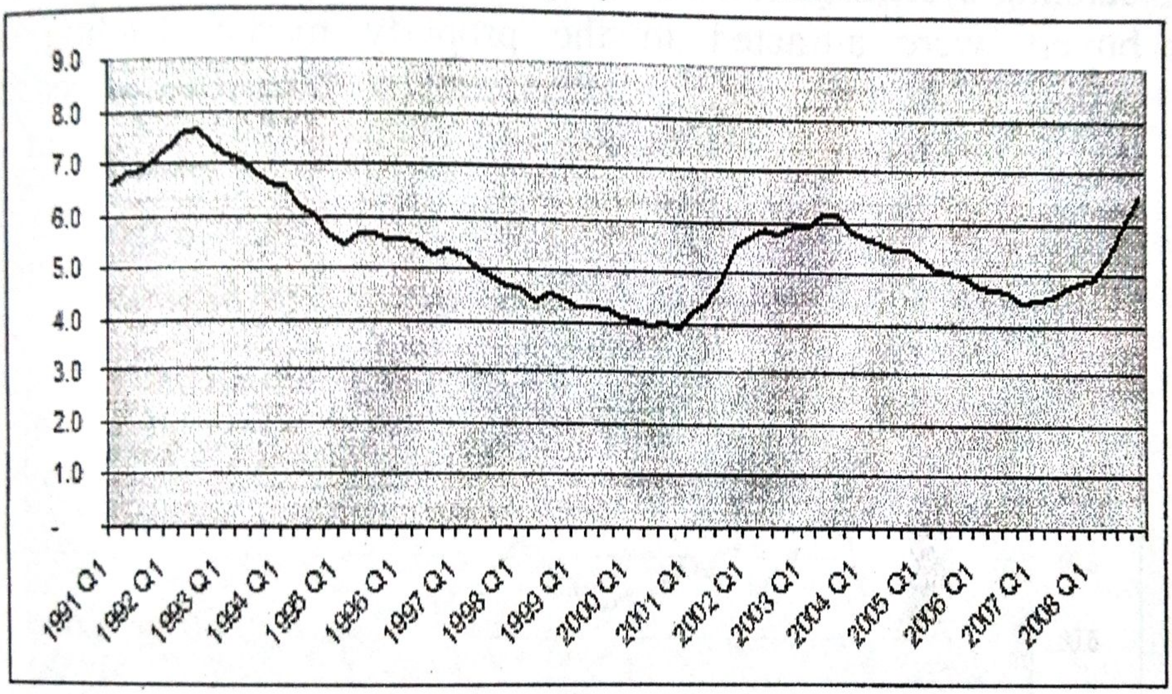


Source: Freddie Mac (2009)

There was a considerable decline in mortgage rates in the period between 2000 and 2003 of more than 8% to over 5%. Figure 5 shows that in precisely this stage, the Federal Reserve System reduced its base rate to the lowest rate. Since the base rate began to increase in 2005, 2006, mortgage rates increased as well.

Therefore the effects of the US government's monetary policy were transmitted to the property market.
It could be stated that the Federal Reserve System was accountable for the financial crisis. The main reason that triggered speculations and resulted in a housing bubble was the very fast decline in interest rates. One argument against this view was that the Federal Reserve System tried encouraging businesses and raised employment levels.

Figure 7: Unemployment in the US

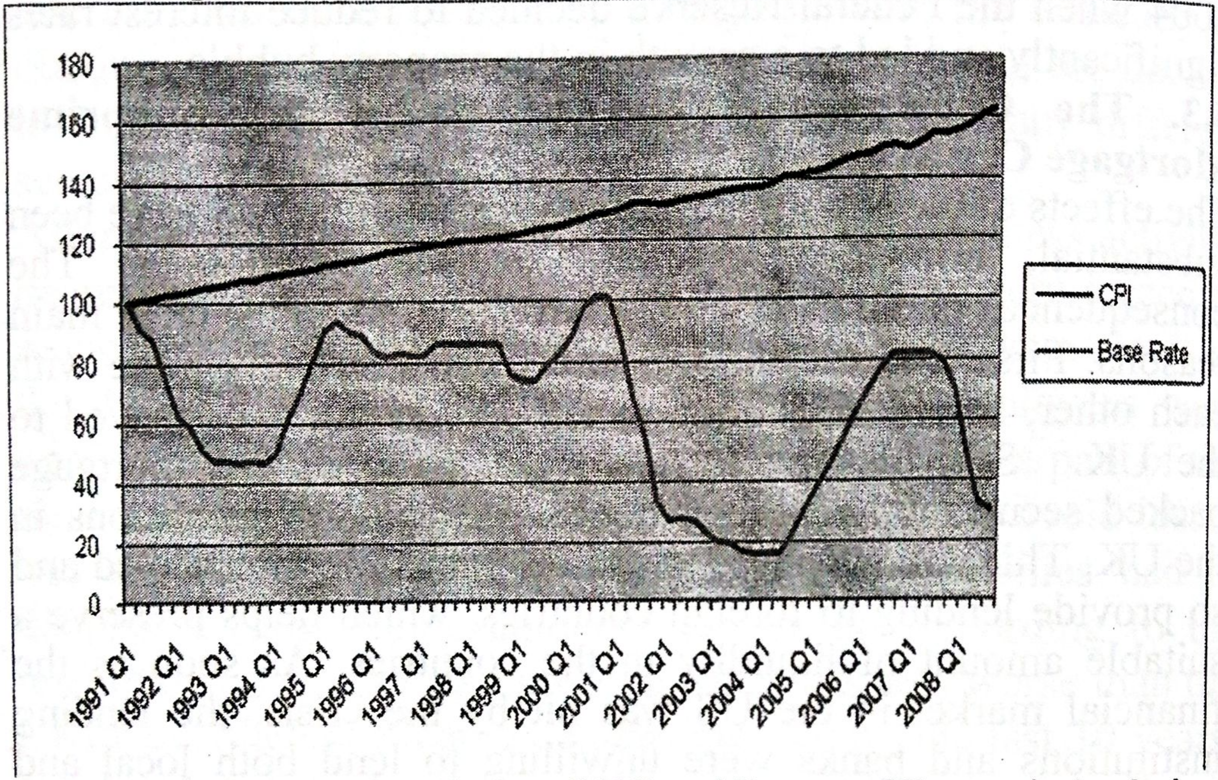


Source: US Bureau of Labor Statistics (2009)

From the period 2001 to 2004, interest rates were lowered by the government, which gave definite results. The unemployment rate in 2003 had stopped rising while investments increased and more workers were employed by businesses. Up till 2007, both the labour market and the monetary policy in US were doing well. In 2005 however, the Federal Reserve tightened its supply of money. In 2006 the base rate was raised from 1% (2004) to 5.3%. So what was the reason that made the US government do that? The most sensible clarification could be that the Federal Reserve wanted to hold back the increasing inflation level and to protect the dollar from devaluing.

The Federal base rate and the CPI are offered in the following graph with base year 1991 to show the correlation between inflation and interest rates.

Figure 8: CPI and Base Rate in US (1991 Q1 = 100)



Source: Federal Reserve System (2009) and Bureau of Economic Analysis (2009)

Even though the tightening of monetary policy, which is classified by high interest rates, tries to hold back inflation, no correlation is noticed between interest rates. The correlation coefficient calculation's result is -0.3. Because it is hard to hold back inflation while the base rate is rising, it can be hypothesized that tightening monetary policy between 2005 and 2006 was not successful. In addition, it resulted in a rise in mortgage rates as well as a housing bubble burst.

However an argument can be based on the fact that even if the Federal Reserve did not increase interest rates, it would be still predictable for a housing bubble to emerge. The crisis could have taken place later on while subprime borrowers would have grown to a large number. More CDO's would have been sold by banks with mortgage-backed securities and the deferred crisis would have suffered worse outcomes. Consequently another clarification can be stated. The government of the US could have possibly increased the interest rates when it was already too late as the property bubble was nearly reaching its peak. So it cannot be blamed on the Federal Reserve increasing the base rate in 2005 and so leading to a burst in the housing bubble. Instead it could be blamed on the policy adopted in 2000 to 2004 when the Federal Reserve decided to reduce interest rates significantly and led to a growth in the property bubble.

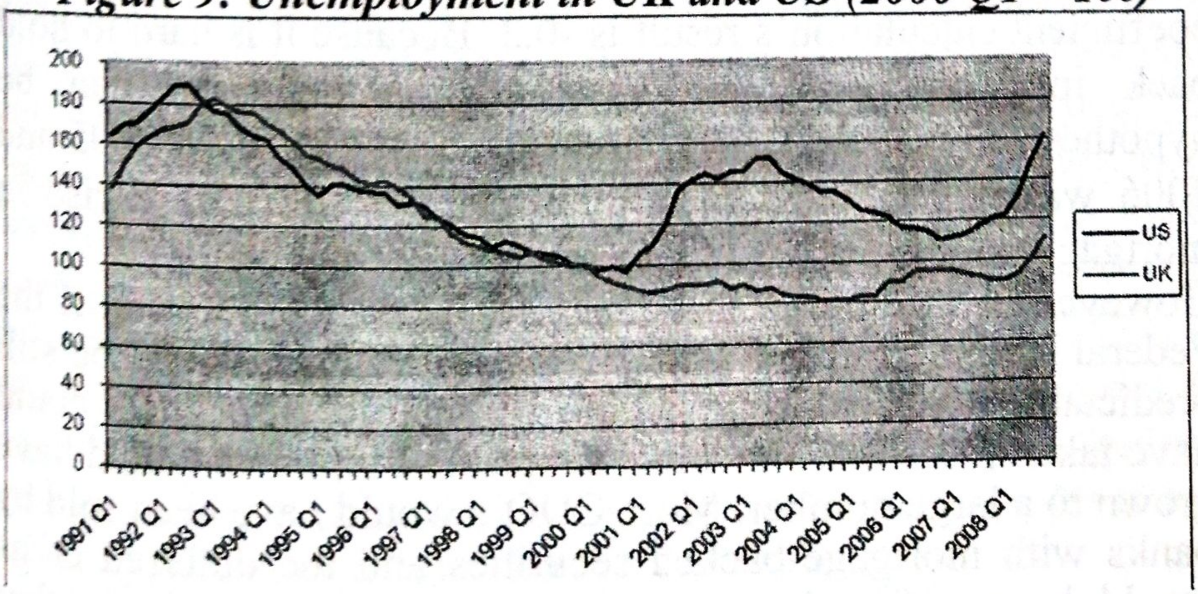
4.3. The Consequences and Effects of the Subprime Mortgage Crisis

The effects of the subprime mortgage crisis of the US have been substantial, affecting local and overseas economies. The consequences on UK's economy have been large for three main reasons. First, because the UK and the US strongly trade with each other, so any disruption in US's economy is conveyed to the UK. Second, investments were made in US mortgage backed securities by several banks and lending institutions in the UK. Third, in advanced countries banks are interrelated and so provide lending to foreign countries, which helps preserve a suitable amount of liquidity in the countries. As soon as the financial market in the US was hit by the crisis, the lending institutions and banks were unwilling to lend both local and foreign economies. So as a result, the mortgage crisis got transmitted to the UK.

4.3.1. Impact on Unemployment

The subprime mortgage crisis strongly affected employment in the US and the UK. This is shown in the following figure:

Figure 9: Unemployment in UK and US (2000 Q1 = 100)



Source: US Bureau of Labor Statistics (2009) and UK Office for National Statistics (2009)

The 2008 3rd quarter showed that the rate of unemployment began to grow quickly. Loans to businesses and to individuals started becoming hard to get when the liquidity in the financial system began to be in shortage. Even though in both countries interest rates were reduced by a large amount, the difficulty of obtaining money was a major cause that resulted in the decline in consumption of customers and a decrease in many different sectors of the economy.

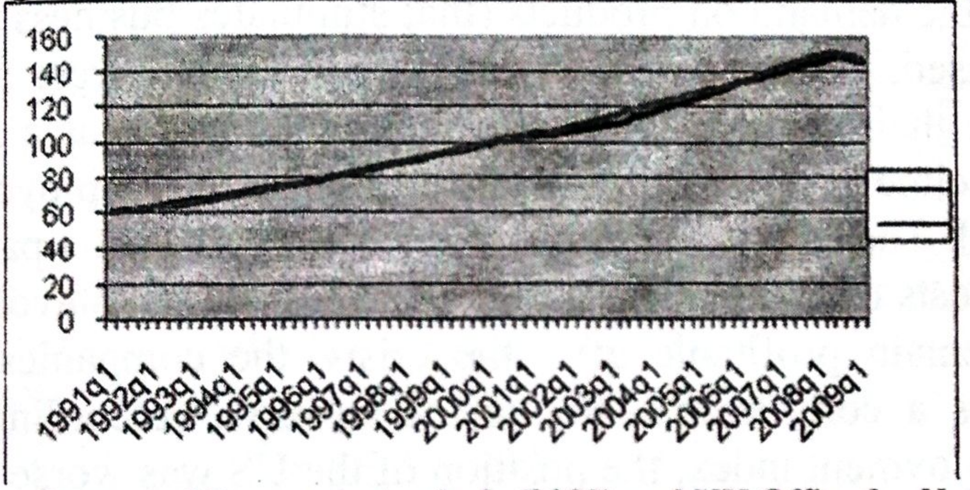
After the demand on products (that stimulates business activity) decreased, the businesses in the US and the UK were forced to reduce their costs as well as their production. So as a result of the decline in production, a fewer amount of employees were needed. The salaries of the workers are considered a part of the total costs of companies. In order for businesses to avoid losses and remain profitable after the crisis, the companies had to dismiss a considerable amount of workers. According to the unemployment index, the position of the US was worse than the UK. Nevertheless it could be seen that during the last 10 years, UK had hit its highest unemployment rate. The rising tendency in rates of unemployment began in 2008. Since then, there hasn't been any progress. Before the initiation of the subprime mortgage crisis, the labour market of the UK was better than the US's. Unemployment was gradually decreasing from 1993 to 2005. Ever since 2000 the percentage of unemployment in the UK continued to be lower than in the US.

By 2006 economic stability had become apparent. When the subprime mortgage crisis began, it worsened conditions in the labour market. Companies in the UK made announcements of the losses endured and the number of dismissal taking place. It can be reasonable to argue that the subprime mortgage crisis has social implications as well as economic effects. The increasing number of unemployment will raise poverty rates, which will surge crime levels and drugs. The government can avoid these results from taking place by providing benefits and transfers to the unemployed people. These benefits will resolve the social effects of the crisis and will help drive the aggregate demand of the economy upwards.

4.3.2. Impact on Economic Growth

Changes in the GDP, which is regarded as a major indicator of the general condition of the economy, estimates the economic growth. By means of providing seasonally adjusted output, the UK and US GDP indexes are shown as follows. The 1st quarter of 2000 is considered to be the base.

Figure 10: GDP of the UK and the US (2000 Q1 = 100)



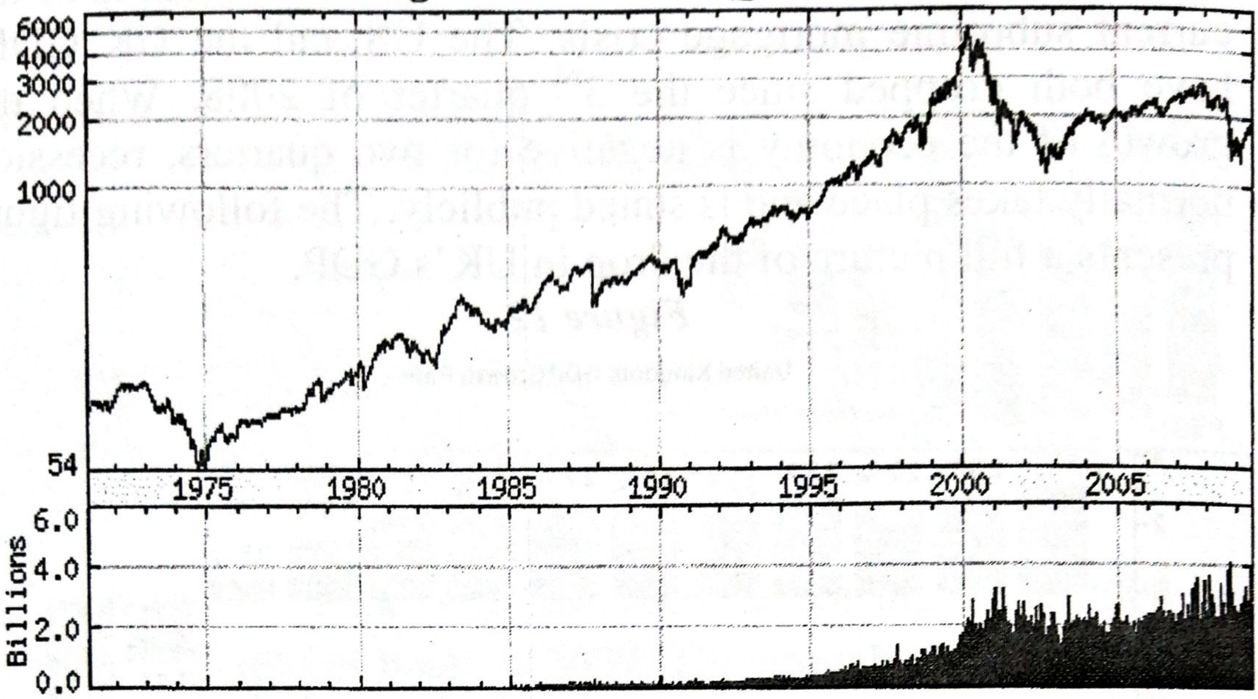
Source: Bureau of Economic Analysis (2009) and UK Office for National Statistics (2009)

Using the graph to show data helps to solve the problem of having different currencies and it makes it more suitable to compare the two indicators.

The GDP's of the UK and the US showed a continuous rise from the years 1991 to 2008. From 1991 to 2001, the economic indicators of both countries looked quite similar with a fairly stable growth. The UK then rose faster, surpassing the US in the period from 2001 to 2006. The US on the other hand revealed a sluggish growth rate from 2001 to 2003. Figure 9 shows that during this period, the unemployment rate in the US was at its highest point. The sluggish growth faced by the US's economy in that period followed by the great financial crisis.

In Figure 11, it can be seen that in 2000 till 2002, the NASDAQ declined. This decline amounted to about 5000 points and was considered the most substantial decrease in the index record.

Figure 11: NASDAQ Index

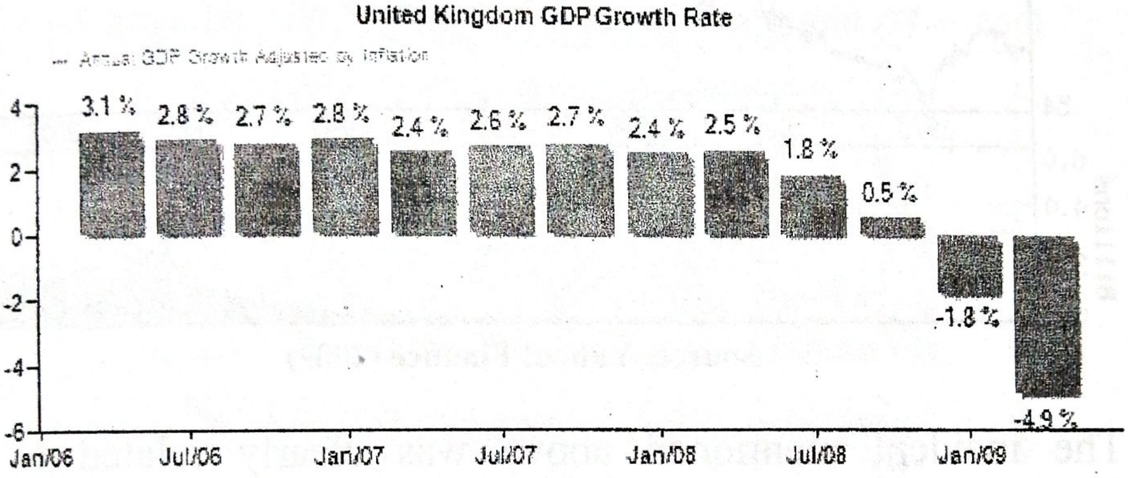


Source: Yahoo! Finance (2009)

The incident mentioned above was clearly related to the subprime mortgage crisis. The decline in the NASDAQ in 2000 occurred because of the breakdown of dot-com companies who had high priced shares. The companies did not receive a great deal of income to justify the high priced shares. This was only a bubble, which had harmful effects on the US economy. After the stock market crash, there was a possibility that a recession was about to happen. As a result the US Fed adopted some measures in order to avoid this from occurring. The shares compose of portfolios of households, so, the prices of those shares measures their wealth. As people lose their wealth, they start to worry about the future and so they begin saving up and spend less. Therefore this is how a recession can occur as a result of a stock market crash. Instantly then, the Fed reduced the interest rates to an extremely low point (1% in 2004), this can be observed in Figure 5. This drop in mortgage rates resulted in a housing bubble. Consequently the stock market crash in the early 2000 is obviously linked to the subprime mortgage crisis.

Near the beginning of 2000, recession could be prevented in the US; however it cannot be avoided after the consequences of the current subprime mortgage crisis. The US and the UK GDPs have both dropped since the 3rd quarter of 2008. When the growth of the economy is negative for two quarters, recession normally takes place and is stated publicly. The following figure presents a full picture of the drop in UK's GDP.

Figure 12

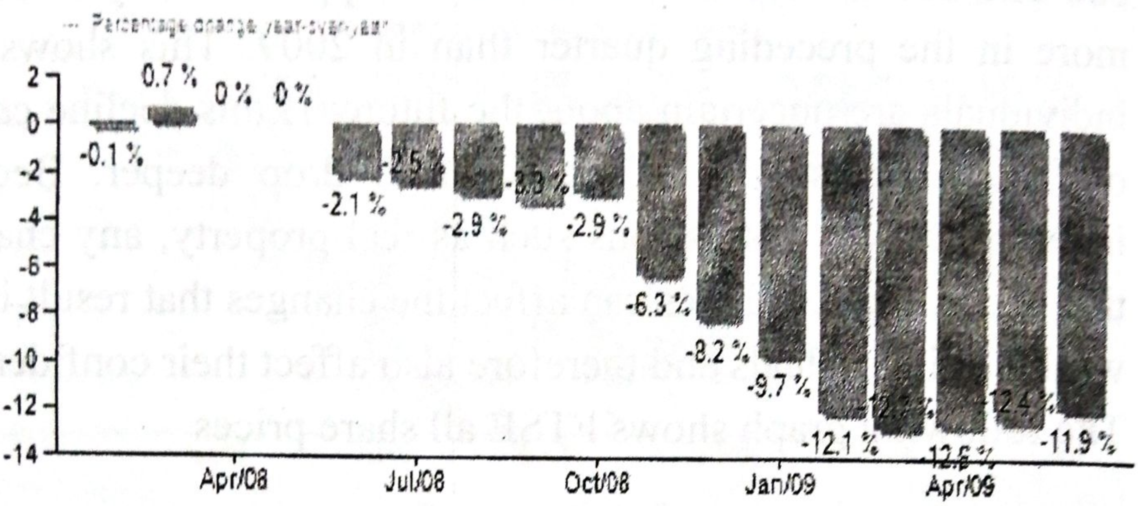


Source: O.N.S

At the end of 2008, the UK's GDP growth rate amounted to -1.8%. Even though the government adopted measures to prevent this sluggish decline in growth rates, the quarter that followed demonstrated a further drop in the growth rate to -4.9%. The increase in negatively growth values of GDP in the UK is a threat to the level the financial crisis can arrive at throughout 2009.

GDP composes of consumption, investments, government spending, and net exports. By looking at the macroeconomic indicators that impact GDP, one can forecast the development of the UK's economy in the future and estimate the impact level of the mortgage crisis. An example of indicators that can forecast the economy's development is the industrial production.

Figure 13

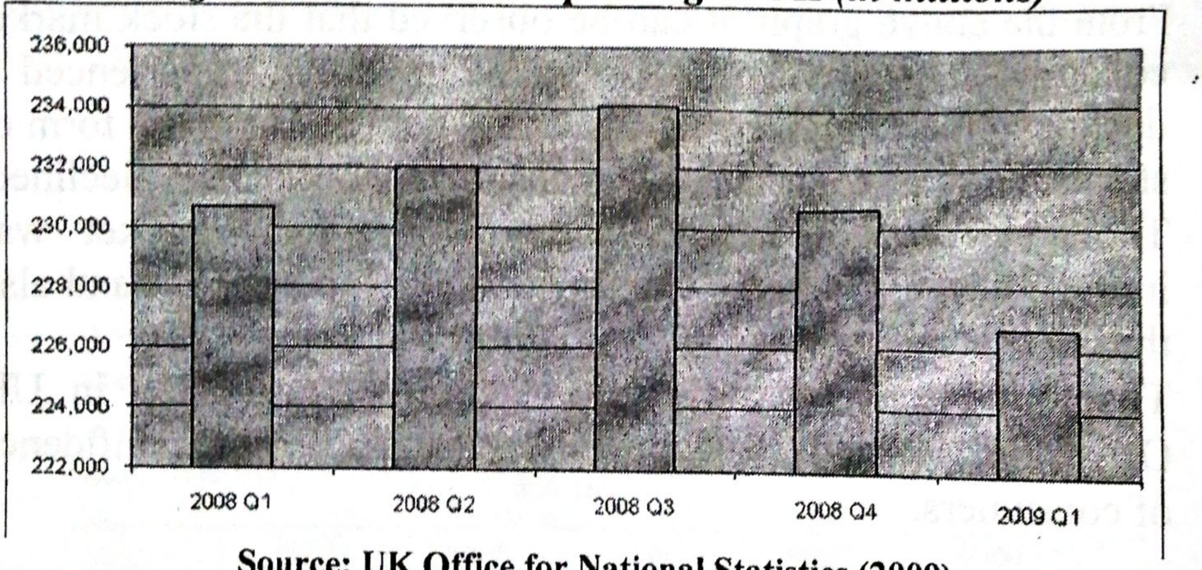


Source: O.N.S

The industrial production has been decreasing since 2008 and reached its lowest point in 2009. The growth has been negative reaching 12.7%. In the next few months progress was made however it was irrelevant. In general, the condition of industrial production was better during the end of 2008 than it was at the beginning of 2009. This could possibly result in a decrease in GDP and it could be very difficult for the economy to overcome this economic recession in the next period.

One other essential aspect affecting the economic growth is the UK household expenditures.

Figure 14: Household spending in UK (in millions)



Source: UK Office for National Statistics (2009)

The consumer spending in quarter 1 of 2009 was significantly cut. The UK households had consumed approximately $4 billion more in the preceding quarter than in 2009. This shows that individuals are uncertain about the future. If this decline carries on, GDP levels will be expected to drop deeper. Because individuals own possessions such as real property, any changes that occur in price shares can affect the changes that result in the wealth of individuals and therefore also affect their confidence. The following graph shows FTSE all share prices

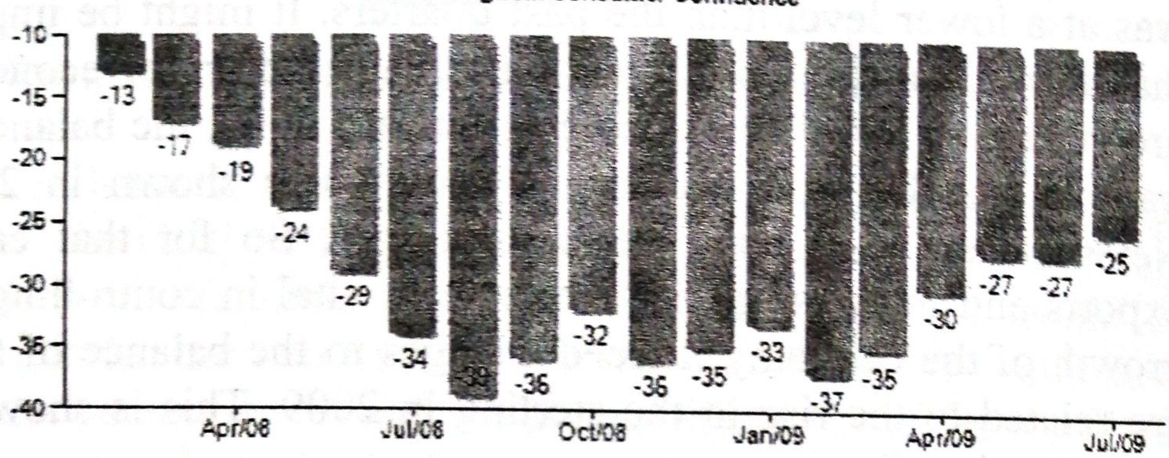
Figure 15: FTSE All Share Price

Source: Yahoo! Finance

From the above graph, it can be observed that the stock market collapsed in March 2009 when the investors experienced a decline in their investments since they held assets in the form of stocks. As a consequence, consumer confidence declined. Though from March 2009, the UK's stock market was increasing. This increase can impact their expenditures and also the GDP will not be as low as it was in 1st quarter.

That observation is backed by the results presented in UK Office for National Statistics (2009) that studied the confidence of consumers.

Figure 16

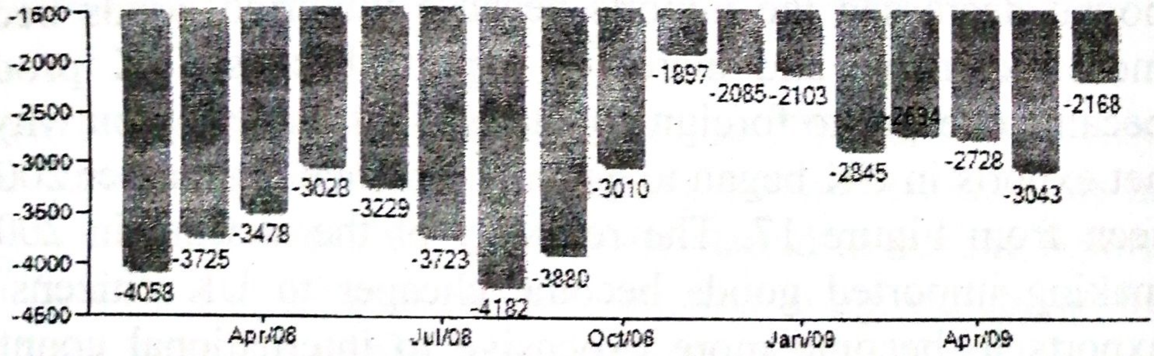


Source: O.N.S

As demonstrated in the diagram above, consumers started to regain their confidence in the 2nd quarter of 2009. They anticipate that the government will control the recession by providing an incentive to businesses and individuals to invest more and consume as much. The economy will be expected to get better if the consumers increase their spending levels in the 2nd quarter of 2009.

Growth of the economy may be affected by exports and imports. The NX (exports minus imports) or the balance of trade reveals whether the country spends more in foreign goods or exports more in foreign trade. If imports are greater than exports then NX is negative. When exports are greater, GDP level grows and so recession can be overcome by consuming from domestic products instead of importing from abroad. In the following diagram, a demonstration is provided of the balance of trade of the UK in 2008 and 2009.

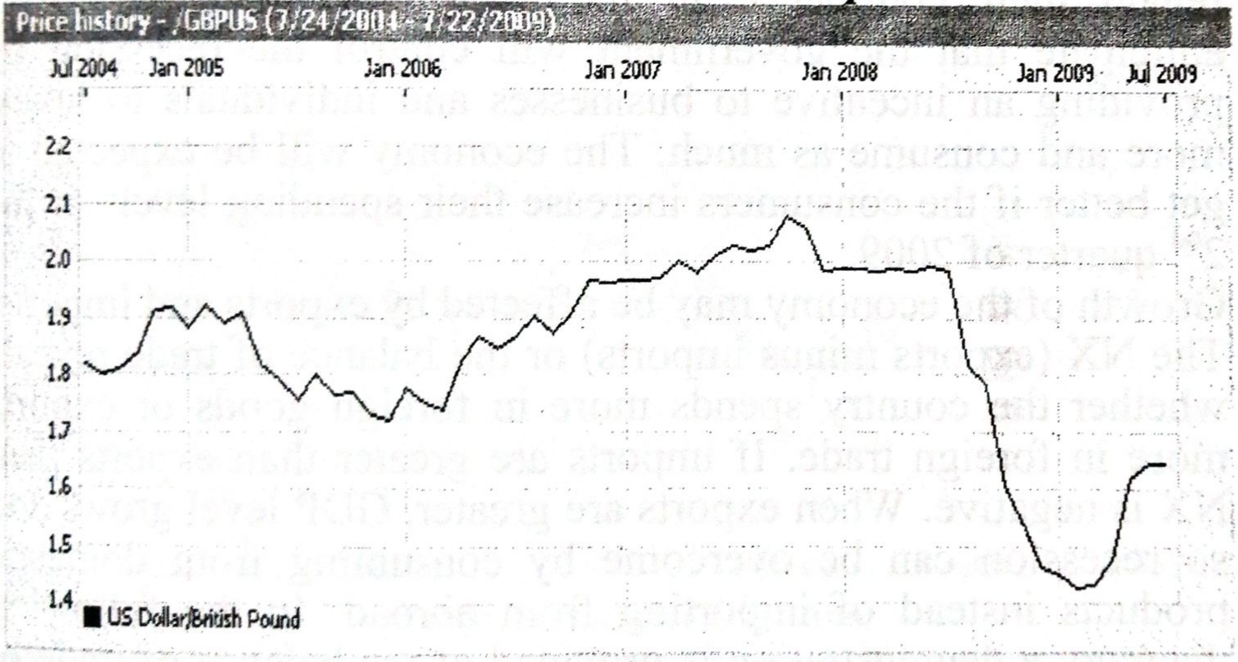
Figure 17



Source: O.N.S

In the 3rd quarter of 2008 the growth in GDP had improved more than in successive periods even though its balance of trade was at a lower level than the past quarters. It might be implied that exports and imports aren't the main factors of economic growth in the UK. For example in January 2009, the balance of trade in the UK did better than the figures shown in 2008.. Nevertheless GDP rates declined further. So for that cause, exports and imports are not particularly vital in controlling the growth of the economy. Indeed changes to the balance of trade are related to the rise in the sterling in 2009. This is shown in the following diagram.

Figure 18: US Dollar/ British pound



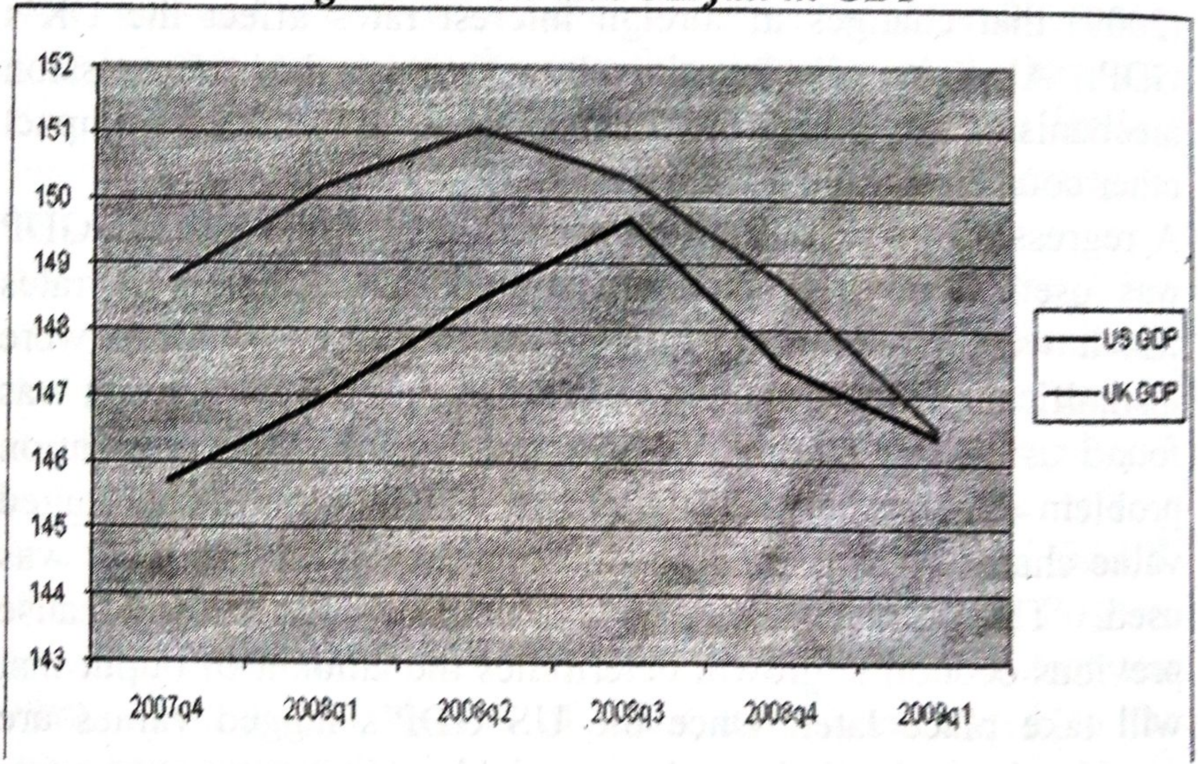
Source: MSN Money (2009)

The value of the sterling depreciated at the end of 2008 and the economy slowed down. The decrease in the value of the British pound decreased the imports because imported goods became more expensive and increased exports because UK products became cheaper to foreign countries. This is the reason why the net exports in UK began to get smaller since September 2008 as seen from Figure 17. The recovery of the sterling in 2009 is making imported goods become cheaper to UK citizens and exports to become more expensive to international countries.. Therefore one can make an assumption that if the British pound carries on being strong, then the net exports will be larger and so economic development will be harder attaining.

4.4 Results from Regression Analysis

Earlier, it has been discussed that due to the subprime mortgage crisis, the GDP both countries decreased. However the amount of drop in economic growth was not the same. It would be thought that the financial crisis that began in the US would have greater consequences in the US than other parts of the world but the empirical results in Figure 19 show that this was not the case.

Figure 19: US and UK fall in GDP



Source: Bureau of Economic Analysis (2009) and UK Office for National Statistics (2009)

Before the subprime mortgage crisis, the UK's economy rose more quickly than the US's as presented by the two indictors in the graph above. Nevertheless the UK started to decline before the US, falling at a high rate. Also another thing, which can be witnessed from the graph, is that the drop in the UK's GDP was steady at the start then it was steeper in 2009. The US on the other hand was steep at the beginning and then it dropped but less severely. By 2009 the GDP's of UK and US both reached nearly one point. If this tendency carries on however, the GDP of the UK will fall dramatically at a deeper level and the US will decline less intensively.

An observation was made by Mumtaz and Surico (2009) about the response taken by the UK's economy to foreign shocks. According to them, the foreign short term interest rates are likely to affect the economic growth of the UK. It was viewed earlier that the property bubble and the collapse of the housing market was triggered by the US monetary policy. In the regression analysis, the effect of the US Federal Reserve Base rate is tested on the economic growth in both countries. This will examine the hypothesis made by Mumtaz and Surico (2009) that changes in foreign interest rates affect the UK's GDP. Also it wil examine how strong the transmission mechanism is by which the financial crisis in the US can impact other countries like the UK.

A regression of a constant and a base rate index on US GDP was used. The findings demonstrated that the interest rates which were at the same interval as the expected GDP were insignificant. Furthermore, a positive high serial correlation was found using the Durbin Watson test.To solve the correlation problem existing between the errors, a regression of the lagged value characterizing the preceding quarter on the US GDP was used. The regression can be explained theoretically because previous economic growth determines the amount of ouput that will take place later. Once the US GDP's lagged values are combined to the independent variables, improvements were observed by using the Durbin Watson test. Nevertheless some positive autocorrelation still can be seen.

According to economic theory, a time lag will always exist between the operations of monetary policy (time between changing the interest and the response of the indicators). To determine the time the US economy takes to react to the base rate changes, a regression of the first lag of GDP and lags of the

1st, 2nd, 3rd and 4th base rate on GDP was used. The results in Appendix 1 showed that not until the 4th lag did the base rate affect GDP. The 4th lag of the base rate was important in impacting the economic growth.

The t-statistic test was used to test the significance of the coefficients. The division of the coefficient derives the formula for the t-statistic over the standard error of the estimates. The t-test obtained values less than -2 just at the 4th lag of the base rate and the p-value was 0.0288. Therefore the test is measured at a 5% significance level. The R-squared and the adjusted R-squared which measure the overall goodness of fit was about 0.999, which is nearly perfect. Thus this result implies that only after a year the US GDP will act in response to the base rate changes. This is why the high levels of interest rate existing in 2007 played a role in the decline of GDP in the US in 2008; also it is for this reason that the resulting reduction in the base rate did not impact present GDP up till now. In addition lending institutions could not lend borrowers due to the limitation of liquidity and so the condition got worse.

To see how the changes in US base rate impact the UK's economy, another regression analysis was carried out. Similarly, a regression of the 1st lag of GDP and other lags of base rate on the UK's GDP has been performed. The t-statistic was also -2 and the p-value was 0.0464. Therefore again, the test is measured at a 5% significance level. Like the model of the US, the R-squared showed a high value of about 0.999. Positive autocorrelation can still be observed by the Durbin Watson test even when lagged figures of GDP have been added to the independent variables.

Therefore the changes in US interest rates take more time to impact the UK's GDP. The lag takes about one year and a half. Based on these results, if the monetary policy was the only factor affecting the economic fall, then the slowdown of the economy would be first found in the US and it would then be conveyed to the UK. Yet the opposite happened. The UK showed signs of a negative growth before the US. Therefore the main impact of the monetary policy on the formation of the current mortgage crisis can't be proved.

5. CONCLUSION

The research paper has investigated the causes and effects of the US subprime mortgage crisis. The US has witnessed two major slowdowns in economic activity during the last 10 years. The first economic decline took place in the early 2000s as a result of the breakdown of dotcom companies, which pulled the NASDAQ index with it leading to a significant collapse. A recession however did not result afterwards. A small decline in economic growth was rapidly adjusted by the actions taken by the US government. The interest rates were reduced and the economy rapidly faced economic growth instead of entering a recession. The stock market as well as the housing market boomed while unemployment was lowered. This reduction in interest rates had impacted mortgage rates. Lending institutions also reduced the interest rates to attract customers when the economy was rising. Even though these actions looked beneficial, they actually resulted in a deeper recession.

New customers occurred in the property market in the 2000's. As a result of competition between finance institutions and banks for lending prime borrowers, the mortgage rates decreased and economic expansion encouraged lenders to profit out of the subprime borrowers. The prices of houses had been generally increasing and the reduction in interest rates resulted in the formation of a property bubble where the prices of houses increased quicker than in the past. Obviously the banks realized that the subprime borrowers who had a bad credit history could now be able to buy a house based on new conditions of refinancing the property. So even if they defaulted on the loans, the lenders were not worried because they could sell the property as collateral. Also the value of the property that was collateralized would rise and banks could end up with a profit. Lending institutions were encouraged to make more loans to subprime borrowers, as they believed that this involved low risk.

Lending to subprime borrowers however was one side of the story behind the financial crisis. The behaviour of the banks resulted in the crisis to become global affecting many different economies. Securitisation pooled subprime mortgages together and sold them as securities to investors. The thought was that securitisation process provided liquidity and would significantly lower the number of defaults and that the risk would be distributed between investors. Credit rating agencies, which were a part of cause of the financial crisis, gave low securities high ratings (AAA). This promised potential returns, which are attractive. Various banks, investors and mutual funds from around the world thought that these securities are safe and therefore bought them while the hedge funds bought the riskier securities. As a result, the markets attracted large amounts of those securities. Investors did not notice the considerable amount of risk involved. It was difficult to measure this risk due to the complicated process of securitisation. When the borrowers started to default on their mortgages and as soon as house prices declined, investors could not get hold of the returns on CDO's as no more cash was going in. Lots of assets, which were worth billions of dollars had been given up. Since investors who obtained risky CDO's retained the households' wealth, the housing market collapse resulted in the households to lose their wealth and lose the values of their homes. As a result, the consumption of the people dramatically declined, as people were unsure about the future.

In this research paper one reason for the financial crisis in the US and also the UK discussed earlier was the US monetary policy of the government. Even though, it was stated that current GDP was affected by the 4^{th} lag of the Fed's base rate, there was no possible clarification to why the UK's economy had earlier repercussions than the US. In the regression analysis, it was observed that the economy of the UK can indeed be affected by US interest rates but it will take about 1 and half years. Therefore if monetary policy was the main cause of the financial crisis, then one would expect that the US's GDP would first fall and then it would impact UK's GDP. However according to the statistical data, the UK experienced a slowdown before the US's economy therefore, a conclusion can be drawn from this that even though the monetary policy can affect the economic activity of the country, it was not a reason behind the economic crisis.

In addition to the causes investigated in the property market, the research also looks into the impact of the credit crisis on both the US and the UK. In the analysis section, the results were derived from information given by government agencies like the Bureau of Economic Analysis (2009) and Office for National Statistics (2009).

From the second half of 2008, the GDP in the US and the UK has been negative. The UK was predicted to fall further in a recession by 2009. Many large companies had to dismiss workers and so unemployment rate increased in both countries. Unemployment continued to rise in 2009 and so far this tendency does not appear to halt. The impact of the financial crisis on the UK's balance of trade was positive since the sterling depreciated and made UK products cheaper to international levels. Nevertheless this positive balance of trade still did not improve the economy nor it helped get past this recession. As a result of the effect of the subprime mortgage crisis, the spending of households in the UK and industrial production has fell significantly, reaching extremely low levels in the first quarter of 2009. In the second half of 2008, consumer confidence dropped to a large extent and in 2009 it managed to be re-established. However, because consumer confidence continues to be negative the financial and economic crisis will remain for quite a time.

5.1. Recommendations and Limitations of the Research

It is recommended that further assessment of the subprime mortgage crisis be carried out. According to changes in factors that impact the country's GDP, a model should be created to forecast the changes in the future's output in order to calculate how much approximately it would take to overcome this economic decline. One tool to reach this objective is vector auto regression (Levitt). However one can form an argument by saying that the most precise estimation would be for the quarters that have amounts like consumption obtainable for 1 month at least. The next 2 months' forecast can be estimated from these forecasts while an estimation of growth of GDP may be undertaken. Nevertheless overcoming the recession can be within limitations. It is more complex to predict GDP for extended periods and it is not certain that this forecast will be 100% correct. Due to the shortage of information on the default rates of US mortgages, the amount of mortgage-backed securities present in every quarter and the rates on quarterly foreclosures, this research was by far limited. To determine by how much each factor impacts the economic slowdown, this information can be adopted in the regression analysis.

Appendices

Appendix A: US Economy

Dependent Variable: US GDP				
Method: Least Squares				
Date: 05/05/10 Time: 11:05				
Sample (adjusted): 1992Q1 2009Q1				
Included observations: 69 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.624239	0.78381	3.348055	0.0013
BASE RATE INDEX(-4)	-0.01288	0.005765	-2.234458	0.0288
US GDP(-1)	1.00106	0.003466	288.8139	0
R-squared	0.999274	Mean dependent var		169.2063
Adjusted R-squared	0.999252	S.D. dependent var		42.5872
S.E. of regression	1.165073	Akaike info criterion		3.18595
Sum squared resid	89.58811	Schwarz criterion		3.283085
Log likelihood	-106.915	F-statistic		45395.74
Durbin-Watson stat	1.104825	Prob(F-statistic)		0

Appendix B: UK economy

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