

The Real Effect of the Recent Financial Crisis on the UK Housing Price Indicators

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Abstract The recent financial crisis has caused unprecedented decline in house prices across the globe, particularly in the UK. Most economic fundamentals have been affected by the credit shortage and failure of many mortgage holders to meet their principal and interest payments. It became apparent that the post Keynesian credit model embraced by many scholars could not sustain the downturn occurred within the mortgage market. This study aims to examine exclusively the correlation between the major economic fundamentals and house price changes both before and during the financial crisis. A multiple regression analysis will be used to test the relationship between a set of selected independent variables and house prices. This would enable us to identify the directions and extent of the relationship. The results show that most indicators, including interest rates and earnings, behave analogously in the pre- and during the financial crisis. However, the directions of relationship for some of the parameters have changed when the market is in crisis, especially in the case of loans extended to house purchase and consumer price index.

Keywords: Economic Fundamentals; Financial Crisis; House Prices; UK

Introduction

The housing market experienced a steady growth before the recent financial crisis as house prices reached one of their highest levels in history. This, however, has changed over the last two years under the impact of the financial crisis. The sudden downturn in financial markets has attracted the interest of many scholars who focussed on issues such as the causes of the crisis, the factors behind the spread of the crisis, and the impact of the crisis on different financial market segments. Some studies investigated exclusively the impact of the financial crisis on the housing market (i.e. Dodd and Mills 2008; Qi and Yang 2008; Yener, 2009; Bagliano and Morana 2010).

The studies addressing the economic drivers of the housing market tend to be not looking at the behaviour of these drivers during economic prosperity and when the crisis hits the economy. Therefore, this research paper aims to fill in a gap in literature by looking specifically at the indicators of the housing prices both before and during the financial crisis.

One of the areas that is extensively researched and empirically tested on the housing market is the correlation between housing prices and credit availability (see for example, Bernanke and Getler 1989; Gerlach and Peng 2005). The key points made in those studies are the existence of information asymmetry and agency costs between the providers of funds and those seeking financing. The demand for properties is also positively correlated with the credit availability (Brissimis and Vlassopoulos 2009). This is based on the notion that in economic downturn credit is

limited as lenders become reluctant to extend further credit, particularly to less net worthy individuals.

Different approaches were used to investigate the factors driving house price movements. For example, indices are widely used to measure housing activity and trend. Himmelberg et al (2005) construct an index by comparing the imputed rent with the actual rent, which is then used to find if houses are highly priced. McCarthy and Peach (2004) note that it is highly complex to create an index for different states or regions in the USA because selling of properties is not carried out in a centralised market. Therefore, they decided to apply asset pricing model in order to capture the effect of interest rate on house price movements.

Some researchers have used financial ratios, such as house price to annual income (Case and Shiller 2003), rent to price (McCarthy and Peach 2004) and rent to income ratios (Himmerlberg et al. 2005) to measure the activity within the housing market. Each ratio is aimed at capturing the relationship between specific housing market drivers. The ratios, however, fail to take into account the continuous alterations in some of the key variables affecting house prices, such as interest rate.

The most widely technique used by researchers to examine the housing market activity is the standard stock-flow model, which aims at finding the equilibrium point between the supply of and demand for housing. On one hand, the supply of housing is mainly dependent on expected rate of return from investment in properties, increase in home prices, housing stock, cost of home construction and price of land. On the other hand, the demand for housing is driven by housing stock, income of households and cost of owning of a house (See Poterba 1984).

The univariate models are also used to capture the effect of single factor on house prices. For instance, the low interest rates set by the Federal Reserve has resulted in an acceleration in the demand for mortgages in the USA, especially in the period from 2000 to 2004 (Ackermann 2008). This, however, has been reversed starting from the mid 2004 following an increase in the interest rate. Housing supply has also directly influenced the price of properties. The increase in the number of housing units has contributed to decline in house prices across the USA. During the financial crisis economic activity would slow down leading to a decrease in the total number of housing units produced and hence results in the mismatch between the demand for and supply of housing. Example of studies looking at economic activity to explain the change in credit include: Kiyotaki and Moore 1997; Hofmann 2004; Fitzpatrick and McQuinn 2004.

In this research paper multiple regression analysis is used as a technique to capture the factors driving the house price movements in the UK. The method enables to weight the impact of each factor on the house price over a period of time and to assess the direction of relationship between the dependent and independent variables, which are considered in the model. The indicators are measured independently and in groups to see the full impact of the variables on house prices before and during the financial crisis.

The rest of the research paper is organised as follows. In section two we discuss the main characteristics of the UK mortgage market. Section three outlines the factors exerting an impact on house prices. Research methodology is discussed in section four. Study results and findings are presented in section five. Section six concludes the research paper.

The UK Mortgage Market

Building societies dominated the UK housing market before the 1980s (Pais, 2008). However, financial deregulation has resulted in the entry of banks and insurance companies into the mortgage market reducing the market share of building societies (Coles, 1992). Nowadays, a large number of financial institutions offer mortgage products leading to an excessive competition between the mortgage providers.

The UK experienced a steady increase in mortgage debt over the last ten years, which reached approximately £1.23 trillion in 2009 (FSA, 2009). This has been supported by relaxed lending constraints and lower short-term real interest rates applied on new mortgage products. Therefore, many new mortgage holders bought their houses through high loan to value mortgage instruments. However, the recent trends show a substantial decline in the net lending to households. According to the Council of Mortgage Lenders' (CML) forecasts net lending has dropped from £108 billion in 2007 to £8 billion in 2009. Gross advances also declined by £222 billion between 2007 and 2009 (CML, 2009).

The debt to GDP, owner occupancy and loan-to-value ratios are all high in the UK making its housing market more volatile, which result in significant increase in house prices during economic prosperity and a decline when the economy is in crisis. The change in interest rates also has a significant impact on the UK mortgage market in terms of cost of borrowing and affordability of mortgage products. In addition, specialist mortgage products geared towards different group of mortgage holders and the re-mortgaging is considered to be easy in the UK housing market.

The deposit model is mainly applied by the mortgage providers to satisfy the financial needs of individuals who are already on mortgage contracts or first time buyers. Under this model the primary owner of credit risk is the financial institution granting the mortgage and households are the primary owners of the interest rate risk. It is worth noting that the securitisation model has gained popularity amongst the mortgage providers in funding the housing market.

Most mortgages granted in the UK use variable interest rates. Even the small proportion of fixed rate mortgages they occasionally become variable after one year of their issue (Miles, 2004). The mortgage rates are mainly driven by the base rate set by the Bank of England and the demand for and supply of housing. In the last two years the base rate has been reduced substantially in an attempt to stimulate lending following the financial crisis, but this evidently did not cause the mortgage rate to decline due to escalation in number of mortgage defaults and deterioration in the financial position of mortgage providers.

Furthermore, the number of households entering into negative equity following the financial crisis continues to increase in the UK. Many houses are also repossessed as the UK law allows the lender to recover the whole outstanding loan from the borrower if he fails to meet his financial obligations over a certain period of time (Blackburn, 2008). According to CML predictions the number of repossessions will reach 48,000 and 53,000 in 2009 and 2010 respectively (CML, 2009).

Another important feature of the UK mortgage market is the shortage in the housing supply. This is caused mainly by the lack of land and the impact of planning system, which is highly restrictive (Cameron, 2005). The decline in the number of housing units constructed each year has resulted in the decline in the housing stock,

particularly in high density areas such as London and Manchester. This makes the mortgage products' demand more influenced by the housing stock in the UK.

This section shows that the UK mortgage market is unique due to various factors including the funding model adopted by mortgage providers that is mainly based on deposits, the significant use of variable interest rate mortgages, the high rate of households who are in negative equity or subject to repossessions after the financial crises, high level of mortgage debt, and the low level of housing stock.

Factors Exerting an Impact on Housing Prices

This section aims at identifying the main factors driving house prices by referring to studies and theories that underpin the movement in the housing market. The variables used in the multiple regression analysis are generated based on these theories and various empirical studies carried out on house price movements. Only relevant indicators of house prices are used for the period under consideration in order to improve the reliability of the study results.

According to economic theory interest rate is the price of money or loan, such as mortgage. Borrowers demand for credit decline as the interest rate rises and vice versa. In highly competitive markets borrowers accelerate their demand for credit in small amounts. This results in high interest rates and an increase in the supply of credit. Because of the increase in the cost of loans, the demand for credit slows down. This continues until the supply of credit equals the demand at the equilibrium price.

Economic factors are good indicators of the fast increase in house prices (Case and Shiller 2003). For example, the growth in individuals' income and low interest rates provide valid explanations of the raise in house prices across the United States. The two researchers find that movement in house prices is explained by income at a rate of 45 per cent. The change in income perfectly matches the changes in home prices in many states in the USA. However, eight states did not exhibit the same trend as home prices were less influenced by the change in home prices. Case and Shiller carried further regressions by adding mortgage rates, unemployment and employment into the regression formula. The results obtained show that these three parameters did not improve the explanations of the change in home prices. Similar results were presented by McCarthy and Peach (2004). They find that healthy economic fundamentals including an increase in income and low level of interest rates facilitated the boom in the housing market in the USA.

The decrease in interest rates enables households to meet their financial obligations and contributes to high demand for dwellings (Tsatsaronis and Zhu 2004). Nevertheless, the future payments are correlated with the time scale of change in the interest rates. In this regard short-term interest rates have significant influence on mortgage payments in the UK.

House price movements are subject to alterations in economic fundamentals particularly during periods of low long-term real interest rates (Himmelberg et al. 2005). The decrease in interest rates causes the cost of mortgage to decline and makes investing in the housing market more attractive to existing and potential homeowners. The cost of owning a property also increases when there is a steady rise in short-term interest rates. This results in an increase in cost of owning a property and hence to possible fall in house prices. Another factor with direct impact on house price growth is change in individuals' income. The acceleration in individuals' incomes contributes

to an increase in housing demand and therefore to rise in house prices. However, the reaction to economic fundamentals is different from one city to another. For example, house prices are more correlated with the level of interest rates in cities where supply of housing is inelastic.

The raise in house prices and other indicators, such as the ratio of price to income, cannot implicitly explain the relationship between the level of interest rates and acceleration in house prices (Himmelberg et al. 2005). Their results also reveal that the cost of renting is actually less than the cost of owning a house, which includes cost of servicing the mortgage. This indicates that houses are overvalued taking into account the change in market conditions.

Jacobsen and Naug (2005) use five main indicators are used to assess house price movements in Norway: (1) average lending rate; (2) households expectations; (3) unemployment rate; (4) total income; and (5) housing. They conclude that the main reasons of the fall in house prices are high lending rate and unemployment. The change in the level of interest rates seems to have the highest effect on house prices. Households' expectations only have a minimal effect on house prices. This, however, contradicts with the findings of (Shiller 2007) in which the growth in the housing market is mainly driven by high market expectations. For example, the survey of consumer expectations endorses the argument of future increase in house prices.

Gallin (2006) applied both panel-data tests and bootstrap approach covering 95 different regions in the USA for a period of 23 years. The results obtained by Gallin endorse the argument that income and house prices are not cointegrated. Therefore, income cannot be used as predictor of future house price movements. In contrast, Meen (2002) used national-level data and found cointegration between economic fundamentals and house prices as values obtained through test statistics were supporting this view. Capozza et al (2004) also find that house price and economic fundamentals are cointegrated.

Wheaton and Nechayev (2007) examined the correlation between the increase in house prices and demand driving factors. They find that to large extent, for the period spanning from 1998 to 2005, economic fundamentals, including movement in interest rates, growth in income and change in population enable to predict the fluctuations in the housing market. In another study by Himmelberg and Sihal (2005) it is found that the change in house prices is exactly in line with the variation in interest rates and income for the period starting from 1976.

Mian and Sufi (2009) carry out their research investigation using various types of loans in measuring the impact of credit supply on house prices covering the period from 2001 to 2005. They find positive correlation between mortgage credit supply and increase in house prices. However, only 10 per cent of their sample of the housing market is actually driven by upward movements in the supply of mortgage credit.

This section shows that many researchers used economic fundamentals with the aim to explain the movement in house prices. The key indicators used are interest rates, income and unemployment. Some studies, however, did include further economic parameters, such as housing stock, number of population and households' expectations. In this study we focus on the main indicators of house price change as outlined in the next section.

Research Methodology

Multiple regression analysis is used to examine the relationship between average house prices and a set of independent variables. These independent variables are weighted in order to explain their contribution to the prediction of the dependent variable. The weights are also used to interpret the results obtained in terms of factors driving house price movements. The period covered in this research investigation is from January 2002 to June 2009. This enables us to observe the housing market conditions prior to the liquidity crisis and also during the period of credit slowdown. We use the main theories outlined in the previous section to decide the predictors to be applied in the multiple regression model.

Twelve predictors were used in the first instance to assess the fluctuation in the housing market prices in the UK. These comprise: (1) Loan Approved for House Purchase (LAHP); (2) Loans Approved for Re-mortgaging (LARM); (3) Standard Variable Rate (SVR); (4) 5 Year 75% LTV Fixed Mortgage Rate ($FMR_{5Y75\%LTV}$); (5) 5 Year 95% LTV Fixed Mortgage Rate ($FMR_{5Y95\%LTV}$); (6) 10 Year 75% LTV Discount Mortgage Rate ($DMR_{10Y75\%LTV}$); (7) 2 Year 75% LTV Discounted Mortgage Rate ($DMR_{2Y75\%LTV}$); (8) 2 Year 95% LTV Discount Mortgage Rate ($DMR_{2Y95\%LTV}$); (9) Tracker 75% LTV Mortgage Rate ($TMR_{75\%LTV}$); (10) Unemployment (UNEMP); (11) Consumer Price Index (CPI); and (12) Average Earnings Index (AEI). Nationwide was the source of data on average house price. The data on LAHP and LARM obtained from British Bankers Association. The different interest rate data was gathered from Bank of England. Office for National Statistics was used to generate data on UNEMP, CPI and AEI. The results obtained from running the individual variables regressions are presented in table 1.

To reduce the problem of multicollinearity only one type of interest rates has been taken, which is SVR. This is based on the notion that SVR has generated the best explanatory power amongst the different interest rates being applied. The regression was re-run for each of the remaining independent variables across three periods (Jan 02 to Jun 09 – the whole period under investigation; Jan 02 to Oct 07 – prior to the financial crisis; and Nov 07 to Jun 09 – during the financial crisis).

The predictors are added progressively to the regression model in order to improve the explanation of the variability in the dependent variable. By the end five independent variables were used in explaining the main indicators of average housing market price movements. These are: LAHP; SVR; UNE; CPI; and AEI. Therefore, the final regression equation used for the UK housing market was as follows:

$$AHP_t = \beta_0 + \beta_1 LAHP_t + \beta_2 SVR_t + \beta_3 UNEMP_t + \beta_4 CPI_t + \beta_5 AEI_t + \varepsilon_t \quad (1)$$

Where: APR_t is the average house price at time t; SVR_t is Standard Variable Rate at time t; $UNEMP_t$ is the unemployment at time t; CPI_t is Consumer Price Index at time t; AEI_t is Average Earnings Index at time t; and ε_t is the error term.

A cluster analysis is adopted to compare results obtained for the pre- and during the financial crisis period. This method enables data simplification and drawing specific relationships between the dependent and independent variables. The variables exhibiting similarities are grouped and then explained in terms of their

correlation with AHP change. All observations are checked to identify the variables showing the same behaviour towards the dependent variable. This covers significance of relationship (by looking at Multiple R and R^2), direction of correlation (by looking at the coefficients), and statistical magnitude (by looking at T statistics and P-value).

Results and Discussion

The results obtained from this study for the UK mortgage market are presented in tables 1, 2, 3 and 4. Table 1 shows the key regression results for the main independent variables at 5% level of significance. As depicted in the table Average Earning Index (AEI) and Standard Variable Rate (SVR) have the highest values in terms of Multiple R indicating that these two variables are closely correlated with the average house price (AHP). Both variables are also positively related with AHP as indicated by their positive coefficients. Other scholars' findings, as presented in section three, support this view with only few exceptions, such as Gallin 2006. There are two variables showing inverse relationship with AHP, LAHP and LARM. Theoretically, the negative sign of LAHP and LARM coefficients is not valid as the availability of more mortgage loans is expected to contribute to acceleration in house prices. This will be tested by adding further variables to the constructed model as exhibited in Table 3. The values of the T statistic endorse the fact that there is high confidence in AEI and SVR coefficients. The variables with poor correlation with AHP include LARM, 2 Year 95% LTV Discount Mortgage Rate ($DMR_{5Y75\%LTV}$) and Unemployment. These variables also have the poorest explanatory powers as shown by the computed R Square and Adjusted R Square. This means they have less influence on explaining the variability in the AHP. The figures attained for P-values signifies that the results are statistically significant except for LARM, $DMR_{2Y95\%LTV}$, and unemployment.

Table 1: Regression results including all independent variables at 5% level of significance

	Multiple R	R Square	Adjusted R Square	Coefficient	T statistic	P-value
Loan Approved for House Purchase	0.5137551	0.2639443	0.2554839	-0.6257319	-5.5854799	0.000
Loans Approved for Re-mortgaging	0.2074004	0.0430149	0.0320151	-0.3779598	-1.9775016	0.051
Standard Variable Rate (SVR)	0.7708484	0.5942073	0.5895430	24219.8304	11.2869479	0.000
5 Year 75% LTV Fixed Mortgage Rate	0.5860403	0.3434432	0.3358966	23139.0287	6.7460719	0.000
5 Year 95% LTV Fixed Rate Mortgage	0.5349373	0.2861579	0.2779528	19562.2993	5.9055649	0.000
10 Year 75% LTV Fixed Rate Mortgage	0.4416330	0.1950390	0.1857870	18690.9800	4.5912776	0.000
2 Year 75% LTV Discounted Mortgage Rate	0.4045370	0.1636502	0.1540370	20260.3110	4.1259505	0.000
2 Year 95% LTV Discounted Mortgage Rate	0.1823397	0.0332477	0.0221356	12561.1327	1.7297497	0.087
Tracker 75% LTV Mortgage Rate	0.6534008	0.4269326	0.4203456	17334.0194	8.0507519	0.000
Unemployment	0.1662686	0.0276452	0.0164687	5931.8129	1.5727426	0.119
Consumer price Index	0.5627989	0.3167427	0.3088891	14927.3755	6.3506883	0.000
Average Earnings Index	0.8454094	0.7147170	0.7114379	2009.3626	14.7634833	0.000

The data obtained using the six main independent variables shows three key area of interest. First, the coefficients of LAHP and LARM are now positive for the period running from Nov 07 to Jun 09. This reveals that the decline in the number of

mortgage loans during the crisis period did influence the house price. The same phenomenon is observed for loans approved for re-mortgaging. Second, Unemployment, CPI and AEI all have negative coefficients during the crisis period. This is also in line with the theory as increase in unemployment, for example, is expected to have a reverse impact on the AHP. Third, the pre-crisis period data for the coefficients continue to behave the same as the whole period under investigation. Although the pre-crisis time has higher values than the whole study period.

Table 2: The coefficients of the six main independent variables for Jan 02 - Jun 09; Jan 02 - Oct 07; and Nov 07 - Jun 09 at 1% and 5% level of significance.

	Coefficient					
	1%			5%		
	Jan 02 – Jun 09	Jan 02 – Oct 07	Nov 07 – Jun 09	Jan 02 – Jun 09	Jan 02 – Oct 07	Nov 07 – Jun 09
Loans Approve for House Purchase	-0.6257319	-1.3696000	0.6612190	-0.6257319	-1.3695971	0.6612188
Loans Approved for Re-mortgaging	-0.3779598	-1.3695971	0.6320803	-0.3779598	0.6320803	-1.3695971
Standard Variable Rate	17334.0194	32777.0500	6615.2130	24219.8304	32777.0525	6615.2133
Unemployment	5931.8129	21774.0200	-10451.000	5931.8129	21774.0156	-10450.9563
Consumer price Index	14927.3800	32312.2400	-1880.4000	14927.3755	32312.2433	-1880.4028
Average Earnings Index	2009.3630	3020.0800	-3269.9800	2009.3626	3020.0799	-3269.9848

The predictors of the AHP are added to the regression model to improve the explanation of the variability in the dependent variable. The results obtained are presented in Table 3 for two periods, before and during the financial crisis. The data in this table exhibits five important points. First, unemployment is the only variable with less explanatory power in relation to AHP. SVR and AEI are the two main variables contributing to the explanation of the dependent variable. Second, R Square and Adjusted R Square both support the view that LAHP, SVR and AEI are the main indicators of AHP as they improve confidence in the regression equation. Using all indicators 99.09% of the total variations in the AHP is explained by the five parameters for the pre- financial crisis period and 95.47% for the crisis period. Third, most coefficients are positive during the crisis period. The two indicators showing reverse effects on the AHP are unemployment and CPI. When all variables are included in the model most coefficients become negative for the pre-financial crisis period except for the AEI. This indicates that AHP declines when there is acceleration in LAHP, SVR, unemployment and CPI. Fourth, adding more predictors to the model has reduced the reliability of the coefficients as shown by the negative signs of the t statistic. The only exception is in the case of AEI, which suggests a high statistical significance of this regression coefficient. Fifth, P-values for each of the indicators are higher in the financial crisis period than in the pre-crisis period. The statistical significance of the variables used is also better when more indicators are added to the regression equation. This is particularly evident in the case of unemployment and CPI.

Table 3: The coefficients of the six main independent variables for the pre- and after the financial crisis periods at 1% and 5% level of significance.

		Multiple R	R Square	Adjusted R Square	Coefficient		T statistic	P-value
					1% level of significance	5% level of significance		
Loans Approved for House Purchase	Jan 02 – Oct 07	0.5954643	0.3545778	0.3449446	-1.3724371	-1.3838061	-6.0669617	0.000
	Nov 07 – Jun 09	0.4815853	0.2319244	0.1867435	0.6575068	0.6426462	2.2656653	0.037
Loans Approved for House Purchase Standard Variable Rate	Jan 02 – Oct 07	0.8789585	0.7725681	0.7656762	0.1864646 34957.8380	0.1766139 34797.7947	0.9659368 11.0136027	0.337 0.000
	Nov 07 – Jun 09	0.9428442	0.8889552	0.8750746	0.6350147 6523.6383	0.6291835 6489.4212	5.5630175 9.7297963	0.000 0.000
Loans Approved for House Purchase Standard Variable Rate Unemployment	Jan 02 – Oct 07	0.8798707	0.7741725	0.7637497	0.2462165 36155.6795 -4202.3374	0.2353711 35971.8642 -4508.1464	1.1560470 9.9196697 -0.6795551	0.252 0.000 0.499
	Nov 07 – Jun 09	0.9518828	0.9060810	0.8872972	0.6220894 2338.6402 -6713.2009	0.6165305 2206.2327 -6918.7158	5.7224068 0.9138852 -1.6538442	0.000 0.375 0.119
Loans Approved for House Purchase Standard Variable Rate Unemployment Consumer price Index	Jan 02 – Oct 07	0.9088585	0.8260199	0.8151462	0.2418617 28446.8710 -15182.2828 15223.5228	0.2322676 28261.5464 -15480.9898 15047.4299	1.2823904 7.7443496 -2.5475897 4.3672080	0.204 0.000 0.013 0.000
	Nov 07 – Jun 09	0.9546100	0.9112802	0.8859317	0.3936564 5008.4929 -3404.2674 -2481.1760	0.3797181 4806.6218 -3683.6620 -2619.1569	1.4554278 1.2800997 -0.6096358 -0.9057829	0.168 0.221 0.551 0.380
Loans Approved for House Purchase Standard Variable Rate Unemployment Consumer price Index Average Earnings Index	Jan 02 – Oct 07	0.9909988	0.9820787	0.9806564	0.32112362 590.6098 -17370.5390 -4796.2326 3526.0659	-0.0305209 -4939.6832 -18250.8131 -2265.5468 3741.7878	-0.4238961 -2.6004385 -9.4295316 -1.6100432 23.4223409	0.673 0.011 0.000 0.112 0.000
	Nov 07 – Jun 09	0.9547157	0.9114821	0.8774368	0.3931175 4824.3408 -3808.6747 -2508.3096 125.2682	0.3786490 4608.0446 -4121.6369 -2651.7377 85.0743	1.4025975 1.1536760 -0.6097247 -0.8817749 0.1721954	0.184 0.269 0.55 0.394 0.172

Further calculations are made using the Percentage Change of the Average House Price (PCAHP) as the dependent variable versus six independent variables as shown in Table 4. The results indicate that LAHP, SVR, CPI and AEI have the best correlation coefficients pointing to a direct impact of these variables on PCAHP. Among these indicators SVR is the highest contributing parameter to the explanation of PCAHP, which is in line with the economic theorem underpinning the mortgage market. However, the coefficients of determination are not highly satisfactory compared to those obtained using AHP. The figures of R Square and Adjusted R^2 reveal that the regression equation is better estimated for the whole period than when the period is divided into sub-periods, pre- and during the financial crisis. This can be explained by the reverse behaviour of PCAHP during the period of economic crisis. The signs for the coefficient points to positive correlation with PCAHP for LAHP, unemployment and AEI for the financial crisis period. SVR is negatively correlated with PCAHP for any of the periods under study. This signifies that the increase in cost of borrowing contributes to decline in average house price. The best indicator of reliability as reflected by the t-statistics' figures is LAHP and the worst is CPI. One possible explanation for this is the change in the number of mortgage loans granted when the economy is facing financial crisis. Based on P values most results are statistically significant except for LARM and unemployment and hence they have less explanations of the PCAHP.

Table 4: Regression results using six independent variables for the average house price percentage change at 5% level of significance for three different periods (Jan 02 to Jun 09; Jan 02 to Oct 07; and Nov 07 to Jun 09)

		Multiple R	R Square	Adjusted R Square	Coefficient	T statistic	P-value
Loan Approved for House Purchase	Jan 02 – Jun 09	0.5730696	0.3284091	0.3206896	0.0000424	6.5225113	0.000
	Jan 02 – Oct 07	0.4547735	0.2068189	0.1949804	0.0000439	4.1797124	0.000
	Nov 07 – Jun 09	0.2361262	0.0557555	0.0002118	0.0000537	1.0019048	0.330
Loans Approved for Re-mortgaging	Jan 02 – Jun 09	0.2172365	0.0472308	0.0362794	0.0000241	2.0767230	0.040
	Jan 02 – Oct 07	0.0302111	0.0009127	-0.0139903	0.0000044	0.2474017	0.805
	Nov 07 – Jun 09	0.2580655	0.0665978	0.0116918	-0.0000287	-1.0133680	0.286
Standard Variable Rate (SVR)	Jan 02 – Jun 09	0.3368129	0.1134429	0.1032526	-0.5439245	-3.3365303	0.001
	Jan 02 – Oct 07	0.4067051	0.1654090	0.1163154	-0.5435461	-1.8355545	0.083
	Nov 07 – Jun 09	0.4269173	0.1822584	0.1700533	-0.6702918	-3.8643206	0.000
Unemployment	Jan 02 – Jun 09	0.3368112	0.1134429	0.1032526	-0.5439245	-3.3365303	0.001
	Jan 02 – Oct 07	0.0921020	0.0084827	-0.0063159	0.3478650	0.7571060	0.451
	Nov 07 – Jun 09	0.4246682	0.1803431	0.1321280	0.8804590	1.9340078	0.069
Consumer price Index	Jan 02 – Jun 09	0.5349109	0.2861297	0.2779243	-0.8636582	-5.9051576	0.000
	Jan 02 – Oct 07	0.3714531	0.1379774	0.1251114	-0.6783096	-3.2747803	0.001
	Nov 07 – Jun 09	0.3156842	0.0996565	0.0466951	-0.6151977	-1.3717444	0.187
Average Earnings Index	Jan 02 – Jun 09	0.5343228	0.2855008	0.2772882	-0.0773081	-5.8960682	0.000
	Jan 02 – Oct 07	0.4482897	0.2009636	0.1890377	-0.0585001	-4.1049975	0.000
	Nov 07 – Jun 09	0.1090230	0.0118860	-0.0462383	0.1336549	0.4522089	0.656

Conclusions

The research paper examined the factors driving house price movements in the UK both before and during the financial crisis periods. Multiple regression analysis is used to measure the correlation between average house price and a set of independent variables, which were selected based on the existing housing market theorem. The results reveal that interest rate and earnings have the highest correlation with the average house price. However, there is clear variation in the behaviour of different types of interest rate on AHP with variable interest rate showing the strongest correlation with AHP. Number of mortgage loans showed higher impact on the AHP during the financial crisis than before the economic downturn. Unemployment has the least effect on AHP followed by CPI.

Most indicators used in the regression models tend to behave in the same way both before and during the financial crisis, but with better explanatory power for the pre-crisis period. The coefficients indicate that there are changes in the directions of some of the independent variables when the markets are in financial crisis. This include in particular number of loans approved for house purchase and consumer price index.

References

- Ackermann, J. (2008) The subprime crisis and its consequences. *Journal of Financial Stability*, 4, 329 – 337.
- Bagliano, F. C., Morana, C. (2010) Permanent and transitory dynamics in house prices and consumption: some implications for the real effects of the financial crisis. *Applied Financial Economics*, 20(1/2), 151 – 170.
- Bernanke, B., Getler, M. (1989) Agency costs, net worth, and business fluctuations. *American Economic Review*, 79, 14 – 31.

- Blackburn, R. (March-April 2008) Subprime mortgage, *New Left Review*, 50, 63 – 106.
- Brissimis, S. N., Vlassopoulos, T. (2009) The interaction between mortgage financing and house prices in Greece. *Journal of Real Estate & Economics*, 39(2), 146 – 164.
- Cameron, G. (April 2005) *The UK housing market economic review*. Department of Economics, University of Oxford.
- Cappoza, D., Hendershott, P., Mack, C. (2004) An Anatomy of price dynamics in illiquid markets: analysis and evidence from local housing markets. *Real Estate Economics*, 32, 1 – 21.
- Case, K. E., Shiller, R. J. (2003) *Is there a bubble in the housing market?* Brookings Papers on Economic Activity, No. 2, 2003.
- Coles, A. (1992). Mortgage markets in Britain, in P. Newman, M. Milgate and J. Eatwell (eds), *The new Palgrave dictionary of money and finance*. London: The Macmillan Press Ltd.
- Council of Mortgage Lenders (2009). *Market Commentary*. Accessed on 20 January 2010, www.cml.org.uk/cml/publications/marketcommentary/186.
- Dodd, R., Mills, P. (2008) *Outbreak: U.S. subprime contagion*. IMF (June), 45(2).
- Fagan, S., Gençay, R. (2007) *Liquidity-induced dynamics in futures markets*. Working paper, Simon Fraser University.
- Financial Services Authority (October 2009) *Mortgage Market Review*, Discussion Paper 09/3.
- Fitzpatrick, T., McQuinn, K. (2004) *House prices and mortgage credit: empirical evidence for Ireland*. Central Bank and Financial Services Authority of Ireland, Dublin Research Technical Paper, No. 5/RT/04.
- Gallin, J. (2006) The long run relationship between house prices and income. *Real Estate Economics*, 34(3), 417 – 439.
- Gerlach, S., Peng, W. (2005) Bank lending and property prices in Hong Kong. *Journal of Banking and Finance*, 29, 461 – 481.
- Himmelberg, C., Mayer, C., Sinai, T. (2005) Assessing high house prices: bubbles, fundamentals, and misperceptions. *Journal of Economic Perspectives*, 19(4), 67 – 92.
- Hofmann, B. (2004) The determinants of bank credit in industrialized countries: do property prices matter? *International Finance*, 7, 203 – 234.
- Kiyotaki, N., Moore, J. (1997) Credit cycles. *Journal of Political Economy*, 105, 211 – 248.
- McCarthy, J., Peach, Richard W. (2004) Are home prices the next ‘bubble’? FRBNY *Economic Policy Review*, 10(3), 278 – 306.
- Meen, G. (2002) The time-series behaviour of house prices: a transatlantic divide. *Journal of Housing Economics*. 11, 1 – 23.
- Mian, A., Sufi, A. (2009) The consequences of mortgage credit expansion: evidence from the U.S. mortgage default crisis. *Quarterly Journal of Economics*, 124(4), 1449 – 1496.
- Miles, D. (March 2004). *The UK mortgage market: taking a longer-term view, final report and recommendations*. HM Treasury.
- Pais, A. (2008) Securitization and rate setting in the UK mortgage market. *International Review of Finance*, 8(1-2), pp. 57-80.
- Poterba, J. (1984) Tax subsidies to owner-occupied housing: an asset market approach. *Quarterly Journal of Economics*, 99(4), 729 – 752.
- Qi, M., Yang, X. (2008) Loss given default of high loan-to-value residential mortgages. *Journal of Banking and Finance*, article in press.

- Shiller, Robert J. (2007) *Understanding recent trends in house prices and home ownership*. Paper presented at Symposium sponsored by the Federal Reserve Bank of Kansas City, Jackson Hole, Wyoming, Aug. 30-Sept. 1.
- Tsatsaronis, K., Zhu, H. (March 2004) *What drives housing price dynamics: cross-country evidence*. BIS Quarterly Review.
- Wheaton, W., Nechayev, G. (2007) The 1998-2005 housing 'bubble' and the current correction. *Journal of Real Estate Research*, 33(1), 1 – 26.
- Yener, A. (2009) Securitisation and the bank lending channel. *European Economic Review*, 58(8), 996 – 1009.