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SENIOR HONOURS DISSERTATION

HOUSE PRICES AND
UNEMPLOYMENT FOR UK
REGIONS

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Summary

This paper investigates the effect of unemployment on house prices in the UK property market to give an indication of the nature of the relationship and to test a common anecdotal assumption with the question 'Do relatively richer regions have house prices more sensitive to unemployment than relatively poorer regions?' By evaluating housing research including unemployment variables this paper will give an overview of the uses of the unemployment variable and show the lack of specific focus on unemployment in house price research. Theories of unemployment being a component of housing demand are presented. A composite model of house prices against supply and demand variables used in other research is constructed. Using regional UK panel data of a fixed effects panel regression at the national level the resulting coefficient for unemployment is compared with the similar findings of other studies, resulting in unemployment being a statistically significantly negatively related to house prices. Then using OLS using regional unemployment coefficients found no relationship between house price sensitivity to unemployment and how relatively rich regions are. This result possibly caused by problems with the regression as research had indicated relatively richer regions do have a greater sensitive of house prices to unemployment.

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SECTION 1: INTRODUCTION

1.1: MOTIVATION

The relationship between of house prices and the rate of unemployment provides an interesting topic for research as the two variables are important macroeconomic indicators for the economy and are of interest to policy makers. This research is particularly relevant as the great recession caused by the credit crunch in 2007, followed a long housing boom, and resulted in the highest unemployment in a generation across the developed world. The negative relationship between the two variables is accepted as given, by both economists and policy makers, and as such has been surprisingly little research into this specific relationship. However the unemployment rate has been used in housing models along with other variables, but unemployment has never been the main focus of the research. That means this important variable has been practically an afterthought in the extensive housing research.

This paper, firstly intends to examine the important relationship between house prices and the unemployment rate, and secondly examine the anecdotal assumption that house prices in relatively richer regions have a higher sensitivity to unemployment than relatively poorer regions. This anecdotal relationship is stated by Clapp and Giacotto (1993), and both their research, along with that of Meen (2001) and Giussani and Hadjimatheou (1991), provide support for this argument. As with all other research on house prices and unemployment, all three papers had another focus to their research. The Clapp and Giacotto (1993) research examined how economic variables influence local house price dynamics using both Repeated Sales and Assessed Values measures of house prices, and found 'Unemployment of 1% reduces house price by 6.09%, this reduction is substantially greater in the relatively *affluent* West Harford region.' Meen's (2001) research concerned UK spatial coefficient heterogeneity and ripple effects, and discovered 'for a given level of unemployment, there is a bigger effect on the south.' This corresponds to the finding in Giussani and Hadjimatheou (1991), in a paper on modelling the UK north south divide in house prices, that the south has a higher sensitivity to unemployment than the north. These three findings, along with the coefficients of regional unemployment in house price models from other papers such as Reilly and Witt (1994) and Wilcox and Peer (1992) will be discussed and examined.

1.2: DO HIGH WAGE REGIONS HAVE A GREATER SENSITIVITY IN HOUSE PRICES TO UNEMPLOYMENT?

The question of whether richer regions have house prices which are more sensitive to the regional unemployment rate is an interesting and relevant economic question. As noted in by Clapp and Giacotto (1993) there is anecdotal evidence that relatively richer regions have a higher sensitivity than relatively poorer regions. The question of why? What is the economic theory supporting this? And could the converse, that relatively poorer regions have house prices more sensitive to regional unemployment, be true?

A theory of why relatively richer regions have a higher sensitivity of house prices to unemployment is related to fact that households in the relatively richer regions have higher average house prices. If the definition of richer is having higher average incomes and/or higher average wealth, then as house prices are directly correlated to incomes, as is argued by King (1990 cited in Meen, 2003, p.90) evidenced by the UK boom in house prices in the second half of 1980s being due to reassessment of permanent income. Also as housing in the main form of wealth for most citizens in the UK, then wealthier regions by definition have higher house prices. Therefore as higher priced houses are more volatile over the business cycle, having a higher percentage increases than lower priced houses during a boom and a convergence of both house prices during a recession, then higher priced houses will be more sensitive to unemployment. Another reason would be the greater levels of leverage associated with purchasing housing relatively higher house price regions than in relatively lower house price regions. Benito (2005), examining house price dynamics across UK regions, argues that high loan-to-value ratios raise the sensitivity of house prices to economic shocks. Similarly Meen (2003) finds that house prices in the south of England are more sensitive to national stimuli, particularly the interest rate.

The reasons for the relationship between house prices and unemployment could be both unemployment and house prices are caused by the deviations of the economy from its long term potential output, thus the relationship between them is from an 'indirect' effect, but simply an indication of economic conditions. A more 'direct' affect for the relationship would be higher unemployment causing more bank repossessions which would increase the

market supply of housing, reducing the price of housing. The actual relationship house prices and unemployment is likely to be a mixture between the direct and indirect relationships as housing is an asset with a complicated relationship with the macro economy. For instance if there was falling house prices caused by unemployment, then building new domestic housing becomes less profitable, reducing supplier activity, which would feedback via the construction industry creating more unemployment. There has been some debate on whether the 1980s consumption boom was causing or caused the house price boom, with the inconstancy between the micro data of Attanasion, Web (1994) and Miles (1997) and the macro data of Muellbauer and Murphy (1990) as cited by Meen (2003).

The converse of the theory in this paper would be, relatively poorer regions having a greater sensitivity of house prices to unemployment. A theory being as relatively poorer households have less valuable non-housing assets, such as saving and shares, they are unable to pay their mortgage if members of the household become unemployed, and are therefore likely to be repossessed. This would increase both the supply of housing, in these regions, and decrease demand, as households cannot access mortgages in the period after facing repossession. Becoming renters, households increase demand for renting but this does not increase the total demand for housing, and therefore the price, as much as for home ownership. Therefore the house price would fall by more in relatively poorer regions for the same given level of unemployment.

The anecdotal evidence and coefficients from the few other studies involving house prices and unemployment supports the theory of house prices being more sensitive to unemployment in the relatively richer regions. This paper will use panel data for UK regions to find the coefficient for unemployment, to test the theory and to compare with the other research. Firstly in section 2 the relationship between house prices and unemployment in other research will be discussed, with a particular emphasis on UK regions, giving the reasons why other papers have used house prices and unemployment. Then in section 3 specific papers and findings will be reviewed, with an emphasis on proving an answer to the aforementioned question before section 4 and 5 explains the data and empirical findings of the panel regression respectively. Finally the conclusion in section 6 will compare and comment on the findings of other research and these results.

SECTION 2: HOUSE PRICE AND UNEMPLOYMENT RESEARCH

2.1: RELATIONSHIPS BETWEEN UNEMPLOYMENT AND HOUSE PRICES

Housing is of importance to the macro economy and as such is an area of much research. Therefore it is surprising that the relationship between housing and unemployment, another area of great importance to the economy, is so deficient. In this section the use of unemployment in house price models is examined with the relevant research and issues being reviewed.

Some house price models, such as Meen (2001), use the rate of unemployment as a simple indicator of labour market risk. With the risk of unemployment reducing the willingness of employed households to get mortgages and thus reducing house prices (Reilly and Witt, 1993). This particularly affects households with volatile incomes, who will not purchase houses due to potential losses in the future and also reduces the availability of mortgages (Yao and Zhang, 2005 cited in Gathergood, 2011). Similarly Dias-Serro (2005) and Turnbull et. al. (1982) found a negative relationship between income uncertainty and homeownership. Therefore as homeownership rates have a positive relationship with house prices, the risk of becoming unemployed increases income uncertainty and thus decreases house prices. Gathergood also (2011) investigates impact of income uncertainty, in the form of unemployment risk, in the decision of renters to become homeowners. The endogeneity of employment to home ownership status is avoided by using an exogenous variation in unemployment risk. This paper is about unemployment and homeownership rather than house prices but it highlights both the use of employment, as opposed to unemployment as is the focus much of the research, and also states the accepted correlation of unemployment and house prices, 'It is likely that regional house price movements are correlated with regional employment fluctuations.' This correlation is taken as given in many papers however it has received some investigation in online financial blogs. The most significant being Blitzer chairman of the Index Committee S&P Indices, who reports the correlation of the unemployment rate and house prices of the 20 American S&P/Case-Shiller cities presented in diagram (1) (HousingViews, 2012).

Diagram 1

**Change in Home Prices Over 12 Months to October 2011
and the Local Unemployment Rate in November 2011**



Diagram is reproduced from <http://www.housingviews.com/2012/01/04/house-prices-and-the-unemployment-rate/> an online blog produce by David Blitzer chairman of the Index Committee S&P Indices. Title, 'House Prices and the Unemployment Rate.'

The diagram simply shows the correlation between the change in Home prices over 12 months to October 2011 on the horizontal axis and the local unemployment rate in November 2011 on the vertical axis for these cities. As the time periods are different for both variables, this diagram only gives a basic indication of the correlation. Blitzer does not speculate over any causation between the two variables or even a third variable causing the relationship.

Another reason for using the unemployment rate being to capture the effect of regional labour markets on house prices as unemployment may constrict interregional labour mobility (Reilly and Witt, 1993). This constriction of interregional labour mobility is discussed by Rabe and Taylor (2010) who find the unemployed are less likely to migrate to high employment areas than to high wage areas, as the unemployed are unable to make a speculative move. Related to this issue is the argument that generally both homeowners and social housing tenants are less likely to move than private renters due to relatively large transaction costs involved (Oswald, 1999, cited by Quigley, 2003). This positive correlation between ownership rates and unemployment received some support from Haavio and Kauppi (2001), however Green and Hendershott (2001) found no simple correlation between home ownership and unemployment and thus housing transaction costs do not affect unemployment. This discussion on home ownership is important as higher levels of home ownership generally relate to higher house prices.

Reilly and Witt (1993) state the theory that high levels of unemployment may also serve to dampen down real wage growth with obvious consequences for house prices, as a reason for including unemployment as a variable. This may not be the case however as Cameron and Muellbauer (2001) theorise that high wages might be compensation for high unemployment or high house prices in a developed economy. This implies that high unemployment may not dampen real wage growth, although it is unlikely that wages would rise in a high unemployment region. However if unemployment did not dampen real wage growth, then the link to the house prices would be broken.

2.2: LONG RUN VRS SHORT RUN

When modelling the housing market it is important to distinguish between long-run, in which supply and demand both effect prices and the short run in which supply is fixed and only changes in demand will affect the house price. The short-run and long-run effects on unanticipated and anticipated inflation, housing construction and other variables of the

regional US house prices and is the focus of research by Baffoe-Bonnie (1998). Using time-series data and a VAR approach the paper analysis only new construction and therefore focused on housing stock investment rather than the flow of housing services. As housing has both a durable consumption element, in the flow of services it provides, such as shelter, storage for possessions, access to neighbourhood amenities and an indicator of social distinction (Meen, 1989), and an investment component, houses are the main or only asset for many households. The Baffoe-Bonnie findings regional house prices for new construction reflect regional employment growth, regional inflation and national interest rate and money supply. It would be expected that the relationship between unemployment and employment would be negative, however not perfectly correlated due to the some of the jobs going to economically inactive and migration from other regions or countries. Interestingly the employment variable uniquely influences demand in most regions, and also economic variables alone cannot explain the fluctuations in prices. This research finds the result of employment disagrees with the findings of Sari et. al.(2007).

The durability of housing means households remain in their property over a given time period rather than moving whenever they have an income change (Muth, 1989). This implies it is important to distinguish between the short-run effect of unemployment on house prices and the long-run effect. This study will focus on the long-run effect on equilibrium house prices rather than short-run deviations from the equilibrium. This is important for explaining the theory of long-run house prices and presenting a simpler model, but it should be noted that short-run deviations are in reality constant.

2.3: TRANSACTION COSTS

Transition cost in housing markets are significant and it is these transaction costs which make short-term adjustments to income, such as being made unemployed, not result in neoclassical equilibrium (Quigley, 2003). These transaction costs involve non-financial costs such as searching and the effort of moving home, and financial costs such as legal costs or moving possessions. Transition costs existence means short-term regional income elasticities are unrealistic, as households do not move house (Goodman, 2001). For this reason random shocks to income streams, such as being made unemployed, have negligible

effects on demand in short run and that is another reason why the model used in this paper will be a long-run model.

The neo-classical equilibrium is also complicated by spatial fixity of Housing and this characteristic also makes defining a neoclassical exchange market difficult as there are overlapping sub markets differentiated by tenure (MacLennan, 1982 cited by Quigley, 2003). Therefore as housing markets reflect local economic conditions, regions will have differences in responsiveness to economic variables (Hwang and Quigley, 2006; Meen, 2001). This factor caused failure of house price models to predict house prices in the 1990s (Meen, 2003). As house prices within regions are in long-run relationships overtime (Ashworth and Parker, 1997), modelling long-run regional house prices with regional unemployment is a close estimation of economic reality. In fact for a national analysis to be valid all households must behave identically in response to unemployment so as to have coefficient homogeneity (Meen, 2001). Using NUT 1 regions is therefore a good estimation of geographical housing markets as the regions are large enough to encapsulate the smaller over-lapping urban housing markets. For these reasons UK regions will be used in this paper to investigate the relationship between house prices and unemployment.

2.4: HOUSE PRICES

Defining the house prices is difficult due to the heterogeneity of housing. Houses are physically unique which causes different house prices within a set location. To get a standardised index for house prices, a hedonic index is used. Housing is decomposed into different attribute and then an average house price house is created (Goodman, 2001). Hedonic pricing is accepted by economists but it has limitations as argued by Wallace and Meese (2003). Using two-stages, first getting an index of hedonic house prices and then using the hedonic index for price in a supply and demand model, gives a different and less satisfactory result than doing the whole model in one stage. However as Wallace and Meese concede that the difference between the two methods would not be worth the extra time and resources of the one stage model, and also as the vast majority of papers use the two stage model, the two stage model will be used in this paper.

2.5: PERMENANT INCOME

Housing models use measures of permanent income as a demand variables rather than current income. In long run supply and demand models, the demand variables chosen need to reflect the long-run lumpy nature of housing. Due to large transaction costs of moving home, households in general move home very infrequently. This means that when they are deciding how much to spend on a house they take into account future income. This life-cycle analysis model is related to the utility function and will be discussed in the section 4. Muth (1989) argues that whole life-cycle analysis is in appropriate due to uncertainty of future income and housing needs. An example of this being students not immediately purchasing the same types of houses as their parents at a young age. Another problem with permanent income is the relatively difficulty to value compared to current income. Meen (2001) uses current consumption as a proxy for income as economic theory relates current consumption to expected future income as well as current income. Consumption is therefore a satisfactory and easily measurable variable to use in the model. Breedoan and Joyce (1993) following Meen (1990) include both wealth variables combined with unemployment as a measure of permanent income (Reilly and Witt, 1992). Therefore using unemployment as a component of permanent income is a reason for past research including unemployment in a house price model.

2.6: LAGS

Lags between changes in house price and component variables of demand and supply, are a common feature of the property market. The house price is generally a leading indicator compared to the economic output whereas unemployment and income are lagging indicators. The existence of these lags means that current unemployment or income will not be affecting current house prices but rather future house prices. If unemployment increases repossessions, which increase supply and lower house prices, then unemployment will operate with a lag on repossession and therefore lag current house prices. A well specified model will therefore need to account for lags between the variables.

Lags are particularly important because the housing market is cyclical with movements related to the business cycle. Tsang and Edelstein (2007) modify existing theoretical demand and supply models to create a more complete dynamic analysis of the housing market, focusing on housing supply. Previous research has shown that house price cycles can vary across property types and markets. This research indicated that local variables, employment growth and unexpected unemployment growth, had the most impact on housing markets. However, the interest rate was positively related to housing supply, contrary to economic theory, possibly due to the short time period used. This gives an indication of why a long-term supply and demand model will be used in this paper, and as such housing market cycles do not need to be part of the model.

2.7: RIPPLE EFFECT

A large part of the UK regional housing economics analysis is concerned with the 'Ripple Effect', in which changes in regional house prices are caused by house price changes in the South East spreading in waves to other regions with time lags (Giussani and Hadjimatheou, 1991). This effect is created by demand factors or migration pressures and many housing models included spatial autocorrelation, where regions are correlated to their neighbouring regions (Ashworth and Parker, 1997). However as the focus of this paper is unemployment, spatial autocorrelation will not be included as part of the model analysis.

Another property of house prices is autocorrelation, where house prices are correlated with lagged house prices. Quigley (1999) finds that the majority of the variation in house prices are due to autocorrelation and not economic fundamentals (Tsang and Edelstein, 2007). Also as housing is a composite good containing both a consumption and investment element, housing has been examined using random walk analysis to explain the difficulty of house prices to predict (Meen, 2003). In general econometric regressions on data need to account for as many of these properties as possible. Again to keep the model focused this paper will not account for these factors.

Similarly multicollinearity between the variables means models are somewhat limited in reliability because they cannot deal with all the interactions with the rest of the economy (Baffoe-Bonnie, 1998). As Leung (2004) argues, at best models of house prices include

some exogenous macroeconomic variables but a more comprehensive modelling of the interplay between the housing market and the rest of the economy would be an improvement. A microeconomic example of this interplay, a factory in a town closes, creating unemployment, then repossessions increase, house prices fall, which decreases consumption due to wealth effects and in turn creates more unemployment (Murthy and Muellbauer, 1993). However Baffoe-Bonnie (1998) argues, including feedback effects such as this increasing the complexity of the model and increases the possibility of serious misspecification. Accounting for house prices causing unemployment rather than unemployment affecting house prices would be complex. Reilly and Witt (1992) noted that lagged house prices can have an effect on personal disposable income and set the issue to one side when examining the effect of disposable income on house prices. It is therefore reasonable to not account for all the complex interplays between the variables in the model to keep it focused, and if the model contains the majority of effects variables have on house prices, then it will be correctly specified.

2.8: ECONOMETRIC METHODS

Most of the House price models use time-series data, with the older research using OLS regressions to test models and the more recent papers using the preferred cointegration analysis where house prices and their fundamentals being intergraded of the first order. The existence of cointegration of house prices and economic fundamentals, such as unemployment, implies causation and a long-run equilibrium relationship between the variables, rather than just a random relationship. The Reilly and Witt paper (1992) is criticised by Ashworth and Parker (1997) for having the 'spurious regression' problem, as the OLS method was used. The reason Reilly and Witt did not use the cointegration analysis was the short time period of the data. Ashworth and Parker use the same variables used by Drake (1993), less variables than earlier studies, with a long-run emphasis, and use the Johnson technique for multivariate analysis. Also Kenny (1999) also uses the Johansen cointegration technique to assess the extent to which the Irish housing market possesses well behaved long-run housing demand and supply relationships. Recently Zhou (2010) argues however that housing economics has focused only on linear cointegration rather than non-linear cointegration, and this may lead to the misconception of no cointegration existing between house prices and economic fundamentals. House price models also often use the

VAR method pioneered by Sims (1980, 1982 cited by Goodman, 2011) to account for the lags of the variables between themselves and that of the other variables, an example of this being the Baffoe-Bonnie (1998). All the issues in this section are evidence of the way housing behaves differently from other goods and as such care needs to be taken in modeling and regression analysis. However if the model is correctly specified it is reasonable to set aside these factors to focus on house prices and unemployment to only investigate the relationship between them.

SECTION 3: UNEMPLOYMENT COEFFICIENTS FROM PERVIOUS RESEARCH

3.1: RESEARCH USING AN UNEMPLOYMENT VARIABLE

The last section highlighted the relevant research linking housing economics and unemployment, in this section the focus is on research that specifically model house prices with the unemployment rate along with other macroeconomic variables. To reviewing coefficients of unemployment in house price models, analysing the research methods for a comparison between the papers methods and results.

The paper on 'Baby Boom, "Pent-Up" Demand and Future House Prices' by Peek and Wilcox (1992) focuses on the household demographic variables in the USA 1950-1989. They model real median hedonic house prices, from Freddie Mac, as a function of demographics, costs of financing home purchases, incomes, cost of construction and the cyclical component of the unemployment rate, using logs. The reason for including the cyclical component of unemployment rate being it may affect demand for housing due to borrowing constraints and income uncertainty (Haurin, 1991). They also note the correlation between the cyclical unemployment rate and the business cycle peaks and troughs. The results for unemployment show that house declines with unemployment rate increases, specifically that a 1% rise in cyclical unemployment will reduce house prices by 0.742%. The result is statically significant, however this regression is uses the OLS method and therefore has the 'spurious' regression problem. Also as it uses national data it will have the problem of regions having different responses to economic variables (Meen, 2001).

Another paper using OLS is 'Regional House Price and Possessions in England and Wales: An Empirical Analysis' by Reilly and Witt (1993). Here the main focus is on repossessions, motivated by real and nominal house price falls in the South East for four years around this period. This paper notes the reason Breedon and Joyce (1993) include unemployment variable as a measure of permanent income along with a wealth variable. Reilly and Witt on the other hand include unemployment to capture the effect of regional labour markets on house prices and give the following economic explanations for this: high unemployment may constricting inter-regional labour mobility; dampen real wage growth; increase labour market risk with consequences for borrowing a mortgage. Reilly and Witt run a regression of log regional unemployment, income, and repossessions on house prices and

do consider the potential endogeneity of the variables. They argue however that as unemployment and income lag current repossessions they are independent. They use planning regions, boundaries preceding but the same as to NUT 1 regions excluding Greater London, with data from 1987-1991 and the resulting coefficient for unemployment implying a 1% rise in the regional unemployment rate decreases regional house prices by 0.17%. The result is statistically significant and the lower coefficient compare to the Peek and Wilcox (1992) could be attributed to using the unemployment rate rather than the cyclical unemployment rate, as house prices would be expected to be more responsive to the cyclical rate. This does paper does not give the specific unemployment rate coefficient for each individual region as its focus is on repossessions. Problems come from the use OLS and of few variables as there is no measure of opportunity cost, such as the interest rate, and any supply variables. The reasons given are no spatial difference in interest rates, the short time period of the data and the lack of availability of regional date. The lack of these variables does possibly imply a miss-specified model however the time period is quite short.

The paper 'Modelling Regional House Prices in the UK' by Ashworth and Parker (1997) uses maximum likelihood cointegration methods to analyse determinants of house prices in the NUT 1 UK regions. This paper does not use unemployment as a variable but does however he gives the examination to why, 'unemployment was found to be integrated of a different order to the other variables, and so could not be a candidate for a cointegration relationship'. Similar findings to this may be the reason unemployment was more commonly used as a variable in the earlier OLS papers and has been generally omitted in more recent cointegration papers.

3.2: RESEARCH PAPER MENTIONING RICHER REGION HOUSE PRICE SENSITIVITY

Three pieces of research presented here which indicate an answer to the question of do relatively richer regions have greater sensitivity in house prices to unemployment than relatively poorer regions? The first of which is by Meen (2001) investigating 'Spatial Coefficient Heterogeneity and the Ripple Effect' on UK regions using annual panel data from 1973 to 1994. He uses a simple regional house price model, partly reflecting less regional

data. Using logs of nominal house prices, income, lagged income, unemployment and the nominal interest rate no expressed in logs. Meen states that although such models are usually expressed in real terms, there is relatively little variation in UK regional consumer prices and no data about the variation, therefore it acceptable to use nominal variables. The reason the Unemployment rate is included is as a simple indicator of labour market risk. The regions are grouped into four blocks and equations are estimate as Seemingly Unrelated Regressions (SUR) to capture the spatial correlation in the error terms. The research is investigating how regional house prices respond to national variables and the difference between national and regional variables. The South is found to be more responsive to a given level of unemployment than the North. Meen highlights however that this does not imply unemployment is more important in the South, possibly as the unemployment rate is higher in northern regions and therefore unemployment depresses house prices by more in absolute terms.

The second research discussed, Clapp and Giacotto (1993) 'The Influence of Economic Variables on Local House Price Dynamics.' The paper's purpose is to explore the relationship between methods used to measure house price indices, Assessed Value and Repeat Sales, and local-level economic variables, quarterly changes in employment and unemployment as suggested by Fama and French (1988), and also national economic variables expected inflation, unexpected inflation and a risk-premium of a long term bond suggested by Case and Shiller (1990). The data was for three US towns East Hartford, Manchester and West Hartford, from 1981 to 1988. The results did not find any significant difference between the two house price indexes. However modelling the test in this way gave the result, rising unemployment reduces house prices, and also the reduction was substantially greater, 6.09%, in the relatively richer West Hartford region compared to the other two towns. Clapp and Giacotto state that 'this supports the notion held by real estate professionals: relatively high prices are more sensitive to cyclical changes in the economy.' The results for unemployment were highly statistically significant in both the contemporaneous relationship and using lagged values for the explanatory variables. Clapp and Giacotto conclude that local unemployment as well as expected inflation is able to predict house prices and that this is contrary to the efficient markets hypotheses.

The final paper discussed 'Modelling the North/South Divide in House Prices' by Giussani and Hadjimatheou (1992). Using UK planning regions quarterly data from 1972 to

1988 and OLS, to find evidence for the north and south divide in property prices. The model explains the fluctuations in relative house prices between the North West and South East regions using relative values of: per capita disposable income; a ratio of households to housing stock; a ratio of housing wealth per household; the rate of interest; the rate of unemployment. Unemployment is included in this model to allow for expectation/degree of optimism about future incomes not captured by present income. Therefore unemployment is used as a constituent of permanent income. All values are in logs except for the unemployment rate and the interest rate. Ratios of variables are used where possible due to multicollinearity between them. It is stated however that the first three variables reflect demand and their level is influenced by supply; this separation of supply and demand components is not completely sound, however the model is reasonably well specified as elements of supply are included. Another problem stated, is that housing wealth is directly affected by house prices and this is a more serious problem which means the model is not well specified. Therefore the choice of variables and the use of OLS mean there are problems with this paper, however the results, like that of Clapp and Giacotto (1993) suggest relatively richer regions have house prices with more sensitive to unemployment than relatively poorer regions. Giussani and Hadjimatheou (1992) state that 'coefficients for changes in unemployment suggest a greater sensitivity of the housing market in the South East to changes in general economic conditions'. A separate cross-correlation test using unemployment as a proxy for the prevailing economic climate shows that annual house price changes in the South East move contemporaneously with annual changes in unemployment where as they move with a lag of one quarter in the North West. The reason suggested for this is that a higher average level of unemployment in the North West means changes in prevailing economic conditions take longer to affect the housing market. The North West also has a higher correlation coefficient, between changes in house price and changes in unemployment, which suggests that unemployment itself, rather than as a proxy for prevailing economic conditions, is a more important determinant of house prices here. This finding has the implication for this research as it implies that though house prices are more sensitive to unemployment in relatively richer regions; this is not caused directly by unemployment and rather general economic conditions. Conversely in the relatively poorer regions where house prices are less sensitive to unemployment, it is unemployment itself which is affecting the house price instead of prevailing economic conditions.

SECTION 4: MODELS

4.1: SUPPLY AND DEMAND

In this section the theoretical house prices models are examined and a composite model relevant to this research will be created. Housing markets, as with all markets, have an equilibrium price determined in long run by supply and demand. A well specified housing model must distinguish between the long run and the short run information from the data (Kenny, 1999). With short-run deviations can only cause changes in prices due to inelastic supply. Long-run housing demand is a function of income, prices and possibly demographics and housing supply is a function profitability which depends on house and construction prices (Huang and Quigley, 2006).

4. 2: TWO ALTERNATIVE MODELS

There are two distinct kinds of models for housing prices and economic variables, the first being the 'supply and demand' approach, an example of which given by Ashworth and Parker (1997). This involves equating long-run demand for housing services, $\ln H_t^D$, to price and a set of demand variables, X_t , which do not vary substantially across studies, usually some form of income measures, employment, demographics, mortgage rates and changes in financing mechanisms (1). With the supply of housing services, $\ln H_t^S$, consisting of house prices and a set of supply variables, W_t , containing construction costs, housing starts, regulations and also interest rates (2). Note that the supply variables, W_t , need to be different from the demand variables, X_t , with some papers using the opportunity cost variable, the interest or mortgage rate, as a demand variable and others as a supply variable (Zhou, 2010).

$$1) \ln H_t^D = \phi_1 \ln p_t^h + \ln f(X_t) \quad \phi_1 < 0$$

$$2) \ln H_t^S = \phi_2 \ln p_t^h + \ln g(W_t) \quad \phi_2 < 0$$

In long-run equilibrium (1) and (2) are equated to give a 'reduce form' equation, (3), of house prices positively related to demand variables and negatively related to supply variables..

$$3) \ln p_t^h = \frac{\ln f(X_t) - \ln g(W_t)}{\phi_2 - \phi_1}$$

The second model is the 'life cycle model' and involves households maximizing lifetime utility, subject to a budget constraint and an asset depreciation condition which gives the 'user cost' equation. In equation (4) the time subscripts are not include for clarity and, i , is the nominal interest rate, τ is tax rate, π is the inflation rate, δ is the depreciation rate of capital, (\dot{p}^h/p^h) is the capital return on housing and (u'_H/u'_C) is the marginal rate of substitution between housing and consumption.

$$4) p^h = (u'_H/u'_C) \cdot [(1 - \tau)i - \pi + \delta - (\dot{p}^h/p^h)]^{-1}$$

As the (u'_H/u'_C) term is unobservable proxies must be used for empirical analysis. This is usually done by setting (u'_H/u'_C) equal to logs of supply and demand, (W_t) and (X_t) terms of equations (1) and (2). The $[(1 - \tau)i - \pi + \delta - (\dot{p}^h/p^h)]$ term is equal to the rental cost of housing services and markets in which the rental sector is not adequately sizeable, such as in the UK; the rental cost of housing is also approximated by the housing stock, the number of households, income and wealth. This has the effect of giving the separate two model

equivalence. This is why many papers fail to mention the explicit theoretical underpinnings of their models (Ashworth and Parker, 1997). However it is important to note that the 'life-cycle model' is the starting point for most modern house price models (Meen, 2002).

4.2: THE COMPOSITE MODEL

The model of this paper will include important supply and demand variables to give a well specified model at the regional level. Many economic variables can influence house prices and the choice of variables does not differ significantly across empirical studies (Zhou, 2010). The demand, (X_t) , terms include incomes, employment, demographics, changes in financing mechanisms and mortgage rates, whereas the supply, (W_t) , terms include construction cost, interest rates, and construction regulation. Recent empirical studies use fewer variables than older studies. An example is the variables of Drake (1993) used by Ashworth and Parker (1997), which uses only household income and an opportunity cost variable, the interest rate, for demand and personal sector housing starts for supply. This paper will also use similar variables, with the addition of the unemployment rate and lagged income. Therefore the following equation (5) is consistent with the two models (3) and (4).

(5)

$$\ln p_t^h = \beta_0 + \beta_1 \ln Y_t + \beta_2 \ln Y_{t-1} - \beta_3 \ln U_t - \beta_4 \ln R_t - \beta_5 \ln PSHS_t$$

Where Y is average regional household nominal income, lagged income, U is the LFS regional unemployment rate, R is the nominal national real rate and PSHS is regional personal housing starts. Using regions this becomes (6).

(6)

$$\ln p_{t,i}^h = \beta_{0,i} + \beta_{1,i} \ln Y_t + \beta_{2,i} \ln Y_{t-1} - \beta_{3,i} \ln U_t - \beta_{4,i} \ln R_t - \beta_{5,i} \ln PSHS_t$$

Similarly to the Meen (2001) model, nominal variables are used to give a panel estimation which controls for the fixed effects of the different regions.

SECTION 5: EMPIRICAL METHODOLOGY AND RESULTS

5.1: DATA INTRODUCTION

The data used in the model is quarterly UK panel data of house prices, unemployment, income, interest rate and housing starts, from quarter 1 1997 to quarter 3 2011. The house price data is compiled by the Halifax and shows the seasonally adjusted quarter-on-quarter changes in property prices across the 12 UK NUT 1 regions (Halifax, 2011). The regional LFS unemployment data was also seasonally adjusted however the housing starts data and average weekly earnings data was not seasonally adjusted (ONS, 2011). Quarter 1 2001 of the income data is missing, for unknown reasons, and the last few quarter of housing start data is missing in for Scotland and Wales. This means the panel is unbalanced. This fact combined with lack of seasonally adjusted data for housing starts and average weekly wages are the main limitations of the date used (ONS, 2012). The 12 regional UK NUT 1 regions as defined by Eurostat are: North East, North West, Yorkshire and Humber, East Midlands, West Midlands, East Anglia, Greater London, South East England, South West England, Wales, Scotland and Northern Ireland (Eurostat, 2012). The LFS unemployment data and the Halifax house price data labelled some of the regions differently from both each other and from the Eurostat definitions, such as the Halifax data labelling East of England as East Anglia, this did not however present a problem as both data sets describe the UK NUT 1 regions. A longer time period or more regions would be advantageous, but due to the availability of regional data in the UK and the problems in using other regions outside of the UK, such as complicating explanations of results or different data compiling methods, means that the data set is limited.

5.2: HOUSE PRICE DATA

The Halifax house price index is compiled by Halifax which is part of the HBOS group and is the largest UK mortgage provider (Home, 2012). The regional average house prices are in a quarterly index. The Halifax data is compiled from a sample of its own mortgage approvals, with the Halifax covering 15,000 housing purchases each month which is approximately a quarter of UK mortgages (Home, 2012). This means the sample is very large and as it only covers mortgages approvals and does not include properties which are not for private occupation or sold at a less than market price e.g. 'right to buy' for council tenants, it gives a good estimation for house prices for the purpose of this regression (Lloyds Banking Group, 2012). The index is seasonally adjusted to account for the higher prices during the spring and the summer. A problem with this data, it being compiled from mortgage approvals rather than actual transactions, means it cannot be entirely accurate (Home, 2012). This could be a particular problem with the data from during the credit crunch in late 2007 to 2008, in which many mortgage approvals were withdrawn from customers by the banks which issued them. Another problem with this data is the possible sampling error of only using Halifax customers. Though these customers cover a large section of the mortgage approvals, they could be skewed toward the North of England as that is where Halifax had its base. The index is compiled using a hedonic regression model which breaks down the House price into various characteristics, using a multivariate regression analysis, in order to estimate the price of a typical house rather than an average house (Lloyds Banking Group, 2012). The constituent characteristics, which contain either quantitative or qualitative attributes are: purchase price, location (*region*), type of property (*house or flat, including type of house*), age, tenure, number of rooms (*function of rooms*), number of toilets, central heating, garages, garden, land area if greater than 1 acre and road charge liability. Having an index compiled against a standardised average property in 1983 and ignoring the filtering, as defined by Gibb (2003), which may have occurred should not present a significant problem for the panel regression.

5.3: UNEMPLOYMENT DATA

The unemployment data was available from the Office of National Statistics (ONS) website and is the Labour Force Survey (LFS) as defined by the International Labour Organisation (ILO). The data comes from a survey of households' resident at private addresses in the UK and is seasonally adjusted to take into account the seasonality of some type of employment. The Social Surveys division managed the survey for the ONS in Great Britain and the Central Survey Unit in the Department of Finance and Personnel in Northern

Ireland manage the survey for the Department of Enterprise, Trade and Investment. The LFS defines the unemployed population as persons above a specified age who are available to work but not engage in the production of goods and services over a short reference period, either a day or a week (ILO, 2012). Therefore these unemployed persons would have accepted suitable employment or started enterprise over the reference period if the opportunity had arose. The ILO defines the employed population as being made up of persons above a specified age who work during the reference period. With the definition of work being working for pay, profit or family gain and includes people with a job but were temporarily absent for the reference week, for example being on holiday or maternity leave. Together the sum of the unemployed population and the employed population during the reference period is equivalent to the labour force. The data used is the unemployment rate, so it is given as the percentage of the unemployed population compared to the labour force. The labour force, or economically active population, as defined contains the two subgroups: the unemployed and the employed. There is a third population of economically inactive people such as the providers of services for household consumption and discouraged workers who are not included in the data used. Using a regional unemployment rate as a percentage of the population containing economically enactive would not be more desirable as the aim of this paper is to compare house price sensitivity to unemployment across regions with different incomes. However this could be a problem as the economically inactive rate has a cyclical element due to the business cycle and could therefore also be correlated to house prices. Also other unemployment data for the UK such as the claimant count would have been acceptable in providing an unemployment rate. The claimant count has the advantage of being compiled by the government which would be preferable to the survey data of the LFS as it does not have the sampling errors and some of the non-sampling errors of LFS. However as the claimant count includes some people who are either economically inactive or employed it is not a preferred measure. Furthermore the claimant count can be easily affected by government policy such as putting people on or taking people of incapacity or other sickness benefits and transferring them on to job seekers allowance.

5.4 OTHER DATA

The other data used in the panel regression are the nominal interest rate, housing starts and the average earnings. The interest rate is the Bank of England's quarterly average

of four UK banks' base rates (Bank of England, 2012). Using an average of banks' base rates gives a representative measure of the interest rate charged to consumers as is closely related to average mortgage interest rates. Therefore it would be expected to negatively affect house prices. The nominal rate was used rather than the real rate as all the variables are nominal values and there would be no significant inflation difference across UK regions (Meen, 2001).

The quarterly not seasonally adjusted housing starts data also comes from the ONS (2012) and is the house building permanent dwellings started for all three tenures, private rental, social housing and owner-occupier, measured in thousands. Data for housing completions is available however due to the possible lags between the house prices and housing construction, housing starts was chosen as the preferred variable.

The average earnings data is nominal gross weekly earnings by employees by region and is not seasonally adjusted. Other measures of income have been used across different studies such as disposable income or consumer expenditure. Problems with the data, are using average earnings from LFS, an underestimation of income if known to occur and it does not include incomes over a hundred thousand pounds. However using nominal average wage will give a good estimation of true income at the regional level. This variable also operates with a lag on house prices, therefore a lagged term has also been included as well as the contemporaneous term (Meen, 2001).

5.5: NATIONAL RESULTS

A panel regression which removed the unobservable cross-section specific fixed effects of the UK regions was used to answer the question of whether house prices are correlated to unemployment. The resulting coefficients for this regression and a pooled panel regression from equation (5) are given in Table (1). The resulting coefficients show that unemployment is negatively related to house prices and the other variables are positively related. The result for unemployment means that a 1% rise in the unemployment rate is equal to 0.27 % decrease in house prices. This corresponds closely with Reilly and

Witt, at 0.17 and, is slightly less than the higher Peek and Wilcox cyclical unemployment result, 0.72. All results in sensitivity of house price to unemployment have a negative relationship of less than 1. These results are also statistically significant, with the R^2 value is very high and F-statistics were also high. Lagged income has the largest effects on house prices the most and this corresponds with other research. However the other results obtained for housing starts and the interest rate do not respond to what is expected from economic theory. The interest rate result is in fact similar to that of Tsang and Edelstein (2007) so could be also caused by the period investigated, containing a long housing boom with higher interest rates followed by a recession with historically low rates. The supply variable could be the result of regulation stopping a positive increase in supply from occurring, and as the period in question contained a housing boom in the UK and supply not keeping up with demand. The pooled panel regression not accounting for fixed effects gave the expected negative coefficients, housing starts and interest rates the correct sign. This would imply at the national level, not accounting for regional effects, the economic relationships hold. The interest rate however was not statistically significant.

TABLE 1

METHOD	CONSTANT	UNEMPLOYMENT	WAGE	WAGE LAG	HOUSE STARTS	INTEREST RATE	R^2
PANEL FIXED EFFECTS	-4.83 (-30.65)***	-0.27 (-9.60)***	1.41 (10.90)***	1.37 (10.62)***	0.08 (4.90)***	0.20 (9.83)***	0.92 (0.92)
POOLED PANEL	-0.94 (-4.24)***	-0.16 (-3.61)***	0.75 (2.85)***	0.86 (3.27)***	-0.16 (-7.1)***	-0.01 (-0.31)	0.66 (0.66)

In the table the t-statistics are the estimated coefficients in brackets and *** denote statistical significance at 1%. Adjusted R^2 is below R^2 brackets.

5.6: REGIONAL RESULTS

The relationships between house prices and variables at the regional level are examined using equation (5), to answer the second question of this paper of whether relatively richer regions have house prices more sensitive to unemployment than relatively poorer regions. Due to technical restraints these relationships will be examined using OLS rather than a panel regression. Though this will result in the 'spurious' regression problem, giving high R^2 showing only high correlation, the result can still be used to compare to other OLS regional studies. The 'spurious' regression explicitly rules out any conclusion of causation in answer to the second question of this paper. This means if, it could be shown that richer regions have more sensitive house prices to unemployment, any causation cannot be included, as another factor such as economic growth could be causing changes in both house prices and unemployment. The resulting relationship between house prices, unemployment and the other variables are shown in table (2).

TABLE 2

REGION	CONSTANT	UNEMPLOYMENT	WAGE	WAGE LAG	HOUSE STARTS	INTEREST RATE	R ²
NORTH EAST	-5.17 (-8.13)***	-0.45 (-4.14)***	1.59 (3.52)***	1.37 (2.97)***	0.14 (2.97)***	0.15 (1.90)*	0.92
NORTH WEST	-6.28 (-12.25)***	-0.14 (-1.64)*	1.62 (3.44)***	1.62 (3.41)***	0.11 (2.50)**	0.31 (5.56)***	0.95

YORKSHIRE AND HUMBER	-6.90 (-13.49)***	-0.11 (-1.20)	2.17 (4.41)***	1.29 (2.69)***	0.14 (2.71)***	0.30 (5.25)***	0.95
EAST MIDLANDS	-5.52 (-14.26)***	-0.53 (-5.37)***	1.52 (4.55)***	1.55 (4.68)***	0.12 (2.63)***	0.13 (2.65)***	0.96
WEST MIDLANDS	-4.61 (-10.41)***	-0.30 (-3.40)***	1.08 (2.26)**	1.57 (3.29)***	0.16 (3.12)***	0.04 (0.43)	0.95
EAST ANGLIA	-6.15 (-15.79)***	-0.23 (-3.13)***	1.37 (2.72)***	1.63 (3.29)***	0.23 (4.41)***	0.15 (2.79)***	
GREATER LONDON	-3.21 (-9.79)***	-0.47 (-7.40)***	1.33 (3.89)***	0.85 (2.51)**	0.05 (1.22)	0.06 (1.20)	0.96
SOUTH EAST ENGLAND	-5.12 (-16.10)***	-0.42 (-5.94)**	1.44 (4.45)***	1.21 (3.80)***	0.28 (4.64)***	0.04 (0.78)	0.96
SOUTH WEST ENGLAND	-3.62 (-7.13)***	-0.85 (-5.87)***	1.00 (1.78)*	1.33 (2.36)**	0.26 (3.95)***	-0.07 (-1.07)	0.93
WALES	-5.45 (-8.39)***	-0.26 (-2.77)***	1.74 (4.09)***	1.30 (3.10)***	0.08 (1.20)	0.25 (3.46)***	0.93
SCOTLAND	-5.61 (-7.75)***	0.23 (1.82)*	1.38 (2.86)***	1.56 (3.21)***	0.01 (0.26)	0.46 (6.16)***	0.94
NORTHERN IRELAND	-4.82 (-4.70)***	-0.20 (-1.29)	1.32 (4.30)***	1.53 (5.20)***	0.04 (0.52)	0.43 (4.35)	0.92

In the table the t-statistics are the estimated coefficients in brackets and *, **, *** denote statistical significance at 1%, 5% and 10% respectively.

5.7: INTERPRETAION OF RESULTS

From the results of the regression no direct comparison can be made between the relatively richer regions to the relatively poorer regions to confirm or deny the house price and unemployment theory. Two of the regions, Yorkshire and Humber, and Northern Ireland, have no statistical relationship between house prices and unemployment. This is not as surprising for Northern Ireland as the larger public sector would be expected to reduce cyclical unemployment compared to other regions and so the house prices would not be as sensitive to unemployment. Scotland and the North West have less statistical significance than the other regions. The coefficient for Scotland in particular causes problems with the theory as the house prices rise with unemployment. This along with regions such as the North East having a higher sensitivity of house price to unemployment than the relatively richer South East does not prove the theory and in general there is no relationship between how rich a region is and how sensitive its house prices are to unemployment borne out by the data. This means the unemployment findings of Meen (2001), Clapp and Giacotto (1993), Giussani and Hadjimatheou (1992), cannot be confirmed by the empirical analysis of this paper. The findings however do not confirm the opposite, that relatively poorer regions have a greater sensitivity of house prices to unemployment, for example Greater London has a higher sensitivity than Wales. These coefficients are randomly distributed by income and as such there is no observable relationship between the how rich a region is and the sensitivity of its house price to unemployment. As this paper did not use a panel regression removing fixed effects and using regional dummies, the resulting coefficients will not be as empirically accurate as possible. This is the most likely reason for the inconclusive results rather than the data used or incorrect theory.

The other variable coefficients broadly correspond with the fixed-effect panel regression and other papers. Contemporaneous average wage have the largest effect on house prices, closely followed by the lagged variable. Both are highly significant and have elasticity greater than one. Housing starts had a positive effect on house prices, a similar result to the national panel regression. This variable was not statistically significant in Wales, Scotland, Northern Ireland and Greater London; possibly as of the Celtic regions have lower population density and therefore the potential ability to build more houses compared to English regions. Conversely Greater London has a very high population density and so house building is restricted which means a very low number of new builds, can do not significantly affect the price, for instance in Quarter 1 2000 Greater London had less housing starts than Northern Ireland despite a much bigger population and one which is growing rather than falling. The final variable, the interest rate, was found to be all positively related to price and only significant in seven regions. For reasons noted with the national fixed

effects regression in the previous section this does not correspond to expected economic theory.

SECTION: 6 CONCLUSIONS

This paper had two aims, firstly to investigate the theory and use of unemployment as a determinate of house prices and secondly to test the assertion that relatively richer regions have house prices more sensitive to unemployment than relatively poorer regions. By researching the use of unemployment in house price models this paper highlighted what will be referred to as 'indirect' effects given for its use as a component of demand. Firstly it is used as a measure of labour market risk, a partial proxy for permanent income, because permanent income is unobservable, and as the lumpiness of housing makes households purchasing decisions based on permanent rather than current income. So unemployment risk reduces the willingness of employed households to get mortgages, thus reducing prices. Secondly unemployment may reduce interregional labour mobility, with the unemployed less willing or able to migrate to other areas and thus more unemployment occurs in some regions, reducing homeownership which in turn reduces prices in the region. A final 'indirect' effect previous research uses unemployment as a proxy for prevailing economic conditions. More 'direct' affects given are unemployment dampens real wage growth lowering wages translate into lower house price and similarly unemployment increased reposessions, which decreases house prices.

When unemployment is included in models is largely due to these 'indirect' effects rather than the 'direct' effect of unemployment. These 'indirect' effects are if the reason that the previous research never has unemployment as the focus when modelling house prices. Unemployment is usually a proxy for one of the above mentioned reasons. As house prices and unemployment are only possibly both influenced by other economic factors, there would be correlation but no direct causation between them. The direct causality could also run the other way, with rising house prices reducing unemployment as opposed falling

unemployment raising house prices. These are the reasons why previous research has largely overlooked the relationship.

This paper brought the relationship between unemployment and the house price to the focus to investigate the relationship fully. Using UK regional panel data this paper created a supply and demand model as a composite of the variables used in other papers. Namely the nominal house price index against the unemployment rate, nominal average wages, housing starts and the nominal interest rate. This model gave a coefficient for unemployment which was similar to other models using unemployment as a house price variable. Therefore it can be confirmed that unemployment could be a component of house prices.

The second aim of this paper was to test the anecdotal assertion that relatively richer regions have house prices more sensitive to unemployment than relatively poorer regions. The theory for this being more expensive house prices fluctuate more than lower priced houses, and as richer regions have more expensive house prices, these will be more sensitive to unemployment than relatively less fluctuating house prices in relatively poorer regions. Research in this area also highlighted that more expensive house prices, such as in South East, usually means greater debt for households in these regions, thus the greater debt may make the unemployed more likely to have a repossession, and thus reduce house prices in the regions.

The anecdotal assertion that relatively richer regions have house prices more sensitive to unemployment than relatively poorer regions, confirmed by the findings of Clapp and Giacotto (1993) from three US towns. Similarly Meen (2001) also found that south of the UK was more responsive to unemployment than the relatively poorer north. Finally Giussani and Hadjimatheou (1992) had similar results that the coefficients for changes in unemployment suggest a greater sensitivity of the housing market in the South East to changes in unemployment. These bits of research presented not only indicate answer to the question of whether relatively richer regions have greater sensitivity in house prices to unemployment but also suggestion that it is the actual unemployment in the relatively poorer regions which affects the house price, rather than prevailing economic conditions.

However the regional results of this paper by OLS were inconclusive. This was most likely due to the problems with the empirical method used and future analysis of house prices and unemployment in different regions could give more definitive response to the question of whether relatively richer regions have house prices that are more sensitive to unemployment than relatively poorer regions. This is an important question, firstly to confirm the commonly held assertion with actual economic analysis and secondly this could have policy implications. Even if there is no significant causal relationship between the two variables it is still important to understand the interactions between house price and unemployment in UK regions.

BIBLIOGRAPHY

- Ashworth, J. and Parker, S. (1997). 'Modelling Regional House Prices in the UK.' *Scottish Journal of Political Economy*, vol. 44 (3), pp. 225–246.
- Baffoe-Bonnie, J. (1998) 'The Dynamic Impact of Macroeconomic Aggregates on Housing Prices and Stock of Houses: A National and Regional Analysis.' *Journal of Real Estate Finance and Economics*, vol. 17 (2), pp.179-197.
- Benito, A. (2005) 'The Down-Payment Constraint and UK Housing Market: Does the Theory fit the Facts?' *Journal of Housing Economics*, vol.15 (1), pp. 1-20.
- Birgitta, R. and Taylor, M. (2010) 'Differences in Opportunities? Wage, Unemployment and House-Price Effects on Migration.' *Institute for Social and Economic Research*, no. 2010-05
- Blitzer, D. (2012) 'House Prices and the Unemployment Rate.' *Housingviews.com, S & P Indices*, [blog] 4th January, Available at: <http://www.housingviews.com/2012/01/04/house-prices-and-the-unemployment-rate/> [Accessed 15/01/2012].
- Cameron, G. and Muellbauer, J. (2001) 'Earnings, Unemployment and Housing in Britain.' *Journal of Applied Econometrics*, vol. 16, pp. 203-20.
- Case, K.E. and Shiller, R.J. (1988) 'The Behavior of Home Buyers in Boom and Post-Boom Markets.' *New England Economic Review*, November/December, pp. 29–46.
- Clapp, J. and Giacotto, C. (1993) 'The Influence of Economic variables on House Price Dynamics.' *Journal of Urban Economics*, vol. 36, pp. 116-83.
- Ducaa, J.V.; Muellbauer, J. and Murphy, A. (2010) 'Housing Markets and The Financial Crisis of 2007.2009. Lessons for the future.' *Journal of Financial Stability*, vol. 6, pp.203-217.
- Edelstein, R, and Tsang, D. (2007) 'Dynamic Residential Housing Cycles Analysis.' *Journal of Real Estate Financial Economics*, vol. 35, pp. 295-313.
- Gathergood, J. (2011) 'Unemployment Risk, House Price Risk and the Transition into Homeownership in the United Kingdom.' *Journal of Housing Economics*, vol. 20, pp. 200-209.
- Gibb, K. and O'Sullivan, T. (2008) Introduction, in *Housing Economics and Public Policy* (eds T. O'Sullivan and K. Gibb), Blackwell Science Ltd, Oxford.
- Gibb, K. (2008) *Urban Housing Models*, in *Housing Economics and Public Policy* (eds T. O'Sullivan and K. Gibb), Blackwell Science Ltd, Oxford

- Giussani, B and Hadjimatheou, G. (1991a) 'Modeling Regional House Prices in the United Kingdom' *Papers in Regional Science: The Journal of the RSAI*, vol. 70 (2), pp. 201-19.
- Giussani, B and Hadjimatheou, G. (1991b) 'Modeling the North/South divide in House Prices' *Discussion papers in Urban and Regional Economics*, vol.3 (C).
- Goodman, A.C. and Muth, F. (1989) *Topics in Empirical Urban Housing Research: The Economics of Housing Markets*. Harwood Academic Publishers, Switzerland.
- Hwang, M. and Quigley, J. M. (2006), 'Economic Fundamentals in Local Housing Markets: Evidence from U.S. Metropolitan Regions.' *Journal of Regional Science*, vol. 46, pp. 425-453.
- Kenny, G. (1999) 'Modelling the Demand and Supply Sides of the Housing Market: Evidence from Ireland.' *Economic Modelling*, vol. 16 pp. 389-409.
- Leung, C. (2004) 'Macroeconomics and Housing: a Review of the Literature.' *Journal of Housing Economics*, vol. 13, pp. 249-267
- Malpezzi, S. (2008) Hedonic Pricing Models: A Selective and Applied Review, in *Housing Economics and Public Policy* (eds T. O'Sullivan and K. Gibb), Blackwell Science Ltd, Oxford.
- Maclennan, D. (1982) *Housing Economics*. Longman Group Limited, Essex
- Meen, G. (2001) *Modelling Spatial Housing Markets Theory, Analysis and Policy*. Kluwer Academic Publishers, London.
- Meen, G. (2001) 'The Time-Series Behavior of House Prices: A Transatlantic Divide?' *Journal of Housing Economics*, vol. 11, pp. 1-23.
- Meen, G. (2008) *Housing, Random Walks, Complexity and the Macroeconomy*, in *Housing Economics and Public Policy* (eds T. O'Sullivan and K. Gibb), Blackwell Science Ltd, Oxford, UK
- Meese, R. and Wallace, N. (2003) 'House Price Dynamics and Market Fundamentals: The Parisian Housing Market.' *Urban Studies*, Vol. 40, No. 5-6, pp. 1027-1045.
- Muellbauer, J. and Murphy, A. (1993) 'Explaining Regional House Prices in the UK. Mimeo, Oxford.
- Peek, J. and Wilcox, J. (1992) 'The Baby Boom, 'Pend-Up Demand' and Future House Prices.' *Journal of Housing Economics*, vol. 1, pp. 347-367.

- Quigley, J. M. (2008) Transactions Costs and Housing Markets, in *Housing Economics and Public Policy* (eds T. O'Sullivan and K. Gibb), Blackwell Science Ltd, Oxford, UK.
- Reilly, B. and Witt, R. (1994) 'Regional House Prices and Possessions in England and Wales: An Empirical Analysis.' *Regional Studies*, vol. 28, pp. 475–482.
- Riddel, M. (2004) 'Housing-Market Disequilibrium: An Examination of Housing-Market Price and Stock Dynamics 1967–1998Q.' *Journal of Housing Economics*, vol. 13, pp. 120-35.
- Serrano-Diaz, L. (2005) 'On the Negative Relationship between Labor Income Uncertainty and Homeownership: Risk Aversion vs. Credit Constraints.' *Journal of Housing Economics*, vol. 14, pp. 109–126.
- Shiller, R. (1990) 'Market Volatility and Investor Behavior.' *The American Economic Review*, vol. 80, pp.58–62.
- Tu, Y. (2008) Segmentation, Adjustment and Disequilibrium, in *Housing Economics and Public Policy* (eds T. O'Sullivan and K. Gibb), Blackwell Science Ltd, Oxford.
- Zhou, J. (2010) 'Testing for Cointegration between House Prices and Economic Fundamentals.' *Real Estate Economics*, vol. 38 (4) pp. 599–632.

FINAL GRADE

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GENERAL COMMENTS

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