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Housing wealth or economic climate: Why do house prices matter for well-being?

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Abstract
UK property prices more than doubled between 1997 and 2007. This paper examines whether house prices influence well-being, and if this effect runs via wealth, or whether other factors, such as economic conditions, drive both house prices and well-being. These alternative viewpoints have contrasting implications for the effect of house prices on homeowners' and non-homeowners' well-being, and are exploited in this paper to shed light on why house prices really matter. This approach contrasts with that of previous studies, in which the role of house prices is, a priori, assumed in the empirical strategy. This paper shows that while house prices do matter for well-being, they do not matter through wealth effects. Instead, the evidence points towards house prices acting as a barometer of confidence in the economy.

Keywords
well-being, house prices, wealth, economic climate

JEL Classification I1,D12

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> Like it or not, the housing market is a key barometer of confidence. As a nation, we are obsessed with it. Put a story on house prices on our website and people read it in their droves.
> **The Telegraph, November 2010**

1 Introduction

Between 1997 and 2007, real UK property prices more than doubled, and almost tripled in Greater London. House prices have since fallen by one quarter.[1] As two-thirds of households own their home and most household wealth is held in the form of housing assets (Banks et al., 2002), house price fluctuations may have a significant impact on the wealth of millions of people. Yet, to date relatively few studies have considered whether house prices affect well-being, and not in the British context, where an unprecedented rise in house prices, combined with large geographical variation in house prices, provide a unique opportunity to study possible wealth effects.

But while developments in the housing market may affect homeowners' well-being via wealth effects, an alternative viewpoint posits that other factors, such as economic conditions, drive both house prices and well-being. Crucially, these very different explanations have contrasting implications for the well-being of homeowners and non-homeowners, which are exploited in this paper to distinguish whether house prices causally drive well-being or otherwise. Homeowners may benefit when house prices unexpectedly rise but non-homeowners lose out as more saving is required to get onto the property ladder (and vice versa if house prices fall). A housing wealth effect is therefore consistent with diverging well-being outcomes by tenure status. On the other hand, the benefits from an improvement in the local economy or infrastructure are not contingent on tenure status to the same extent, suggesting that both homeowners and non-homeowners will exhibit a similar reaction to house prices.

Very little is known about why house prices matter for well-being because to date house prices appear in cross-section studies, in different manifestations, and not as the primary interest of the analysis. On this basis, Luttmer (2005) finds that more housing wealth, as measured by estimated property values, is associated with better well-being outcomes for homeowners. But it is not possible to establish whether house prices matter through housing wealth effects without also considering how non-homeowners react to house prices. Moreover, estimated property values are likely to be endogenous as they reflect investment decisions made by each individual. Blanchflower and Oswald (2004), Luttmer (2005) and Kotacorpi and Laamanen (2010) correlate area level house prices and well-being (for various reasons) but do not allow the effect of house prices to vary by tenure status. These studies find no effect of house prices on well-being but the possibility that diverging well-being across tenure groups, leads to a zero effect on aggregate, cannot be ruled out.

Using restricted access geographic identifiers, this study matches the average price of properties sold in cities and towns to individuals in the British Household Panel Survey (BHPS) between

[1] Source: Halifax House Prices, deflated to 2000 prices.

1991-2006. The ability to measure house prices at a low level geography is advantageous because it provides a good approximation to the house prices that people face. The BHPS contains detailed information about respondents, including their tenure status and also asks homeowners to provide an estimate of the value of their property. This study can therefore replicate previous findings before showing that an improved research design, combined with panel data leads to substantially different results.

To preview the results, a positive association between house prices and well-being is found for both homeowners and non-homeowners, suggesting that house prices do not affect well-being through wealth effects. Moreover, this association remains after controlling for a proxy of earnings expectations, measures of local earnings and unemployment, and subjective assessments of the neighbourhood (which provide implicit evaluations of the quality of local public and private infrastructure). One remaining possibility is that house prices are a barometer of general confidence in the economy. Thus, people may feel better when house prices go up because a strong performance in the housing market signals that the economic outlook is bright. However, while the association between house prices and well-being is statistically significant, it is very small in magnitude.

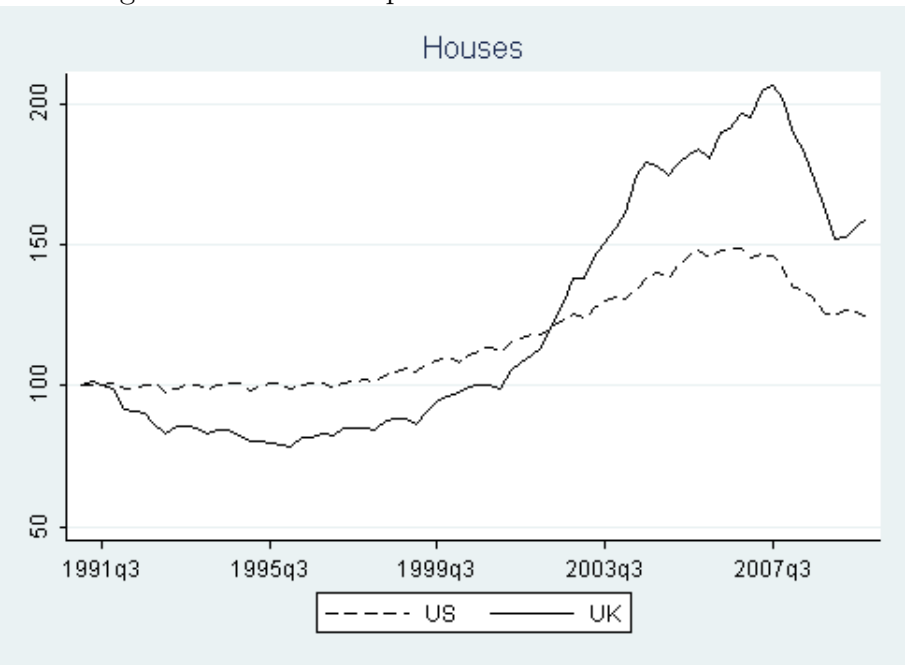
The remainder of this paper is structured as follows; the next section provides a brief overview of the UK housing market, section 3 discusses the links between house prices and well-being (and why homeowners and non-homeowners may react differently to house prices) in more detail, and finishes with a discussion of three previous studies where house prices appear in the empirics. Section 4 discusses the empirical strategy and data used in this paper, section 5 discusses the empirical evidence while section 6 concludes.

2 The UK housing market

Since the late 1990's, rising levels of net immigration, life expectancy, family dissolutions, single adult households and incomes have all contributed to faster growth in housing demand in the UK. On the supply side, the planning system heavily limits the building of new houses by restricting the supply of land available for this purpose. As a result, house building has not kept pace with housing demand and house prices have soared (Nickell, 2009). Figure 1 documents the evolution of house prices in the UK since 1991, and for comparison, contrasts this with the evolution of house prices in the US over the same period. UK house prices fell throughout the recession of the early 1990's but increased rapidly from the late 1990's. House prices peaked in late 2007 at more than twice the level observed in 1991. Over the next two years house prices fell, but nevertheless, still equalled 1.6 times the level observed in 1991. In the US, house prices remained flat over much of the 1990's and increased by 50 percent at the pinnacle of the housing market boom. At the end of 2009, house prices stood at 1.25 times the level observed in 1991. Fluctuations in UK house prices are large in both absolute terms, and relative to house price dynamics elsewhere in the world. The UK therefore makes a particularly attractive setting in which to analyse whether house prices

matter for well-being.

Figure 1: Real house price indices in the UK and US



Source: Halifax House Prices, Federal Housing Finance Agency.

3 Links between house prices and well-being

This section discusses why a positive correlation between house prices and well-being is likely to exist among homeowners, and explains why non-homeowners can be used to shed light on whether this correlation reflects a (causal) wealth effect or whether other factors drive both house prices and well-being.

3.1 Wealth shocks

Homeowners are made wealthier when the value of their home rises. If rapid increases in house prices are unexpected, developments in the housing market may result in sizeable positive wealth shocks. If additional wealth is used to consume more goods, services and leisure, a causal relationship where house prices boost the wealth of homeowners and ultimately their well-being will exist. Thus, it may be possible to exploit differences in regional house price dynamics, as providing wealth shocks of varying size, in much the same way that lottery winnings (Gardner and Oswald, 2007) or German reunification (Frijters et al., 2004) are used in previous research to estimate the causal effect of economic resources on well-being. An advantage of using house prices for this purpose is that the scale of house price fluctuations provides greater variation in wealth than previously studied. A caveat, however, is that housing wealth is comparatively illiquid; homeowners must remortgage or

move to a smaller property to access housing wealth. Another possibility is that house prices raise the net worth of homeowners, resulting in better access to capital markets for credit constrained homeowners. This is a slightly different story in that consumption is brought forward rather than increased but has the same implication for the well-being of homeowners.

3.2 Economic conditions

Alternative explanations link house prices and well-being without implying a causal relationship. One possibility is that rising house prices reflect economic circumstances. As housing supply is fixed in the short term, house prices are sensitive to demand conditions and one driver of housing demand is economic performance. For example, during economic booms, people raise their expectations of future earnings, and start consuming more (including housing), which drives up house prices (King, 1990). As the rise in house prices coincides with higher levels of consumption, homeowners will report higher levels of well-being when house prices rise even though the revision in earnings expectations (and its effect on consumption patterns) generates this association. But, there is evidence to suggest that well-being is sensitive to the state of the economy more generally, without running through consumption. Research by Di Tella et al. (2001) and Di Tella et al. (2003) shows that people living in countries with higher per capita GDP report higher levels of well-being whereas people facing higher unemployment rates report lower well-being. Macroeconomic conditions are found to matter even after taking into account the effect a weak economy has on personal income and employment, leading the authors to suggest that people simply dislike economic woes, which may stimulate a 'fear of unemployment' (see Blanchflower, 1991). This raises two possibilities. As house prices respond to macroeconomic circumstances, homeowners may report higher levels of well-being when house prices rise that really reflects how they feel about falling unemployment and rising incomes. Alternatively, house prices may be a barometer of general confidence in the economy and a strong performance in the housing market may foster a 'feel good' factor in much the same way that high unemployment fuels discontent; both are indicators of economic prospects.

3.3 Area attributes

Another reason why house prices may be linked to well-being in the absence of a causal relationship is that house prices capture differences in the provision of local pubic services. The price of a house reflects the stream of local public services available relative to the stream of property tax liabilities. All other things equal, people are willing to pay more for houses where publicly provided services are superior (see Gibbons and Machin, 2008, for an overview of the effects of school quality, transport and crime on UK house prices). However, the evidence on whether public services (measured via government expenditures) affects well-being is mixed and suggests that public expenditures have a modest, if any, influence on well-being (see Bjørnskov et al. (2007) and Ram (2009) for national expenditures and Wassmer et al. (2009) and Kotacorpi and Laamanen (2010) for local

expenditures). On the other hand, general neighbourhood attributes are also captured by house prices and correlate with well-being. Dolan and Metcalfe (2008) find that improvements to the aesthetics of a neighbourhood enhances well-being[2] while Knies et al. (2008) find that proximity to green areas and sports facilities is associated with better well-being outcomes. Taken together, this implies that house prices may be associated with well-being because they capture the valuation placed on public services and amenities that are accessed by living at a particular address. However, if people are sufficiently mobile, those people who place little value on public services and local amenities would move into neighbourhoods with lower house prices and inferior neighbourhood attributes, and vice versa, leading to no association between house prices and well-being. In reality, there are significant switching costs, which include transactions costs and psychological costs of leaving established networks. So homeowners may not move if local attributes deteriorate, even if deterioration of the area makes them less happy, and if this deterioration is captured by house prices, an association between house prices and well-being will exist.

3.4 Identification

A number of different explanations are consistent with a positive correlation between house prices and well-being among homeowners. One way to better understand the true nature of this relationship is to look separately at homeowners and non-homeowners. This is the same identification strategy used in existing research on the effect of house prices on consumption and retirement (see inter alia Attanasio and Weber, 1994; Farnham and Sevak, 2007; Disney et al., 2010).[3] It uses the fact that non-homeowners lose out when property prices rise because houses become less affordable. One measure of affordability for first time buyers is the ratio of lower quartile house prices to lower quartile earnings and in England, this ratio increased from 3.5 in 1997 to 7.25 in 2007 (Nickell, 2009). Non-homeowners seeking to purchase a first home must therefore save a larger share of their income, or save for longer, before having a sufficiently large deposit to put towards a house. Rental prices also tend to move in line with house prices, so at the same time, a larger share of income may go towards meeting accommodation costs. This implies that the consumption of goods, services and leisure among non-homeowners falls when house prices unexpectedly rise, which lowers their well-being. A causal mechanism is therefore consistent with diverging well-being outcomes across homeowners and non-homeowners. The assumption that provides identification is that however people respond to economic factors, this should not depend on their tenure status. For example, if expectations of higher future earnings are driving both house prices and well-being, there is no reason to expect homeowners to revise their earnings expectations while renters do not, or that homeowners upwardly revise their future earnings while renters revise their future

[2]But this result may reflect a general neighbourhood effect as pre-treatment well-being is unknown. Perhaps surprisingly, this study also finds no evidence that regeneration affects house prices.

[3]An advantage of focusing on well-being over looking at consumption and leisure in isolation, is that well-being is likely to reflect changes in both these variables (and more), and can provide a way to quantify how much changes in consumption, leisure and other circumstances matter to people based on how it makes them feel.

earnings downwards. If both groups experience similar revisions in earnings expectations, any correlation between house prices and well-being will be of similar magnitude across homeowners and non-homeowners.[4] Therefore, by comparing whether non-homeowners react differently to, or in the same way as homeowners, when house prices rise, it is possible to establish whether house prices matter through housing wealth effects or through economic channels. If the rise in house prices reflects an improvement in neighbourhood attributes, whether non-homeowners report higher well-being depends on how quickly rental prices adjust in the short-term. If rental prices are quick to adjust, improvements in neighbourhood attributes are offset via the rental market through higher rents, leading to no association between house prices and well-being. If, on the other hand, rental prices are slow to adjust, the response of non-homeowners will be similar to that of homeowners.

3.5 Previous Literature

Relatively few studies have considered the effect of house prices on well-being. Notably, all these studies use cross-section data and the majority use data from the United States. Section 2 highlights the relative attractiveness of the British setting to analyse the influence of house prices on well-being; the scale of house price fluctuations in the UK is unparalleled. When house prices feature in studies of well-being, they are not the primary focus of the analysis and appear under several guises. For example, Luttmer (2005) uses the estimated property value as a measure of household wealth, Blanchflower and Oswald (2004) and Luttmer (2005) use regional house prices as a proxy of the local price level and Kotacorpi and Laamanen (2010) control for house prices in their study of public spending and well-being because they worry that better public services lead to higher house prices. But there are various reasons why house prices might affect well-being, so it is important to avoid imposing a role for house prices in empirical specifications. Luttmer (2005) allows estimated property values (which are informative of house prices) to influence the well-being of homeowners, but not non-homeowners, and finds that more 'housing wealth' is associated with better well-being. However, by not allowing for the possibility that non-homeowners are influenced by house prices too, it is not clear that this provides evidence of a housing wealth effect. In the same study, Luttmer (2005) includes a prediction of Public Use Micro Area house prices in the regression model and finds a small negative but insignificant correlation with well-being. Adopting a similar research design, Blanchflower and Oswald (2004) use regional house price index and find a very small positive and insignificant correlation with well-being. Kotacorpi and Laamanen (2010) correlate municipality level house prices and well-being in a Finnish setting. They find a negative

[4]With respect to the state of the local economy, differences in the response to house prices across homeowners and renters, may emerge. As renters are relatively more mobile than homeowners, it is easier for renters to avoid poorly performing local economies and to access better performing local economies than it is for homeowners. This might make renters more sensitive to economic booms and less sensitive to economic downturns than homeowners, which would be borne out in their response to house prices. However, this does not pose a problem for identification because it does not create a situation where homeowners report higher well-being and renters report lower well-being, when house prices rise.

but insignificant association between house prices and well-being. As none of these studies using geographical house prices allow the effect of house prices to vary by tenure status, the possibility that diverging well-being across tenure groups, leads to a zero effect on aggregate, cannot be ruled out. Moreover, it is difficult to say much about the relationship between house prices and well-being, without observing how house prices over the housing market cycle influence well-being. Two of these studies are based on at most two year of data.

4 Empirical strategy

This paper investigates whether homeowners report higher well-being when house prices rise, and by contrasting how homeowners and non-homeowners respond to house prices, infers whether house prices causally affect well-being through wealth effects or through other mechanisms. Hence, the effects of interest in this study are interaction effects. Empirically, this poses some issues. Well-being is an ordinal concept but computing marginal effects for interaction terms is much more difficult in non-linear models (Ai and Norton, 2003), as is dealing with unobserved heterogeneity. Therefore, following Clark and Oswald (2002) and Clark et al. (2008), this study treats well-being as a cardinal concept. This approach is justified by Ferrer-i-Carbonell and Frijters (2004) who show that whether well-being is treated as an ordinal or cardinal concept does not substantively affect results whereas ignoring unobserved heterogeneity leads to important biases. This study estimates the following well-being equation:

$$\begin{aligned} \mathrm{WB}_{\mathrm{ijt}} = {} & \alpha_1 \text{house prices}_{\mathrm{jt}} * \text{outright owner}_{\mathrm{ijt}} + \alpha_2 \text{house prices}_{\mathrm{jt}} * \text{mortgaged owner}_{\mathrm{ijt}} \\ & + \alpha_3 \text{house prices}_{\mathrm{jt}} * \text{private renter}_{\mathrm{ijt}} + \alpha_4 \text{house prices}_{\mathrm{jt}} * \text{social renter}_{\mathrm{ijt}} \\ & + \mathrm{z}'_{\mathrm{ijt}}\beta + \delta_{\mathrm{t}} + \eta_{\mathrm{i}} + \pi_{\mathrm{j}} + \mathrm{v}_{\mathrm{ijt}} \end{aligned} \tag{1}$$

where $\mathrm{WB}_{\mathrm{ijt}}$ is a measure of well-being for individual i, in area j, at time t and $\text{house prices}_{\mathrm{jt}}$ measures the level of house prices faced by residents in area j, at time t. In a similar approach to Di Tella et al. (2003), who look at the effect of GDP levels and changes on well-being, this study focuses on house price levels and growth rates, as growth rates have a natural interpretation in this context as the return to housing investments. The association between house prices and well-being is allowed to vary according to tenure status. Four different tenure groups are identified; homeowners who own their property outright (outright homeowners), homeowners who still have outstanding mortgage repayments (mortgaged homeowners), renters that rent from the private market (private renters) and renters that rent from local authorities or charitable trusts (social renters). A priori, there are reasons to expect wealth effects, if these are present, to differ across outright and mortgaged homeowners because the latter group includes first time buyers, who are likely to up-size their housing consumption in future, and may not benefit if house prices unexpectedly rise. To establish whether house prices causally effect well-being, the well-being of renters is considered. If renters

report lower well-being when house prices rise, this would support a housing wealth mechanism whereas if renters also report higher levels of well-being, this would suggest that house prices matter for other reasons. Renters are also split into two groups as it is anticipated that social renters may respond differently to other renters when house price rise as they are less likely to pay full rental costs, less likely to purchase a house and more likely to live in disadvantaged neighbourhoods.[5].

Equation 1 also includes year fixed effects δ_t, area fixed effects π_j and individual fixed effects η_i. As this model is estimated using a fixed effects estimator, the effect of house prices on well-being is identified from observing whether changes in house prices that occur over time in a particular area are correlated with changes in the reported well-being of people living in that area. Differences in socio-economic and demographic characteristics are taken into account through the vector z_{ijt}, which contains age, marital status, household composition, employment status of the individual and net household weekly income. Any remaining influences on well-being are assumed to be randomly distributed and confined to the random error term v_{ijt}. Standard errors are clustered at the individual level.[6] In subsequent analysis, variables that might potentially account for an observed correlation between house prices and well-being are added.

Some issues merit further discussion. Area level house prices are interacted with tenure status and neither tenure status nor area of residence are fixed. If either of these decisions responds to unmeasured factors that affect well-being or are influenced by well-being, it is not possible to estimate equation 1 without bias. Banks et al. (2002) and Banks et al. (2004) argue that tenure status reacts to house price volatility, with individuals purchasing houses at younger areas in areas with high volatility, and people may dislike house price volatility. To the extent that house price volatility is constant over time, this would be captured via the individual and area fixed effects. Volatility could even increase over time so long as this is not accompanied by relative changes in volatility across areas.

A different concern is that tenure status or location of residence responds to well-being. The analysis controls for many circumstances previously shown to influence well-being but there is the possibility that unobserved shocks to well-being precipitate changes in tenure status or location. This is, however, unlikely owing to significant costs that are incurred when changing tenure status or location. These include financial costs (estate agents, legal fees and stamp duty), opportunity costs (of search) and psychological costs (the stress of moving and losing established networks).

[5]Two thirds of tenants in social housing receive a state subsidy towards rental costs and while the national Right-to-Buy (RTB) subsidises the purchase of social housing for tenants (Source: Department of Communities and Local Government), RTB sales accounted for less than 3% of mortgages sold between 2005 and 2007 after mortgages sold for remortgaging homeowners are excluded (Source: Mortgage Product Sales Trends Report 2007) and nearly half of all social housing is located in the most deprived neighbourhoods (Hills, 2007).

[6]Initially the analysis focused on clustering within postcode areas (because house prices are measured at this level) but this resulted in smaller standard errors compared to clustering within individuals and suggests there are too few area clusters and too many people in each area cluster to produce a satisfactory asymptotic approximation in the former case.

4.1 Data

Data are taken from the British Household Panel Survey (BHPS) between 1991 and 2006.[7] This is a nationally representative survey[8] of more than 5 000 British households (approximately 10 000 adults) and contains detailed information about each respondent. Starting in 1991, the BHPS coincides with upward as well as downward movements in house prices.

The General Health Questionnaire (GHQ) is used to measure well-being (see Clark and Oswald, 1994; Clark, 2003; Gardner and Oswald, 2007, 2006, for other studies using this measure). The version of the GHQ in the BHPS has twelve questions, which focus on positive and negative emotions and answers to these questions are aggregated to produce a 36-point index of well-being. Full details are contained in section 7 in the appendix. Following previous studies, this variable is re-ordered such that higher scores reflect better well-being. The BHPS collects detailed information about individuals and their circumstances, and the Institute for Social and Economic Research produce an additional dataset that simulates net household income.[9] The measure used in this study is net weekly income net of local taxes, which therefore takes into account payments towards local public services. This measure is superior to the gross household income measure available in the BHPS but net income files are only available between 1991-2006. Detailed information about tenure status is available, albeit at the household level, so initially the analysis is restricted to those individuals who report they are the principle owners or renters in the household (along with their partners). The survey also asks homeowners to estimate the market value of their property, which is used to replicate results in other studies. However as already argued, this measure likely to be endogenous because it reflects an individual's investment decisions. Summary statistics for BHPS variables are given in table 1.

The average price of all properties sold in postcode areas (e.g cities and clusters of towns) is matched to individuals in the BHPS, as are gender-specific unemployment rates and weekly earnings. There are 124 postcode areas in the UK and 116 are identified in BHPS sample spanning Great Britain. If the population were equally distributed across postcode areas, this would imply just under 475 000 people per postcode area in 2001.[10] But in practice, some postcode areas are larger than others, for example, the number of postcodes (streets) in Leeds is 1.25 times larger than in neighbouring Bradford, and the number of postcodes in Bristol is 1.8 times larger than in

[7]University of Essex. Institute for Social and Economic Research, British Household Panel Survey: Waves 1-17, 1991-2008 [computer file]. 6th Edition. Colchester, Essex: UK Data Archive [distributor], May 2009. SN: 5151.

[8]To maintain representativeness of the British population, sample members are followed over time even as they move address and/or form new households. If sample members form new households, all adults in these households are also interviewed. Furthermore, children of household members are interviewed once aged 16. Note that booster samples for Scotland and Wales are added in 1999 and in 2001 for Northern Ireland but I restrict attention to original sample members.

[9]Bardasi et al., British Household Panel Survey Derived Current and Annual Net Household Income Variables, Waves 1-16, 1991-2007 [computer file]. 8th Edition. University of Essex. Institute for Social and Economic Research, [original data producer(s)]. Colchester, Essex: UK Data Archive [distributor], November 2008. SN: 3909.

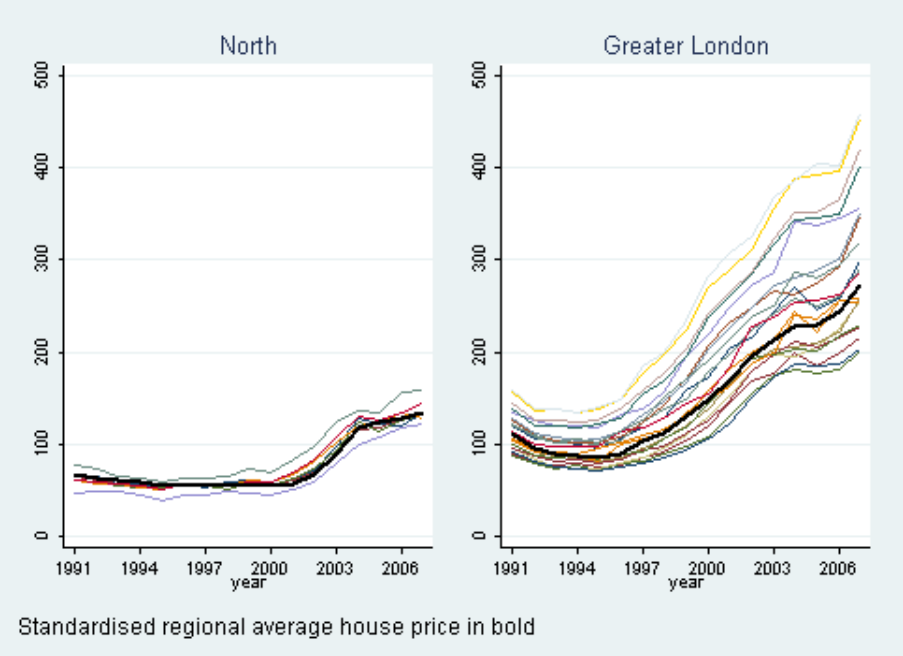
[10]Source: Office for National Statistics

Table 1: Descriptive statistics

	mean	sd	min	max
GHQ	24.78	5.37	0	36
owner	0.20	0.40	0	1
mortgaged	0.58	0.49	0	1
private renter	0.08	0.26	0	1
ln net household weekly income	5.94	0.61	3	9
age	43.81	12.77	20	69
single	0.08	0.28	0	1
partner	0.81	0.40	0	1
widowed	0.03	0.17	0	1
divorced/separated	0.08	0.27	0	1
1 child	0.16	0.37	0	1
2 children	0.16	0.37	0	1
3+ children	0.06	0.24	0	1
kids aged 0-4	0.18	0.38	0	1
kids aged 5-11	0.21	0.41	0	1
kids aged 12-15	0.13	0.33	0	1
2 adults	0.66	0.47	0	1
3 adults	0.13	0.34	0	1
4+ adults	0.06	0.24	0	1
employed	0.72	0.45	0	1
unemployed	0.03	0.17	0	1
year	1998.22	4.58	1991	2006
satisfied with area	0.92	0.27	0	1
prefers to move for area-related reason	0.11	0.32	0	1
financial expectations: better	0.28	0.45	0	1
financial expectations: worse	0.11	0.31	0	1
financial change: better	0.28	0.45	0	1
financial change: worse	0.25	0.44	0	1
N	82603			

neighbouring Bath.[11] Section 7 in the data appendix provides further details and includes a map of postcode areas in Great Britain. Unlike estimated property values, area house prices provide a general summary of house price *fluctuations* that is not directly linked to an individual's investment decisions. Figure 2 shows just how much house prices have changed in the North of England and in Greater London, and emphasises the difference in the evolution of house prices across different parts of the country. In addition, it highlights the extra detail in postcode area house prices versus regional average house prices (in bold). Generally speaking, house prices are much higher in Greater

Figure 2: Postcode area house prices in the North of England and in Greater London (£1000's)



Source: Halifax House Prices, deflated to 2000 prices.

London compared to the North of England. Even after the rapid increase in house prices in the North of England, the level of house prices observed in the North of England in 2007 barely exceeds the level observed in Greater London in 1991. The dramatic rise in house prices is also relatively delayed in the North of England, starting after the millennium compared to the late 1990's in Greater London. And while house prices doubled in the North of England, they tripled in some areas of Greater London.

It is evident from figure 2 that regional house prices mask a great deal of the spatial variation in house prices and thus do not accurately capture the house prices faced by residents living in different parts of the same region. This is particularly true in the case of Greater London where the growth in house prices in some areas, notably Westminster, Camden and Kensington and Chelsea has outpaced the growth in the region as a whole. Measuring house prices over a smaller geography clearly has advantages. However, a drawback is that house prices measured at the postcode area level are not standardised and simply reflect the average price of all properties sold in that area. This

[11]Source: National Statistics Postcode Directory 2006

may result in a different type of mis-measurement, because for example, a change in the composition of sales will affect the average price of properties sold. This 'noise' is stripped out of standardised series, which adjust for sales composition. Hamnett (1999) suggests that unstandardised series may have hidden the extent to which house prices fell during the housing market slump of 1989-1993, although this is not evident in figure 2 where the standardised regional average house price series exhibits the same trend as unstandardised postcode area house prices during this period.

5 Results

The first two columns of table 2 replicate the results of previous studies using BHPS data while the remaining columns present results based on the approach taken in this study, which also exploits the panel dimension of these data. For brevity only the house price terms are reported but all control variables are included. Results from a baseline model can be found in section 7.3.1 in the appendix, and are in line with standard results in this literature. For example, well-being is increasing in net household income,[12] is U-shaped in age, improves when living with a partner but falls sharply with widowhood, and also with unemployment.

Following Luttmer (2005), the first column includes an interaction term between the (log of) the estimated property value and whether the individual is a homeowner, and is estimated using an ordinary least squares (OLS) estimator. The result points towards more 'housing wealth' leading to better well-being outcomes. As in Blanchflower and Oswald (2004), Luttmer (2005) and Kotacorpi and Laamanen (2010), the second column includes area house prices, without reference to tenure status, and without taking into account individual heterogeneity in well-being. The result suggests that there is no clear relationship between house prices and well-being. The third column, in which house prices are interacted with tenure status and a fixed effects estimator (FE) is used, tells a different story. The interaction between house prices and home ownership status is consistent with (outright and mortgaged) homeowners feeling better as house prices rise but while this effect is statistically significant, it is economically small in magnitude. A £10 000 increase in house prices increases GHQ scores by 0.04 units, which is equivalent to less than a one percent change in GHQ (based on mean GHQ scores). Between the first quarter of 2000 and the third quarter of 2007, UK house prices more than doubled from just under £71 000 to just over £174 500 (figures deflated to 2000 prices), suggesting that over this period, the well-being of homeowners increased by 0.41 units. Comparing how homeowners respond to house prices with how non-homeowners respond to house prices provides evidence of whether house prices causally drive well-being through housing wealth effects or whether house prices matter through other mechanisms. The results neither support a housing wealth effect nor confirm alternative explanations i.e that other factors drive both house

[12]This result is conditional on measuring net as opposed to gross household income, and moreover, taking into account income from second jobs and subtracting local taxes. It shows that the quality of the income measure matters in these studies.

prices and well-being. Private renters appear to be as happy with rising house prices as homeowners are (if not more so) but this effect is not precisely determined. On balance, the evidence points towards alternative explanations driving this association because (i) renters are not less happy when house prices rise and (ii) it is not possible to reject the hypothesis that the estimated marginal effects for all tenure groups are equal (see p-value at bottom of table).

Table 2: The relationship between house prices and well-being

	(1) OLS	(2) OLS	(3) FE	(4) FE	(5) FE	(6) FE
ln estimated house value*homeowner	0.051***					
	(0.015)					
house prices		0.011				
		(0.016)				
house prices*outright owner			0.039**		0.046***	
			(0.018)		(0.017)	
house prices*mortgaged owner			0.038**		0.036**	
			(0.017)		(0.016)	
house prices*private renter			0.045		0.041*	
			(0.028)		(0.024)	
house prices*social renter			0.019		0.024	
			(0.023)		(0.021)	
%Δ house prices*outright owner				0.008*		0.010**
				(0.004)		(0.004)
%Δ house prices*mortgaged owner				0.003		0.003
				(0.003)		(0.003)
%Δ house prices*private renter				0.015*		0.013*
				(0.008)		(0.007)
%Δ house prices*social renter				-0.004		-0.005
				(0.006)		(0.006)
N			9852	9852	10929	10929
NT	82603	82603	82603	82603	93042	93042
p-value			0.76	0.16	0.70	0.05

See equation 1 for details of regression model;
*p<0.1, **p<0.05, ***p<0.01. Standard errors in parentheses, clustered by individual
House prices scaled by a factor of 10 000, deflated to 2000 prices.
p-value: test of equality of marginal effects.

The second column reinforces the tentative conclusion that house prices do not matter through housing wealth effects. Here, growth rates in house price growth are interacted with tenure status, and it is clear that both outright homeowners and private renters report higher levels of well-being when house prices grow more rapidly. The final two columns of table 2, repeat the analysis in columns 3 and 4 but including all household members instead of restricting the sample to principal owners and renters. As house prices do not appear to matter through housing wealth effects, there

is no reason to exclude these individuals, and moreover, as the excluded household members are typically younger, the current sample ignores people who might be most sensitive to house prices (see Attanasio and Weber, 1994; Attanasio et al., 2009). With the additional sample members, the estimated association between house prices and well-being for outright homeowners is larger, and the positive association between house prices and well-being among private ranters becomes significantly different from zero. The estimated association between house price growth rates and well-being is now very similar for both outright homeowners and private renters, but remains both smaller and insignificant for mortgaged homeowners. The p-value at the bottom of the table rejects the hypothesis that the estimated marginal effects are the same across tenure groups owing to the estimated marginal effect for social renters.

So far, the results of this study provide little evidence that house price fluctuations matter to homeowners through housing wealth effects. Instead it appears that other factors drive both house prices and well-being. The next question is, what is driving this association? The discussion in the introduction points to a number of alternative explanations, which are tested in the remainder of this paper. Insofar as earnings expectations drive house prices, and also consumption patterns, earnings expectations may be responsible for the association between house prices and well-being. Disney et al. (2010) use financial expectations as a proxy for earnings expectations and present evidence to suggest that earnings expectations are correlated with house prices. They use the following BHPS question 'Looking ahead, how do you think you yourself will be financially a year from now?' where respondents can indicate they believe they will be better off, worse off or the same (used as the base category). In a similar vein, the BHPS asks respondents 'Would you say that you yourself are better off, worse off or about the same financially than you were a year ago?', with the same options to respond. Subjective assessments of changes in financial circumstances are shown to matter to well-being in Frijters et al. (2008) and may indicate whether house prices correlate with well-being through explanations that focus on unmeasured, but underlying changes in economic well-being. The results presented in column 1 of table 3 suggest this is not the case. While better expectations of, or improvements in, financial circumstances have a strong positive association with well-being, these variables do not explain why house prices are correlated with well-being.

Other explanations, linked to economic conditions, suggest that house prices correlate with unemployment rates and earnings, and these latter variables matter to well-being. The second and third columns tests this possibility by augmenting the basic model first with area earnings and then with unemployment rates. These variables are gender-specific so that male earnings are matched to men and female earnings to women. If, as argued in Di Tella et al. (2003), people worry about losing their jobs, gender specific unemployment rates are more appropriate. The results suggest that neither earnings nor unemployment rates can account for why house prices correlate with well-being. Both higher area earnings and unemployment rates reduced well-being, which points towards a comparison income effect (see Blanchflower and Oswald, 2004; Luttmer, 2005) although neither earnings and nor unemployment are estimated precisely.

Table 3: Looking for alternative explanations

	(1)	(2)	(3)	(4)	(5)
house prices*outright owner	0.051***	0.055***	0.046***	0.047***	0.061***
	(0.016)	(0.018)	(0.017)	(0.017)	(0.017)
house prices*mortgaged owner	0.037**	0.045***	0.036**	0.037**	0.046***
	(0.015)	(0.017)	(0.016)	(0.016)	(0.016)
house prices*private renter	0.040*	0.050**	0.041*	0.040*	0.047**
	(0.023)	(0.025)	(0.024)	(0.024)	(0.024)
house prices*social renter	0.020	0.034	0.024	0.022	0.026
	(0.021)	(0.022)	(0.021)	(0.021)	(0.022)
financial expectations: better	0.345***				0.344***
	(0.042)				(0.042)
financial expectations: worse	-0.478***				-0.472***
	(0.059)				(0.058)
financial change: better	0.516***				0.517***
	(0.039)				(0.039)
financial change: worse	-1.281***				-1.277***
	(0.046)				(0.046)
area average weekly earnings/10		-0.025			-0.023
		(0.015)			(0.015)
area unemployment rate			-0.003		-0.003
			(0.016)		(0.016)
satisfied with area				0.755***	0.726***
				(0.088)	(0.086)
prefers to move for area-related reason				-0.118*	-0.109*
				(0.065)	(0.064)
N	10929	10929	10929	10929	10929
NT	93042	93042	93042	93042	93042
p-value	0.41	0.71	0.70	0.61	0.34

See equation 1 for details of regression model;

*p<0.1, **p<0.05, ***p<0.01. Standard errors in parentheses, clustered by individual

House prices scaled by a factor of 10 000, deflated to 2000 prices.

p-value: test of equality of marginal effects.

A final explanation focusing on unmeasured factors, is that house prices reflect differences in local public and private infrastructure, which vary over time and with the business cycle. In previous research measures of public spending are found to have no effect on well-being (although see Kotacorpi and Laamanen, 2010, for evidence that 'excess spending' matters) so it is not clear whether public spending per se can account for this association. Moreover, public spending provides no information on private businesses in an area. Therefore, to capture changes in area attributes, this study uses respondents' subjective evaluations about the area they live in. Research by van Praag and Baarsma (2005) suggests that in some circumstances subjective evaluations may carry more information about what matters to people than objective measures do. They find that an objective measure of noise pollution has no effect on well-being but that predicted noise nuisance, conditioned on the objective noise measure and factors that might affect perceptions of noise nuisance (e.g whether the individual has a garden), matters for well-being. This study directly employs two subjective measures of neighbourhood quality, as insufficient data exists to condition on both public and private infrastructure. The BHPS asks respondents 'Overall do you live living in this neighbourhood?' and 'If you could choose, would you stay here in your present home or would you prefer to move somewhere else?'. Individuals who indicate they would move are asked to list the main reason for stating this preference. A binary variable, which captures whether people wish to move for area-related reasons (e.g traffic, safety, unfriendliness, noise, prefers another area or dislikes area). About 60% of people who dislike their neighbourhood indicate they would like to move specifically for area-related reasons and 7% of people who like their neighbourhood would also like to move for area-related reasons. This either indicates that there is not a complete overlap between what people consider to be the neighbourhood or the area they live in, or that people like their neighbourhood but would still prefer to move given the choice. Nevertheless, the correlation between these two variables is in line with what might be expected. The result presented in column 4 is consistent with subjective evaluations of area attributes conveying useful information; people who like the neighbourhood they live in report higher levels of well-being whereas people who would prefer to move owing to area-related reasons report lower levels of well-being. Nevertheless, it does not explain the association between house prices and well-being. This is perhaps not surprising given that house prices increased dramatically over such a small time frame and over the country as a whole, and it is less likely that this pattern would have been driven by area improvements.

The final column includes all variables simultaneously. The result suggests that house prices matter to well-being even after taking into account a number of alternative explanations that may affect both house prices and well-being. It appears to be easier to rule out what does not explain this association than pinpoint what does. One remaining possibility is that house prices are a barometer of general confidence in the economy (in a more general sense than earnings expectations) so that people may feel better when house prices rise owing to the perception that a strong performance in the housing market indicates a favourable economic outlook. Coverage of the housing market is often bundled together with coverage of the economic climate by the media so it is not surprising

that people might make a connection between the two outcomes.

5.1 Robustness checks

Between the first quarter of 1997 and the third quarter of 2007, the average UK homeowner saw the value of their property rise by just over £100 000. If such rapid increases in house prices were unexpected, this amounts to non-trivial positive wealth shocks for homeowners and equally, to non-trivial negative wealth shocks for non-homeowners. Yet this study finds no evidence that house prices affect well-being through housing wealth effects. This section discusses a number of specification checks performed to ensure that this result is robust (results are available from the author on request).

One reason why wealth effects may not materialise is that, for optimising individuals, behavioural responses occur only after unexpected variations in wealth. House price levels may be a noisy measure of house price shocks, leading to measurement error bias. Insofar as residuals from an AR(1) process in house prices provide a good measure of house price shocks (Disney et al. (2010) use employ residuals from an AR(2) process), there is no evidence to suggest that modelling house price shocks reverses the conclusions from this study. With respect to the specification of house prices, more generally, it makes no difference to the results whether log levels, levels, changes or growth rates in house prices are used.

Perhaps wealth effects are not found because, even though this study uses a very low level of spatial disaggregation, there remains substantial measurement error in using postcode area house prices. As a further check, a second house price dataset covering a slightly smaller geography (councils, boroughs and metropolitan districts) and containing property specific house prices (detached, semi-detached, terraced and flats) is matched to individuals in the BHPS.[13] These data allow a better measure of potential fluctuations in wealth, because each individual is matched with the average house price for the property they actually own. This may be important as more expensive detached properties experience larger increases in value when house prices rise. For renters, the house prices that actually matter, are of property types that renters are looking to buy. While this is unknown, a reasonable approximation is likely to be given by the purchase price of flats. These data also allow a test of whether changing sales composition i.e an increased number of detached houses sold relative to terraced houses, which may affect the observed average price in the postcode area series when house prices do not actually change, is problematic. A disadvantage of this new dataset is that house price information is only available from 1995, which only spans the upturn in the housing market cycle, and is only available for England and Wales. As it transpires, there is very little difference between using property specific house prices and postcode area house price with the same sample. Overall, however these estimates are smaller in magnitude, and are statistically significant only in the case of property specific house prices. As an illustration, when using

[13]These data are available from `http://www.landreg.gov.uk/houseprices/`.

property specific house prices, the estimated marginal effect of house prices on the well-being of outright homeowners and private renters is 0.026 and 0.055 respectively. The same figures for the postcode area series are 0.022 and 0.035 and are roughly half the size of the effects reported in table 2 above. If anything, these results highlight the importance of looking at house prices over the entire housing market cycle.

The remaining tests concentrate on more general specification issues. In the first instance, additional variables are added to equation 1. These are the log of net monthly housing costs, an indicator for whether a person has moved in the past year and whether an individual's partner is employed or unemployed (if a partner is present in the household). Housing costs are excluded from the main analysis because rental costs are likely to rise when house prices rise, and is one reason why renters may become less happy according to a wealth mechanism, or why their happiness does not change, according to an area attributes explanation. For completeness, the robustness analysis verifies what happens when housing costs are taken into account. The mover indicator controls for the possibility that house prices change substantially when an individual moves across an area, which may be systematically correlated with house price fluctuations if people typically move to areas with higher house prices. A partner's unemployment status takes into account that people may care about their partner's employment status, in addition to their own employment status, and employment conditions vary with the business cycle.[14] For the most part, these variables do not matter for well-being, except the indicator for spousal unemployment, which is negative and significantly different from zero, so adding these extra variables does not change the main message of the paper.

To account for possibility that the well-being of homeowners evolves differently that of renters over time, perhaps because the composition of these groups changes over time, aggregate year fixed effects are replaced with homeowner and non-homeowner specific year fixed effects. While there is some evidence to suggest that homeowners report lower well-being than renters in the early 90's (many homeowners were in negative equity at this time), the estimated interaction terms do not change.

To guard against the possibility that tenure status is endogenous, all tenure status variables are excluded and the analysis is repeated using house price/age interactions as age is exogenous but linked to tenure status (Attanasio et al., 2009). The following age groups are defined; young ($<$40), middle-aged (40-59) and old ($\geq$60) people. Older households are more likely to be homeowners looking to downsize (but 20% of this group are not homeowners) whereas younger households are more likely to either be non-homeowners or homeowners looking to trade up the housing ladder. In this instance, comparing the influence of house prices on young people with that on old people provides evidence of whether wealth or economic factors matter. The results are consistent with previous findings. When excluding 'alternative explanation' variables (see table 3), the influence of

[14]These variables are not used in the main analysis because they require that both household members fill in an individual survey.

house prices on the well-being of young people is positive but insignificant whereas it is statistically significant when including these variables. In both cases, it is not possible to reject the hypothesis that all estimated marginal effects are equal to each other.

Finally, as the GHQ is made up of 12 component questions, it is possible to analyse whether any specific components of well-being drive these results. House prices are most strongly linked to decision making, and reducing strain and unhappiness, and least strongly linked to enjoying day-to-day activities and helping people to face problems, but there is no single component driving this association. The finding that house prices are barely associated with individuals reporting a greater ability to enjoy day-to-day activities is interesting because it provides a further, albeit small, piece of evidence that this association is not driven by area attributes.

6 Conclusion

This paper examines whether house prices influence well-being, and whether this effect runs via wealth or whether other factors, such as economic conditions, drive both house prices and well-being. In contrast to previous research, the role of house prices is not, a priori, assumed in the empirical strategy. Instead, this paper looks separately at homeowners and non-homeowners to identify why house prices matter, as these different mechanisms have contrasting implications for homeowners' and renters' well-being. For example, a wealth effect is consistent with diverging well-being by tenure status when house prices rise; homeowners are made wealthier but non-homeowners must save more to get onto the property ladder. On the other hand, economic conditions are unlikely to affect homeowners and non-homeowners in a substantially different manner. This implies that if other factors drive both house prices and well-being, the association between between house prices and well-being will be similar for both homeowners and non-homeowners.

The British setting provides the ideal context in which to study this issue owing to large fluctuations in house prices, combined with large regional variation in house price dynamics. By constructing a detailed house price dataset, which documents the average price of properties sold in cities and towns, this paper replicates with a high degree of precision, the house prices that people actually face. The analysis shows that a different research design, combined with panel data, leads to new and interesting findings. Both homeowners and non-homeowners report higher levels of well-being when house prices rise, which is not consistent with a wealth mechanism, and in spite of large increases in house prices. Rather this result suggests that other factors drive both house prices and well-being. The association between house prices and well-being is not explained by a proxy of earnings expectations, measures of area earnings and unemployment rates and subjective evaluations of the neighbourhood, leaving as a remaining possibility that house prices are a barometer of general confidence in the economy. A strong performance in the housing market may foster a 'feel good' insofar as it signals that the economic outlook is bright.

7 Data appendix

7.1 General Health Questionnaire

Here are some questions regarding the way you have been feeling over the past few weeks. For each question please ring the number next to the answer that best suits the way you have felt. Have you recently...

a) been able to concentrate on what you are doing?

Better than usual...1

Same as usual...2

Less than usual...3

Much less than usual...4

then

b) lost sleep over worry?

e) felt constantly under strain?

f) felt you couldn't overcome your difficulties?

i) been feeling unhappy or depressed?

j) losing confidence in yourself?

k) been thinking of yourself as a worthless person?

with responses:

Not at all...1

No more than usual...2

Rather more than usual...3

Much more than usual...4

then

c) felt that you were playing a useful part in things?

d) felt capable of making decisions about things?

g) been able to enjoy your day-to-day activities?

h) been able to face up to your problems?

l) been feeling reasonably happy, all things considered?

with responses:

More than usual...1

Same as usual...2

Less so than usual...3

Much less than usual...4

The Likert scale (36-point) aggregation incorporates the severity of symptoms experienced by subtracting one from each response score (1=0,2=1,3=2,4=3) and summing the new scores. As mentioned in the text, following previous studies, the Likert scale is re-ordered such that higher scores reflect better well-being.

7.2 Postcode area data

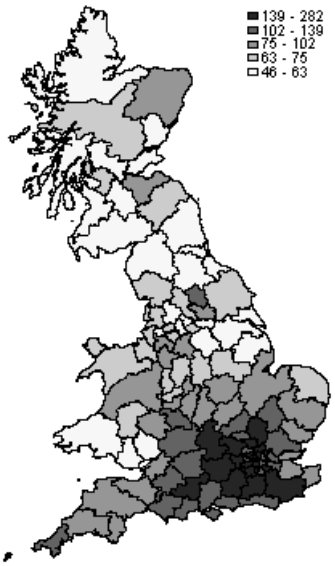
7.2.1 House prices

House price data are based on mortgage transactions recorded by The Halifax (the UK's largest mortgage provider). These data have been provided by HBOS (now part of Lloyds TSB) and measure the average price of properties sold in just over 750 post towns on a yearly basis from 1988 onwards. In addition, quarterly data on the average property sold in 32 London Boroughs begins in 1992. Post towns are collections of towns and villages that are grouped together to facilitate the delivery of mail to UK households. House price information is published only when 50 or more sales are made within a post town. Because some post towns are comparatively small, these data are incomplete. Therefore, the Royal Mail Posttown Gazetter is used to match post towns to postcode areas - the next tier of the postal delivery system - and an average postcode area house price is constructed from (larger) post towns with continuous time series data. For postcode areas in central London, an average house price for 1991 is constructed using the average house price observed in 1992, adjusted by the growth rate of house prices in Greater London between 1991 and 1992.

Figure 3 maps the postcode areas in Great Britain (excluding the Kirkwall postcode area in the North of Scotland)[15] and shows the distribution of house prices in 2000 (deflated to 2000 prices) in these areas. Darker areas indicate higher house prices. House prices are highest in London at £139 000+, followed by the South East, and lowest in South Wales, some areas in the North of England and in Scotland, where house prices range between £46 000-63 000.

[15]Postcode area shape files; Crown Copyright/boundary download 2008. An Ordnance Survey/EDINA supplied service.

Figure 3: Real postcode area house prices in 2000 (£1000's)



Source: Halifax House Prices and author's own calculations, deflated to 2000 prices.

7.2.2 Unemployment rates

Male and female unemployment rates are constructed by dividing the claimant count in a postcode area by the working age population. The JSA claimant count records the number of people claiming JSA and National Insurance credits at Job Centre Plus local offices and represents an unofficial measure of unemployment in postcode areas. Population data are taken from mid-year population estimates, which is available at (a lower geography) Local Authority District (LAD). A specialised geographic conversion tool - GeoConvert available at `http://geoconvert.mimas.ac.uk/index.htm` - is used to create postcode area level population information from LAD level data. Claimant counts and population data are taken from National Statistics (Nomis: `www.nomisweb.co.uk`) Crown copyright material is reproduced with the permission of the Controller Office of Public Sector Information (OPSI).

7.2.3 Earnings

Earnings data are taken from The New Earnings Survey (NES) and the Annual Survey of Hours and Earnings (ASHE). The NES is based largely on a 1% sample of employees appearing in the pay-as-you-earn (PAYE) taxation system covering all types of employees in all types of businesses. In October 2004 Annual Survey of Hours and Earnings (ASHE) replaced the New Earnings Survey (NES) although a back history of ASHE data from 1998 is available and is used in the present study. Both surveys report average earnings at county level. Counties are matched to postcode areas and average earnings are calculated for each postcode area. This process is complicated by changes to British counties from 1996 onwards, which increase the number of counties. In 1991 there are 96 counties (Greater London is treated as 32 rather than one area) but this number

increases to more than 200 over time. Earnings data are taken from National Statistics, (Nomis: `www.nomisweb.co.uk` and New Earnings Survey Journals) Crown copyright material is reproduced with the permission of the Controller Office of Public Sector Information (OPSI).

7.3 Additional results

7.3.1 Basic regression

Table 4: Determinants of well-being

	GHQ	
owner	0.376**	(0.190)
mortgaged	-0.010	(0.168)
private renter	0.025	(0.175)
ln net household weekly income	0.297***	(0.057)
aged 25-29	-0.281**	(0.128)
aged 30-34	-0.525***	(0.164)
aged 35-39	-0.607***	(0.203)
aged 40-44	-0.784***	(0.244)
aged 45-49	-0.901***	(0.284)
aged 50-54	-0.721**	(0.325)
aged 55-59	-0.567	(0.368)
aged 60-64	0.125	(0.413)
aged 65-69	0.381	(0.459)
partner	0.435**	(0.214)
widowed	-1.694***	(0.317)
divorced/separated	-0.722***	(0.240)
1 child	-0.292***	(0.112)
2 children	-0.384***	(0.148)
3+ children	-0.724***	(0.212)
kids aged 0-4	0.159*	(0.094)
kids aged 5-11	0.314***	(0.089)
kids aged 12-15	0.077	(0.094)
2 adults	-0.367**	(0.166)
3 adults	-0.691***	(0.182)
4+ adults	-1.020***	(0.207)
employed	0.812***	(0.093)
unemployed	-0.989***	(0.161)
individual fixed effects:	yes	
area fixed effects:	yes	
time fixed effects:	yes	
N	9852	
NT	82603	

*p<0.1, **p<0.05, ***p<0.01.
Standard errors in parentheses, clustered by individual.

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