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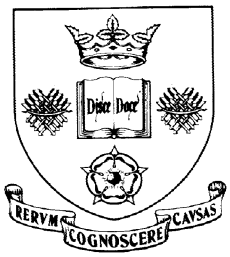

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Wealth Effects or Economic Barometer: Why Do House Prices Matter for Psychological Health?

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Wealth effects or economic barometer: Why do house prices matter for psychological health?*

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Abstract

This paper investigates whether house prices are linked to mental health outcomes, and whether this association arises through wealth effects or whether third factors such as area amenities or economic conditions drive both house prices and psychological health. These alternative explanations have contrasting implications for the effect of house prices on the well-being of homeowners and non-homeowners, which are exploited in the empirical analysis. I document a positive association between house prices and the mental health of homeowners and non-homeowners, which is not consistent with wealth effects. Further analysis indicates that house prices matter via a role as an economic barometer.

Keywords: Psychological health, House prices, Wealth, Economic conditions
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

In 1991 the average price paid for a house in the UK was £85 000. By 1995, following a slump in the housing market, the average price fell to £68 000. But over the next decade house prices more than doubled, fuelled by the rise in single adult households, increases in life expectancy and high levels of income growth (Nickell, 2009). By 2007 the average price reached £172 000.[1]

The ups and downs of house prices attract considerable media attention, and according to anecdotal reports house prices are a favourite topic of conversation at dinner parties.[2] With this in mind, this research asks whether house price dynamics are correlated with well-being as measured via psychological health. A number of reasons suggest this might be the case. For example, fluctuations in house prices of this magnitude may have a significant impact on household wealth, particularly since most UK household wealth is held as housing (Banks et al., 2004). Unexpected increases in house prices leave homeowners materially better off, which should make them feel better whereas the opposite is true for renters, whose economic situation deteriorates with increased property and rental values. But other mechanisms point to different pathways linking house prices and mental health. For example, improvements in area amenities and economic conditions may drive both house prices and well-being, with benefits accruing to homeowners and renters alike.

Data on well-being or psychological health are increasingly used to complement traditional research methods in economics.[3] The aim of this paper is to complement existing research on the welfare effects of house price booms and busts (see Attanasio et al., 2009, for a recent study of UK house prices and consumption levels). While changing consumption or leisure patterns may underpin any association between house prices and well-being, focusing on mental well-being may reveal new insights if non-pecuniary effects are relevant. For example, Di Tella et al. (2001, 2003) find that unemployment rates matter to reported well-being even after taking into account the effects of high unemployment levels on personal income and employment status. They suggest unemployment rates are informative of economic prospects and that high unemployment rates may induce a 'fear of unemployment'. Equally, house prices may assume the role of economic barometer, perhaps reflecting longer term economic prospects given that investment in property is a long-term

[1] Source: Halifax House Prices. All monetary values in this research are adjusted for inflation and correspond to the price level of 2000. The retail price index excluding mortgage interest payments (RPIY) is used to calculate inflation adjustments.

[2] In addition to reporting news about house prices, some national newspapers have web pages devoted to house prices (e.g. `http://www.guardian.co.uk/money/houseprices`, `http://www.telegraph.co.uk/finance/economics/houseprices/`).

[3] As a simplification, well-being, happiness, life satisfaction and psychological health are used interchangeably in this paper.

commitment.

To date very little is known about the relationship between house prices and well-being.[4] Using restricted access geographic identifiers, I match the average price of properties sold in cities and towns to individuals in the British Household Panel Survey (BHPS) between 1991-2006 and investigate this relationship by comparing the psychological health of homeowners to that of renters as house prices fluctuate. I find a positive association between house prices and mental well-being for both homeowners and non-homeowners, suggesting that house prices do not affect mental health through wealth effects. This association remains after controlling for variables at the individual level, such as income and labour market outcomes, and at the area level, such as proxies of area amenities and unemployment rates and earnings, that may be changing at the same time as house prices. In further analysis, I show that parents with young children in the household, who ought to care more about unmeasured area amenities, such as good schools or crime, are less sensitive to house prices than others, which further weakens the support for an amenities explanation. This indicates that house prices may matter as an independent economic barometer of longer term economic prospects. Consistent with this notion, I present evidence that house prices matter more to individuals exhibiting a greater attachment to an area, for whom signals about future economic prospects are likely to bear more relevance.

The remainder of this paper is structured as follows; the next section discusses links between house prices and well-being and finishes with a review of the literature to date. Section 3 discusses the empirical methodology and data, Section 4 discusses the empirical evidence while Section 5 concludes.

2 Links between house prices and well-being

Wealth shocks

Buoyant housing markets may confer homeowners with sizeable positive wealth shocks.[5] 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 German reunification (Frijters et al., 2004) or lottery winnings (Gardner and Oswald, 2007) are exploited as sources of income and wealth shocks to investigate the 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 and affects the majority of households. Another possibility is that house prices

[4]Some evidence can be gleaned from studies that focus on a different research question but include house prices within the empirical specification as a control variable (Blanchflower and Oswald, 2004; Luttmer, 2005; Kotacorpi and Laamanen, 2010). These papers are discussed in the next section.

[5]King (1990) argues increased property values do not increase wealth among homeowners planning to remain in the same property for a long time and that genuine wealth increases are confined to homeowners looking to downsize. Conversely Skinner (1996) suggests all homeowners benefit from increased property values against which precautionary savings can be offset.

raise the net worth of homeowners, resulting in better access to credit (Iacoviello, 2004) or better terms of credit (Aoki et al., 2004). This is a slightly different story[6] but ultimately has the same implication for the well-being of homeowners. Conversely, renters are made worse off when house prices unexpectedly rise as renting and buying property becomes more expensive, and we would expect their well-being to fall as a result.

Area amenities

House prices may be linked to well-being because they capture the valuation placed on public services and amenities that are accessed by living at a particular address.[7] The evidence on whether public services (measured via government expenditure) affect well-being is limited; studies exploiting variation in local government expenditures find a positive, if any, effect of public expenditures on well-being (Wassmer et al., 2009; Kotacorpi and Laamanen, 2010) although better neighbourhood aesthetics (Dolan and Metcalfe, 2008) and proximity to green spaces and sports facilities (Knies et al., 2008) appear to have a positive influence on well-being. However, if people are sufficiently mobile, those placing little value on public services and amenities would move into neighbourhoods with lower housing costs and worse attributes, and vice versa, resulting in no association between house prices and well-being. In reality, there are significant switching costs, including transactions costs and psychological costs of leaving established networks, that may prevent equilibrium in housing and rental markets. Hence, house prices and mental health outcomes may be correlated owing to desirable area amenities.

Economic conditions and prospects

During economic booms and busts, people revise their income expectations, and correspondingly alter their consumption (including of housing) which, with a relatively fixed housing supply, influences house prices (King, 1990; Attanasio et al., 2009). A correlation between house prices and mental health may therefore arise through underlying changes in consumption and labour supply, which together with house prices, are driven by income expectations. But information contained in house prices about income expectations may separately influence mental well-being. For example, Di Tella et al. (2001, 2003) find that macroeconomic conditions (unemployment rates and GDP) influence reported life satisfaction even after taking into account the effect the economy has on personal income and employment, a result that implies people simply dislike economic woes, perhaps owing to a 'fear of unemployment' (see Blanchflower, 1991). So economic variables may matter over

[6]It describes an indirect rather than direct mechanism leading to higher current consumption. Better access to credit implies consumption is brought forward rather than increased over the life cycle whereas better terms of credit implies higher lifetime consumption through wealth effects resulting from lower interest rates.

[7]It is worth noting that while local public services may drive house prices, in the UK just 20-25% of local government finance is raised from local taxes (the remainder coming from central government), and house prices are not highly correlated with property values (Adam et al., 2007), indicating a limited scope for fluctuations in house prices to alter local tax revenues and public services.

and above the underlying changes in tangible outcomes because they convey news about economic prospects that affect anxiety levels.

Since house prices move in tandem with earnings and unemployment rates, people may report higher levels of well-being when house prices rise that echoes how they feel about rising incomes and falling unemployment. Alternatively, a strong performance in the housing market may foster a 'feel good' factor as a distinct barometer of economic prospects. This will be the case if house prices capture a separate dimension of the economic outlook compared to income levels and unemployment rates. One possibility is that house price statistics are produced with greater frequency (each month as opposed to each quarter) and simply provide a more timely stream of information relative to the other indicators. House prices may also be informative of income expectations over a longer horizon. For example, purchasing a house is one of the largest and long-term investments that people make, suggesting the decision to buy property takes into account the expected trajectory of the economy. As the housing market aggregates the actions of may individuals, it may provide a summary of the beliefs of many forward looking individuals with respect to longer term economic prospects. A related recent study by Deaton (2012) presents evidence that share prices and satisfaction with living standards in the US move together, even among groups unlikely to own shares, and moreover that the evolution of share prices better accounts for the evolution in satisfaction levels than unemployment rates. This evidence would be consistent with asset prices performing a role of economic barometer, and providing signals that are distinct from those conveyed in unemployment rates. The current research exploits time variation in asset prices across localities, purging any effect of asset prices that vary across time but not localities, such as shares.

Previous literature

To date no studies explicitly consider the relationship between house prices and well-being but some studies include house prices in the empirical analysis, and present different arguments for considering house prices. While investigating the impact of social comparisons on well-being Luttmer (2005) seeks to control for household wealth and finds that homeowners with more valuable homes (according to their own estimate) report higher levels of happiness. However, estimated property values confound wealth and investment in housing, the latter may influence well-being directly. Moreover, unobserved character traits such as optimism may influence both estimated house values and well-being. Subsequently, Luttmer constructs a measure local house prices to proxy for the local price level. The rationale is as follows; comparison income is measured as the average income of residents in the local area, and since higher incomes may simply reflect higher local prices, the finding that people dislike having wealthy neighbours may be symptomatic of lower real wages, hence the need to control for local prices. He finds a small negative but insignificant correlation between local area house prices and happiness. Similarly, Blanchflower and Oswald (2004) find a very small positive but insignificant correlation between regional house prices and happiness. Kota-

corpi and Laamanen (2010) analyse the relationship between municipal public health expenditures and life satisfaction. Since better public services are associated with higher house prices, and they argue higher house prices will offset any positive effect on well-being from higher expenditures, they control for local house prices. The association between house prices and well-being is again negative but insignificant.

A limitation of these studies is that, as the central research focus is directed elsewhere, the treatment of house prices is inappropriate. These studies impose the role of house prices in the empirical specification: an assignment of house price measures to homeowners and not renters implicitly assumes a wealth mechanism whereas restricting the effect of house prices to be the same across homeowners and renters implicitly assumes house prices proxy for third factors (e.g. the price level). In the latter specification, it may be that a lack of correlation between house prices and well-being on aggregate masks a disparate effect of house prices on the well-being of different groups in the population.

3 Empirical strategy

Methodology

This research analyses whether and why a relationship between house prices and well-being exists. A wealth mechanism suggests any effect of house prices on well-being will reflect changes in material circumstances so that homeowners feel better while renters feel worse when house prices rise. In contrast, both homeowners and renters are expected to benefit - and feel better - from an increase in house prices driven by improvements in local area amenities or economic conditions. Accordingly, I estimate the following equation:

$$\begin{aligned} \mathrm{Y_{ijt}} =& \sum_{\mathrm{g=1}}^{\mathrm{G}} \alpha_{\mathrm{g}} \mathrm{house\ prices_{jt}} * \mathrm{I\{tenure\ status_{it} = g\}} + \sum_{\mathrm{g=2}}^{\mathrm{G}} \psi_{\mathrm{g}} * \mathrm{I\{tenure\ status_{it} = g\}} \\ &+ \beta' \mathrm{z_{ijt}} + \delta_{\mathrm{t}} + \eta_{\mathrm{i}} + \pi_{\mathrm{j}} + \mathrm{v_{ijt}} \end{aligned} \tag{1}$$

where $\mathrm{Y_{ijt}}$ is a measure of psychological health for individual i, in area j, at time t. $\mathrm{house\ prices_{jt}}$ measures the level of house prices faced by residents in that area and time period, which is interacted with tenure status to allow the effect of house prices on well-being to differ across homeowners and renters (see Attanasio et al. (2009) and Farnham and Sevak (2007) for similar applications to consumption and retirement behaviour). The measure of psychological health used here (and discussed below) ranges from 0 to 36 and is treated as a cardinal variable that can be estimated via a linear model. Taking this approach greatly facilitates computation of marginal effects, given the focus here on interaction effects, and permits straightforward handling of unobserved heterogeneity. Moreover, Ferrer-i-Carbonell and Frijters (2004) 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.

Four 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. Renters are also split into two groups as social renters may respond differently to other renters when house price rise given they are less likely to pay full rental costs, less likely to purchase a house and more likely to live in disadvantaged neighbourhoods.[8]

Differences in socio-economic and demographic characteristics are taken into account through the vector z_{ijt}. Initially the analysis controls for variables unlikely to be directly affected by house prices or variables correlated with house prices such as unemployment rates. This restricts the set of control variables to age dummies for each year of age, marital status and household composition. Intermediate variables such as income and labour market outcomes might soak up any correlation between house prices and well-being if, for example a wealth mechanism is relevant or if house prices merely correlate with local economic conditions that may affect personal outcomes. These variables are added later.

The specification also includes year dummies δ_t, area dummies π_j[9] and individual fixed effects η_i. As this model is estimated using a fixed effects estimator, the effect of house prices on mental health 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. 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.[10]

[8]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).

[9]These dummies are identified only from people that move across areas. Defining areas to represent smaller (towns/cities) or larger (regional) geographies makes very little difference to the results, nor does accounting for moving behaviour via individual dummies equal to one if an individual has moved since they were last surveyed.

[10]Results are robust to clustered standard errors at the level of aggregation of house prices.

Data

Data are taken from the British Household Panel Survey[11] (BHPS) between 1991 and 2006, which is the latest year in which household net income is available.[12] This is a nationally representative survey[13] of more than 5 000 British households (approximately 10 000 adults) and contains detailed information about each respondent. The period examined covers boom (late 2000's) and bust (early 1990's) phases in the housing market.

The BHPS contains a standard measure of mental well-being, the General Health Questionnaire (GHQ), which is frequently used to measure psychological stress (see inter alia Clark, 2003; Gardner and Oswald, 2007; Roberts et al., 2011). This measure is apt for studying whether non-pecuniary effects of house price booms and busts exist. The GHQ appears as part of the self-completed questionnaire administered to all household adults. 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 0-36 point Likert index of mental well-being that is recoded so that higher scores reflect better psychological health.[14] Details are provided in the Appendix.

Household income is measured as weekly household income net of national and local taxes/benefits. Taking into account what people pay for local public services is important since the costs and benefits of local public services are likely to be positively correlated. Better local public services improves well-being while higher costs of provision (paid for via higher taxes) reduce well-being and so any positive influence of area attributes reflected in house prices would be offset by negative effects of higher local taxes. Moreover, since social renters are less likely to pay local area taxes, this offsetting effect is likely to be weakest for this group. As a more general concern, disposable income matters for spending, which suggests net income is a better measure than gross income. Net income data is made available in the BHPS until 2006.

Since tenure status is available at the household level, the analysis is restricted to those individuals who report they are the principal owners or renters in a household (along with spouses if these are not directly listed as principal owners).[15] The sample is also restricted to respondents

[11]University of Essex. Institute for Social and Economic Research, British Household Panel Survey: Waves 1-18, 1991-2009 [computer file]. 7th Edition. Colchester, Essex: UK Data Archive [distributor], July 2010. SN: 5151.

[12]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.

[13]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.

[14]Results are similar when using a 12-point Caseness index of well-being.

[15]This sample restriction makes it possible to estimate wealth effects (if relevant) more cleanly. Relatives or lodgers residing with homeowners are technically renters and treating them as homeowners may dilute any housing wealth effects whereas treating them as renters ignores any pooling of household economic resources and thus that these individuals may too benefit from wealth effects. Without applying this sample restriction some 17% of male respondents are not the head of household whereas this fall to figure to 5% after applying the sample restriction.

Table 1: Summary statistics for BHPS sample

	mean	sd	min	max
GHQ	24.78	5.36	0	36
owner	0.20	0.40	0	1
mortgaged	0.58	0.49	0	1
private renter	0.07	0.26	0	1
age	43.83	12.77	20	69
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	0.63	0.48	0	1
self employed	0.09	0.29	0	1
unemployed	0.03	0.17	0	1
ln(weekly work hours+1)	2.52	1.63	0	4.61
ln(net household weekly income)	5.94	0.61	3.19	9.22
dividend $<$ £100	0.21	0.41	0	1
dividend £100-£999	0.22	0.42	0	1
dividend $\geq$ £1000	0.08	0.26	0	1
satisfied with area	0.92	0.27	0	1
prefers to move for area-related reason	0.11	0.32	0	1
% in area active in clubs	46.11	8.39	6.25	88.89
expectations: better	0.28	0.45	0	1
expectations: worse	0.11	0.31	0	1
area average house price/10 000	10.07	4.86	4.00	39.53
area average weekly earnings/10	37.21	7.99	22.40	72.90
area unemployment rate	4.22	3.59	0.35	25.37
N	82004			

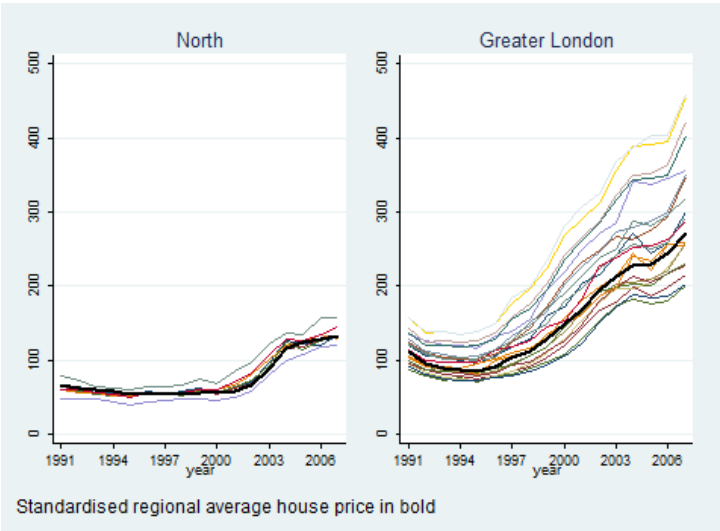
Prices adjusted for inflation using the RPI excluding mortgage interest payments (base year 2000).

aged 20-69.

I match the average house price by postcode area (e.g. cities and clusters of towns) to respondents in the BHPS, along with earnings and unemployment rates measured at the same geography. There are 124 postcode areas in the UK and 115 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.[16] 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 neighbouring Bath.[17] Details of all postcode area data used in this analysis can be found in the Appendix, which includes a map of postcode areas in Great Britain. Summary statistics of all variables are provided for the BHPS sample in Table 1.

Figure 1 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. For example, the dramatic rise in house prices is 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, they tripled in some areas of Greater London. Figure 1 also highlights the extra variation provided by postcode area house prices compared to regional average house prices (in bold).

Figure 1: Postcode area house prices in the North of England and in Greater London (£1000's)



Source: Halifax House Prices, deflated to 2000 prices.

A possible drawback to such localised house price data is that prices are not standardised (i.e. adjusted for the composition of sales) and simply reflect the average of all properties sold in an area. Changes in sales composition affect the average price. But while this 'noise' is stripped out of standardised series, these series are available at regional geographies only. Hamnett (1999) suggests

[16]Source: Office for National Statistics.
[17]Source: National Statistics Postcode Directory 2006.

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 1 where the standardised regional average house price series exhibits the same trend as unstandardised postcode area house prices during this period.

4 Results

Table 2 reports the main results of this paper. For brevity only house price terms are reported but a selection of results including other covariates can be found in Table 6 in the Appendix. Column 1 of Table 2 reports results using only demographic variables such as age, martial status and household composition as controls for individual characteristics. I find a positive and statistically significant correlation between house prices and the well-being of all homeowners and also private renters. While the estimated house price effect among social renters is smaller in magnitude and is not statistically significant, it is not statistically different from the effect estimated for the other groups (the p-value from a test of equality of coefficients is reported at the foot of Table 2). This evidence does not support a wealth mechanism but indicates that alternative mechanisms forge a link between house prices and well-being. In terms of the size of these estimated effects; a £10 000 increase in house prices increases GHQ scores by around 0.045 units, corresponding to less than 1% of the mean GHQ score.

Column 2 adds economic variables such as consumption (proxied by income and interest/dividends from investments), leisure (proxied by work hours) and employment status that may account for the observed correlation between house prices and mental well-being. These estimated effect of these variables conforms with previous evidence, for example, higher income and wealth increase mental well-being while more work hours and the experience of unemployment increase mental strain. The house price effect is somewhat reduced by adding these variables but it does not go away, indicating that changes in personal economic circumstances only partially explain this correlation. Including the household income variable permits a calculation of the amount of income that someone with the median net household weekly income could forfeit when house prices rise without undermining psychological health. A loss of £0.0053 of household net weekly income[18] (or 0.001 percent of median income) could be offset by a £1 annual increase in house prices. Over the period examined, the average change in house prices is just under £9 500, or £182 per week, so loosely speaking the implied weekly trade-off is closer to £1 (0.2 percent of median income). This trade-off is substantial partly because income has little effect on mental well-being (even without including proxies of wealth in the regression specification).

A concern is that tenure status responds to unobserved factors that affect well-being or that well-

[18]This is calculated as $403 * [1 - exp((-0.0000039)/0.299)]$ where 403 is the median household net weekly income, 0.0000039 is the coefficient for mortgaged homeowners divided by 10 000, and 0.299 is the coefficient on net weekly income from column 2 of Table 2.

Table 2: House prices and GHQ scores

	(1)	(2)	(3)
house price*outright owner	0.039**	0.036*	
	(0.018)	(0.018)	
house price*mortgaged owner	0.043**	0.039**	
	(0.017)	(0.017)	
house price*private renter	0.055**	0.047*	
	(0.028)	(0.028)	
house price*social renter	0.033	0.020	
	(0.023)	(0.023)	
house price*old			0.039**
			(0.019)
house price*middle			0.036**
			(0.018)
house price*young			0.038*
			(0.020)
employed		1.086***	1.087***
		(0.140)	(0.140)
self employed		1.179***	1.185***
		(0.173)	(0.173)
unemployed		-0.993***	-0.990***
		(0.162)	(0.162)
ln(weekly work hours+1)		-0.096**	-0.099***
		(0.038)	(0.038)
ln(net household weekly income)		0.299***	0.288***
		(0.057)	(0.057)
dividend < £100		0.186***	0.185***
		(0.054)	(0.054)
dividend £100-£999		0.235***	0.240***
		(0.058)	(0.058)
dividend ≥ £1000		0.430***	0.450***
		(0.087)	(0.087)
N	9513	9513	9513
NT	82004	82004	82004
p-value	0.873	0.742	0.971

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

Dependent variable: GHQ (36-point index of mental well-being).

House price levels scaled by a factor of 10 000.

All specifications include demographic variables, area and time dummies.

Column 2 adds income and labour market variables.

Column 3 repeats Column 2 with house price*age interactions.

p-value: tests equality of house price interaction terms.

being influences tenure decisions. While significant costs incurred when changing tenure status or location (e.g. estate agent and legal fees, stamp duty, opportunity cost of search, and psychological costs from losing established networks) are likely to deter such moves, this possibility cannot be ruled out altogether. An alternative and exogenous proxy for tenure status suggested by Attanasio et al. (2009) is age: older people are more likely to be homeowners while younger people are more likely to want to trade-up the housing ladder. Thus as an alternative specification three groups are constructed on the basis of age: young <40, middle-aged 40-59 and old 60+. Column 3 therefore repeats the analysis in Column 2 but interchanging the house price and tenure interaction terms with house price and age. It is evident that people of all age groups report better mental well-being when house prices rise, corroborating the previous result.

The evidence so far is not consistent with a link between house prices and well-being driven by wealth effects, since all tenure and age groups report higher levels of well-being when house prices rise. Moreover, changes in personal economic circumstances e.g. modifications to consumption and labour supply provide only a partial explanation for the observed relationship. This leaves two remaining possibilities; house prices reflect local area amenities or local economic conditions. In the latter case, house prices simply correlate with established indicators of economic activity such as income and unemployment or relay unique information about economic prospects. Table 3 investigates further. Column 1 includes variables to capture the appeal of living in a particular area. For example, if people are satisfied with local public and private infrastructure they are more likely to respond positively to question *'Overall do you like living in this neighbourhood?'* and less likely to indicate they want to move because of an area related reason (BHPS respondents are asked *'If you could choose, would you stay here in your present home or would you prefer to move somewhere else?'* and those stating a preference for moving are asked to indicate the main reason why they feel that way, which includes options such as 'traffic', 'area unsafe', 'unfriendly area', 'noise', 'to specific area' and 'dislikes area').[19] Moreover, some areas are characterised by high levels of community and civic engagement, and greater opportunities for social interaction. The percentage of people in an area who actively participate in an organisation, such as environmental, voluntary, or sports group is used to capture this aspect of living at a particular address.[20] All these proxy measures of area amenities are linked to mental health outcomes. For example, people who

[19]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.

[20]Respondents are asked if they actively participate in either of the following organisations; political party, trade union, environmental group, parent's association, tenant or residents group, religious group, voluntary group, other community group, social group, sports club, Women's Institute, women's group, other organisation. This information is asked annually between 1991-1995 and then bi-annually with the following additional organisations included; pensioners association, Scouts/Guides, and professional organisation. The percentage of people by postcode area who actively participate in these groups is calculated, using the average across t-1 and t+1 from 1995. High rates of participation in a minority of postcodes can be attributed to low sample size in a postcode, though ultimately it is the variation in participation rates over time that is used to estimate desired effects.

like the neighbourhood they live in report higher levels of psychological health but those wanting to move for an area-related reason experience higher levels of psychological strain. Mental well-being is also better in areas that provide more opportunities for social engagement. Nevertheless the association between house prices and psychological health remains, suggesting that while local area amenities are important to people they are unlikely to be the reason why house prices matter.

Table 3: House prices, area characteristics and GHQ scores

	(1)	(2)	(3)	(4)	(5)
house price*outright owner	0.038**	0.043**	0.036*	0.040**	0.050***
	(0.018)	(0.019)	(0.018)	(0.018)	(0.019)
house price*mortgaged owner	0.041**	0.046**	0.039**	0.041**	0.051***
	(0.018)	(0.018)	(0.017)	(0.017)	(0.018)
house price*private renter	0.050*	0.054*	0.047*	0.049*	0.058**
	(0.028)	(0.029)	(0.028)	(0.028)	(0.028)
house price*social renter	0.018	0.027	0.020	0.019	0.025
	(0.023)	(0.024)	(0.023)	(0.023)	(0.023)
satisfied with area	0.718***				0.700***
	(0.097)				(0.097)
prefers to move for area-related reason	-0.141**				-0.144**
	(0.070)				(0.069)
% in area active in clubs	0.009***				0.009***
	(0.003)				(0.003)
area average weekly earnings/10		-0.020			-0.021
		(0.017)			(0.017)
area unemployment rate			-0.009		-0.009
			(0.017)		(0.017)
expectations: better				0.278***	0.278***
				(0.045)	(0.045)
expectations: worse				-0.745***	-0.738***
				(0.062)	(0.062)
N	9513	9513	9513	9513	9513
NT	82004	82004	82004	82004	82004
p-value	0.63	0.75	0.75	0.66	0.57

Demographic and economic variables, area and time dummies included. See notes to Table 2.

The remaining analysis presented in Table 3 explores whether business cycle variables explain the link between house prices and mental well-being. Columns 2 and 3 include measures of area earnings and unemployment rates since house prices may reflect how people feel about higher unemployment rates and rising incomes. Both variables are constructed to be gender-specific so that male earnings/unemployment rates are matched to men and female earnings/unemployment rates to women. If, as argued in Di Tella et al. (2003), people worry about losing their jobs, gender specific unemployment rates are more appropriate. Higher area earnings reduce well-being, which is consistent with a comparison income effect with regard to one's neighbours' earnings (see

inter alia Blanchflower and Oswald, 2004; Luttmer, 2005) as opposed to a prospering local area making everyone feel better, however it is not possible to reject the hypothesis that this effect is zero. Higher unemployment levels lead to a minor reduction in well-being but this effect is not precisely determined either. These results indicate that signals contained in house prices about local economic prospects supersedes information contained in other economic indicators.

Column 4 includes financial expectations, which may, to some extent, reflect beliefs about forthcoming economic circumstances. In the BHPS respondents are asked *'Looking ahead, how do you think you yourself will be financially a year from now, will you be'* where respondents can select *'Better than now'*, *'Worse than now'*, *'About the same'*. Reverse causation may be a potential issue with this variable but there are no obvious variables to use as an instrument. While optimistic expectations are linked to better well-being and pessimistic expectations are linked to poorer well-being, there is little evidence that financial expectations explain the correlation between house prices and well-being. There are, however, good reasons to believe that house prices would matter over and above financial expectations. Firstly, house prices may be a better measure of forthcoming economic circumstances. For example, financial expectations for the year ahead are not necessarily an accurate predictor of financial realisations (Brown and Taylor, 2006). In contrast, house prices summarise the beliefs and behaviour of many individuals and averages, by giving less weight to exaggerated expectations, are more accurate. Secondly, signals contained in house prices may reflect economic prospects over a longer horizon compared to expectations for the year ahead. Thirdly, house prices provide supplementary information to one's own beliefs and may be valued precisely for that reason. For completeness, column 6 includes all variables simultaneously.

While including variables to capture area amenities and economic conditions provides one way to test why house prices are correlated with mental health outcomes, a lack of support for an explanation grounded in area amenities may reflect a failure to control for all relevant area amenities. In alternative tests to shed light on the mechanism through which house prices are linked to mental health, I look for heterogenous effects across different groups of the population. For example, school quality, transport and crime are known to determine UK house prices (see Gibbons and Machin, 2008, for a review) and arguably parents care more about school quality and crime than others. Therefore if house prices reflect the quality of unmeasured area amenities one might expect the psychological health of parents with young children (aged<16) to be more sensitive to developments in house prices. However, separate analysis across people with and without young children in the household (the latter includes people whose children are grown-up/have left the parental home) does not lend support to this argument. Results reported in the first two columns of Table 4 suggest that parents care more about area amenities, as measured via satisfaction with the area and social interaction levels, but there is little evidence that parents care more about house price fluctuations, and hence that house prices proxy for the amenities accessed by living at a particular address. The smaller sample of parents makes is difficult to estimate the house price effects with precision, but the magnitude of the estimated effects are for the most part similar across both groups. Interestingly, the

Table 4: House prices, area characteristics and GHQ scores, by sub-groups

	(1) no children	(2) children	(3) <7yrs	(4) 7yrs+
house price*outright owner	0.046*	0.020	0.043	0.048**
	(0.024)	(0.046)	(0.051)	(0.021)
house price*mortgaged owner	0.036	0.055	0.009	0.053***
	(0.025)	(0.034)	(0.036)	(0.020)
house price*private renter	0.064*	0.070	-0.023	0.077*
	(0.038)	(0.053)	(0.040)	(0.043)
house price*social renter	0.058*	-0.004	0.003	0.032
	(0.031)	(0.044)	(0.051)	(0.026)
satisfied with area	0.530***	0.748***	0.698***	0.712***
	(0.125)	(0.152)	(0.176)	(0.116)
prefers to move for area-related reason	-0.113	-0.200*	-0.201	-0.085
	(0.087)	(0.116)	(0.150)	(0.079)
% in area active in clubs	0.004	0.019***	-0.003	0.013***
	(0.004)	(0.006)	(0.007)	(0.004)
area average weekly earnings/10	-0.012	-0.038	0.020	-0.022
	(0.022)	(0.029)	(0.035)	(0.019)
area unemployment rate	-0.023	0.031	-0.003	-0.016
	(0.024)	(0.030)	(0.048)	(0.019)
expectations: better	0.262***	0.331***	0.332***	0.268***
	(0.061)	(0.070)	(0.102)	(0.051)
expectations: worse	-0.715***	-0.811***	-0.426***	-0.820***
	(0.077)	(0.107)	(0.122)	(0.071)
N	7707	4507	4824	5360
NT	50504	31500	18059	63945
p-value	0.73	0.26	0.55	0.67

Demographic and economic variables, area and time dummies included in columns 1 & 2.
Demographic and economic variables, region and time dummies included in columns 3 & 4.
See notes to Table 2.

house price effect among social renters without young children in the household is now statistically significant. This result would be consistent with house prices reflecting local economic prospects as opposed to area amenities. For example, social renters with young children in the household are more likely to be lone mothers with limited labour market attachment and removing this group from the pool of social renters (as is done in column 1) also removes any dampening effect associated with a group of people potentially unconcerned with local economic prospects.

If house prices are a barometer of longer term economic prospects, house price dynamics ought to be most relevant to people planning to stay in an area. On the other hand, if house prices reflect area amenities, a person's level of attachment to an area should matter less given that all residents experience the benefits of local public and private infrastructure.[21] The remainder of Table 4 investigates whether people exhibiting a greater attachment to an area also exhibit a greater sensitivity to local area house prices. The average number of years that people are observed to live in a postcode area is 7.5 years in the BHPS sample. Hence the third column focuses on people living in an area for less than 7 years (i.e. short term residents) and the fourth on people living in an area for at least 7 years (i.e. longer term residents).[22] In these regressions, the area dummies are replaced with regional dummies since fewer moves makes it more difficult to identify the former, though ultimately the results are unchanged by this swap. Columns 3 and 4 indicate that house prices matter more to people exhibiting a greater attachment to an area; the magnitude of estimated house price effects is always larger among this group. Together with all the other evidence presented in this paper, the picture that emerges is that house prices do not matter to mental health via wealth effects or because they capture area amenities (this is perhaps not surprising considering that improvements to area amenities would need to be quite substantial to generate the increases in house prices witnessed in recent years).[23] The most likely explanation for the observed correlation between house prices and mental health is that house prices are informative of longer term economic prospects.

Sensitivity analysis

These results indicate that both homeowners and renters report better mental well-being when house prices rise. This is a novel result; previous research indicates a positive relationship exists between estimated property values and the well-being of homeowners (Luttmer, 2005) but no relationship between regional house prices and well-being (Blanchflower and Oswald, 2004; Luttmer, 2005; Kotacorpi and Laamanen, 2010). One reason why the findings of this research differ may be

[21]While the price of a house reflects the expected future stream of rental payments - and hence expected future area amenities - without a proposed policy to build public transport networks or a school or a prison, the current price is likely to reflect currently available amenities that are expected to persist over time.

[22]Note that people with young children in the households are not necessarily more likely to exhibit greater levels of attachment to an area than those without which includes people whose children are grown-up/have moved out of the parental home and who typically remain at the same residence afterwards.

[23]For similar reasons, it is very unlikely that reverse causality between mental health and house prices would explain this results.

due the research design, which focuses on homeowners and renters and takes into account unobserved heterogeneity. Another reason may be that this research focuses on a composite index of psychological health, which differs from reported happiness or life satisfaction (although in practice factors measured by the GHQ most likely contribute to a sense of well-being). To rule out the latter explanation, Table 5 replicates the analysis presented in previous research. For example, column 1 includes the (natural log of) the house value - estimated by homeowners themselves - as a measure of housing wealth (set to zero for renters) while column 2 includes area level house prices without reference to tenure status. Both specifications are estimated using an ordinary least squares (OLS) estimator. Consistent with previous evidence I find that homeowners with more valuable housing assets report better levels of mental well-being and I find no evidence that area house prices influence mental well-being.

Table 5: A replication exercise

	(1)	(2)
ln(house value+1)	0.041***	
	(0.015)	
house price		0.011
		(0.016)
N	82004	82004

Demographic and economic variables, area and time dummies included. See notes to Table 2.

I also use different specifications for house prices, for example, using the log of house prices to relax the linearity assumption, and decomposing the observed house price level into an expected and unexpected component using predicted and residual values from an AR(1) process in house prices. Results are robust to alternative treatments of house prices (available upon request).

Finally, I analyse which factors contributing to psychological health are particularly sensitive to house price fluctuations. These results indicate that people are less likely to report issues with strain, making decisions, overcoming difficulties, feeling unhappy, feeling worthless or useless when house prices rise, suggesting house prices are associated with relaxed or anxious states of mind (available upon request).

5 Conclusion

This paper examines whether house prices are linked to mental health outcomes, and whether any association is explained by a wealth mechanism, area amenities or economic conditions. These alternative explanations have contrasting implications for the effect of house prices on the mental well-being of homeowners and renters. For example, according to a wealth mechanism, unexpected increases in house prices leave homeowners materially better off, which should make them feel

better whereas the opposite is true for renters, whose economic situation deteriorates. On the other hand, improvements in area amenities and economic conditions may drive both house prices and well-being, with benefits accruing to homeowners and renters alike.

I document a positive correlation between house prices and the well-being of both homeowners and renters, which is not consistent with a wealth mechanism. This association remains after controlling for proxies of area amenities and current economic conditions. Further analysis also indicates that parents of young children are not more sensitive to house price fluctuations, as might be expected if house prices capture the value of unmeasured area amenities, such as school quality or crime. A remaining explanation is that house prices project signals about longer term economic prospects that in turn affect anxiety levels. Consistent with this notion, I present evidence that house prices matter more to individuals exhibiting a greater attachment to an area, for whom signals about future economic prospects are likely to bear more relevance.

6 Appendix

Table 6: Full regression results

	(1)		(2)		(3)	
house price*outright owner	0.039**	(0.018)	0.036*	(0.018)	0.050***	(0.019)
house price*mortgaged owner	0.043**	(0.017)	0.039**	(0.017)	0.051***	(0.018)
house price*private renter	0.055**	(0.028)	0.047*	(0.028)	0.058**	(0.028)
house price*social renter	0.033	(0.023)	0.020	(0.023)	0.025	(0.023)
owner	0.296	(0.286)	0.171	(0.285)	0.017	(0.284)
mortgaged	-0.022	(0.250)	-0.196	(0.250)	-0.329	(0.249)
private renter	-0.160	(0.322)	-0.240	(0.322)	-0.365	(0.322)
partner	0.475**	(0.215)	0.402*	(0.215)	0.422**	(0.214)
widowed	-1.592***	(0.319)	-1.691***	(0.319)	-1.702***	(0.319)
divorced/separated	-0.718***	(0.242)	-0.713***	(0.241)	-0.702***	(0.240)
2 adults	-0.236	(0.165)	-0.359**	(0.167)	-0.376**	(0.167)
3 adults	-0.460***	(0.178)	-0.669***	(0.183)	-0.686***	(0.183)
4+ adults	-0.726***	(0.202)	-0.987***	(0.209)	-1.014***	(0.209)
1 child	-0.333***	(0.114)	-0.281**	(0.113)	-0.287**	(0.113)
2 children	-0.435***	(0.151)	-0.360**	(0.151)	-0.406***	(0.150)
3+ children	-0.753***	(0.215)	-0.682***	(0.214)	-0.730***	(0.213)
kids aged 0-4	0.061	(0.094)	0.137	(0.094)	0.129	(0.094)
kids aged 5-11	0.339***	(0.090)	0.321***	(0.090)	0.308***	(0.089)
kids aged 12-15	0.143	(0.095)	0.095	(0.095)	0.100	(0.095)
employed			1.086***	(0.140)	1.069***	(0.139)
self employed			1.179***	(0.173)	1.138***	(0.172)
unemployed			-0.993***	(0.162)	-0.999***	(0.162)
ln(weekly work hours+1)			-0.096**	(0.038)	-0.089**	(0.038)
ln(net household weekly income)			0.299***	(0.057)	0.305***	(0.057)
dividend $<$ £100			0.186***	(0.054)	0.190***	(0.053)
dividend £100-£999			0.235***	(0.058)	0.240***	(0.057)
dividend $\geq$ £1000			0.430***	(0.087)	0.435***	(0.087)
satisfied with area					0.700***	(0.097)
prefers to move for area-related reason					-0.144**	(0.069)
% in area active in clubs					0.009***	(0.003)
area average weekly earnings/10					-0.021	(0.017)
area unemployment rate					-0.009	(0.017)
expectations: better					0.278***	(0.045)
expectations: worse					-0.738***	(0.062)
age dummies:	yes		yes		yes	
area dummies:	yes		yes		yes	
time dummies:	yes		yes		yes	
N	9513		9513		9513	
NT	82004		82004		82004	

Column 1 replicates column 1 of Table 2.
Column 2 replicates column 2 of Table 2.
Column 3 replicates column 5 of Table 3
.

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 (i.e. 1=0,2=1,3=2,4=3) and summing. I re-code the Likert scale so that higher scores reflect better mental well-being.

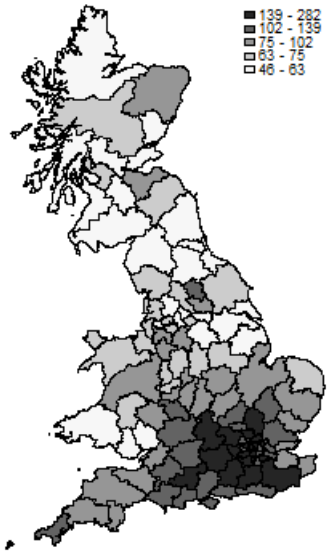
Postcode area data

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 2 maps the postcode areas in Great Britain (excluding the Kirkwall postcode area in the North of Scotland)[24] 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.

Figure 2: Real postcode area house prices in 2000 (£1000's)



Source: Halifax House Prices and author's own calculations.

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

Unemployment rates

Male and female unemployment rates are calculated from claimant counts and working age population data available from Nomis.[25] The claimant count records the number of people claiming Job Seekers Allowance and National Insurance credits at Job Centre Plus local offices and represents an unofficial measure of unemployment in postcode areas. Administrative data contains the entire population of claimants and is unaffected by sampling variability, which tends to plague the official measure of unemployment (based on the Labour Force Survey) at sub-regional geographies.[26] Mid-year population estimates are available at (a lower geography) Local Authority District (LAD) and the online tool GeoConvert[27] is used to create postcode area level population information from LAD level data.

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).

[25] Nomis: `www.nomisweb.co.uk` Crown copyright material is reproduced with the permission of the Controller Office of Public Sector Information (OPSI).

[26] While there is a great deal of overlap between unemployment measured via claimant counts and the Labour Force Survey (LFS), these estimates differ because some people do not claim benefits but are unemployed. This includes people whose partner is working (who are therefore not entitled to claim benefits), students, the long-term sick and people who left their previous job voluntarily (for further details see `http://www.statistics.gov.uk/downloads/theme_labour/unemployment.pdf`). A comparison of UK employment rates between 1992-2006 constructed from the LFS and from claimant counts indicates both series are similar for men until 1995 but diverge afterwards, which reflects the last major change in benefit entitlement rules. For women, both series track each other over the entire period but estimates of unemployment rates based on claimant counts are consistently lower than LFS estimates, reflecting the fact that women may not be entitled to claim benefits if their partner is employed. Hence, postcode area unemployment rates based on claimant counts would consistently underestimate the true level.

[27] Developed by the Census Dissemination Unit at the University of Manchester, United Kingdom. Available at `http://geoconvert.mimas.ac.uk/index.htm`.

References

Adam, S., C. Emmerson, and A. Kenley (2007). A survey of UK local government finance. IFS Briefing Note 74, Institute for Fiscal Studies.

Aoki, K., J. Proudman, and G. Vlieghe (2004). House prices, consumption, and monetary policy: a financial accelerator approach. *Journal of Financial Intermediation 13*(4), 414–435.

Attanasio, O. P., L. Blow, R. Hamilton, and A. Leicester (2009). Booms and busts: Consumption, house prices and expectations. *Economica 74*, 20–50.

Banks, J., R. Blundell, and J. P. Smith (2004). Wealth portfolios in the United Kingdom and the United States. In D. A. Wise (Ed.), *Perspectives on the Economics of Aging*, Chapter 5, pp. 205–246. University of Chicago Press.

Blanchflower, D. G. (1991). Fear, unemployment and pay flexibility. *Economic Journal 101*(406), 483–496.

Blanchflower, D. G. and A. J. Oswald (2004). Well-being over time in Britain and the USA. *Journal of Public Economics 88*, 1359–1386.

Brown, S. and K. Taylor (2006). Financial expectations, consumption and saving: a microeconomic analysis. *Fiscal Studies 27*(3), 313–338.

Clark, A. E. (2003). Unemployment as a social norm: Psychological evidence from panel data. *Journal of Labour Economics 21*(2), 323–351.

Deaton (2012). The financial crisis and the well-being of Americans. *Oxford Economic Papers 64*(1), 1–26.

Di Tella, R., R. MacCulloch, and A. J. Oswald (2001). Preferences over inflation and unemployment: Evidence from surveys of happiness. *American Economic Review 91*(1), 335–341.

Di Tella, R., R. MacCulloch, and A. J. Oswald (2003). The macroeconomics of happiness. *The Review of Economics and Statistics 85*(4), 809–827.

Dolan, P. and R. Metcalfe (2008). Comparing willingness-to-pay and subjective well-being in the context of non-market goods. CEP Discusision Paper 890, Centre for Economic Peformance.

Farnham, M. and P. Sevak (2007). Housing wealth and retirement timing. Working Papers 172, University of Michigan, Michigan Retirement Research Center.

Ferrer-i-Carbonell, A. and P. Frijters (2004). How important is methodology for the estimates of the determinants of happiness? *Economic Journal 114*(497), 641–659.

Frijters, P., J. P. Haisken-DeNew, and M. A. Shields (2004). Money does matter! Evidence from increasing real income and life satisfaction in East Germany following reunification. *American Economic Review 94*(3), 730–740.

Gardner, J. and A. J. Oswald (2007). Money and mental wellbeing: A longitudinal study of medium-sized lottery wins. *Journal of Health Economics 26*(1), 49–60.

Gibbons, S. and S. Machin (2008). Valuing school quality, better transport and lower crime: evidence from house prices. *Oxford Review of Economic Policy 24*(1), 99–119.

Hamnett, C. (1999). *Winners and Losers: Home ownership in modern Britain*. UCL Press.

Hills, J. (2007). Ends and means: The future roles of social housing in England. Centre for Social Exclusion report 34, London School of Economics and Political Science.

Iacoviello, M. (2004). Consumption, house prices, and collateral constraints: a structural econometric analysis. *Journal of Housing Economics 13*, 304–320.

King, M. (1990). Is the UK balance of payments sustainable?: Disussion. *Economic Policy 5*(11), 348–395.

Knies, G., S. Burgess, and C. Propper (2008). Keeping up with the schmidts: An empirical test of relative deprivation theory in the neighbourhood context. *Journal of Applied Social Science Studies 128*(1), 75–108.

Kotacorpi, K. and J. P. Laamanen (2010). Welfare state and life satisfaction: Evidence from public health care. *Economica 77*, 565–583.

Luttmer, E. F. (2005). Neighbors as negatives: Relative earnings and well-being. *The Quarterly Journal of Economics 120*(3), 963–1002.

Nickell, S. (2009). The British housing market: What has been happening? *Oxonomics 4*, 10–18.

Roberts, J., R. Hodgson, and P. Dolan (2011). "It's driving her mad": Gender differences in the effects of commuting on psychological health. *Journal of Health Economics 30*(5), 1064 – 1076.

Skinner, J. S. (1996). Is housing wealth a sideshow? In D. A. Wise (Ed.), *Advances in the Economics of Aging*, Chapter 14, pp. 241–272. NBER.

Wassmer, R., E. Lascher, and S. Kroll (2009). Sub-national fiscal activity as a determinant of individual happiness: Ideology matters. *Journal of Happiness Studies 10*(5), 563–582.