

**THE WELFARE EFFECTS OF HOUSING  
ENVIRONMENTS AND LIVING CONDITIONS:  
EVIDENCE FROM NORTHERN IRELAND**

**TRINITY ECONOMIC PAPERS  
2006/14**

**MICHEÁL L COLLINS**  
Department of Economics  
Trinity College  
Dublin

This Draft: July 2006

# **The Welfare Effects of Housing Environments and Living Conditions: Evidence from Northern Ireland**

**MICHEÁL L COLLINS**

*email: mcollin@tcd.ie*

July 2006

## **Abstract**

This paper explores two hypotheses which empirically consider the relationship between housing variables and the welfare of individuals. The 1992 British Government White Paper on public health, entitled the *Health of the Nation*, stated that “the environment in which people live and work can have both favourable and adverse effects on their health and well-being”. Consequently, it continued, “government action to improve housing recognises the broad link between decent local environment and housing conditions and good health” (Department of Health, 1992:12, 27). Therefore, this paper assesses the nature and strength of the ‘link’ between individuals’ welfare and well-being levels and the housing environment and living conditions they experience. Furthermore, the paper considers the welfare impacts of changes to individuals’ experiences of these situations. To perform this analysis the paper uses a newly available dataset, wave one (2001) of the Northern Ireland Household Panel Survey.

**Keywords:** Housing, Health, Psychological Distress, Welfare, Northern Ireland

**JEL Classification:** I31, R29

## **Introduction**

Increasingly, social scientists have developed an interest in assessing the welfare status of people and populations in ways other than those based on measures of national output or income.<sup>1</sup> Among the paths followed to pursue that interest, one has led to a series of attempts to measure people's welfare status through assessments of psychological distress. This paper uses the twelve question General Health Questionnaire (GHQ-12) measure to consider levels and variations to individual's welfare outcomes. Using data from wave one (2001) of the Northern Ireland Household Panel Survey (NIHPS) the paper focuses on the role which housing environments and living conditions play in determining individual outcomes.

In Northern Ireland the GHQ-12 measure carries particular policy significance given that addressing psychological problems has been identified as a Government priority. Furthermore, the key policy target established as part of that programme is framed using the GHQ-12. That target aims "to reduce the proportion of people with a potential psychiatric disorder (as measured by the GHQ-12 score) by a tenth by 2010" (Northern Ireland, 2002:88). Thus, a central aim of this paper is to consider whether housing variables, and as a consequence housing policy, has a part to play in achieving that target.

Against that background, this paper considers two hypotheses. Both concern the relationship between housing variables and levels of welfare as captured by the GHQ-12 measure of psychological distress. The 1992 British Government White Paper on public health, entitled the *Health of the Nation* stated that "the environment in which people live

and work can have both favourable and adverse effects on their health and well-being”. Consequently, it continued, “government action to improve housing recognises the broad link between decent local environment and housing conditions and good health” (Department of Health, 1992:12, 27). Therefore, the roles of housing environment and housing quality are considered.

Initially the influence of the area, or environment, within which a dwelling is located is assessed. Previous studies have already provided an insight into this association. Using data from four socially contrasting areas in Glasgow, Sooman and Macintyre found that different qualities of neighbourhood environment had robust associations in the expected direction with self-assessed depression measures (1995:22). Similarly, Theodossiou found that Britons living in council housing estates, areas normally associated with below average housing environments, were more likely to report lower psychological well-being (1998:92, 95). When analysing the 1999 British Poverty and Social Exclusion (PSE) survey, Payne also found this association, however her results derived from cross tabulations and did not control for compounding effects from variables such as income on GHQ-12 outcomes (2000:17-18). Finally the 2003 Northern Ireland mental health strategy also suggests that the presence of a poor physical environment is likely to increase the probability of individuals being psychologically distressed (2003:18).

To measure the presence of a poor housing environment in the NIHPS, results from four variables have been combined. These collected information from respondents concerning the presence of each of the following housing environment problems: (i) noise from

neighbours, (ii) other street noise, (iii) pollution, grime or other environmental problems, and (iv) vandalism or crime in the area. Taken together the four items generate a Cronbach alpha reliability coefficient of 0.7124 (see table 1) and can therefore be regarded as collectively appropriate for measuring the presence of a poor housing environment.<sup>2</sup>

The presence of just one of these four indicators in a household's area is unlikely, by itself, to suggest that it is in a poor environment. Rather, it is the cumulative effect of these problems occurring simultaneously that generates a poor environment.<sup>3</sup> Given this, a threshold of two was set to identify households with a poor housing environment. Overall 12.5% of the Northern Ireland population were identified as living in dwellings located in areas which had two or more of these problems. Using this measure the first hypothesis examined in this paper states that:

*H1: individuals in Northern Ireland who live in a poor housing environment experience higher levels of psychological distress.*

The second hypothesis considers the association between housing conditions and psychological distress. In other examinations of this relationship, individual or collective indicators of this phenomenon have found that the presence of poor living conditions is associated with higher mental distress. Hyndman reached that conclusion when examining the health and living conditions of British Bengali tenants in London. He found an association between the presence of dampness and psychological ill health (1990:140). In their Glasgow study, Hopton and Hunt also found dampness to be a significant predictor of higher psychological distress (1996:59-60). More comprehensive

assessments of housing conditions have recorded similar relationships. Yen and Kaplan studied areas of sub-standard housing in Oakland, California and found that people in these areas were twice as likely to report high levels of depressive symptoms that those in other areas (1999:92). In Britain, Marsh *et al.* (1999:5-6) have also shown this relationship while Payne found that householders with multiple housing quality problems recorded higher GHQ-12 scores and that both these variables were positively related (2000:15, 17). The 2003 Northern Ireland mental health strategy also flags this issue as having a substantial impact on people's psychological well-being (2003:19).

**[Table 1, about here]**

To assess the presence of poor housing quality in the NIHPS, results from seven variables were combined. These collected information from respondents concerning the presence of each of the following problems with their accommodation: (i) shortage of space, (ii) too dark, not enough light (lack of light), (iii) lack of adequate heating facilities, (iv) condensation, (v) leaky roof, (vi) damp walls, floors and foundations, and (vii) rot in window frames or floors. Collectively the seven variables generate a Cronbach alpha reliability coefficient of 0.8512 (see table 1). There are therefore collectively appropriate for measuring the presence of poor quality housing.<sup>4</sup>

Like the housing environment indicators, the presence of just one of these indicators is unlikely, by itself, to indicate poor housing quality. Again a threshold must be set which recognises that multiple simultaneous experiences of these problems is indicative of poor

housing. Therefore a threshold of two was chosen with households at or above this level taken to be living in poor housing conditions. This threshold resulted in 16.8% of the Northern Ireland population being identified as belonging to that group. Using this measure the second hypothesis considered by this paper states that:

*H2: individuals in Northern Ireland who live in poor quality housing, experience higher levels of psychological distress.*

The data used to compile these indicators, and to test these hypotheses, represents a new data source offering insights into the nature of society in Northern Ireland. Wave one of the NIHPS is an extension of the British Household Panel Survey (BHPS) and was commissioned by Government Departments in Northern Ireland and the Economic and Social Research Council (ESRC) for the UK. Its intention was to address a deficit in the provision of comparable socio-economic data for Northern Ireland. The survey was carried out by the Central Survey Unit of the Northern Ireland Statistics and Research Agency. The questionnaire used was “largely similar” to that used by the BHPS but incorporated some changes in content due to local circumstances and some additional questions specific to Northern Ireland (Taylor *et al.*, 2005:A2-4, A4-25). Using a simple random sample of household addresses, a total of 1,978 households across Northern Ireland completed the survey. Within these households 3,458 individuals completed surveys giving a household response rate of 69% and a individual response rate for eligible adults of 89% (Taylor *et al.*, 2005:A5-12, A4-25). McGregor *et al.* (2003) have compared the results of the NIHPS to other datasets in Northern Ireland and found that on the key demographic characteristics the survey provided a representative sample of the Northern Ireland population.

## **Measuring Psychological Distress**

The process of measuring psychological distress within surveys evolves from Goldberg (1972) who developed a General Health Questionnaire (GHQ) with the intention to “differentiate psychiatric patients as a class from non-cases as a class” (Goldberg and Williams, 1991:5). When originally proposed in 1972 the measure comprised sixty questions allowing respondents to rate themselves according to the degree to which they recently experienced feelings of happiness, strain, anxiety, insomnia, lack of confidence and unhappiness among others. Since then, through validity and sensitivity testing, these questions have been narrowed down to shorter versions of the GHQ containing 30, 28, 20 and 12 questions (Goldberg, 1978). The shortest version, known as the GHQ-12, is used in the NIHPS analysed in this paper. Tests of that measure have found it to be as reliable as the 60-question version (Bowling, 1997). Furthermore, Goldberg *et al.* (1997:191, 195-196) found that the GHQ-12 was “remarkably robust” across individuals in different age groups, of different gender and possessing different education levels. Table 2 presents the twelve questions used by the measure.

**[Table 2, about here]**

Each of the 12 items has four response categories. For questions 1 to 6 these range from ‘more than usual’ to ‘much less than usual’ whilst questions 7 to 12 offer responses ranging from ‘not at all’ to ‘much more than usual’. There are a number of ways to use these responses, however the simplest and most common is to create a dichotomous variable where the highest two categories for each question are taken to indicate the



presence of psychological distress. Donath describes this as the (0-0-1-1) method (2001:231).<sup>5</sup> Combined together the answers to the 12 questions provide a score ranging from a minimum of 0 to a maximum of 12. This score is known as a ‘caseness score’.

The statistical appropriateness of any survey instrument, such as the GHQ-12, can be assessed in three ways. These are *convergent validity*, which tests that a measure correctly classifies an individual when compared with the results of another measure attempting to assess the same phenomenon. The second is *internal consistency*, which through the Cronbach alpha reliability technique assess that all the elements of the instrument are highly correlated and are therefore measuring the same phenomenon. The third assessment is of the instruments *stability*, which considers the success of the measure in generating the same results when re-administered a short time after the initial interview (normally two weeks). A review by Darity and Goldsmith found that “the General Health Questionnaire perform(s) well along the dimensions of convergent validity, internal consistency and stability” (1996:127). Similarly, Argyle (1989) concluded that the GHQ was one of the most reliable indicators of psychological distress available.

One critique of the GHQ-12 approach is that perhaps respondents have provided misleading answers to the instrument and have therefore facilitated false conclusions to be drawn with regard to their psychological distress classification. While this is a possibility, it would be difficult given the complexity of the questions and their location within the overall survey (Clark and Oswald, 1994:650). Equally, there is no obvious

incentive for respondents to strategically lie, and little evidence from any of the studies published to date that misleading answers play a significant role in the GHQ-12 data results.

The mood of respondents has also been pointed to as a source of concern for the measure. Respondents who were in an abnormally bad mood at the time of the survey may provide an inaccurate picture of their well-being and as a consequence supply misleading data. A similar case can be made for individual's experiencing short-term elation around the time of the survey. Intuitively, the numbers of such individuals is likely to be small and it may even be the case that taken together across a large dataset the positives and negatives cancel themselves out. Using nine years of panel data for Britain, Clark and Oswald (2002a) empirically identified that these effects bore no consequence for the results of their analysis. Criticism for the GHQ-12 measure has been strongest when it is being used as a proxy for measuring happiness; a path not followed by this paper. That point was strongly made by Veenhoven (2002:1145) when critiquing an assessment by Clark and Oswald (2002b). He suggested that alternative and "more appropriate" measures are available to measure happiness in the World Database on Happiness.<sup>6</sup> Elsewhere there are limited critiques of the measure, though there are clear warnings not to over-interpret its results. The GHQ-12 serves as a screening instrument rather than as a definitive diagnostic tool (Payne, 2000:5; Willitts *et al.*, 2004:54).

Darity and Goldsmith (1996:126), Winkelmann and Winkelmann (1998:3), Blanchflower and Oswald (1999:1) and Clark and Oswald (2002a:2) all point out that many social

scientists have been suspicious of the usefulness of data reporting well-being; a factor reflective of the newness of subjective data to analysis in that discipline. Although that situation is presently changing (see Dixon, 1997 and DiTella *et al.*, 2001) Blanchflower and Oswald specifically address those reservations through pointing out the long history of these measures in other disciplines such as psychology. Consequently they suggest that “it seems difficult to believe that economists have a more acute understanding of the limitations of well-being statistics than do thousands of psychologists who use such data in their own research” (1999:1). Similarly, Darity and Goldsmith cite the evolution of these measures in the psychological literature and the fact that these measures were developed and refined such that “confidence in the accuracy, and hence usefulness, of these measures has grown with time” (1996:126).

Since its original appearance, the GHQ has become one of the most widely used self-administered questionnaires employed to measure non-psychotic mental illness in the community and in general medical practice (Donath, 2001:231; Gardner and Oswald, 2001:4). While there are other ways to measure psychological distress (see Darity and Goldsmith, 1996:126-127; EORG, 2003:2-5) the GHQ-12’s established statistical validity combined with its extensive use across a number of disciplines underscores the strength of the measure. It therefore offers this paper an appropriate tool with which to assess and consider the experiences of psychological distress in Northern Ireland and in particular consider any associations with the housing variables outlined above.

## **Initial Results**

An examination of the results from the individual GHQ questions show that 27% of the Northern Ireland population felt constantly under strain while approximately one-fifth of individuals had difficulty concentrating, enjoying normal activities or sleeping. A similar proportion indicated that they were feeling unhappy or depressed. The lowest recorded scores in either of the two extreme categories combined to 8.2% for the GHQ question assessing self-worth. The distribution of the caseness scores shows that 53% of that population recorded a zero score; thus both the median and mode caseness values are zero. At the other extreme, almost 4% of Northern Ireland's residents reported very high psychological distress with scores in excess of 10. Of these, 1.4% had a score of 12. When compared to caseness distributions from other studies, the NIHPS data is not abnormal. Indeed, the distribution is similar to (though not the same as) that found by Payne using the PSE survey of Britain (2000:5).

Initial insights into the two housing hypotheses can be gained through an analysis of some simple descriptive statistics. Table 3 assessed the distribution of the GHQ-12 caseness scores across a small number of socio-economic disaggregations. The top row of table 3 records that the average caseness score among the population of Northern Ireland was 1.811. It also shows that on average women record higher caseness scores than men; 2 out of twelve versus 1.5 for men.

**[Table 3, about here]**

Disaggregating the GHQ-12 results by income group provides an insight into the association between psychological distress and income. The results in table 3 reflect *a priori* expectations. As income increases the mean caseness score decreases. It is only when equivalised household monthly income exceeds £1,000 that the mean caseness value drops below average. The income disaggregation suggests that income and psychological distress experiences are negatively related. However, the strength of that relationship seems small given the raw data results.

The relationship between age and psychological distress is less clear. Studies elsewhere have found an inverted U-shape relationship between these two variables (Clark and Oswald, 1994:650; Oswald, 1997:1823; Theodossiou, 1998:94). The Northern Ireland data reflects these findings. On average the highest caseness score is among those aged 55-64yrs. Overall, there is a marked difference between psychological distress levels when individuals are middle aged compared with levels when they are either less than 35 years or more than 65 years.

Turning to the housing hypotheses, people living in a poor housing environment record above average caseness scores of 2.489. Similarly, those classified as being in poor quality housing carry a higher average psychological distress caseness score of 2.421. Both results therefore suggest that the hypotheses are plausible. However, the limitations of the approach adopted in table 3 are clear given that the compounding effects of other variables are ignored. To draw more concrete conclusions on the relationship between these housing variables and psychological distress, and to test the aforementioned

hypotheses, more formal multivariate techniques are required. These are introduced and applied over the next two sections.

### **The Empirical Model**

This section describes the procedures followed to establish the econometric model used in the remainder of this paper. It regresses individuals' psychological distress levels on a set of personal characteristics. This analytical approach follows that used by Clark and Oswald (1994), Theodossiou (1998), Yen and Kaplan (1999), Borooah (2000), Frey and Stutzer (2000) and Helliwell (2003).

The dependent variable ( $y$ ) used in the logit model is a two-category variable which distinguishes between people in Northern Ireland who are above (psychologically distressed) and below (not psychologically distressed) a GHQ-12 caseness threshold of 4. That threshold has been chosen for two reasons. First, following an extensive review of the measure, that threshold was identified by Papassotiropoulos and Heun as “the optimal cut-off value for the GHQ-12 for case identification”. Their study found that applying this threshold minimised the number of clinical misclassifications generated by the measure (1999:437). The second reason for choosing this threshold is a policy reason. The aforementioned mental health policy target adopted for Northern Ireland also uses a caseness score of four or above to indicate the presence of psychiatric disorder (Northern Ireland, 2003:31). Therefore, for the purposes of accuracy, continuity and policy relevance it makes sense to adopt a GHQ-12 caseness threshold of four. When applied to the NIHPS results, this threshold identified 18.83% of the Northern Irish population as

psychologically distressed. Thus the dependent variable comprises two discrete categories: not psychologically distressed (0) and psychologically distressed (1).

Following Hosmer and Lemeshow (2000:93-99) a series of steps were followed to build the psychological distress model. In total 13 variables were identified for inclusion in the model. These variables incorporate a broad set of personal characteristics representing gender, income, age, housing environment and quality, interaction with neighbours, religion, physical health, family status, satisfaction with employment and financial difficulties. Experiments with variables representing social class, completed education levels, lone parenthood, overcrowding and living in a household with children failed to produce robust effects. This was also the case when a variable representing unemployment was used as a regressor. This was an unexpected result, given findings elsewhere in the literature which suggested that being unemployed increased psychological distress. However, the variable produced a Wald statistic of 1.06 and a corresponding significance value of 0.3033. Finally, the presence of interaction effects between the variables was explored. No evidence was found that any such interactions were statistically relevant.<sup>7</sup> The determining variables used in the logit equation were:

- *male* = Respondent is male: 1 if yes, 0 otherwise
- *income100* = Equivalised monthly household income from the month before the survey, equivalised using the OECD modified equivalence scale. All values then divided by 100
- *age* = Normalised age of respondent, where age = 0 for person aged 16
- *age\*age* = Normalised age squared
- *phenviro* = Respondent lives in a poor housing environment: 1 if yes, 0 otherwise
- *phquality* = Respondent lives in poor quality housing: 1 if yes, 0 otherwise
- *talknbr* = Respondent talks to neighbours at least weekly: 1 if yes, 0 otherwise
- *catholic* = Respondent is a Catholic: 1 if yes, 0 otherwise

- *phealth* = When compared to people of their own age, respondent considers that his/her physical health during the last 12 months has been poor (either poor or very poor): 1 if yes, 0 otherwise
- *disabled* = Respondent is registered as disabled: 1 if yes, 0 otherwise
- *alone* = Respondent lives alone: 1 if yes, 0 otherwise
- *job disat* = Respondent is not satisfied with their present job: 1 if yes, 0 otherwise
- *fin diff* = Respondents financial situation is difficult (either very or quite): 1 if yes, 0 otherwise

Thus the model was specified as:

$$y_i = \beta_1 + \beta_2 * \text{male} + \beta_3 * \text{income100} + \beta_4 * \text{age} + \beta_5 * (\text{age} * \text{age}) + \beta_6 * \text{phenviro} + \beta_7 * \text{phquality} + \beta_8 * \text{talknbr} + \beta_9 * \text{catholic} + \beta_{10} * \text{phealth} + \beta_{11} * \text{disabled} + \beta_{12} * \text{alone} + \beta_{13} * \text{job disat} + \beta_{14} * \text{fin diff} + \varepsilon_i \quad (\text{equation 1})$$

where  $\beta_1$  is a constant and  $\varepsilon_i$  is a logistically distributed error term. Before its implementation the model and the data were tested for the effects of residuals and influential cases.

### Regression Results

Table 4 sets out the results from estimating the logit model embodied in equation 1. The  $\beta$  coefficients offer information on the direction of change in the probability of being psychologically distressed when all other variables are held constant.

Turning first to the hypotheses outlined earlier. The coefficient on the poor housing environment variable is positive implying that, while controlling for all other variables, people in Northern Ireland who live in a poor housing environment are more likely to experience psychological distress. The results of a Wald test on this coefficient provided a z-statistic of 3.30 and a significance level of 0.001. A similar relationship was found for the variable representing poor quality housing. The positive coefficient is significant at



the 5% level and implies that individuals in Northern Ireland living in a dwelling with two or more of the housing quality problems are more likely to be psychologically distressed.

**[Table 4, about here]**

The results for both these housing hypotheses add statistical strength to the aforementioned assertions in the Northern Ireland mental health strategy that both these variables increase the probability of experiencing psychological distress. From a policy perspective they also imply that where policies are pursued to enhance the quality of local areas, for example through tackling crime and vandalism or reducing noise and pollution, a secondary benefit of these changes will be improvements to mental health. A similar case can be made for policies aimed at improving conditions in people's dwellings.

With regard to these housing findings, it could be argued that they may be explained by the possibility of people who are psychologically distressed being more likely to perceive and report their housing environment/conditions as poor. While this cannot be completely ruled out, this explanation is not supported by the raw data. It shows that people reporting above threshold levels of either housing problem do so for some and not all of the items. In other words, they identify some components of both measures as problems and separate these items out from those that are not. Of the 1,978 households in the NIHPS sample only seven indicate the presence of all four poor housing environment indicators and only one of these possesses an individual classified as psychologically distressed. For the housing environment indicators, two households signal that all seven of its items are

problems with only one household possessing a person who is psychologically distressed. Were the proposed explanation correct, we would at least expect to see a pattern of high counts of problems among psychologically distressed individuals, this is not the case in the raw data. Furthermore, we would also expect to see individuals reporting high counts of problems on both housing indicators. Again, the raw data does not show this. In summary, the model's results imply that we cannot reject  $H1$  and  $H2$ .<sup>8</sup>

Among the other independent variables in the logit model, the attributes of a person which increase the probability of psychological distress were found to be: being in poor physical health over the last year; holding a job you are dissatisfied with; being a catholic and experiencing financial difficulties. The variables representing being registered as disabled, talking to neighbours and living alone also reported positive relationships with the dependent variable, however their coefficients are only significant at the 10% level. The only other dichotomous variable that decreased the probability of being classified as distressed was male, implying that Northern Irish women were more likely to be in that category than that region's males. For the continuous variables, a negative association was found between income and psychological distress levels. For age the association was positive but insignificant at the 5% level. Furthermore the effect of the age-squared variable was found to be very small and insignificant. These age findings reflect the shape of the distribution of the dependent variables across the age groups as outlined earlier in table 3.

### *Predicted probabilities*

To more explicitly quantify the influence of the two housing variables on psychological distress status the analysis was extended to consider predicted probabilities generated from the logit model. Using the coefficients outlined in table 4 the model was used to predict the probability of being at each of the two psychological distress outcomes for an individual who is at average values on each of the independent variables in equation 1. It predicts that such a hypothetical person would have an 83.5% chance of being not distressed and a 16.5% chance of reporting a caseness score above the selected threshold of four.<sup>9</sup>

Taking the two housing variables, the analysis proceeds to examine the impact on these predicted probability outcomes when their values are changes from 0 to 1. In effect this procedure implies that we re-estimate these predicted probabilities holding all variables at their mean except for each of the housing variables. In turn, each one of these independent variables is first set equal to 0 and a set of probabilities are established. Subsequently, it is set equal to 1 and another set of probabilities are estimated. The difference between these generated probabilities is then calculated and presented in table 5.

**[Table 5, about here]**

Holding the effect of all other independent variables constant, the transition from living in a good housing environment to living in one with a poor environment carries an increased probability of psychological distress of 7%. A Northern Irish person at average

on all other variables but who is living in poor housing conditions is 3.6% more likely to be psychologically distressed than those in dwellings without two or more housing problems. The latter statistic is marginally insignificant at the 5% level but significant at the 10% level.

### **Implications**

Addressing psychological distress has been identified as a key health policy objective by the Northern Ireland government. Using the measurement tool adopted to monitor progress towards that objective, the GHQ-12, this paper has examined the role which housing variables can play in assisting progress towards that target. Using a multivariate logit model the paper found that it was not possible to reject two hypotheses which stated that individuals in Northern Ireland who live in a poor housing environment experience higher levels of psychological distress and that those living in poor quality housing also experienced a similar outcome. As such the paper finds that housing issues are an important area of social policy that needs to be considered as Northern Ireland attempts to meet its 2010 target.

The strength of the association between the housing variables and the psychological distress indicator also carries important policy implications for government agencies with specific responsibility for housing policy as well as for housing agencies and local authorities. The empirical analysis has shown that efforts to increase the environment within which housing is located, such as through cleaning up areas or addressing problems of vandalism, returns dividends that stretch beyond the purely aesthetic.

Similarly, efforts to enhance the living conditions of individuals, such as through improving the quality of housing experienced by those on low incomes or in local authority housing, also offer indirect welfare benefits to such individuals. From a policy perspective, these findings also carry important implications for those charged with making decisions on the appropriateness and viability of future housing related expenditures. A clear conclusion of this papers analysis is that when the costs and benefits of such spending are being weighted up, the indirect mental health benefits which flow from these investments should be taken into account.

### **Acknowledgement**

The author wishes to acknowledge the financial support of the Urban Institute Ireland. Thanks are also due to the Northern Ireland Social and Political Archive (ARK) who made wave one of the NIHPS available for this analysis.

## References

- Argyle, M. (2001). *The Psychology of Happiness*. East Sussex, Routledge.
- Atkinson, A.B., B. Cantillon, E. Marlier and B. Nolan (2002). *Social Indicators – The EU and Social Inclusion*. Oxford. Oxford University Press.
- Blanchflower D.G. and A. Oswald (1999). “Well-Being, Insecurity and the Decline of American Job Satisfaction”. *Working paper*, Department of Economics. University of Warwick.
- Borooah, V.K. (2000). “Targeting Social Need: Why are deprivation levels in Northern Ireland higher for Catholics than for Protestants?”. *Journal of Social Policy*, 29, 281-301.
- Borooah, V.K. (2001). Logit and Probit: ordered and multinomial models. *Quantitative Applications in the Social Sciences*. Sage, California.
- Bowling, A. (1997). *Measuring Health: A Review of Quality of Life Scales*. Buckingham, Open University Press.
- Clark, A.E. and A. Oswald (1994). “Unhappiness and Unemployment”. *Economic Journal*, 104, p.648-659.
- Clark, A.E. and A. Oswald (2002a). “Well-being in Panels”. *Working paper*, Department of Economics. University of Warwick.
- Clark, A.E. and A.J. Oswald (2002b). “A Simple Statistical Method for Measuring how Life Events Affect Happiness”. *International Journal of Epidemiology*, Vol. 31, p. 1139-1144.
- Darity, W. Jr. and A.H. Goldsmith (1996). “Social Psychology, Unemployment and Macroeconomics”. *Journal of Economic Perspectives*, Vol. 10, No. 1, p. 121-140.
- Department of Environment Transport and the Regions (DETR) (1998). *English House Conditions Survey*. London, DETR.
- Department of Health (1992). *The Health of the Nation: a strategy for health in England*. London, DHSS.
- deVaus, D. (2002). *Analyzing Social Science Data*. London, Sage.
- Di Tella, R., R. MacCulloch and A.J. Oswald (2001). “Preferences over Inflation and Unemployment: evidence from surveys of happiness”. *American Economic Review*, Vol. 91, No. 1, p. 335-341.

- Dixon, D. (1997). "Controversy: Economics and Happiness". *The Economic Journal*, Vol. 107, p. 1812-1814.
- Donath, S. (2001). "The Validity of the 12-item General Health Questionnaire in Australia: a comparison between three scoring methods". *Australian and New Zealand Journal of Psychiatry*, Vol. 35, p. 231-235.
- European Opinion Research Group (EORG) (2003). *The Mental Health Status of The European Population*. Brussels, SANCO Directorate-General.
- Frey, B.S. and A. Stutzer (2000). "Happiness, Economy and Institutions". *The Economic Journal*, Vol. 110, p. 918-938.
- Gardner, J. and A. J. Oswald (2001). What Has Been Happening to the Quality of Workers Lives in Britain? *Warwick Economic Research Paper*. No. 22. University of Warwick, Warwick.
- Goldberg, D.P. (1972). *The Detection of Psychiatric Illness by Questionnaire*. London, Oxford University Press.
- Goldberg, D.P. (1978). *The Detection of Psychiatric Illness by Questionnaire*. London, Oxford University Press.
- Goldberg, D.P. and P. Williams (1991). *A User's Guide to the General Health Questionnaire*. Windsor, NFER-Nelson.
- Goldberg, D.P., R. Gater, N. Sartorius, T.B. Ustun, M. Piccinelli, O. Gureje and C. Rutter (1997). "The Validity of Two Versions of the GHQ in the WHO Study of Mental Illness in General Health Care". *Psychological Medicine*, Vol. 27, p. 191-197.
- Helliwell, J.F. (2003). "How's Life? Combining individual and national variables to explain subjective well-being". *Economic Modelling*, Vol. 20, p. 331-360.
- Hopton, J.L. and S. M. Hunt (1996). "Housing Conditions and Mental Health in a Disadvantaged Area in Scotland". *Journal of Epidemiology and Community Health*, Vol. 50, p. 56-61.
- Hosmer, D.W. and S. Lemeshow (2000). *Applied Logistic Regression*. New York, Wiley.
- Hyndman, S. J. (1990). "Housing Dampness and Health amongst British Bengalis in East London". *Social Science and Medicine*, Vol. 30, No. 1, p. 131-141.
- Long, J.S (1997). *Regression Models for Categorical and Limited Dependent Variables*. California, Sage.

Long, J.S. and J. Freese (2003). *Regression Models for Categorical Dependent Variables Using Stata: revised edition*. Texas, Stata Corporation.

Marsh, A., D. Gordon, C. Pantazis and P. Heslop (1999). *Home Sweet Home? The impact of poor housing on health*. Bristol, The Policy Press.

McGregor P, P. McKee, F. Forsythe, M. Bailey, C. O'Neill (2003). "A comparison between the first wave of the Northern Ireland Household Panel Survey and Other Northern Ireland Surveys". *Report to the Department of Finance and Personnel. School of Economics and Politics*. Newtownabbey, University of Ulster, Jordanstown.

Northern Ireland (2002). *Investing for Health*. Belfast, Department of Health, Social Services and Public Safety.

Northern Ireland (2003). *Promoting Mental Health: Strategy and action plan 2003-2008*. Belfast, Department of Health, Social Services and Public Safety.

Oswald, A. (1997). "Happiness and Economic Performance". *The Economic Journal*, Vol. 107, p. 1815-1831.

Pampel, F.C. (2000). Logistic Regression: A primer. *Quantitative Applications in the Social Sciences*. California, Sage.

Papassotiropoulos A. and R. Heun (1999). "Screening for Depression in the Elderly: A study on misclassification by screening instruments and improvement of scale performance". *Progress in Neuro-psychopharmacology and Biological Psychiatry*, Vol. 23, p. 431-446.

Payne, S (2000). "Poverty, Social Exclusion and Mental Health" *PSE Working Paper No. 15*. Bristol, University of Bristol and Townsend Centre for International Poverty Research.

Sen, A. (1997). "Inequality, unemployment and contemporary Europe". *International Labour Review*, Vol. 136, no. 2.

Sooman A. and S. Macintyre (1995). "Health and Perceptions of the Local Environment in Socially Contrasting Neighbourhoods in Glasgow". *Health and Place*, Vol. 1, No. 1, p. 15-26.

Taylor, M.F. (ed). with J. Brice, N. Buck and E. Prentice-Lane (2005) *British Household Panel Survey User Manual Volume A: Introduction, Technical Report and Appendices*. Colchester, University of Essex.

Theodossiou, I (1998). "The Effects of Low-Pay and Unemployment on Psychological Well-Being: a logistic regression approach". *Journal of Health Economics*, Vol. 17, p. 84-104.



Veenhoven, R. (2002). "Commentary: The units of utility". *International Journal of Epidemiology*, Vol. 31, p. 1144-1146.

Willitts, M., M. Benzeval, S. Stansfeld (2004). "Partnership History and Mental Health Over Time". *Journal of Epidemiology and Community Health*, Vol. 58, p. 53-58.

Winkelmann L. and R. Winkelmann (1998). "Why Are The Unemployed So Unhappy? Evidence from panel data". *Economica*, Vol. 65, p. 1-15.

Yen, I.K. and G.A. Kaplan (1999). "Poverty Area Residence and Changes in Depression and Perceived Health Status: evidence from the Alameda County Study". *International Journal of Epidemiology*, Vol. 28, p. 90-94.

**Table 1. Cronbach alpha reliability coefficients for items measuring poor housing environment and poor housing quality**

	<b>Alpha coefficient if removed</b>
<b>Housing Environment Measures</b>	
<i>Does your accommodation have any of the following problems?</i>	
(i) noise from neighbours	0.6456
(ii) other street noise	0.6155
(iii) pollution, grime or other environmental problems	0.6388
(iv) vandalism or crime in the area	0.7060
<b>Overall Cronbach alpha coefficient</b>	<b>0.7124</b>
<b>Housing Quality Measures</b>	
<i>Does your accommodation have any of the following problems?</i>	
(i) shortage of space	0.8493
(ii) too dark, not enough light	0.8334
(iii) lack of adequate heating facilities	0.8267
(iv) condensation	0.8335
(v) leaky roof	0.8294
(vi) damp walls, floors and foundations	0.8193
(vii) rot in window frames or floors	0.8229
<b>Overall Cronbach alpha coefficient</b>	<b>0.8512</b>

**Table 2. GHQ-12 questions in NIHPS**

<b>Have you recently:</b>
1. been able to concentrate on whatever you are doing?
2. felt that you were playing a useful part in things?
3. felt capable of making decisions about things?
4. been able to enjoy your normal day-to-day activities?
5. been able to face up to problems?
6. been feeling reasonably happy, all things considered?
7. lost much sleep over worry?
8. felt constantly under strain?
9. felt you couldn't overcome your difficulties?
10. been feeling unhappy or depressed?
11. been losing confidence in yourself?
12. been thinking of yourself as a worthless person?

**Table 3. The distribution of psychological distress in Northern Ireland (caseness scores 0-12)**

		<b>% of N #</b>	<b>Mean value</b>	<b>Standard error*</b>
<b>Overall</b>		N = 2,256	1.811	.051
<b>Gender</b>	male	46.32	1.508	.074
	female	53.68	2.072	.070
<b>Monthly Equivalised Income</b>	£0-£499.99	14.53	2.277	.148
	£500-£999.99	34.25	2.092	.094
	£1,000-£1,499.99	24.77	1.690	.100
	£1,500+	26.45	1.304	.081
<b>Age</b>	16-25 yrs	17.12	1.569	.123
	25-34yrs	19.20	1.706	.113
	35-44yrs	18.36	1.915	.120
	45-54yrs	14.99	1.944	.139
	55-64yrs	13.08	2.138	.145
	65+ yrs	17.25	1.692	.117
<b>Housing Status</b>	in poor housing environment	12.51	2.489	.165
	otherwise	87.49	1.714	.053
	in poor quality housing	16.76	2.421	.146
	otherwise	83.24	1.688	.054

**Notes:** # The proportion in each category is for the weighted population sample of 2,256.

\* Accurate t-statistic values could not be calculated as the data is weighted.

**Table 4. Equation estimates for psychological distress in Northern Ireland**

<i>x</i>	<i>Coefficient</i>	<i>R. Std Error</i>	<i>z</i>	<i>P&gt; z </i>	<i>[95% Conf. Interval]</i>	
<i>male</i>	-0.4467851	0.1015425	-4.40	0.000	-0.6458744	-0.2477
<i>income100</i>	-0.0157394	0.0070636	-2.23	0.026	-0.0295887	-0.00189
<i>age</i>	0.0163277	0.0098397	1.66	0.097	-0.0029646	0.03562
<i>age*age</i>	-0.0002302	0.0001507	-1.53	0.127	-0.0005256	0.0000653
<i>phenviro</i>	0.4616985	0.140047	3.30	0.001	0.1871154	0.736282
<i>phquality</i>	0.249426	0.1250015	2.00	0.046	0.0043418	0.49451
<i>talknbr</i>	-0.2133778	0.1106408	-1.93	0.054	-0.4303058	0.00355
<i>catholic</i>	0.2217264	0.0995735	2.23	0.026	0.0264976	0.416955
<i>phealth</i>	1.384384	0.1404305	9.86	0.000	1.109048	1.659719
<i>disabled</i>	0.3215115	0.1722128	1.87	0.062	-0.0161375	0.659161
<i>alone</i>	0.2328983	0.1331537	1.75	0.080	-0.0281697	0.493966
<i>job disat</i>	0.9952658	0.1931997	5.15	0.000	0.6164687	1.374063
<i>fin diff</i>	0.8842706	0.1590853	5.56	0.000	0.57236	1.196181
<i>cons</i>	-1.783868	0.1896068	-9.41	0.000	-2.155621	-1.41212

Log pseudo-likelihood full model = -1415.941

Log pseudo-likelihood intercept-only model = -1576.245

Number of observations = 3,258 ; Population size (weighted) = 2,256

Wald  $\chi^2(13) = 287.68$ ; Probability  $> \chi^2 = 0.000$

McFaddens  $R^2 = 0.102$

**Table 5. Changes in the predicted probability from variations in housing variables**

<i>x</i>	<i>dy/dx</i>	<i>Std Error</i>	<i>z</i>	<i>P&gt; z </i>
<i>phenviro</i>	+0.0712850	0.02397	2.97	0.003
<i>phquality</i>	+0.0363654	0.01920	1.89	0.058

**Note:** To eight decimal places, the probability of being psychologically distressed for a person at mean values on all variables is 0.16535512.

## Notes

---

<sup>1</sup> For example see Sen (1997:157-185) and Atkinson *et al.* (2002).

<sup>2</sup> deVaus suggests that an alpha value of at least 0.7 is “normally considered to indicate a reliable set of items” (2002:20).

<sup>3</sup> Ideally a measure of this nature would assess the presence of these problems over time. As the NIHPS data used in this chapter is the first wave of that study this is not currently possible.

<sup>4</sup> The variables reflect similar measures used in the English House Condition Survey (DETR, 1998:83, 97) to measure housing quality. Marsh *et al.* (1999:30-40) adopt a similar approach to build housing deprivation indices for Britain.

<sup>5</sup> For other methods of interpreting the GHQ-12 responses see Donath (2001:231-232), Clark and Oswald (1994:649-650; 2002a:4-5), Gardner and Oswald (2001:4, 5, 17). Goldberg *et al.* (1997:191) found that complex scoring methods offered no advantage over the simple approach adopted in this paper’s analysis.

<sup>6</sup> See [www.eur.nl/fsw/research/happiness](http://www.eur.nl/fsw/research/happiness)

<sup>7</sup> For example an interaction between income and job satisfaction produced a significance value of  $p = 0.313$  while one between income and financial difficulties produced a  $p$  value of 0.997.

<sup>8</sup> Using an interaction effect for gender, the model was re-examined to discover if these findings have general applicability or are gender-specific. It found that there were no statistically significant gender interaction effects for the hypothesised variables.

<sup>9</sup> Long (1997), Pampel (2000), Borooah (2001) and Long and Freese (2003) all detail the mathematical derivation of these predicted probabilities.