Does Money Buy Happiness? A Longitudinal Study Using Data on Windfalls

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Abstract

The most fundamental idea in economics is that money makes people happy. This paper constructs a test. It studies longitudinal information on the psychological health and reported happiness of approximately 9,000 randomly chosen people. In the spirit of a natural experiment, the paper shows that those in the panel who receive windfalls -- by winning lottery money or receiving an inheritance -- have higher mental wellbeing in the following year. A windfall of 50,000 pounds (approximately 75,000 US dollars) is associated with a rise in wellbeing of between 0.1 and 0.3 standard deviations. Approximately one million pounds (1.5 million dollars), therefore, would be needed to move someone from close to the bottom of a happiness frequency distribution to close to the top. Whether these happiness gains wear off over time remains an open question.

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1. Introduction

The central tenet of economics is that money makes people happy. Using deduction, rather than evidence, economists teach their students that utility must be increasing in income[1]. In this paper we construct one of the first empirical tests. Our results, using two measures of mental wellbeing, show that the economist's textbook view is correct. We also estimate the size of the effect of a windfall on wellbeing.

To make persuasive progress on this problem, data with three special features are required. First, it is necessary to have a panel of people, that is, longitudinal rather than purely cross-sectional information. Second, measures of psychological wellbeing are needed. Third, it is necessary to observe, whether by an actual or natural experiment, a random assignment of money amongst individuals. We have a data set that approximates these conditions. As far as we know, previous investigators in economics or psychology have been unable to implement such a test. Diener and Biswas-Diener (2000) argue that this form of research design is required.

Individuals' survey responses to questions about wellbeing are used in the paper. Such responses have been studied before. They have been used intensively by psychologists[2], examined a little by sociologists and political scientists[3], and largely ignored by economists[4]. Some economists may emphasise the likely unreliability of subjective data –

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[1] A common approach would be to argue that more income simply must make people happier because it opens up extra choices that are denied those with less money; yet in principle human beings might find it costly to make more decisions about how to spend the greater income. Another argument might be that people seek more income whenever they can, so that it necessarily makes them happier; yet in principle they could be mistaken about how they will feel ex post. However, the best reason to want empirical evidence is that it is dangerous for any subject to reach the point where it cannot be conceived that a familiar assumption might be wrong.

[2] Earlier work includes Andrews (1991), Argyle (1989), Campbell (1981), Diener (1984), Diener et al (1999), Douthitt et al (1992), Fox and Kahneman (1992), Larsen et al (1984), Mullis (1992), Shin (1980), Veenhoven (1991, 1993), and Warr (1990).

[3] For example, Inglehart (1990) and Gallie et al (1998). There is also a related empirical literature on interactions between economic forces and people's voting behavior; see for example Frey and Schneider (1978).

[4] The recent research papers of Andrew Clark, Bruno Frey and Yew Kwang Ng are exceptions (Clark, 1996; Clark and Oswald, 1994; Frey and Stutzer, 1998, 1999; Ng, 1996, 1997). See also Frank (1985,

perhaps because they are unaware of the large literature by research psychologists that uses such numbers, or perhaps because they believe economists are better judges of human motivation than those researchers. A recent literature on the border between economics and psychology, however, has attempted to understand the patterns in happiness and stress data.

2. Wellbeing Patterns

One definition of happiness is the degree to which an individual judges the overall quality of life in a favourable way (Veenhoven, 1991, 1993).

Self-reported wellbeing measures are thought to be a reflection of at least four factors: circumstances, aspirations, comparisons with others, and a person's baseline happiness or disposition (e.g. Warr, 1980, Chen and Spector, 1991). Konow and Earley (1999) describes evidence that recorded happiness levels have been demonstrated to be correlated with:

1. Objective characteristics such as unemployment.
2. The person's recall of positive versus negative life-events.
3. Assessments of the person's happiness by friends and family members.
4. Assessments of the person's happiness by his or her spouse.
5. Duration of authentic or so-called Duchenne smiles (a Duchenne smile occurs when both the zygomatic major and obicularus orus facial muscles fire, and human beings identify these as 'genuine' smiles).
6. Heart rate and blood pressure measures responses to stress.
7. Skin-resistance measures of response to stress.
8. Electroencephelogram measures of prefrontal brain activity.

Rather than summarise the psychological literature's assessment of wellbeing data, this paper refers readers to the checks on self-reported happiness statistics that are discussed in Argyle (1989) and Myers (1993), and to psychologists' articles on reliability and validity, such as

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1997), Blanchflower and Freeman (1997), Blanchflower and Oswald (1998, 1999), Blanchflower, Oswald and Warr (1993), MacCulloch (1996), Di Tella and MacCulloch (1999), and Di Tella et al (2001). Offer (1998) contains interesting ideas about the post-war period and possible reasons for a lack of rising wellbeing in industrialised society.

Fordyce (1985), Larsen, Diener, and Emmons (1984), Pavot and Diener (1993), and Watson and Clark (1991).

Assume a reported wellbeing function:

$$(1) \qquad r = h(u(y, z, t)) + e$$

where r is some measure of psychological stress or self-reported number or wellbeing level (perhaps the integer 4 on a satisfaction scale, or "very happy" on an ordinal happiness scale), u(…) is to be thought of as the person's true wellbeing or utility, h(.) is a continuous non-differentiable function relating actual to reported wellbeing, y is real income, z is a set of demographic and personal characteristics, t is the time period, and e is an error term. It is assumed, as seems plausible, that u(…) is a function that is observable only to the individual. Its structure cannot be conveyed unambiguously to the interviewer or any other individual. The error term, ε, then subsumes among other factors the inability of human beings to communicate accurately their happiness level (your 'two' may be my 'three').[5] The measurement error in reported wellbeing data would be less easily handled if wellbeing were to be used as an independent variable. This approach might be viewed as an empirical cousin of the experienced-utility idea advocated by Kahneman et al (1997).

It is possible to view some of the self-reported wellbeing questions in the psychology literature as assessments of a person's lifetime or expected stock value of future utilities. Equation 1 would then be rewritten as an integral over the u(…) terms. This paper, however, will use stress and happiness questions on the assumption they describe a flow rather than a stock.

Easterlin's seminal research (1974, and more recently 1995) examined the reported level of happiness in the United States. The author viewed people as getting utility from a comparison of themselves against others; this is the idea that happiness has a large relative component. Hirsch (1976), Scitovsky (1976), Layard (1980), Frank (1985, 1999) and Schor (1998) have argued a similar thesis; a different tradition, with equivalent implications, begins with Cooper and Garcia-Penalosa (1999) and Keely (1999).

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[5] This recognises the social scientist's instinctive distrust of a single person's subjective 'utility'. An analogy might be to a time before human beings had accurate ways of measuring people's height. Self-reported heights would contain information but be subject to large error. They would predominantly be useful as ordinal data, and would be more valuable when averaged across people rather than used as individual observations.

3. Data

The data used in this study come from the British Household Panel Survey (BHPS). This is a nationally representative sample of more than 5,000 British households, containing over 10,000 adult individuals, conducted between September and Christmas of each year from 1991 to 1998. Respondents are interviewed in successive waves; if an individual splits off from their original household, all adult members of their new household are also interviewed. Children are interviewed once they reach 16. The sample has remained representative of the British population throughout the 1990s.

The BHPS contains a standard mental wellbeing measure, a General Health Questionnaire (GHQ) score. This is used by medical researchers and psychiatrists as a measure of stress or psychological distress. It is unfamiliar to some economists, but GHQ is probably the most widely used questionnaire-based method of measuring mental stress. In the spirit favoured by psychologists, it amalgamates answers to the following list of twelve questions, each one of which is itself scored on a four-point scale for 0 to 3:

Have you recently:

1. Been able to concentrate on whatever you are doing?
2. Lost much sleep over worry?
3. Felt that you are playing a useful part in things?
4. Felt capable of making decisions about things?
5. Felt constantly under strain?
6. Felt you could not overcome your difficulties?
7. Been able to enjoy your normal day-to-day activities?
8. Been able to face up to your problems?
9. Been feeling unhappy and depressed?
10. Been losing confidence in yourself?
11. Been thinking of yourself as a worthless person?
12. Been feeling reasonably happy all things considered?

We use the responses to these so-called GHQ-12 questions. For the *first measure of mental wellbeing*, we take the simple sum of the responses to the twelve questions, coded so that the

response with the lowest wellbeing value scores 3 and that with the highest wellbeing value scores 0. This approach is sometimes called a Likert scale and is scored out of 36. The GHQ measure of stress, or lack of wellbeing, thus runs from a worst possible outcome of 36 (all twelve responses indicating very poor psychological health) to a minimum of 0 (no responses indicating poor psychological health). In general, medical opinion is that healthy individuals will score typically around 10-13 on the test. Numbers near 36 are rare and usually indicate depression in a formal clinical sense.[6]

A second measure is used in the paper. We also study a direct happiness question. This is Q12 above, denoted GHQH; so our happiness measure is in fact one twelfth of the GHQ measure. We assume that this is a sufficiently small proportion to be ignored without re-calibrating GHQ on only eleven questions.

We therefore employ a measure of (un)happiness as well as the mental stress measure described earlier. The GHQH question is: have you been feeling reasonably happy all things considered? This is the *second measure of mental wellbeing*. It is coded so that high numbers denote more unhappiness.

A key requirement for a test is that something approximating a random drop of money occurs. In a giant laboratory setting, this could be created experimentally. Aside from any ethical considerations, such an experiment at the start of the 21st century is probably infeasibly expensive to run. An equivalent is needed.

This paper relies on a natural experiment created by windfalls. The data contains two sources of these – lottery wins and inheritances. These figures refer to windfalls 'within the last year', as assessed by the respondents. Lottery wins throughout the paper include other gambling wins such as on the soccer 'pools'. A huge percentage of the British population play the national lottery, and small wins are common. Hence for simplicity, because they dominate the data, we talk primarily of the lottery. The inheritance variable includes both bequests and inherited property [it excludes receipts of gifts or other private income transfers]. Despite the potential usefulness of lottery data to economists and psychologists, the literature exploiting lottery information is still a comparatively small one. Most work has looked at how consumption and work choices are affected by winning (for example, Bodkin 1959, Holtz-Eakin, Joulfaian and Rosen 1993, Imbens, Rubin and

[6] Likert is 12 times a number from zero to three. An alternative is the Caseness score, which counts the number of times, out of twelve, that an individual answers in one of two negative response categories.

Sacerdote 2000, Kaplan 1985, Kreinin 1961, Landsberger 1963, and Sacerdote 1996). One well-known study in the psychology literature is Brickman, Coates and Janoff-Bulman, 1978. This uses only a tiny cross-section sample of lottery winners, and concludes that winners are slightly happier than those who do not win, but that the difference is not statistically significant. Smith and Razzell, 1975, examined a cross-section of those who won on football betting (the 'pools'), and found that there was some evidence of higher recorded happiness; but individuals also reported lower wellbeing in other spheres of life.

There is an important disadvantage to our data set. Although the British panel itself goes back to the start of the 1990s, questions on windfalls are new. Information on the size of windfalls is known only for the 1997 and 1998 survey years. Analysis is therefore restricted to that sample period[7]. These data are augmented with people's GHQ scores from prior waves, so as to allow the examination of how windfalls affect both the level of wellbeing and how it changes over time. In other words, we are able to examine long lags on the dependent variable. In the panel equations, we then have only two years with which to examine the effect of windfall gains.

4. Results

Table 1 presents the simplest results. In these bivariate regressions, money does buy greater happiness and lower measured stress.

Rises in wellbeing, to be clear about the choice of units and definitions, are given by declines in GHQ mental stress and in GHQH unhappiness. This follows the standard usage in the psychology and medical literature. Hence if money buys happiness, that shows up in the paper's tables as negatives on windfall coefficients.

Windfalls are associated with a statistically well-determined improvement in wellbeing. Mental stress (GHQ) and unhappiness (GHQH) both decline in the year after a windfall. This effect is found in the cross-sectional levels and in the panel's changes.

In the cross-section equations, a windfall dummy (that is, whether the individual had either an inheritance or lottery win) enters negatively for the full sample in both a mental stress equation and an unhappiness equation. In the first columns of Tables 1a and 1b, the

[7] There is one other piece of information. In 1995, people were asked whether they had received a windfall. This is used as a control variable in some of the regression equations.

t-statistics are, respectively, 2.83 and 1.24. Entering the amount of windfall gives, predictably, results that are better determined. This is column 2 of Tables 1a and 1b. When only windfall recipients are studied, in column 3, the size of the windfall enters with the expected negative sign and it is possible in each of Table 1a and 1b to reject the null of zero at normal confidence levels.

The pure longitudinal effect of a windfall is picked up in the first-difference equations in the last three columns of Tables 1a and 1b. Here the two dependent variables are the change in mental stress GHQ and the change in reported unhappiness GHQH. Person fixed-effects, therefore, have been removed. In five of these six equations, it is possible to reject the null of zero on the windfall variables. In the sixth case, in column four of Table 1a, the t-statistic is 1.64.

How large are these improvements in wellbeing? The cross-section estimates predict that subsequent to a windfall of 50,000 pounds sterling (approximately 75,000 United States dollars) the level of GHQ improves by 0.709. This is approximately 0.13 of a standard deviation in GHQ (5.44). For the sample of windfall recipients, the gain in GHQ is 1.11 or around 0.21 of the relevant standard deviation (5.28).[8] For GHQH, the predicted gain in wellbeing is 0.042 amongst all respondents, and is 0.114 amongst the sub-sample of windfall recipients. These are relative to a standard deviation of 0.59.

When the change in wellbeing is instead examined (columns four to six of Tables 1a and 1b), a 50,000 pounds windfall is predicted to improve GHQ by 0.446, or in other words 0.08 of a standard deviation. For the sample of recipients, the relevant figure is 1.09, or 0.21 of the relevant standard deviation. When we examine the change in GHQH unhappiness, we predict a welfare gain of approximately 0.1 of a standard deviation for the sample of all respondents, and 0.2 of a standard deviation within the sample of windfall recipients[9].

There are two sources of windfalls in our data – lottery wins and inheritances. For the rest of the paper, we examine their impact upon wellbeing separately, and add

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[8] The change in wellbeing is calculated for windfalls of 50,000 pounds relative to the minimum windfall in the sample examined. For the sample of all individuals this is 0.1 (a small constant replaces zero wins). For the sample of windfall recipients 1 pound. The improvement in wellbeing is then calculated as, β*(Ln(50,000)-Ln(min)), and compared to the standard deviation in the dependent variables for that sample. Where the change in wellbeing is examined we use the standard deviation in the differenced variable.

explanatory variables. Although this reduces the size of the regression samples and tends to weaken the standard errors, it has the advantage of providing transparency. Having data on inheritances provides a useful check on the results for lottery wins, because people choose to play the lottery, whereas they presumably have less control over their probability of receiving bequests.

If ordered probit or similar methods are used for the cross-section estimation in Tables 1a and 1b, almost identical results are produced. These are available upon request.

The aim of the remainder of the paper is deliberately not to present equations with the highest t-statistics. Rather, it is to provide a feel, by studying lottery wins and inheritances separately, even when standard errors become poorly determined, for the ubiquity of the expected negative sign on windfalls. Later tables find that in all but 2 of 70 occasions -- across a variety of settings -- the windfall coefficient has the expected sign.

It is natural to begin in a simple way by examining whether, in a cross-section, those who obtain such windfalls are happiest. Table 2a provides evidence consistent with this hypothesis. In the second column of Table 2a, the mean GHQ stress score among those who are not lottery winners is 11.22. Among winners[10] it is 10.91. The same pattern is observed for the GHQH unhappiness score in the third column of Table 2a, though the raw effect is much less pronounced. The mean score for winners is 2.00 whilst amongst non-winners it is 2.01.

These cross-tabulations are consistent with the idea that money and wellbeing are positively correlated. Yet, these findings are raw cross-section results without controls. Further evidence, in the same spirit, would be provided if individuals longitudinally report themselves with higher levels of wellbeing subsequent to a lottery windfall. This issue is investigated in the second panel of Table 2a (so-called Sample 2), and summary statistics reported for those individuals where we observe the change in GHQ score. For this sample, the mean lottery win, conditional on being a winner, is observed to be considerably lower than that observed in the cross-section, respectively 118.5 and 200.0 pounds. Investigation revealed this difference to be chiefly attributable to the dropping of large lottery wins in the sample. Whether this selectivity reflects coincidence, or a more systematic bias, is not here

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[9]As an illustrative way to think about the size of this effect, if the estimated number is 0.2 then a windfall of 1 million pounds (1.5 million dollars) would move a person by 4 standard deviations -- or in other words from approximately close to the bottom of a wellbeing distribution to close to the top.

possible to ascertain. The direction of bias is not clear *a priori* and will depend upon whether there are diminishing returns to wellbeing at very large windfalls.

Despite these concerns, the mean GHQ and GHQH scores for both winners and non-winners are remarkably similar to those observed previously. In the lower half of Table 2a, column 2, the mean GHQ stress score among lottery winners is 10.93, compared to 10.91 for the full sample (called Sample 1). Among non-winners it is 11.25, as opposed to 11.22. Both samples appear to capture similar patterns of behaviour.

When the data are differenced, and changes over time in a person's wellbeing studied, we observe lottery winners to show on average increased levels of wellbeing (more precisely a reduced lack of wellbeing). In the second half of Table 2a, individuals who record a lottery win have an average decrease in GHQ mental stress of 0.096 points (see the fourth column of Table 2a, Sample 2). Amongst non-winners, GHQ worsens on average by approximately 0.020. For the GHQH unhappiness question the respective figures for winners and non-winners are 0.010 and 0.006. The observed rise in wellbeing subsequent to a lottery windfall appears pronounced when contrasted with the secular fall in wellbeing for non-winners in this period.

Inheritances also work in the way that would be predicted. In Table 2b, the GHQ mental stress scores of inheritors are on average better than the scores of those who do not inherit any cash; they are 10.93 as opposed to 11.15 (see the second column of Table 2b, Sample 1). For the GHQH unhappiness question, the mean response for inheritors is 1.95 in Table 2b, whilst for those who do not receive a bequest the measured level of unhappiness is 2.01. Panel two of Table 2b, which uses the so-called Sample 2, restricts attention to those individuals where we can observe the change in wellbeing over time. Both for those who inherit and those who do not, this (smaller) sample appears to be representative of that observed for the pooled cross-section. Furthermore, this selection does little to alter the tenor of the results.

The most noticeable finding in Table 2b, Sample 2, is that there is a marked drop in mental stress and unhappiness among those people who inherit. Amongst inheritors, there is an average GHQ mental stress decline of 0.429 compared to a mean rise of 0.0002 amongst non-inheritors. For GHQH unhappiness, the relevant figures are 0.097 and 0.006

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[10] We are unable to distinguish between those who do not gamble and those who do gamble but do not win.

respectively. As with winning the lottery, inheritances are associated with greater psychological wellbeing.

These numbers are averages across rather heterogeneous outcomes. It is likely that more information, in the statistical sense, is conveyed by the *size* of the inheritance or lottery win. Tables 3 and 4 explore such data.

Table 3 reveals in its second column a strong pattern in which the worst mental wellbeing scores (mean of GHQ is 11.22) are found among those who did not receive a lottery win. This accords with intuition. Largish wins are nicer than tiny wins. For those individuals who received small winnings, of less than 100 pounds, there is slightly higher wellbeing (mean 11.05). For those individuals who win between 100 and 1000 pounds, GHQ scores are observed to be noticeably better (mean 10.18). Although the sample size here is not a large one, the stress levels of big lottery winners, 1000 pounds or more, seem paradoxically in Sample 1 of Table 5 to rise slightly (mean 10.28). For GHQH, we observe in the second column of Table 3 a similar relationship, and in this case the effect of winnings upon unhappiness is satisfactorily monotonically negative.

Consider the sample where we observe the change in wellbeing, namely, panel two of Table 3. The issue of selectivity can here be seen more clearly: mean lottery wins for those individuals who receive more than 1000 pounds is 2868.9 in Sample 2 as opposed to 6766.6 for the full sample. Whilst we do not know the largest lottery winners, the same distribution of GHQ and GHQH scores is observed. Examining changes in scores, Table 3 reveals in Sample 2 that GHQ stress levels improve with the size of lottery windfall. On average, GHQ worsens over the year 1998-97 by 0.020 for non-winners, but improves by 0.081 for small winners, 0.109 for medium winners, and 0.655 for the largest winners. For the change in GHQH unhappiness levels, the most marked effect is of an improvement in happiness of large winners (mean 0.109).

The same issue can be pursued for individuals who receive an inheritance. Table 4 reports the data. A consistent and intriguing cross-section pattern is revealed in both GHQ and GHQH scores: a smallish inheritance of less than 2500 pounds is associated with the highest level of wellbeing. An inheritance of between 2500 and 10,000 pounds on average improves welfare relative to not receiving an inheritance but is associated with lower wellbeing than the smallest level of inheritance. Individuals who receive the largest inheritances, over 10,000 pounds, are however those with significantly *worse* cross-section

levels of wellbeing both for stress (GHQ) and unhappiness (GHQH). This is true in the full sample and in the sample where we observe the change in wellbeing. Yet when we instead examine the change in wellbeing in response to a bequest, both GHQ stress levels and GHQH unhappiness levels are observed to have improved for all categories, relative to a decline observed for non-inheritors. In the deltas, then, observed behaviour matches intuition. The largest windfalls produce the greatest gains in GHQH wellbeing (column 5 of Table 4, Sample 2).

The summary statistics thus support the hypothesis that money is welfare improving. Windfalls of cash are associated with higher levels of wellbeing. This is, in the main, observed independent of how the data are cut, for both GHQ mental stress and GHQH unhappiness scores, both when examining the level of wellbeing and its change over time.

This evidence is fairly compelling. The recipients of windfalls have, on average, higher levels of wellbeing. For such summary statistics to provide conclusive evidence, however, would require the receipt and size of windfall to be randomly distributed across individuals. Whilst windfalls may be unanticipated, this is unlikely always to be true. The decision to gamble and the intensity of play are likely to be correlated with observed and unobserved characteristics. Indeed early tables demonstrate a positive correlation between lottery winnings and income. Furthermore, if happier people are more (or less) likely to play, and thus win, the correlation between winnings and wellbeing could be due to some subtle self-selection of players rather than any welfare-enhancing effects. Similarly, inheritances may be positively associated with parental wealth, which is likely to be correlated with recipient income (as seen in Tables 2 and 4). To investigate these issues in more detail we turn to regression analysis.

Throughout the remainder of the paper we examine the robustness of the negative sign on windfall gains.

Estimation strategy

The regression equation estimated is an empirical version of equation 1. Wellbeing is assumed a function of the monetary windfall, personal characteristics (such as education, gender, race, and region) and the time period. On occasion it is also examined whether results are robust to the inclusion of family income as an explanatory variable. Wellbeing for individual i, in time period t, is then expressed as:

$$(2) \qquad r_{it} = w_{it}'\beta + y_{it}'\delta + z_{it}'\gamma + \varepsilon_{it} \qquad i = 1,\ldots,n \quad t = 1,\ldots,T$$

where r is the dependent variable that captures individual wellbeing, w is the amount of windfall (lottery win or inheritance), y is family income, z is a vector of individual characteristics and time dummies, ε is the conformable error term with mean zero and constant variance, and β, δ and γ the parameters to be estimated. The two measures of wellbeing, the overall GHQ score (on a 0 to 36 scale) and the GHQH unhappiness question (on a 0 to 3 scale), are approximated as linear and equations estimated by least squares.[11] Alternative specifications include a lagged dependent variable or instead adopt the change in wellbeing as the dependent variable.

Lottery Wins

A simple regression-equation test of whether winning money improves wellbeing is contained in Table 5. Here, and in all subsequent tables, panel A contains analysis of the GHQ mental stress score, panel B the GHQH unhappiness score. For comparison, column one of Table 5 reports the estimated effect of family income upon wellbeing. As expected, richer people are happier. GHQ is estimated to improve by 0.117, and GHQH by 0.005, for an increase in income of ten thousand pounds sterling. The controls here, and throughout, are a quadratic in age, and dummies for gender, ethnic minority status, educational qualifications, region, and year. This cross-section result is, however, likely to confound various influences and cannot be presumed to capture causation.

Columns two and three of Table 5 do a regression test of the hypothesis that lottery winners are happier. Similarly to the sample statistics observed previously, wellbeing is observed to be higher for those who receive winnings and it is increasing in the amount of windfall. The monotonicity in column 3 is encouraging. Coefficient estimates are negative but not usually independently well-determined. For people who win a small amount, such as less than 100 pounds, there is only a negligible difference in wellbeing relative to non-winners. This suggests that the pleasure associated with being a winner per se is largely trivial, at least for the measures of wellbeing studied here, and should not greatly influence results.

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[11] This implicitly assumes responses are cardinal.

Column four of Table 5 instead enters the amount of winnings as the explanatory variable. This gives a strong result. Both for GHQ mental stress and GHQH unhappiness, the amount of winnings enters negatively -- thus improving wellbeing -- and is statistically significant. A windfall of 10,000 pounds improves GHQ mental wellbeing by 0.686 with a t-statistic above 6 and the GHQH unhappiness score by 0.032 with a t-statistic of 2.01. These effects are of a magnitude approximately 6 times as large as those estimated for income; it is not easy to know why.

The impact of a 50,000 pounds lottery windfall is estimated from Table 5 to improve GHQ mental stress by 3.43 points or over 0.6 of a standard deviation. The improvement in GHQH is slightly less marked at 0.16, but still constitutes approximately 0.3 of a standard deviation. Nevertheless, if 'gamblers' in general have high (low) levels of wellbeing independent of any monetary gain, we shall overestimate (underestimate) the effects of a windfall upon welfare. If gambling behaviour is characterised by such selection, then coefficient estimates may be different when we restrict attention to a sample of winners only. All individuals are then gamblers and they are also likely to be the more intensive players. In this case, selection bias should be reduced. Column five of Table 5 checks this and reveals that both for GHQ and GHQH the estimated effects of winnings are similar, for the sample of all individuals and the sample of winners. This is reassuring and suggests that the impact of winnings upon wellbeing is broadly orthogonal to the selection of gamblers.[12]

Walker (1998) and Farrell and Walker (1999) provide some evidence that lottery expenditure is a form of inferior good, that is, increasing in income but at a declining rate. Our amount-won variable may then capture the effect of income and be prone to similar problems of status and selection. Table 6 examines whether the effect of a lottery windfall is robust to the inclusion of a control for income. Column one restates the basic result. Column two of Table 6 adds family income as an explanatory variable. For both the GHQ mental stress and the GHQH unhappiness measures of wellbeing, the estimated coefficient upon the amount won is essentially unaltered – indicating that the psychological benefits of winnings occur largely independently of income.

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[12] Ideally one would wish to instrument winnings by a variable correlated with play but uncorrelated with wellbeing. However, as we analyse the effect of the *amount* won, a large degree of random variation is introduced subsequent to participation. This is why this variable is of particular interest; yet as a result, no variable was available that identified the amount won separately from wellbeing.

There is potential for non-linearity. This is checked in column three of Table 6, where quadratics in the amount of winnings and income are examined. The first and second-order terms for the amount won enter with the expected signs consistent with diminishing returns but are not statistically significantly different from zero – neither for stress (GHQ) or reported feelings of unhappiness (GHQH).

An alternative approach to the self-selection of gamblers is followed in Table 7. This assumes the effects of selection are stable over time, and then scrutinises the change in wellbeing associated with a windfall.

As seen previously, the sample of individuals where such data are observed omits some of the largest windfalls. This has the effect of increasing the magnitude of the estimated effect of winnings upon mental stress (GHQ) and reducing the estimated effect upon unhappiness (GHQH) and in both cases reduces the precision of estimates. Nevertheless, when a lagged dependent variable is included in column three of Table 7, the effect is to increase the estimated gain in wellbeing subsequent to a lottery win. In contrast, the coefficient upon income is driven towards zero and is no longer well-determined.

In column three of Table 7 a control for previous gambling behaviour is added – whether the individual received a lottery windfall in 1995[13]. Again the estimated coefficient upon amount won is more pronounced whilst the income parameter is unaffected. Furthermore, previous gambling exerts a positive though not well-determined effect upon both GHQ mental stress and GHQH unhappiness scores.[14] This evidence suggests that any differences in wellbeing levels between gamblers and non-gamblers do not crucially shape results.

A similar conclusion is reached when we examine the change in wellbeing scores over time in columns four and five of Table 7. For GHQ mental stress scores, a windfall of 10,000 pounds is predicted to improve wellbeing, relative to the previous year, by 1.976. This effect is statistically significant only at the 10 percent level. By comparison, in column one of Table 7, where the dependent variable is the level of GHQ the predicted improvement in wellbeing is 0.826. Similar results are observed for GHQH unhappiness, although coefficient estimates are again not well-determined. Interestingly, high-income

[13] The amount won is not known.

[14] This result holds if lottery winnings in the *current* year are omitted.

individuals are observed in Table 7's column five to have experienced, on average, a secular decline in wellbeing levels over this period, both for GHQ and GHQH.

Hence, whilst, due to the characteristics of the sample, care must be taken in interpretation, results seem robust to the inclusion of a lagged dependent variable, to controlling for previous gambling success, and to examining the change in wellbeing over time. If anything, such checks magnify the improvement in wellbeing from a lottery windfall.

Inheritances

A potential difficulty with the examination of lottery wins is that the act of gambling, and winning, may bring pleasure independent of monetary gain. Table 8 therefore explores the impact upon wellbeing of receiving an inheritance. This event is likely to occur with the death of a close friend or relative and hence, in contrast, often be associated with reductions in wellbeing.

Column one of Table 8 estimates the effect of income upon wellbeing for this sample. Results are close to those in column one of Table 5. Table 8's column two examines a simple test of whether a windfall increases happiness. Receiving a bequest is found to improve wellbeing for both GHQ mental stress and GHQH unhappiness scores. For GHQ the estimated coefficient is -0.235, for GHQH -0.061, though only the latter effect is statistically robust. Column three extends this analysis by instead entering dummies for the amount of inheritance. For both measures of wellbeing it is predominantly small inheritances, of less than 2500 pounds, that are observed to reduce mental stress and unhappiness. The effect upon GHQ is estimated at -0.488. For GHQH the parameter estimate is -0.102. Again only the latter effect is statistically significant. Medium sized bequests are observed to improve wellbeing, whilst the largest inheritances are estimated to increase GHQ mental stress, though to reduce GHQH unhappiness.

Column four of Table 8 examines the effect of the amount of inheritance, in tens of thousands of pounds, upon wellbeing. Both GHQ and GHQH scores are shown to be improving in the size of the bequest, despite the non-linearity observed above. A bequest of 10,000 pounds is predicted to improve the GHQ mental health score by 0.075 points and the GHQH unhappiness score by 0.014 points. When analysis is conditional upon only

those individuals who do inherit, in column five of Table 8, both GHQ and GHQH coefficients are attenuated and are less precisely estimated but remain negative.

McGarry (1999) examines data on intended bequests and finds that the major determinant of the size of bequest is parental wealth. A significant role is, though, found also for the closeness of family relations.

With respect to the data studied here, recipients of the smallest category of inheritance (less than 2500 pounds) may include grandchildren rather than children and individuals with weaker parental links. They may then be more distant from the deceased benefactor and thus likely to suffer less distress. As the amount of inheritance increases, we potentially observe individuals with closer ties to the deceased. Also, larger inheritances may be in the form of property or other assets, which themselves may induce greater levels of stress in possibly disposing of. The improvement in wellbeing observed for small inheritances may be being offset for larger bequests by the mental stress associated with bereavement.

Alternatively, those who inherit are themselves likely to be more affluent, due to linkages in family wealth, potentially with *higher* levels of wellbeing. Yet for such a mechanism to explain the behaviour observed here would require this effect to be felt for small inheritances but not for large. Such a relation seems doubtful, especially as the age, gender, race, education and region of the recipient are held constant.

Table 9 seeks to investigate these issues. It uses the sample of individuals where past (i.e. lagged levels of) GHQ and GHQH data are available. Column one replicates the result for column four of Table 8. Parameter estimates are found to be similar, though less well determined. In column two of Table 9, family income is added as an explanatory variable. If the observed effect of the size of inheritance upon wellbeing reflects the wealth of inheritors, then the addition of this variable should drive the estimated coefficient towards zero. In fact, the estimated relationship between wellbeing and bequests seems to be orthogonal to the inclusion of an income control. Furthermore, when we add a lagged dependent variable or instead examine the change in wellbeing[15], in columns three and four of Table 9 respectively, the estimated beneficial effect of a bequest increases. Thus the results do not depend upon the wealth of inheritors.

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[15] This will capture the effect of selectivity if it remains stable over time.

Any gains in wellbeing associated with an inheritance are potentially contaminated by distress associated with the death of a close relative. The results so far may then form a lower bound upon the true effect. Assuming stress levels are liable to be high both pre- and post-bereavement, it seems natural to examine how wellbeing changes over time in response to an inheritance. Columns one and two of Table 10 indicate an improvement in both GHQ mental health scores and GHQH unhappiness scores that itself is increasing in the size of the bequest. This is true both within the sample of all individuals and the sample restricted to inheritors only. A 50,000 pounds inheritance is then predicted to produce an improvement in GHQ mental stress of 0.99 and GHQH unhappiness of 0.15, both of which are approximately 0.2 of a standard deviation.

The results may reflect heightened distress pre-bereavement and a subsequent return to 'normal' wellbeing levels. If so, we spuriously overestimate the effect of a windfall. If the bequest is anticipated, consumption patterns may change in advance, improving welfare, and so we underestimate the true gain in wellbeing. Hence we next examine the change in wellbeing over longer time periods, namely, two-year and three-year gaps. Columns three to six of Table 10 show that the results are robust to such considerations; indeed the gains in wellbeing from an inheritance appear to be amplified. A bequest of 10,000 pounds improves the GHQ mental stress score by 0.520 and the GHQH unhappiness scores by 0.083 – compared to the wellbeing levels that prevailed three years prior. The latter effect is found to be statistically significant at normal confidence levels.

5. Conclusions

Economists assume, without detailed evidence, that a person who becomes richer becomes happier. This paper shows that what is arguably the central tenet of economics is supported by the data.

While it is known from recent cross-sectional work that reported happiness is positively correlated with income, that is not a persuasive reason to believe that more money leads to greater wellbeing. Cross-section patterns are at best suggestive because their causal implications are hard to interpret. Constructing a compelling test is difficult because of the stringent requirements of an ideal data set. Our approach seems to have three advantages. First, we follow a group of individuals longitudinally, and thus can measure the same

person's wellbeing and income level at different points in time. Second, the data set provides information on financial windfalls (inheritances and lottery wins). These are probably as close as can be achieved to randomly occurring events in which some individuals have money showered upon them while others, in a control group, do not. Third, information is available on two ways to measure wellbeing: mental stress using a standard psychological health measure, and happiness using a simple four-point question.

We find that, as theory predicts, a windfall of money in year t is followed by lower mental stress and higher reported happiness[16]. As a conservative estimate, a windfall of 50,000 pounds (75,000 US dollars) improves mental wellbeing by between 0.1 and 0.3 standard deviations.

[16] Because we have data on both windfalls *and* wellbeing only for two years right at the end of our sample, it is not possible to assess whether people adapt psychologically to a windfall (perhaps returning eventually to some baseline happiness level). But the longitudinal data collection is continuing, so eventually it should be possible to address this question.

The Effects of Windfalls upon Two Measures of Wellbeing in a Panel

Table 1a – Mental Stress Equations
GHQ Stress Scores

Regressor	*All GHQ*	*All GHQ*	*Windfall GHQ*	*All ΔGHQ*	*All ΔGHQ*	*Windfall ΔGHQ*
Windfall dummy	-0.299			-0.156		
	(2.83)			(1.64)		
Ln(Windfall amount)		-0.054	-0.103		-0.034	-0.101
		(3.45)	(2.26)		(2.31)	(2.13)
Observations						
Individuals in Panel	9588	9588	2932	8620	8620	2722
Panel Total	17556	17556	3737	16075	16075	3478
Mean GHQ stress score	11.14	11.14	10.90	11.16	11.16	10.93
	(5.44)	(5.44)	(5.28)	(5.43)	(5.43)	(5.27)
Mean windfall amount in pounds	388.7	388.7	1825.9	376.0	376.0	1737.6
[1 pound equals 1.5 US dollars]	(5655.3)	(5655.3)	(12151.5)	(5344.5)	(5344.5)	(12387.8)

Table 1b – Unhappiness Equations
GHQH Unhappiness Scores

Regressor	*All GHQH*	*All GHQH*	*Windfall GHQH*	*All ΔGHQH*	*All ΔGHQH*	*Windfall ΔGHQH*
Windfall dummy	-0.014			-0.026		
	(1.24)			(2.03)		
Ln(Windfall amount)		-0.003	-0.011		-0.005	-0.013
		(1.86)	(2.05)		(2.59)	(2.02)
Observations						
Individuals in Panel	9588	9588	2932	8696	8696	2737
Panel Total	17556	17556	3737	16201	16201	3499
Mean GHQH unhappiness score	2.01	2.01	2.00	2.01	2.01	2.00
	(0.59)	(0.59)	(0.59)	(0.59)	(0.59)	(0.59)
Mean windfall amount in pounds	388.7	388.7	1825.9	376.0	376.0	1737.6
[1 pounds equals 1.5 US dollars]	(5655.3)	(5655.3)	(12151.5)	(5344.5)	(5344.5)	(12387.8)

- t-ratios are in parentheses. Standard errors are robust to arbitrary heteroscedasticity and the repeat sampling of individuals. All estimates are from least squares bivariate regressions. Data are for 1997 and 1998.
- GHQ is a measure of mental stress on a 36-point scale. GHQH is a measure of unhappiness on a 4-point scale.
- 'All' refers to the whole sample. The heading 'Windfall' refers to the sub-sample of those people who receive a non-zero windfall. Windfalls refer to cumulative gains, from lottery winnings plus inheritances, within the last year. They are deflated to 1997 values.
- The log of windfall corrects the zero-windfall terms by adding a small constant (0.1).
- The first three columns are cross-sections. The second three columns are differences.
- Where sample means are reported, standard deviations are in parentheses.

Summary Statistics by Source of Windfall

Table 2a – Summary Statistics by Whether Had a Win on the Lottery

Sample 1: The Pooled Cross-section

Lottery Win	*Lottery Amount*	*GHQ*	*GHQH*	*ΔGHQ*	*ΔGHQH*	*Income*	*Frequency*
No		11.22	2.01			21532	14079
		(5.48)	(0.59)			(18730)	
Yes	200.0	10.91	2.00			23439	3334
	(2859.2)	(5.29)	(0.59)			(17234)	
Total	38.3	11.16	2.01			21897	17413
	(1253.4)	(5.45)	(0.59)			(18467)	

Sample 2: The sub-sample with Lagged GHQ Scores available

Lottery Win	*Lottery Amount*	*GHQ*	*GHQH*	*ΔGHQ*	*ΔGHQH*	*Income*	*Frequency*
No		11.25	2.02	0.020	0.006	21445	11558
		(5.46)	(0.58)	(5.41)	(0.71)	(18395)	
Yes	118.5	10.93	2.01	-0.096	-0.010	23483	2831
	(565.6)	(5.19)	(0.58)	(5.27)	(0.70)	(17378)	
Total	23.3	11.19	2.02	-0.003	0.003	21846	14389
	(255.2)	(5.41)	(0.58)	(5.38)	(0.71)	(18217)	

Table 2b - Summary Statistics by Whether had an Inheritance

Sample 1: The Pooled Cross-section

Inheritance	*Bequest Amount*	*GHQ*	*GHQH*	*ΔGHQ*	*ΔGHQH*	*Income*	*Frequency*
No		11.15	2.01			21811	16953
		(5.45)	(0.59)			(18113)	
Yes	14547.6	10.93	1.95			24621	422
	(32582.4)	(5.16)	(0.61)			(27959)	
Total	353.3	11.15	2.01			21898	17375
	(5544.4)	(5.44)	(0.59)			(18418)	

Sample 2: The sub-sample with Lagged GHQ Scores available

Inheritance	*Bequest Amount*	*GHQ*	*GHQH*	*ΔGHQ*	*ΔGHQH*	*Income*	*Frequency*
No		11.19	2.02	0.0002	0.006	21797	13306
		(5.40)	(0.58)	(5.36)	(0.70)	(17827)	
Yes	14137.0	11.10	1.96	-0.429	-0.097	24465	340
	(30362.3)	(5.34)	(0.62)	(5.59)	(0.78)	(28793)	
Total	352.2	11.18	2.02	-0.010	0.003	21864	13646
	(5268.9)	(5.39)	(0.58)	(5.37)	(0.70)	(18184)	

- Mean windfall values are given in the first column in pounds. Sample 2 means those in the data set for whom we have some observations on wellbeing for earlier periods. Lottery winnings and inheritances refer to cumulative gains within the last year. The amount of lottery winnings, bequests and income variables are deflated to 1997 values.
- Standard deviations are in parentheses. The 'Income' column gives the mean incomes for the groups.
- ΔGHQ refers to the one period change in GHQ score ($GHQ_t - GHQ_{t-1}$). ΔGHQH is defined analogously.

Summary Statistics by Amount of Windfall

Table 3 – Summary Statistics by Amount of Win on Lottery

Sample 1: The Pooled Cross-section

Lottery Win	*Lottery Amount*	*GHQ*	*GHQH*	*ΔGHQ*	*ΔGHQH*	*Income*	*Frequency*
No		11.22	2.01			21532	14079
		(5.48)	(0.59)			(18730)	
1-99	28.6	11.05	2.01			23098	2769
	(24.1)	(5.34)	(0.59)			(16684)	
100-999	256.6	10.18	1.98			23921	497
	(195.4)	(4.98)	(0.56)			(17278)	
1000 plus	6766.6	10.28	1.94			33776	68
	(19009.5)	(4.67)	(0.57)			(30829)	
Total	38.30	11.16	2.01			21897	17413
	(1253.4)	(5.45)	(0.59)			(18467)	

Sample 2: The sub-sample with Lagged GHQ Scores available

Lottery Win	*Lottery Amount*	*GHQ*	*GHQH*	*ΔGHQ*	*ΔGHQH*	*Income*	*Frequency*
No		11.25	2.02	0.020	0.006	21445	11558
		(5.46)	(0.58)	(5.41)	(0.71)	(18395)	
1-99	28.9	11.07	2.02	-0.081	-0.011	23073	2353
	(23.9)	(5.22)	(0.58)	(5.28)	(0.71)	(16667)	
100-999	259.7	10.24	1.98	-0.109	0.009	24156	423
	(200.2)	(5.02)	(0.57)	(5.30)	(0.66)	(17707)	
1000 plus	2868.9	10.31	1.98	-0.655	-0.109	35878	55
	(2865.8)	(4.53)	(0.59)	(4.25)	(0.66)	(33319)	
Total	23.3	11.19	2.02	-0.003	0.003	21846	14389
	(255.2)	(5.41)	(0.58)	(5.38)	(0.71)	(18217)	

- Lottery winnings and inheritances refer to cumulative gains within the last year. The amount of lottery winnings, bequests and income variables are deflated to 1997 values.
- Standard deviations are in parentheses.
- ΔGHQ refers to the one period change in GHQ score ($GHQ_t - GHQ_{t-1}$). ΔGHQH is defined analogously.

Table 4 – Summary Statistics by Amount of Inheritance

Sample 1: The Pooled Cross-section

Inheritance	*Bequest Amount*	*GHQ*	*GHQH*	*ΔGHQ*	*ΔGHQH*	*Income*	*Frequency*
No		11.15	2.01			21811	16953
		(5.45)	(0.59)			(18113)	
1-2499	881.7	10.58	1.89			24269	189
	(629.3)	(5.04)	(0.56)			(19974)	
2500-9999	5351.7	10.95	1.97			23270	118
	(2150.1)	(5.19)	(0.61)			(14219)	
10,000 +	46442.8	11.50	2.02			26588	115
	(49917.4)	(5.34)	(0.68)			(44894)	
Total	353.3	11.15	2.01			21880	17375
	(5544.4)	(5.44)	(0.59)			(18418)	

Sample 2: The sub-sample with Lagged GHQ Scores available

Inheritance	*Bequest Amount*	*GHQ*	*GHQH*	*ΔGHQ*	*ΔGHQH*	*Income*	*Frequency*
No		11.19	2.02	0.0002	0.0061	21797	13306
		(5.40)	(0.58)	(5.36)	(0.70)	(17827)	
1-2499	908.4	10.76	1.90	-0.2800	-0.0933	23489	150
	(641.5)	(5.20)	(0.58)	(5.42)	(0.74)	(19709)	
2500-9999	5477.4	11.04	1.99	-0.8242	-0.0769	24366	91
	(2177.6)	(5.25)	(0.61)	(5.43)	(0.67)	(14723)	
10,000 +	42140.3	11.68	2.04	-0.2929	-0.1212	26033	99
	(45324.0)	(5.62)	(0.68)	(6.00)	(0.91)	(45544)	
Total	352.2	11.18	2.02	-0.0105	0.0035	21864	13646
	(5268.9)	(5.39)	(0.58)	(5.37)	(0.70)	(18184)	

- Lottery winnings and inheritances refer to cumulative gains within the last year. The amount of lottery winnings, bequests and income variables are deflated to 1997 values.
- Standard deviations are in parentheses.
- ΔGHQ refers to the one period change in GHQ score ($GHQ_t - GHQ_{t-1}$). ΔGHQH is defined analogously.

The Effect of a Lottery Win upon Wellbeing

Table 5a – Mental Stress Equations
GHQ Stress Scores

Regressor	*All 1997-98*	*All 1997-98*	*All 1997-98*	*All 1997-98*	*Win 1997-98*
Amount of Income	-0.117				
	(4.72)				
Lottery Win		-0.199			
		(1.81)			
Lottery Win: 1-99 pounds			-0.077		
			(0.65)		
Lottery Win: 100-999			-0.796		
			(3.36)		
Lottery Win: 1000 or more			-0.825		
			(1.37)		
Amount of Lottery Win				-0.686	-0.666
				(6.26)	(5.36)
Observations					
Individuals in Panel	9493	9493	9493	9493	2607
Panel Total	17413	17413	17413	17413	3334
R-squared	0.03	0.03	0.03	0.03	0.03

Table 5b – Unhappiness Equations
GHQH Unhappiness Scores

Regressor	*All 1997-98*	*All 1997-98*	*All 1997-98*	*All 1997-98*	*Win 1997-98*
Amount of Income	-0.005				
	(1.74)				
Lottery Win		-0.005			
		(0.45)			
Lottery Win: 1-99 pounds			0.000		
			(0.01)		
Lottery Win: 100-999			-0.026		
			(1.00)		
Lottery Win: 1000 or more			-0.078		
			(1.14)		
Amount of Lottery Win				-0.032	-0.031
				(2.01)	(1.74)
Observations					
Individuals in Panel	9493	9493	9493	9493	2607
Panel Total	17413	17413	17413	17413	3334
R-squared	0.01	0.01	0.01	0.01	0.02

- t-ratios are in parentheses. See notes to Table 1.
- The lottery win dummies are relative to the omitted category of zero winnings. The amount variables are measured in £0,000's (deflated to 1997 values).
- All regressions are estimated by OLS and include controls for age, gender, race, highest educational qualification, region of residence, and year.

The Effect of a Lottery Win upon Wellbeing: Non-linear Income Effects

Table 6a – Mental Stress Equations
GHQ Stress Scores

Regressor	*All 1997-98*	*All 1997-98*	*All 1997-98*
Amount of Lottery Win	-0.686	-0.664	-1.510
	(6.26)	(6.35)	(1.16)
(Amount of Lottery Win)^2/100			0.917
			(0.67)
Amount of Income		-0.117	-0.172
		(4.69)	(4.86)
(Amount of Income)^2/100			0.041
			(2.86)
Observations			
Individuals in Panel	9493	9493	9493
Panel Total	17413	17413	17413
R-squared	0.03	0.03	0.03

Table 6b – Unhappiness Equations
GHQH Unhappiness Scores

Regressor	*All 1997-98*	*All 1997-98*	*All 1997-98*
Amount of Lottery Win	-0.032	-0.031	-0.142
	(2.01)	(1.98)	(0.96)
(Amount of Lottery Win)^2/100			0.121
			(0.78)
Amount of Income		-0.005	-0.006
		(1.73)	(1.68)
(Amount of Income)^2/100			0.001
			(1.08)
Observations			
Individuals in Panel	9493	9493	9493
Panel Total	17413	17413	17413
R-squared	0.01	0.01	0.01

- t-ratios are in parentheses. See notes to Table 1.
- The amount variables are measured in £0,000's (deflated to 1997 values).
- All regressions are estimated by OLS and include controls for age, gender, race, highest educational qualification, region of residence, and year.

The Effects of a Lottery Win upon Wellbeing: Robustness Checks

Table 7a – Mental Stress Equations
GHQ Stress Scores

Regressor	*GHQ All 1997-98*	*GHQ All 1997-98*	*GHQ All 1997-98*	*ΔGHQ All 1997-98*	*ΔGHQ All 1997-98*
Amount of Lottery Win	-0.826	-1.391	-1.449	-1.976	-2.012
	(0.61)	(1.23)	(1.28)	(1.68)	(1.70)
Amount of Income	-0.123	-0.020	-0.020	0.088	0.088
	(4.32)	(0.90)	(0.91)	(3.68)	(3.67)
GHQ (t-1)		0.491	0.491		
		(44.11)	(44.11)		
Lottery Win in 1995			0.059		0.037
			(0.70)		(0.47)
Observations					
Individuals in Panel	7515	7515	7515	7515	7515
Panel Total	14389	14389	14389	14389	14389
R-squared	0.03	0.26	0.26	0.00	0.00

Table 7b – Unhappiness Equations
GHQH Unhappiness Scores

Regressor	*GHQH All 1997-98*	*GHQH All 1997-98*	*GHQH All 1997-98*	*ΔGHQH All 1997-98*	*ΔGHQH All 1997-98*
Amount of Lottery Win	-0.019	-0.059	-0.073	-0.181	-0.177
	(0.14)	(0.44)	(0.55)	(1.15)	(1.13)
Amount of Income	-0.003	0.000	-0.001	0.006	0.006
	(0.89)	(0.18)	(0.20)	(2.02)	(2.03)
GHQH (t-1)		0.247	0.247		
		(21.38)	(21.36)		
Lottery Win in 1995			0.014		-0.004
			(1.37)		(0.38)
Observations					
Individuals in Panel	7515	7515	7515	7515	7515
Panel Total	14389	14389	14389	14389	14389
R-squared	0.01	0.07	0.07	0.00	0.00

- t-ratios are in parentheses. See notes to Table 1.
- The amount variables are measured in £0,000's (deflated to 1997 values).
- All regressions are estimated by OLS and include controls for age, gender, race, highest educational qualification, region of residence, and year.
- ΔGHQ refers to the one period change in GHQ score ($GHQ_t - GHQ_{t-1}$). ΔGHQH is defined analogously.

The Effect of an Inheritance upon Wellbeing

Table 8a – Mental Stress Equations
GHQ Stress Scores

Regressor	*All 1997-98*	*All 1997-98*	*All 1997-98*	*All 1997-98*	*Inherit 1997-98*
Amount of Income	-0.113				
	(4.55)				
Inheritance dummy		-0.235			
		(0.89)			
Inheritance: 1-2499 pounds			-0.488		
			(1.26)		
Inheritance: 2500-9999			-0.232		
			(0.49)		
Inheritance: 10,000 or more			0.176		
			(0.34)		
Amount of Inheritance				-0.075	-0.057
				(1.28)	(0.78)
Observations					
Individuals in Panel	9488	9488	9488	9488	392
Panel Total	17375	17375	17375	17375	422
R-squared	0.03	0.03	0.03	0.03	0.09

Table 8b – Unhappiness Equations
GHQH Unhappiness Scores

Regressor	*All 1997-98*	*All 1997-98*	*All 1997-98*	*All 1997-98*	*Inherit 1997-98*
Amount of Income	-0.004				
	(1.45)				
Inheritance dummy		-0.061			
		(1.98)			
Inheritance: 1-2499			-0.102		
			(2.41)		
Inheritance: 2500-9999			-0.035		
			(0.63)		
Inheritance: 10,000 or more			-0.019		
			(0.29)		
Amount of Inheritance				-0.014	-0.008
				(1.91)	(1.00)
Observations					
Individuals in Panel	9488	9488	9488	9488	392
Panel Total	17375	17375	17375	17375	422
R-squared	0.01	0.01	0.01	0.01	0.06

- t-ratios are in parentheses. See notes to Table 1.
- The inheritance dummies are relative to the omitted category of not receiving a bequest. The amount variables are measured in £0,000's (deflated to 1997 values).
- All regressions are estimated by OLS and include controls for age, gender, race, highest educational qualification, region of residence, and year.

The Effect of an Inheritance upon Wellbeing: Robustness Checks

Table 9a – Mental Stress Equations
GHQ Stress Scores

Regressor	*GHQ All 1997-98*	*GHQ All 1997-98*	*GHQ All 1997-98*	*ΔGHQ All 1997-98*	*ΔGHQ All 1997-98*
Amount of Inheritance	-0.075	-0.078	-0.136	-0.198	-0.196
	(0.96)	(0.99)	(1.16)	(1.11)	(1.10)
Amount of Income		-0.113	-0.014		0.089
		(3.90)	(0.62)		(3.65)
GHQ (t-1)			0.492		
			(43.54)		
Observations					
Individuals in Panel	7262	7262	7262	7262	7262
Panel Total	13646	13646	13646	13646	13646
R-squared	0.03	0.03	0.26	0.00	0.00

Table 9b – Unhappiness Equations
GHQH Unhappiness Scores

Regressor	*GHQH All 1997-98*	*GHQH All 1997-98*	*GHQH All 1997-98*	*ΔGHQH All 1997-98*	*ΔGHQH All 1997-98*
Amount of Inheritance	-0.009	-0.009	-0.014	-0.030	-0.030
	(0.96)	(0.96)	(1.18)	(1.29)	(1.28)
Amount of Income		-0.001	0.001		0.007
		(0.39)	(0.32)		(2.27)
GHQH (t-1)			0.248		
			(21.07)		
Observations					
Individuals in Panel	7262	7262	7262	7262	7262
Panel Total	13646	13646	13646	13646	13646
R-squared	0.01	0.01	0.07	0.00	0.00

- t-ratios are in parentheses. See notes to Table 1.
- The amount variables are measured in £0,000's (deflated to 1997 values).
- All regressions are estimated by OLS and include controls for age, gender, race, highest educational qualification, region of residence, and year.
- ΔGHQ refers to the one period change in GHQ score ($GHQ_t - GHQ_{t-1}$).

The Effect of an Inheritance upon Wellbeing: First Differences

Table 10a – Mental Stress Equations
GHQ Stress Scores

Regressor	*ΔGHQ All 1997-98*	*ΔGHQ Inherit 1997-98*	*Δ2GHQ All 1997-98*	*Δ2GHQ Inherit 1997-98*	*Δ3GHQ All 1997-98*	*Δ3GHQ Inherit 1997-98*
Amount of Inheritance	-0.196	-0.235	-0.363	-0.450	-0.520	-0.683
	(1.10)	(1.07)	(1.23)	(1.26)	(1.26)	(1.41)
Amount of Income	0.089	-0.031	0.087	-0.251	0.054	-0.605
	(3.65)	(0.37)	(2.29)	(1.55)	(0.84)	(2.13)
Observations						
Individuals in Panel	7262	316	7262	316	7262	316
Panel Total	13646	340	13646	340	13646	340
R-squared	0.00	0.06	0.00	0.06	0.00	0.08

Table 10b – Unhappiness Equations
GHQH Unhappiness Scores

Regressor	*ΔGHQH All 1997-98*	*ΔGHQH Inherit 1997-98*	*Δ2GHQH All 1997-98*	*Δ2GHQH Inherit 1997-98*	*Δ3GHQH All 1997-98*	*Δ3GHQH Inherit 1997-98*
Amount of Inheritance	-0.030	-0.031	-0.060	-0.072	-0.083	-0.108
	(1.28)	(1.07)	(1.83)	(1.73)	(2.15)	(2.21)
Amount of Income	0.007	-0.002	0.008	-0.017	0.007	-0.036
	(2.27)	(0.20)	(1.61)	(0.82)	(0.79)	(0.93)
Observations						
Individuals in Panel	7262	316	7262	316	7262	316
Panel Total	13646	340	13646	340	13646	340
R-squared	0.00	0.06	0.00	0.07	0.00	0.08

- t-ratios are in parentheses. See notes to Table 1.
- The amount variables are measured in £0,000's (deflated to 1997 values).
- All regressions are estimated by OLS and include controls for age, gender, race, highest educational qualification, region of residence, and year.
- ΔGHQ refers to the one period change in GHQ score ($GHQ_t - GHQ_{t-1}$). Δ2GHQ is the two period change in GHQ score ($GHQ_t - GHQ_{t-2}$). Δ3GHQ is the three period change in GHQ score ($GHQ_t - GHQ_{t-3}$). Terms are defined similarly for GHQH.

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