04 June 2014

Office for National Statistics

Income, Expenditure and Personal Well-being, 2011/12

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Abstract

This article presents new findings on the relationship between personal well-being and household income and expenditure using regression analysis. It looks at how income, the distribution of income across society, source of income and spending affect life satisfaction, a sense that the things we do in life are worthwhile, and levels of happiness and anxiety.

1. Introduction

This article analyses the relationship between personal well-being and household income and expenditure.

Previous analysis by ONS (2013a, b) has used the Annual Population Survey (APS) to study the factors related to personal well-being, for example, the link between commuting and well-being. These articles did not look at relationships between personal well-being and household income or household expenditure, as this data is not recorded by the APS. The relationships between household finances and personal well-being in this article have been explored using household income and expenditure data available from the Effects of Taxes and Benefits on Household Income dataset.

This article looks at how personal well-being varies in relation to household finances, after taking account of a range of possible influences on well-being. Specifically, the analysis examines the relationships between different aspects of personal well-being and:

- household income,
- the proportion of total household income that is received in cash benefits from the state, while controlling for the total level of household income,
- household expenditure.

2. Key Points

- Individuals in households with higher incomes report higher life satisfaction and happiness, and lower anxiety, holding other factors fixed. Higher household income is not significantly related to people’s sense that the things they do in life are worthwhile.

- An increase in the proportion of household income from cash benefits such as Housing Benefit and Jobseeker's Allowance is associated with lower well-being across all four measures, with the effects strongest for men. This effect remained even when taking differences in household income into account.

- Household expenditure appears to have a stronger relationship with people's life satisfaction, sense that the things they do in life are worthwhile and happiness, than household income. There is no significant relationship between higher household expenditure and lower anxiety.

- The biggest differences in well-being between people in neighbouring fifths of both the income and expenditure distributions are between those in the bottom and second-lowest fifths of the distributions, holding other factors fixed. This suggests that well-being increases fastest in relation to increases in income and expenditure from the lower levels of income and expenditure.

3. Research methods

This article presents results obtained from regression analysis, a statistical technique which enables analysis of how responses to personal well-being questions vary by specific characteristics and circumstances of individuals while holding all other characteristics equal. The key benefit of regression analysis is that it provides a better method of identifying those factors which matter most to personal well-being than by analysing the relationship between only two characteristics at a time.

The analysis is based on a special version of the Effects of Taxes and Benefits on Household Income dataset (which included the four standard ONS personal well-being questions) and covers the period April 2011 to March 2012. The Effects of Taxes and Benefits on Household Income is an annual article produced by ONS using data from the Living Costs and Food Survey (LCF).

3.1 Key definitions

Over 8,000 adults (aged 16 and over) answered the following four standard ONS personal well-being questions which were included in all Living Costs and Food Survey interviews conducted in Great Britain during this period:

- Overall, how satisfied are you with your life nowadays?
- Overall, to what extent do you feel the things you do in your life are worthwhile?
- Overall, how happy did you feel yesterday?
- Overall, how anxious did you feel yesterday?

People answer these questions on a scale of 0 to 10 where 0 is 'not at all' and 10 is 'completely'. Further information about the distribution of responses for each measure is available in section 7.10 Personal well-being questions.

Household income

The measure of income used in this analysis is equivalised disposable household income. Disposable income is the total income a household has from 'original' sources (primarily employment and investment income) plus cash benefits received from the state, minus direct taxes.

This measure of income is ‘equivalised’ to adjust for differences in household composition, in order to give a measure that can be used to meaningfully compare incomes between households of different sizes and types.

Household, as opposed to personal income, is used in this analysis as typically all members of a household can benefit economically from an increase in income. In addition, certain taxes and benefits are paid or received by the household as a whole, such as Council Tax and Housing Benefit.

Cash benefits

This article also analyses the relationship between personal well-being and the proportion of a household’s gross income (their total income from both original and cash benefit sources) which is made up of cash benefits received from the state, such as Housing Benefit and Jobseeker’s Allowance.

The Effects of Taxes and Benefits on Household Income publication provides further information on definitions of income and equivalisation and covers a comprehensive range of cash benefits.

Household expenditure

Household expenditure in this analysis includes all expenditure defined by ONS as consumption expenditure (See: ONS Family Spending Chapter 1), plus a number of additional items and adjustments which make expenditure more comparable across households. These include expenditure abroad, on mortgage interest and employer-paid expenditure on company cars. Further information on the definition of expenditure used in this article can be found in the Supporting Information section.

As with income, household expenditure has been equivalised using the modified-OECD scale, in order to make the expenditure of households of different sizes and types comparable.

3.2 The regression models

In order to isolate the relationship between income or expenditure and personal well-being, other factors which could potentially influence well-being are held equal in the analysis:

- employment status,
- sex,
- age,
- whether there are dependent children in the household,
- relationship status,
- housing tenure,
- region of Great Britain (including urban/rural differences),
- personal receipt of a disability benefit (this is included as a substitute for self-reported health or disability, which are not available from the LCF. Further information on what is contained in this variable can be found in the section Supporting Information),
- highest qualification obtained,
- ethnicity.

The relationships between many of these variables and personal well-being are explored in detail in ONS (2013a) using data from the APS.

Two different regression analysis techniques were used in this analysis: ordered probit and ordinary least squares (OLS). Further information about these techniques can be found in section 7 Technical Appendix.

Ordered probit was used to specify the models as it is the technique best suited to the ordered nature of the responses to the personal well-being questions (ie, with responses on a scale from 0 to 10), while OLS is generally used for continuous data. However, the results of ordered probit analysis are not straightforward to interpret and explain to a wide audience in an accessible way. Due to the two methods often yielding similar results when there are more than four categories for ordered responses, it is considered acceptable to undertake the analysis using either ordered probit or OLS (Ferrer-i-Carbonell and Frijters 2004; Stevenson and Wolfers 2008; Fleche et al., 2011).

In this analysis, the relative coefficient sizes and statistical significance levels produced using the two techniques are very similar. As a result, this analysis has used the ordered probit method to specify the models (including control variables) and the estimated models produced by the OLS method to report the results.

Results from both ordered probit and OLS models are included in the reference tables.

3.3 Interpreting the numbers

For the regression models in this article, a natural logarithmic transformation has been applied to income and expenditure (see 7.7 Key analysis variables). This enables the findings to be presented as the difference in each aspect of personal well-being measured on a 0 to 10 scale, associated with a percentage difference in income or expenditure.

Looking at the absolute difference in well-being resulting from a percentage difference in income reflects the widely held notion that a percentage difference in income is likely to have similar effects on people of different income levels; whereas an absolute increase in income of, say £500 per year, is likely to have a larger impact on people with a low income than on people with a high income (see Kahneman and Deaton, 2010, for an example of how this relates to personal well-being).

The article also looks at the differences in well-being associated with differences in the percentage of household income derived from cash benefits. The results can be interpreted as the difference in reported well-being between people living in a household where 0% of the income is derived from cash benefits and people living in a household where 100% of income is derived from benefits.

It is important to note that the results should not be interpreted as the difference in well-being experienced immediately before and immediately after a change in income, expenditure, or the proportion of income derived from cash benefits. Previous studies (Di Tella et al., 2003, Brickman et al, 1978) have shown that an increase in economic prosperity can lead to a large increase in well-being immediately after the change occurs. However, over time people can “adapt” to their new level of prosperity, and their reported well-being appears to fall over time, closer to the original pre-change level.

This analysis is based on responses made at a one point in time and cannot differentiate between an impact on well-being that is recent, for example, a change in income last month, or one to which the individual has had time to adapt, such as a change in income a year ago.

More information on the caveats around inferring causality from regression analysis is in the section 7.6 Causality.

Overall, the analysis has been able to explain just over 12% of the differences between individuals in reported levels of life satisfaction and just over 4% of the differences in reported anxiety. For more information on the explanatory power of the models, see 7.3 The explanatory power of the models.

4. How much does household income matter to personal well-being?

Key findings:

- Those in households with higher incomes report higher life satisfaction and happiness, and lower anxiety on average, but do not give significantly different ratings to their sense that the things they do in life are worthwhile, holding other factors equal.
- Comparing this analysis to previous ONS findings suggests that household income has a relationship with a wider range of measures of personal well-being than personal earnings.
- The aspect of well-being most strongly associated with household income is life satisfaction, with a doubling of income associated with life satisfaction 0.17 points higher on the 0 to 10 scale. The scale of this difference is considerably smaller than that between employees and the unemployed or that between people who are married and those who are widowed.
- Holding all else equal, the biggest differences in well-being between neighbouring fifths of the income distribution are between the lowest and second-lowest income groups, suggesting that increases in income are most strongly related to increases in well-being for those at the bottom of the income distribution.

4.1 Income and well-being

There is an argument that more income allows people to satisfy more preferences, resulting in increased well-being (see OECD, 2013). The importance of income in determining people's ability to satisfy their preferences suggests that a relationship should be expected between higher household income and higher personal well-being.

On average, those living in households in the poorest fifth (or quintile) of the income distribution rated their life satisfaction at 6.9 on the 0 to 10 scale. Those in the richest fifth of households rated their life satisfaction at an average of 7.7. This is a similar result to that recently found between life satisfaction and earnings for employees in the EU as a whole (Eurofound, 2013). While these figures show that average life satisfaction is higher for individuals at the top than the bottom of the income distribution, this does not take into account other factors (such as employment status, age and region). For example, there is a large increase in life satisfaction between individuals in the bottom fifth and the second fifth of the income distribution. However, there are also more retired people in the second fifth of the income distribution and, as life-satisfaction is known to increase between middle-age and old-age (Blanchflower and Oswald, 2007, ONS, 2013a), this may also have some impact on the difference in life satisfaction between these two groups.

Using regression analysis, these additional factors can be taken into account in order to isolate the relationship between income and personal well-being. This article looks at the absolute difference in personal well-being on a scale of 0 to 10 associated with a percentage difference in income.

Table 1: Relationship between household income and personal well-being, after controlling for individual characteristics (1)

Great Britain

	Life satisfaction	Worthwhile	Happy yesterday	Anxious yesterday
Log of equivalised disposable household income (coefficients)	0.249*	0.079	0.114*	-0.164*
Difference in well-being associated with a doubling of equivalised disposable household income (points on the 0–10 scale)	0.173*	0.055	0.079*	-0.114*

Table source: Office for National Statistics

Table notes:

1. * Shows that the relationship is statistically significant at the 5% level.

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Table 1 shows that higher income appears to be associated with higher well-being across all four measures of well-being, that is: higher levels of life satisfaction, people's sense that the things they do in life are worthwhile and happiness, and lower levels of anxiety. The relationship between income and people's sense that the things they do in life are worthwhile is not strong enough to be considered statistically significant.

The findings show that the aspect of well-being most strongly associated with household income is life satisfaction. A doubling of income is associated with an average life satisfaction rating which is 0.17 points higher on the 0 to 10 scale, holding other factors equal. The size of this difference is roughly comparable to the difference in life satisfaction between individuals renting social (Local Authority and Housing Association) accommodation compared with those renting privately. This difference is small relative to the average 1.15 point difference observed in life satisfaction between

individuals in employment compared with those who are unemployed when holding other factors equal.

The impact of a doubling of income is smaller on happiness and anxiety than on life satisfaction. Table 1 shows that, on average, a doubling of income is associated with people rating their happiness 0.08 points higher and their anxiety 0.11 points lower on the 0 to 10 scale.

It is important to note that these results cannot be interpreted as the change in personal well-being immediately before and after a doubling of income as, over time, people's well-being can 'adapt' to changes in prosperity. More information on adaption can be found in 3.3 Interpreting the numbers.

4.2 Distribution of household income

To analyse the distribution and (in)equality of income, the Effects of Taxes and Benefits on Household Income dataset ranks households from poorest to richest in terms of their equivalised disposable income to split them into five equally-sized groups known as quintiles or fifths. For these allocations:

- the bottom fifth contains the poorest 20% of households, by equivalised disposable income,
- the second fifth contains households with incomes between the 20th and 40th percentile of the distribution,
- the middle fifth contains households with incomes between the 40th and 60th percentile of the distribution,
- the fourth fifth contains households with incomes between the 60th and 80th percentile of the distribution,
- the top fifth contains the richest 20% of households by equivalised disposable income.

These income groups were used to analyse the relationship between an individual's personal well-being and where they are in the income distribution.

Image 1: Allocation of households into income fifths

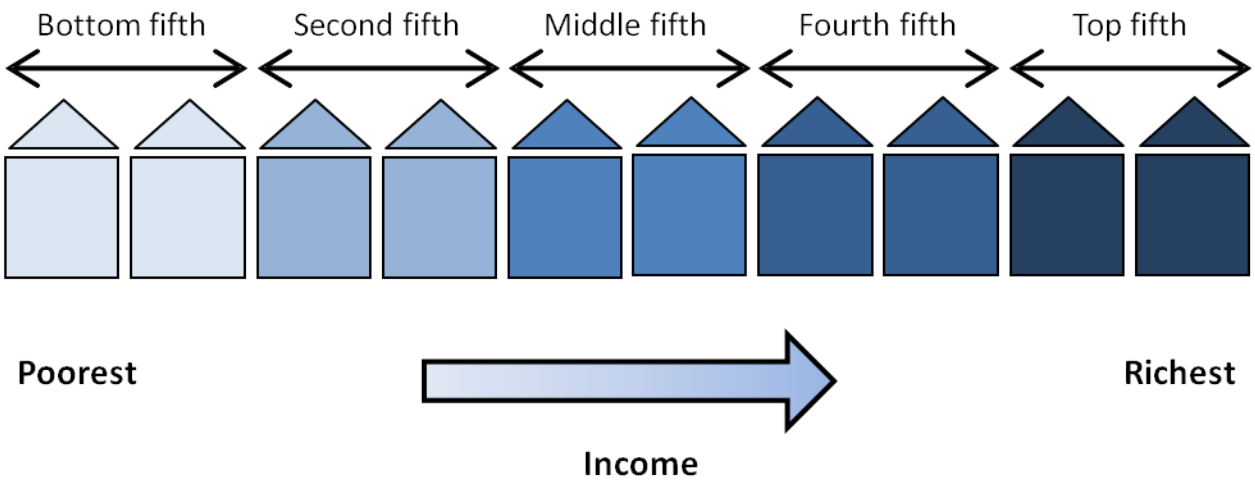
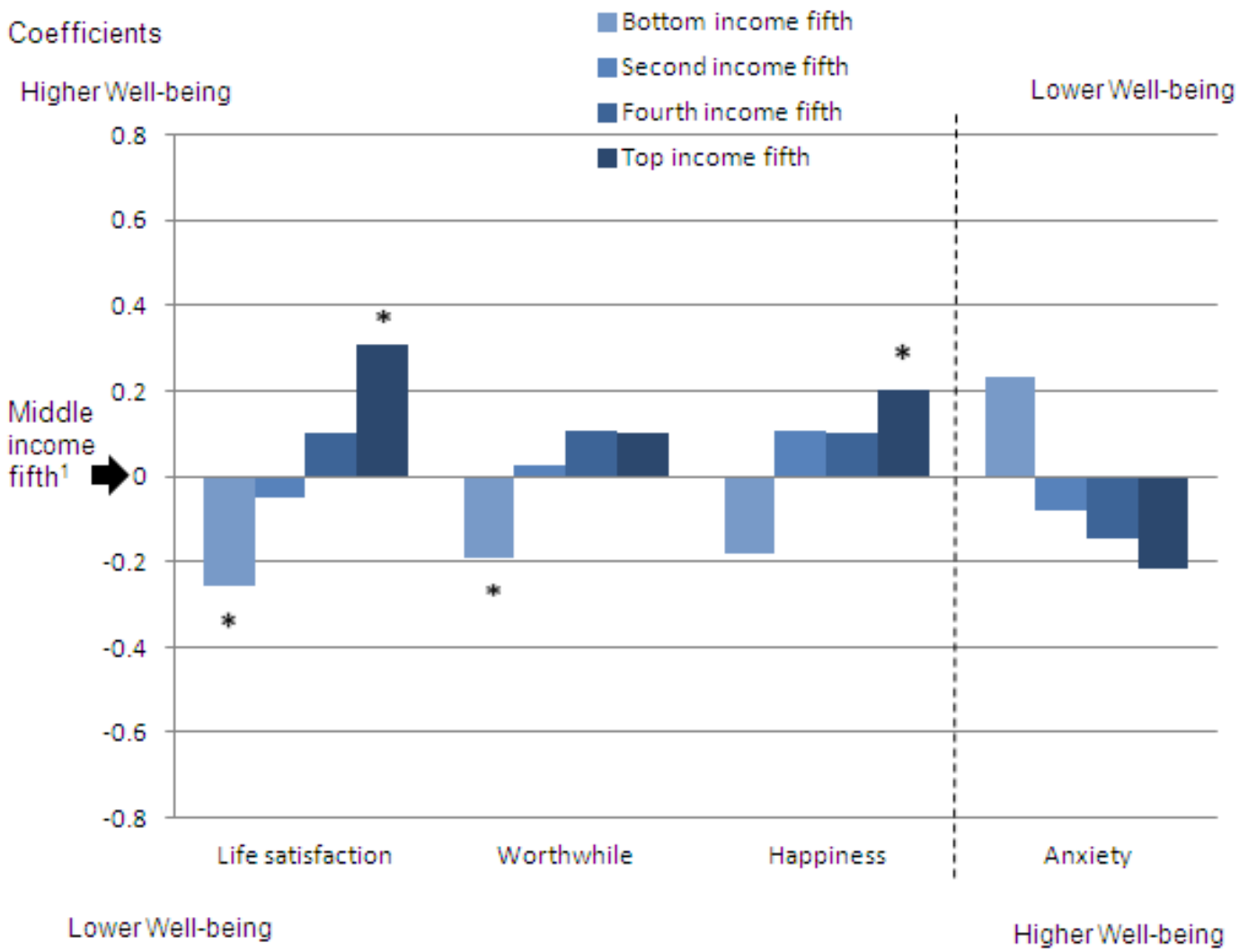


Figure 1: Relationship between personal well-being and different income fifths, compared to the middle fifth, after controlling for individual characteristics

Great Britain



Source: Office for National Statistics

Notes:

1. People in households in the middle fifth of the income distrubution are represented at the baseline (zero).
2. * Shows that the difference from the middle fifth is statistically significant at the 5% level.

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Figure 1 shows the difference in personal well-being associated with living in a household in the middle fifth of the income distribution compared to living in a household in one of the other income groups. The difference in life satisfaction estimated for individuals in households in the bottom and top fifths of the income distribution is 0.56 points. This is roughly comparable to the difference in life

satisfaction between individuals in married couples and those who are single, when other factors are taken into account. Relative to those in households in the bottom fifth, being in the top of the income distribution is associated with a perception that the things one does in life are worthwhile and happiness respectively 0.29 and 0.38 points higher, and anxiety 0.45 points lower, holding all else equal.

Figure 1 shows that the biggest difference in all four measures of personal well-being between individuals in neighbouring fifths of the income distribution, is between the bottom and second fifths. Between households in the second, middle, fourth and top fifths of the income distribution, there are no statistically significant differences in perceptions that the things they do in life are worthwhile or in anxiety. This suggests that, as income increases, the largest differences in people's perceptions that the things they do in life are worthwhile and anxiety are at the lower levels of income.

Life satisfaction differs from the other three well-being measures in its relationship with the different income groups, with individuals in the top fifth of the income distribution having significantly higher life satisfaction than those in any other fifth. This suggests that greater household incomes may be associated with higher life satisfaction, even for people in households which are near the top of the income distribution.

An interactive version of Figure 1 is also available.

4.3 Taking the household perspective

The finding that household income is more strongly associated with life satisfaction than other measures of well-being is consistent with previous findings from ONS (2013a) on the relationship between earnings from employment and well-being.

The results of this new analysis also show that, unlike higher personal earnings, higher household income is related to lower anxiety. This may be due to people living in households with high incomes, many of whom may not personally have high earnings, experiencing lower anxiety as a result of finding it easier to meet financial obligations. This reinforces the idea that the total income available to a household is generally more important to personal well-being than individual earnings.

5. How important is the source of household income?

Key findings:

- A higher proportion of household income obtained from cash benefits (for example Jobseeker's Allowance) is associated with lower well-being across all four measures, even after holding equal the total amount of household income.
- Anxiety is the aspect of personal well-being most strongly associated with differences in the proportion of household income derived from cash benefits.
- The relationship between personal well-being and the proportion of household income derived from cash benefits is stronger for men than for women, affecting both happiness and a sense that the things one does in life are worthwhile.

- The relationship between personal well-being and the proportion of income derived from cash benefits is significant even after taking employment status into account, suggesting that the source of income matters to well-being beyond its connection to employment status.

5.1 Income from cash benefits

Having seen a positive relationship between income and life satisfaction, it is helpful to analyse whether the source of a households' income also has an effect on personal well-being in addition to the amount. In the Effects of Taxes and Benefits on Household Income data and report, a distinction is made between the original income that households obtain from employment and investments (including private pensions), and cash benefits received from the state, such as Housing Benefit and Jobseeker's Allowance. This section looks at the association between personal well-being and the proportion of a household's gross (ie. pre-tax) income that is derived from cash benefits, while holding other factors equal, including the total amount of equivalised disposable household income.

A large proportion of households that receive the majority of their income from cash benefits (including the State Pension) are retired households. To distinguish potential effects of the proportion of income coming from cash benefits from the effects of being in a retired household, this part of the analysis looks at non-retired households only.

Table 2: Relationship between the proportion of household income derived from cash benefits and well-being, and household income and well-being, after controlling for individual characteristics (1,2)

Great Britain, Individuals in non-retired households only

Coefficients

	Life satisfaction	Worthwhile	Happy yesterday	Anxious yesterday
Proportion of household income derived from cash benefits (coefficients)	-0.477*	-0.346*	-0.488*	0.655*
Log of equivalised disposable household income (coefficients)	0.240*	0.099	0.084	-0.112

Table source: Office for National Statistics

Table notes:

1. * shows that the relationship is statistically significant at the 5% level.
2. Non-retired households are households which receive less than half their income from retired members.

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Table 2 shows that, both the household income and the proportion of this income that comes from cash benefits have a statistically significant relationship with life satisfaction, with a higher proportion of income coming from cash benefits being associated with lower life satisfaction.

After taking the proportion of income from cash benefits into account, only life satisfaction is significantly related to household income while all four measures of personal well-being are significantly related to the proportion of income from cash benefits.

A higher proportion of income being derived from cash benefits is significantly related to lower life satisfaction, lower ratings for the perception that the things one does in life are worthwhile, lower happiness and higher anxiety. The largest of these relationships appears to be for anxiety. All else being equal, including the amount of household income, an individual living in a household receiving all its income from cash benefits would rate their anxiety 0.66 points higher on the 0 to 10 scale than someone living in a household receiving no income from cash benefits.

5.2 Differences in the relationship between the source of income and personal well-being for men and women

In contrast to the relationship between well-being and income alone, which does not appear to show large disparities between men and women, there appear to be some differences between the sexes when the relationship between both the level of household income and the proportion of income derived from cash benefits are analysed together.

Table 3: Relationship between the proportion of household income derived from cash benefits and well-being, and household income and well-being, and after controlling for other factors, for men and women (1,2,3)

Great Britain, Individuals in non-retired households only

Coefficients

	Life satisfaction	Worthwhile	Happy yesterday	Anxious yesterday
Proportion of household income derived from cash benefits (coefficients)				
Men	-0.561*	-0.661*†	-0.774*†	0.873*
Women	-0.395*	-0.065†	-0.229†	0.461
Log of equivalised disposable household income (coefficients)				
Men	0.200*	0.053	0.025	-0.080
Women	0.286*	0.146*	0.148	-0.146

Table source: Office for National Statistics

Table notes:

1. * Shows that the relationship is statistically significant at the 5% level.
2. † Difference between the sexes is statistically significant at the 5% level. This has been calculated by "interacting" the income and proportion of income derived from cash benefits with the variables for sex.
3. Non-retired households are households which receive less than half their income from retired members.

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Table 3 shows that men's well-being is, on average, more negatively affected by the proportion of household income derived from cash benefits than women's, particularly the sense that the things they do in life are worthwhile and happiness. All else being equal, a man living in a household in which all of the income is derived from cash benefits would rate his sense that the things he does in life are worthwhile 0.66 points lower and his happiness 0.77 points lower on average than a man living in a household with the same amount of income, none of which is from cash benefits. The findings show this is not the case for women for whom only life satisfaction is significantly affected by the proportion of income from cash benefits.

5.3 Interpretation of relationship between well-being and source of income

Much research has been carried out on the effects of unemployment on personal well-being. McKee-Ryan et al. (2005) and Sen (1997) summarise a variety of reasons that unemployment may impact on well-being, including a lack of structure and purpose to people's lives, lowered social status and sense of self-esteem and a reduced sense of freedom and financial control. Very little research has previously been carried out on the relationship between receipt of cash benefits as a proportion of income and personal well-being.

The findings here show a strong relationship between a higher proportion of household income being derived from cash benefits and lower well-being across all four aspects of personal well-being. Potential reasons may relate to those which link unemployment and low well-being, such as a loss of financial control. However, over 80% of adults living in non-retired households where more than half of income was derived from cash benefits were not unemployed. Employment status was controlled for in the models looking at the proportion of income coming from cash benefits, and both of these variables are highly significant. This suggests both unemployment and the source of household income are related to personal well-being.

6. Does household spending matter to personal well-being?

Key findings:

- Those in households with higher expenditures report higher life satisfaction, sense that the things one does in life are worthwhile and happiness, but do not give significantly different ratings for anxiety, holding other factors equal.
- The relationship between household expenditure and life satisfaction, a sense that the things one does in life are worthwhile and happiness appears to be stronger than the relationship between these aspects of personal well-being and household income.
- As with household income, the largest differences in personal well-being between people in neighbouring fifths of the expenditure distribution, while holding other factors equal, is between people in the lowest and second-lowest expenditure groups.

6.1 Expenditure and well-being

Recent research has highlighted the importance to well-being of economic factors other than income, such as wealth, debt and expenditure. Stiglitz, Sen and Fitoussi (2009) and OECD (2013) emphasise the importance of looking at income, consumption and wealth, when measuring a society's material standard of living.

The availability of detailed expenditure data on the Living Costs and Food Survey has enabled analysis of the relationship between expenditure and well-being. As with household income, expenditure has been equivalised in order to account for differences in household size and composition.

Table 4: Relationship between household expenditure and personal well-being, after controlling for individual characteristics (1)

Great Britain

	Life satisfaction	Worthwhile	Happy yesterday	Anxious yesterday
Log of equivalised household expenditure (coefficients)	0.364*	0.210*	0.254*	-0.112
Difference in well-being associated with a doubling of equivalised household expenditure (points on the 0–10 scale)	0.252*	0.146*	0.176*	-0.077

Table source: Office for National Statistics

Table notes:

1. * Shows that the relationship is statistically significant at the 5% level.

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Table 4 shows that, holding all else equal, people in households with higher levels of expenditure have significantly higher life satisfaction, give higher ratings for the sense that the things they do in life are worthwhile and rate their happiness higher as well. As with household income, the strongest of these relationships is between household expenditure and life satisfaction. While the results in section 4 showed a doubling of household income being associated with life satisfaction 0.17 points higher on the 0 to 10 scale, the relationship is larger for expenditure, with a doubling in household expenditure associated with life satisfaction 0.25 points higher on average.

Unlike with household income, there is a statistically significant relationship between household expenditure and the sense that the things one does in life are worthwhile. A doubling of household expenditure is associated with people rating the things they do in life as worthwhile 0.15 points higher on the 0 to 10 scale on average.

Looking at the relationship between happiness and household expenditure, holding all else equal, a doubling of expenditure is associated with reported happiness 0.18 points higher on the 0 to 10

scale on average. This suggests there is a larger positive effect on happiness associated with a doubling of household expenditure than with a doubling of household income.

In contrast to the household income findings, the data do not show a significant relationship between household expenditure and levels of anxiety. This could suggest that while the experiences that expenditure bring appear to increase peoples' enjoyment of life, it is higher income that appears to have a larger effect on their feelings of financial security and therefore their levels of anxiety.

Comparing the overall results, the regression models which included household expenditure rather than household income were able to explain more of the differences in people's life satisfaction, sense that the things they do in life are worthwhile and happiness. This suggests that household expenditure may be a more accurate predictor of these aspects of personal well-being than household income. For example, the model which included household expenditure was able to explain 12.5% of the variance in individual life satisfaction compared to 12.1% for the model with household income. Similarly, the models with household expenditure explained 8.8% of the variance in individual ratings of the extent to which the things they do in life are worthwhile and 6.6% of the variance in happiness ratings compared to 8.5% and 6.4% respectively for the household income models.

6.2 Expenditure and well-being in different types of households

When comparing across different types of households, expenditure can often be a more helpful measure of a household's material standard of living than income, as people may fund expenditure from different sources during different periods of their lives. For example, income is the most important determinant of expenditure for most non-retired households, while savings are more likely to play a part in the expenditure of retired households.

The ability of people to draw on savings and loans and to accumulate savings means that their expenditure level maybe more stable over their lifetime than their income level (Friedman, 1957, OECD, 2013). Looking at expenditure data enables us to see if the relationship between people's well-being and the economic resources of their household differs for people of different ages, something which is not possible in studies on only income and personal well-being.

This analysis looks at whether there are differences in the relationship between household expenditure and personal well-being for retired households and for non-retired households with and without children. These household groupings are the same as those used in the annual ONS publication, the Effects of Taxes and Benefits on Household Income, and further definitions of how they are comprised can be found in the Background Notes section.

Table 5: Relationship between household expenditure and personal well-being, after controlling for individual characteristics, by household type (1,2)

Great Britain

	Life satisfaction	Worthwhile	Happy yesterday	Anxious yesterday
Log of equivalised household expenditure (coefficients)				
Retired households	0.206*†	0.175*	0.170	-0.175
Non-retired households with children	0.306*	0.068†	0.166	-0.013
Non-retired households without children	0.499*	0.320*	0.361*	-0.136
Difference in well-being associated with a doubling of equivalised household expenditure (points on the 0–10 scale)				
Retired households	0.143*†	0.122*	0.118	-0.121
Non-retired households with children	0.212*	0.047†	0.115	-0.009
Non-retired households without children	0.346*	0.222*	0.250*	-0.094

Table source: Office for National Statistics

Table notes:

1. * Shows that the relationship is statistically significant at the 5% level.
2. Non-retired households are households which receive less than half their income from retired members.

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Table 5 suggests a stronger relationship between household expenditure and life satisfaction, a sense that the things one does in life are worthwhile and happiness for non-retired households without children than for other household types. Only two of these differences are large enough to be considered statistically significant: the association of household expenditure and life satisfaction is significantly stronger for non-retired households without children than for retired households; and the association of household expenditure with the sense that the things one does in life are

worthwhile is significantly stronger for non-retired households without children than non-retired households with children.

These results suggest that the well-being of people in non-retired households without children may be more strongly related to household spending than among those in other types of household.

6.3 Importance of expenditure in addition to income

The findings confirm the importance of household expenditure to personal well-being, although the relative strength of association between expenditure and the four well-being measures differs substantially.

It is important to remember that it is through expenditure that households are able to obtain the necessities required to maintain an acceptable standard of living, as well as the non-essential goods and services which may add to their enjoyment of life. Headey, Mufflels and Wooden (2004) describe expenditure as ‘the most valid measure of current living standards’ in their analysis of household finances and well-being.

The strength of the relationships found here between expenditure and the three positive aspects of well-being, particularly happiness and the sense that the things one does in life are worthwhile, suggests that higher expenditure, through increasing the household’s purchases of goods and services resulting in positive experiences, may increase people’s enjoyment of life. Hudders and Pandelaere (2011) list numerous mechanisms through which expenditure may impact well-being from the purely functional benefits of purchasing more and higher-quality goods to the enjoyment resulting from purchases of luxury goods, and also mention that the benefits from increasing expenditure appear to differ depending on personality type. Truglia (2013) proposes that increases in ’conspicuous’ expenditure result in higher well-being as a result of enabling individuals to signal a higher socio-economic status to others.

The absence of a strong relationship between higher expenditure and lower anxiety, however, suggests that higher expenditure is not closely associated with an increased sense of financial security. This is in contrast to the income model, which showed a relationship between higher household income and lower anxiety.

It is possible that many households with high levels of expenditure relative to their income run a risk of falling into debt. Brown, Taylor and Price (2005) have studied the link between well-being and wealth and debt, with their results suggesting a strong negative effect on well-being from debt, but a much smaller positive effect from saving. Information on wealth and debt are not available from the Living Costs and Food Survey, on which this analysis is based. However ONS intends to examine the links between wealth, debt and personal well-being later in the year, using data from the Wealth and Assets Survey.

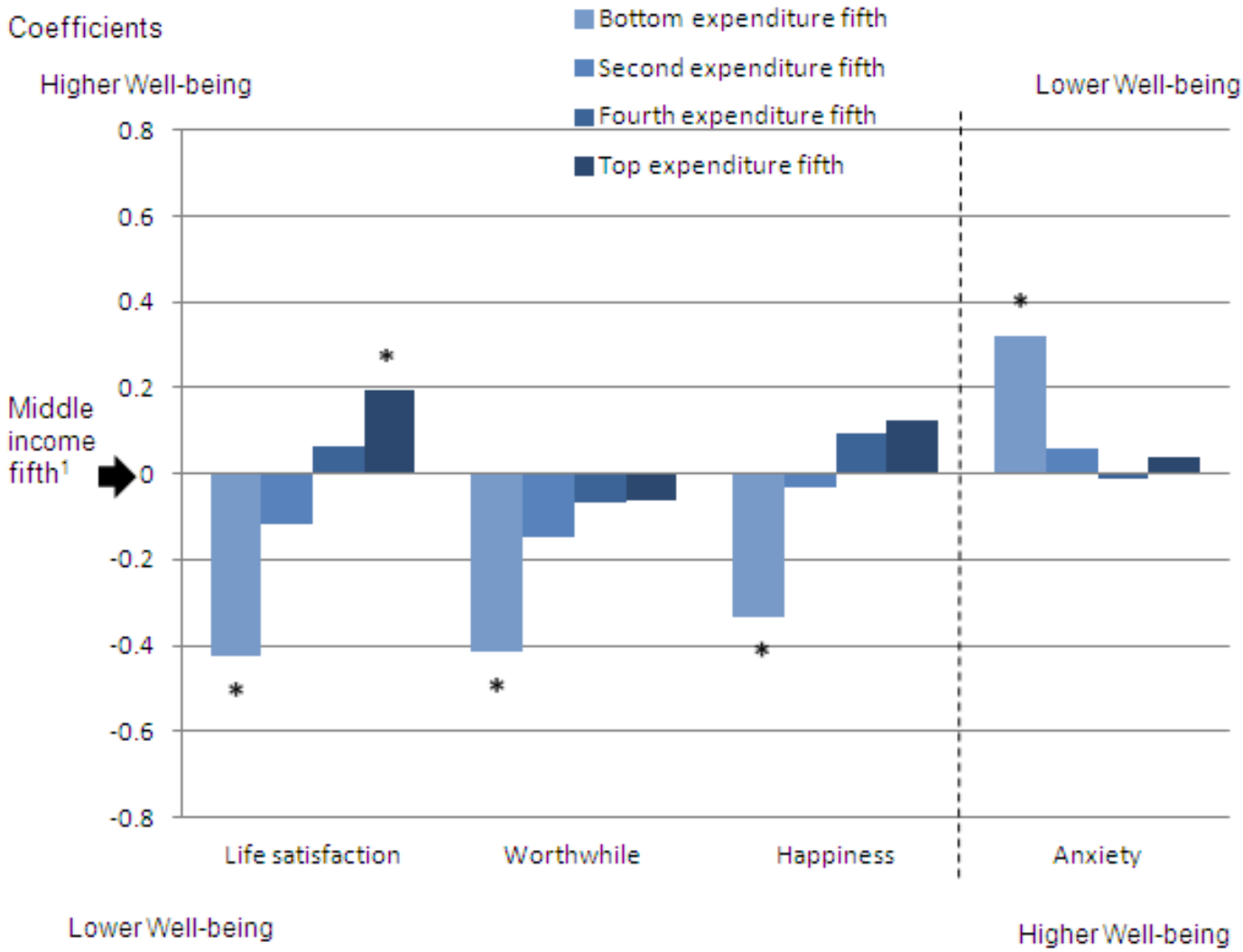
6.4 Distribution of expenditure

As with household income, this article also looks at the relationship between an individual’s personal well-being and the fifth of the expenditure distribution that their household is in, holding all else equal. Figure 2 shows that some of the patterns observed in the relationship between income fifths

and personal well-being can also be observed in the relationship between expenditure fifths and personal well-being.

Figure 2: Relationship between personal well-being and different expenditure fifths, compared to the middle fifth, after controlling for individual characteristics

Great Britain



Source: Office for National Statistics

Notes:

1. People in households in the middle fifth of the expenditure distribution are represented at the baseline (zero).
2. * Shows that the difference from the middle fifth is statistically significant at the 5% level.

Download chart

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(28.5 Kb)

As with household income, the largest differences for all four measures of personal well-being between individuals in neighbouring fifths of the expenditure distribution, are between the bottom and second fifth, which are statistically significant for all measures except anxiety. There are smaller differences in well-being between individuals in the second, middle, fourth and top fifths of the income distribution, particularly for anxiety and people's sense that the things they do in life are worthwhile. The largest differences between individuals in different fifths of the expenditure distribution are in life satisfaction, with individuals in the top fifth rating their life satisfaction 0.62 points higher than those in the bottom fifth of the income distribution, all other factors held equal.

An interactive version of Figure 2 is also available.

7. Technical Appendix

7.1 Why undertake a regression analysis?

In analysis which looks at the relationship between two variables, it can be tempting to infer that one variable is directly related to the other. For example, life satisfaction is higher for households in the top fifth of the income distribution than those in the bottom, but does this mean we can assume that the differences observed in relation to life satisfaction ratings are primarily about differences in income? This conclusion would only be justified if we could show there were no other important differences between high- and low-income households which might affect the findings, such as differences in age or region of residence in the UK.

Regression analysis allows us to do this by holding all the variables in the model equal while measuring the size and strength of the relationship between two specific variables. If the regression results show a significant relationship between income and life satisfaction, then this means that two people who have identical characteristics apart from their income are very highly likely to rate their anxiety levels differently. This implies a direct relationship between income and life satisfaction even when the other variables included in the analysis are taken into account. Therefore, the key benefit of regression analysis is that it provides a better method of isolating the factors which matter most to personal well-being than looking at the relationship between only two variables without controlling for differences in others.

However, every analytical method has its limitations and regression analysis is no exception. The following sections summarise some key considerations which should be borne in mind in terms of the statistical assumptions underlying the techniques used here, and the types of inference which can be drawn from the findings.

7.2 Using OLS for ordered responses and the robustness of the OLS estimates

A key implicit assumption in ordinary least squares (OLS) regression is that the dependent variable (the outcome we are trying to explain, such as the personal well-being rating) is continuous. Continuous data is data that can take any value (usually within a range). For example, the height of two individuals would be within the range of human heights, but could differ by a tiny fraction of a millimetre. The personal well-being survey responses, however, are discrete, that is, they can only take on a relatively small number of whole integer values, between 0 and 10 with no other values possible, such as halves, in between.

OLS regression also assumes that the values of the dependent variable (e.g., personal well-being ratings) are cardinal. This means that the interval between any pair of categories such as between 2 and 3 is assumed to be of the same magnitude as the interval between any other similar pair such as between 6 and 7. As the personal well-being responses are based on subjective ratings, it is not possible to say with certainty that the distance between 2 and 3 is the same as the distance between 6 and 7 on the 0 to 10 response scale. For example, it may be that only small changes in circumstances are required to move people from 2 to 3 in their rating of life satisfaction, but it may take a lot more for them to jump from 6 to 7. This suggests that the OLS regression approach may not be ideally suited to modelling this kind of dependent variable.

There are a number of alternatives to OLS for modelling discrete response variables, such as logit or probit regression. In these models the categories of the responses are treated separately which means there is no implied order of the categories, for example 4 is not necessarily higher than 3. An important disadvantage of these methods is that the information contained in the ordering of the personal well-being ratings is lost. A way of overcoming this issue is to create two categories, for example ratings of life satisfaction above or below 7 on the 0 to 10 scale, but the resulting categories are artificial and do not capture people's actual ratings of their well-being.

An alternative method is to treat the response variable as ordinal and use regression techniques, such as ordered logit or ordered probit that are developed to deal with ordinal data. Ordinal data values can be ranked or ordered on a scale such as from 0 to 10 with each higher category representing a higher degree of personal well-being (or lower personal well-being in the case of anxiety) and unlike the OLS method, ordered probit or ordered logit regression does not assume that the differences between the ordinal categories in the personal well-being rankings are equal. They capture the qualitative differences between different scores. It is important to note that ordinal probit/logistic performs several probit/logistic regressions simultaneously, assuming that the models are identical for all scores. The latter assumption can be relaxed but the interpretation of the results becomes more difficult.

In common with much of the existing literature modelling subjective well-being, this analysis has used ordered probit models to explore the factors contributing to a person's personal well-being. As Greene (2000) points out, the reasons for favouring one method over the other (such as ordered probit or ordered logit) is practical and in most applications it seems not to make much difference to the results.

The major advantage of such models is that it takes the ordinal nature of the personal well-being ratings into account without assuming equality of distance between the scores. Similarly to OLS, it identifies statistically significant relationships between the explanatory variables, for example age, disability, and relationship status, and the dependent variable which in this case is the rating of personal well-being. A difficulty that remains is that the estimated coefficients are difficult to explain clearly to a wide audience.

The existing literature also suggests that OLS may still be reasonably implemented when there are more than four levels of the ordered categorical responses, particularly when there is a clear ordering of the categories as is the case for the personal well-being questions which have response scales from 0 to 10 (Larrabee 2009). Several studies applied both methods to personal well-being data and found that the results are very similar between the OLS models and the theoretically

preferable methods such as ordered probit. For example, see Ferrer-i-Carbonell and Fritjers (2004) for a detailed discussion of this issue.

The main advantage of OLS is that the interpretation of the regression results is more simple and straightforward than in alternative methods.

For the sake of completeness, the analysis was conducted in both OLS and probit regression methods. This also acts as a sensitivity check for the robustness of the OLS results as the key assumptions for the OLS regression may not hold for the ordered personal well-being data.

It should be noted that this does not imply that the OLS regression estimates were completely 'robust'. Post regression diagnostics identified some violations of the OLS regression assumptions such as model specification and the normality of residuals. However, as some studies (for example see Osborne and Waters, 2002), suggest that several assumptions of OLS regression are 'robust' to violation, such as normal distribution of residuals, and others are fulfilled in the proper design of the study such as the independence of observations. In this analysis, using the survey design controlled for the potential dependence of the individual observations with each other and applying the survey weights provided some protection against model misspecification.

SAS, the computer program in which the analysis was conducted, automatically computes Huber-White standard errors that are robust to heteroskedasticity when the regressions are estimated incorporating survey design.

Additionally, estimating the models using different specifications as well as two methods (OLS and ordered probit) confirmed that the magnitude and the statistical significance of the parameter estimates did not notably change and the general inferences from the analysis remained the same.

7.3 The explanatory power of the models

It is important to note that the explanatory power of the regression models used in this analysis are similar to that of other reported regression analyses undertaken on personal well-being. As with these previous studies, there are substantial differences in the ability of the models as a whole to explain different aspects of well-being.

The lowest proportion of variance explained by the statistical models was for anxiety, at between 4-5%. A higher proportion of the variance in individuals' happiness and their sense that the things they do in life are worthwhile was explained by the models at 6-7% and 8-9% respectively. As is consistent with previous studies (Kahneman and Deaton, 2010 and ONS, 2013a, b), a much larger proportion of the variation in individual's life satisfaction was explained, at 12-13%. On the whole the levels of explanatory power observed in this analysis are very similar to those found on other analyses of sample surveys, such as ONS (2013a, b) and Headey, Muffels and Wooden (2004).

The limited explanatory power of the model could be due to leaving out important factors which contribute to personal well-being. For example, genetic and personality factors are thought to account for about half of the variation in personal well-being. It has not been possible to include variables relating to personality or genes in the models as the LCF does not include data of this type.

The subjective nature of the outcome variable also means that it is probably measured with some imperfect reliability. The lower the reliability of the outcome variable, the more unclear its correlations with other variables will tend to be.

7.4 Omitted variable bias

In an ideal world, a regression model should include all the relevant variables that are associated with the outcome (i.e. variable being analysed such as personal well-being). In reality, however, we either cannot observe all the potential factors affecting well-being (such as personality) or are limited by whatever information is collected in the survey data used in the regression analysis.

If a relevant factor is not included in the model, this may result in the effects of the variables that have been included being mis-estimated. When the omitted variables are correlated with the included variables in the model, the coefficient estimates of those variables will be biased and inconsistent. However, the estimated coefficients are less affected by omitted variables when these are not correlated with the included variables (i.e. the estimates will be unbiased and consistent). In the latter case, the only problem will be an increase in the estimated standard errors of the coefficients which are likely to give misleading conclusions about the statistical significance of the estimated parameters.

7.5 Multi-collinearity-dependence (or correlations) among the variables

If two or more independent variables in the regression model are highly correlated with each other, the reliability of the model as a whole is not reduced but the individual regression coefficients cannot be estimated precisely. This means that the analysis may not give valid results either about individual independent variables, or about which independent variables are redundant with respect to others. This problem becomes increasingly important as the size of correlations between the independent variables (i.e. multi-collinearity) increases.

As there is no formal statistical test that can be used to identify excessive multi-collinearity when the covariates in the model are dummy variables, an informal method of cross-tabulating each pair of variables can be used, along with analysis of the Pearson correlation coefficients between variables and the Variance Inflation Factors (VIFs) of each of explanatory variables. When very high correlations between the variables were observed, the explanatory regressions were rationalised by removing the variable with the weaker relationship with well-being.

It would be reasonable to expect there to be a degree of correlation between equivalised disposable household income and the proportion of gross household income which comes from cash benefits. Indeed, the data show that higher income households often receive a lower proportion of their income from cash benefits. However the Pearson correlation coefficient between equivalised disposable household income and the proportion of gross household income which comes from cash benefits is closer to 0 (indicating no correlation) than to -1 (indicating perfect correlation), while the VIFs for these two variables are also low (under 3). This indicates that the relationship between these two variables is not strong enough to adversely affect our ability to draw inferences from these models.

7.6 Causality

Regression analysis based on cross-sectional observational data cannot establish with certainty whether relationships found between the independent and dependent variables are causal. This is particularly the case in psychological contexts where there may be a reciprocal relationship between the independent and the dependent variables. For example, the usual assumption is that individual characteristics or circumstances like marital or employment status are independent variables which may affect personal well-being (viewed here as a dependent variable). However, some of the association between employment and well-being may be caused by the impact of personal well-being on employment.

Furthermore, as the data used in the regression analysis here are collected at one point in time (i.e. cross-sectional), they are not able to capture the effect of changes over time and identify which event preceded the other. For example, it is not possible to tell from this data whether movement out of employment precedes a drop in well-being or whether a drop in well-being precedes movement out of employment. We can only definitely say that unemployment is significantly related to lower levels of well-being compared to people who are employed. Therefore, while the regression analysis here can demonstrate that a relationship between two variables exists even after holding other variables in the model equal, these findings should not be taken to infer causality.

The coefficients reported in this article cannot be taken as the difference in well-being experienced immediately before and immediately after a change in income, expenditure, or the proportion of income being derived from cash benefits. Previous studies (such as Di Tella et al., 2003) have suggested that an increase in economic prosperity can lead to a large increase in well-being immediately after the change occurs. However, over time people can “adapt” to their new level of prosperity, and their reported well-being appears to fall over time back to a level closer to that before the change. Brickman et al. (1978) appear to find this even in the case of extreme changes in prosperity, by observing the well-being of lottery winners.

As households with a low income in a particular year are likely to have had a low income in the previous year, and households with a high income are likely to have had a high income in the previous year (Jenkins, 2011), many individuals in this analysis will have had time to fully adapt to their current income levels. However, many individuals in this data source will have experienced recent changes in their incomes, and so the coefficients reported in this analysis cannot be assumed to be the effect on well-being of different income levels after individuals have fully adapted to these changes.

It should also be noted that the data used in this analysis are from responses to the Living Costs and Food Survey between April 2011 and March 2012. This was a period of low economic growth, and it cannot necessarily be assumed that the relationships during this time will be representative of the relationship between income and expenditure in different economic conditions.

7.7 Key analysis variables

7.7.1 Income and expenditure

For the regression models in this article, a natural logarithmic transformation has been applied to income and expenditure.

Looking at the absolute difference in well-being resulting from a percentage difference in income reflects the widely held notion that an absolute increase in income of, for example £500 per year, is likely to have a larger impact on the individual if they have a low income than if they have a high income; but that a percentage difference in income is likely to have similar effects on people of different income levels. This is an application of Weber's Law, which states that the size of a just noticeable difference in a stimulus (such as a sound), is generally a fixed proportion of the intensity of the original stimulus. Evidence from the United States (Kahneman and Deaton, 2010) suggests that this may apply to responsiveness of personal well-being to differences in income.

In addition to helping the models better fit the relationship between personal well-being and income and expenditure, applying a logarithmic transformation reduces the skewness of the income distribution due to very high income and expenditure cases, reducing the influence of these outliers and helping to "normalise" the income and expenditure distributions.

Use of a logarithmic transformation does, however, necessitate further calculations in order to work out the difference in personal well-being associated with a percentage difference in income. In the following formulae, β is the regression coefficient produced for log income or log expenditure, Δ is the percentage difference in income or expenditure for which an associated difference in well-being is sought, and ln is the natural logarithmic function.

The difference in well-being from a Δ% increase in income or expenditure = $\beta \times \ln(1 + (\Delta/100))$

The difference in well-being from a Δ% decrease in income or expenditure = $\beta \times \ln(1 - (\Delta/100))$

As a result of the calculations required to interpret the regression coefficients, additional figures have been provided in the article showing the difference in well-being, measured on a 0 to 10 scale, between two individuals with identical circumstances except that one has a household income or expenditure double that of the other.

7.7.2 Proportion of income from cash benefits

This article also looks at the differences in well-being associated with differences in the percentage of gross household income derived from cash benefits. Unlike with household income and expenditure, no logarithmic term has been applied to the cash benefit term and this relationship is modelled as being linear.

The coefficients for this relationship can be interpreted as the difference in reported well-being between someone living in a household where 0% of the income is derived from cash benefits and someone living in a household where 100% of income is derived from benefits. As this relationship is linear, the difference in well-being associated with a one percentage point increase in the proportion of household income derived from cash benefits is assumed to be one-hundredth the size of the difference in well-being associated with a one hundred percentage point increase in this measure. Likewise, the difference in well-being associated with a fifty percentage point increase in proportion of household income derived from cash benefits (for example an increase from 25% to 75% of income being derived from cash benefits) can be assumed to be half the size of the regression coefficient.

The logarithm of equivalised disposable household income was also included in the proportion of gross income from cash benefits models, to control for the average income of households which get most of their income from cash benefits being lower than the average income of households with little income from cash benefits. As a large proportion of the households receiving the majority of their income from cash benefits (which includes the State Pension) are retired households, the cash benefits models used data from non-retired households only, to isolate any potential effects of the proportion of income coming from cash benefits from the effects of being in a retired household.

7.7.3 Income and expenditure quintiles

In order to analyse how well-being differs across the income and expenditure distributions, while holding other factors equal, further regression models were produced with the log of income or expenditure variables replaced with the quintile of the income or expenditure distribution a person is in.

This approach is less appropriate for calculating the statistical significance of the relationship between income and well-being than analysing the relationship between the logarithm of income and well-being, as information about differences in well-being associated with small differences in income within fifths of the income distribution is lost. However, including the fifth of the income distribution that a household occupies in the regressions can provide some interesting insights into the implications of the distribution of income for personal well-being.

The figures in the quintile charts in this article can simply be interpreted as the difference in personal well-being between an individual in any quintile relative to the personal well-being of an individual in the middle quintile, holding other factors equal.

7.8 Interpreting the reference tables

In addition to the coefficients discussed above, the reference tables included in this analysis also report the standard errors, confidence intervals and statistical significance of all the variables included in the regression analysis.

The level used to determine statistical significance throughout this article is the 5% level. This means that a variable is considered statistically significant where the probability of observing a relationship between the variable in question and personal well-being as strong as that found in the model, by pure chance, is less than .05 (or less than one in twenty).

Statistical significance is displayed in the reference tables using p-values (P > |t|). Smaller p-values indicate higher statistical significance, so a p value of <.0001 indicates that the probability of observing a relationship as strong as has been found by pure chance is less than one in ten thousand.

The reference tables also give the 95% confidence intervals around the coefficient estimate. These show the range of possible values which the coefficient lies within with 95% probability.

The proportion of the variance in each aspect of personal well-being which is explained by the model as a whole is also given in the reference tables for each OLS model as the R-square.

7.9 Taking the design of the LCF sample into account in the analysis

Regression analysis normally assumes that each observation is independent of all the other observations in the dataset. However, members of the same household are likely to be more similar to each other on some or all of the measures of personal well-being than they are to members of different households. If the analysis ignores this within-household correlation, then the standard errors of the coefficient estimates will be biased, which in turn will make significance tests invalid.

Therefore, to correctly analyse the data and to make valid statistical inferences, the regressions are estimated in SAS with the specification of the survey design features – the clusters that are formed by the households and the strata that the survey was drawn from. The survey weights were also used in the estimation of the model as these allow for more consistent estimation of the model coefficients, reduce the effects of any biases due to non-response and provide some protection against model misspecification.

Unlike some ONS surveys, such as the Annual Population Survey, which may be conducted both in person and via telephone, the Living Costs and Food Survey is only conducted in person. This means that there are no modal effects that need to be controlled for in this analysis.

7.10 Personal well-being questions

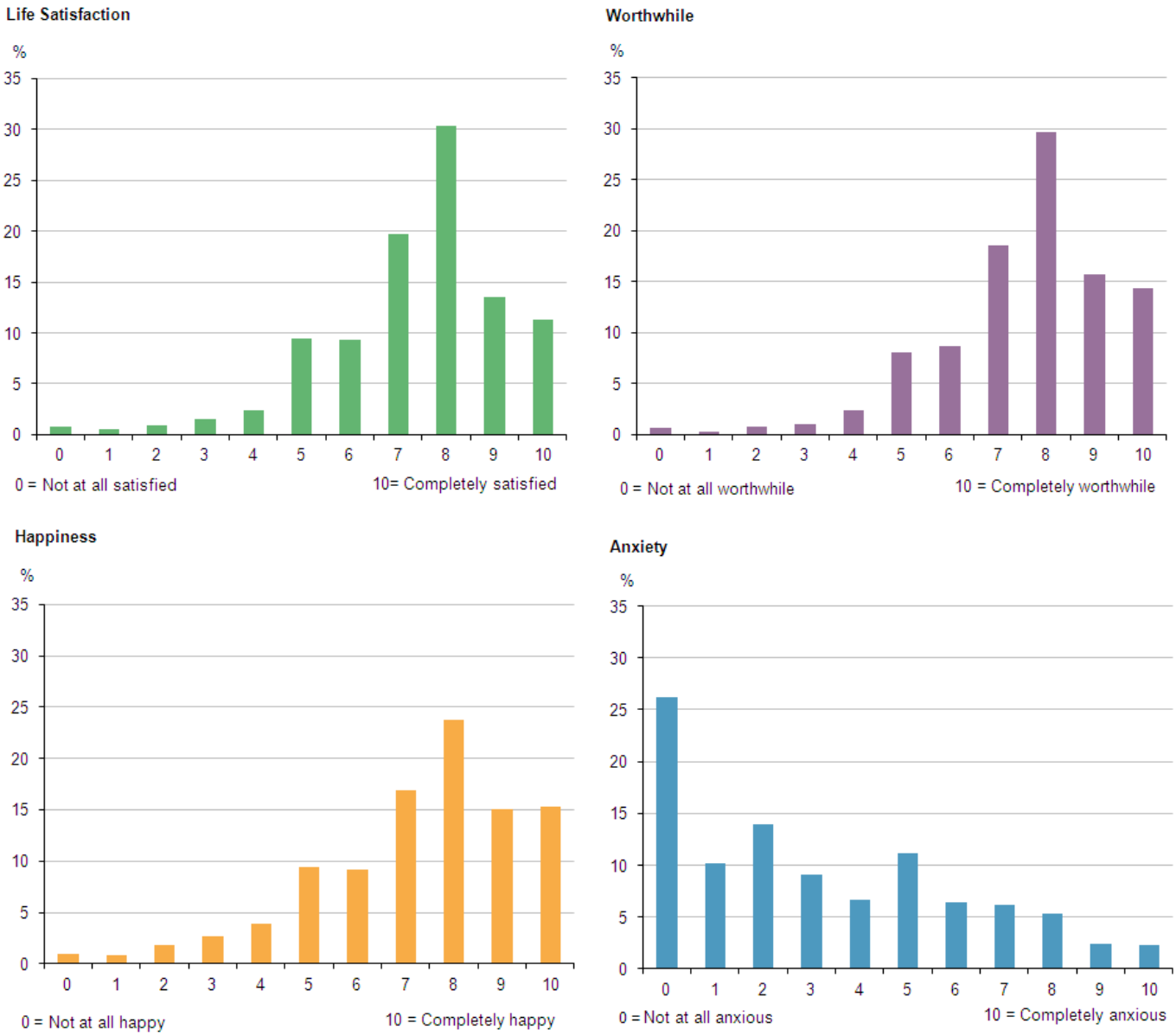
Four personal well-being questions were included in all Living Costs and Food Survey interviews conducted in Great Britain between April 2011 and March 2012:

- Overall, how satisfied are you with your life nowadays?
- Overall, to what extent do you feel the things you do in your life are worthwhile?
- Overall, how happy did you feel yesterday?
- Overall, how anxious did you feel yesterday?

These are the four ONS questions on personal well-being, and interviewees give answers to these questions on a scale of 0 to 10. Figure 3 shows how these responses are distributed for each measure.

Figure 3: Distribution of responses for personal well-being in the Living Costs and Food Survey, 2011/12

Great Britain



Source: Office for National Statistics

Notes:

1. Adults aged 16 and over were asked 'Overall, how satisfied are you with your life nowadays?', 'Overall, to what extent do you feel the things you do in your life are worthwhile?', 'Overall, how happy did you feel yesterday?' and 'Overall, how anxious did you feel yesterday?'. Answers were given on a 0 to 10 scale where 0 meant 'not at all' and 10 meant 'completely'.

Download chart

XLS XLS format
(28 Kb)

This distribution of responses is generally very similar to that from the Annual Population Survey (ONS, 2013e). The large proportion of the population rating their life satisfaction, the sense that the things they do in life are worthwhile and happiness between 8 and 10 and their anxiety between 0 and 2, suggests the majority of individuals have high levels of personal well-being.

There are slight differences between the distributions from the two surveys, with slightly fewer respondents to the Living Costs and Food Survey reporting the highest level of personal well-being. This could be due to a number of reasons including differences in the mode of interview. Regression analysis of the APS ONS (2013a) showed that, on average, respondents to telephone interviews gave higher ratings for their personal well-being than respondents to face-to-face interviews. As the APS is conducted both by telephone and face-to-face, while the LCF is only conducted face-to-face, the additional 1-2% of people giving the top rating to their personal well-being in the APS relative to the LCF is consistent with these modal effects.

Due to the personal nature of these well-being questions, respondents only gave ratings for their own personal well-being, and not for other household members who were absent when the interview took place. This meant that, while there were 10,500 eligible people living in households covered by the LCF, nearly 2,500 did not give ratings for their personal well-being, resulting in a final sample of just over 8,000 individuals.

Of those who gave ratings for their personal well-being, just over half were considered to be the Household Reference Person for their household (typically the person responsible for the accommodation, or if there is joint responsibility, the householder with the higher personal income). In order to account for potential non-response bias, data from each interview was weighted by the age, sex and region of the respondent.

7.11 Development of the regression models

Overall, 7 regression models have been published for each well-being measure, using both ordinary least squares and ordered probit techniques:

- Household income.
- Household income quintiles (fifths).
- Household income and the proportion of income received from cash benefits.
- Household income and the proportion of income received from cash benefits by sex.
- Household expenditure.
- Household expenditure by different household types.
- Household expenditure quintiles (fifths).

Each of these was analysed first using OLS and then using ordered probit. All of these results are available in the Reference Tables, as follows:

Reference Table 1 (351 Kb Excel sheet) contains the results for the household income and household income quintile models.

Reference Table 2 (229.5 Kb Excel sheet) contains the results for the proportion of income received from cash benefits and proportion of income received from cash benefits by sex models.

Reference Table 3 (297 Kb Excel sheet) contains the results for the household expenditure, household expenditure by household type and household expenditure quintile models.

Reference Table 4 (52 Kb Excel sheet) contains details of the sample sizes for each of the variables used in the regression models.

8. About the ONS Measuring National Well-being Programme

NWB logo 2

This article is published as part of the ONS Measuring National Well-being Programme.

The programme aims to produce accepted and trusted measures of the well-being of the nation - how the UK as a whole is doing.

Measuring National Well-being is about looking at 'GDP and beyond'. It includes headline indicators in areas such as health, relationships, job satisfaction, economic security, education, environmental conditions and measures of personal well-being (individuals' assessment of their own well-being).

Find out more on the Measuring National Well-being website pages.

Background notes

1. The Effects of Taxes and Benefits on Household Income is an annual ONS publication. The most recently published edition is for 2011/12 and can be found here. Should users have any queries on household income or expenditure they can email ONS at hie@ons.gov.uk.

2. The data analysed in this report are derived from a customised weighted 12 month Living Costs and Food Survey/Effects of Taxes and Benefits on Household Income microdataset produced specifically for the analysis of personal well-being. ONS plans to make this microdata available to approved researchers to allow them to undertake further analysis on personal well-being.

3. A list of the job titles of those given pre-release access to the contents of this article is available on the website.

4. Details of the policy governing the release of new data are available by visiting the UK Statistics Authority or from the Media Relations Office.

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Supporting Information

Glossary

Retired and non-retired persons and households

A retired person is defined as anyone who describes themselves (in the Living Costs & Food Survey) as ‘retired’ or anyone over minimum National Insurance pension age describing themselves as ‘unoccupied’ or ‘sick or injured but not intending to seek work’. A retired household is defined as one where the combined income of retired members amounts to at least half the total gross income of the household. Non-retired individuals are simply those who do not meet the criteria of retired individuals. A non-retired household is one where combined income of non-retired members amounts to more than half the total gross income of the household. By no means are all retired people in retired households and all non-retired people in non-retired households. For example, households comprising one retired and one non-retired adult are often classified as non-retired. Around one in five households comprising three or more adults contains retired people.

Original Income

Original income is all income that households receive from non-government sources, including earnings from employment and income from private pensions, annuities and other investments.

Gross Income

Gross income is the total income households receive from original income plus cash benefits provided by the state, including the State Pension.

Disability Benefit

The Living Costs and Food Survey does not ask respondents to rate their health or disability. Instead, disability has been controlled for in the model by including a variable for receipt of one of the following benefits: Industrial Injury Disablement Benefit, Disability Living Allowance (either self-care or mobility), Severe Disablement Allowance, Attendance Allowance or Employment and Support Allowance (either contribution or income-based)).

Disposable Income

Disposable income is the amount of money that households have available for spending and saving. It is equal to gross income minus direct taxes (such as income tax and council tax).

Expenditure

The definition of household expenditure used in this article includes all expenditure defined by ONS as consumption expenditure (See: ONS Family Spending Chapter 1), plus a small number of additional items and adjustments which make expenditure more comparable across households. These include expenditure abroad, on duty free goods bought in the UK, on mortgage interest (but not capital repayments), interest payments on credit cards, and on TV licences. Adjustments are made for uprating of expenditure on items where underreporting in surveys is known to occur (such as alcohol, tobacco and confectionary, see The Effects of Taxes and Benefits on Household Income

- ONS 2013c, OECD 2013) and employer-paid expenditure on company cars and fuel (which can be considered a form of household income which is immediately spent – ONS 2013c). Money obtained from gambling winnings and the onward sale of used vehicles are subtracted from the expenditure figure, as these can be considered forms of negative expenditure (OECD, 2013).

Equivalisation

Equivalisation is a process that makes adjustments to disposable incomes, so that the standard of living of households with different compositions can be compared. When applying an equivalence scale, the values for each household member are added together to give the total equivalence number for that household. This number is then used to divide disposable income for that household to give equivalised disposable income. The equivalence scale which has been applied to the LCF income data in order to divide the sample into the fifths (also known as income quintiles) used in this article is the modified-OECD scale where a two-adult household has an equivalence value of one:

Modified–OECD Equivalence Scale

Type of household member	Modified-OECD Equivalence value
First adult	0.67
Second and subsequent adults	0.33 (each)
Child aged 14 and over	0.33 (each)
Child aged 13 and under	0.2 (each)

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