

The poverty line and its impact on wellbeing

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Abstract

Much has been made within the last 30 years of the relationship between income and wellbeing, and interest in happiness determinants is rising significantly within economics. Despite the attention given to income and wellbeing, there is a dearth of clear-cut evidence explaining how income poverty affects individuals' wellbeing. After exploring the concepts of wellbeing and poverty, I use a relative measure of income poverty– defined as household income less than 60% of the median – to examine the significance of this seemingly arbitrary indicator in determining wellbeing. Using the British Household Panel Survey, I apply fixed effects regression and decomposition techniques to a panel dataset. The analysis suggests that poverty in this form does not have a large effect on individual wellbeing, and that multi-dimensional poverty may have a greater impact.

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Data from the British Household Panel Survey were provided through the Economic and Social Research Council Data Store. Additional income data was taken from UK Data Archive Study Number 3909.

Notes:

This paper is the foundation of several chapters from my forthcoming PhD thesis. Apologies for the length and any errors or problem formatting; this is an early draft.

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1 Introduction

As Imperial Britain was conscripting young men for its second Boer War, Seebohm Rowntree was collecting data on absolute poverty in York (Seebohm Rowntree 1901). At that time poverty was well known – resulting in such poor health that one third of all military conscripts were unable to enlist on medical grounds – but was assumed to be isolated to large urban areas like London. Seebohm Rowntree's investigation showed that poverty was present in smaller urban areas, the suburbs and even in rural communities – it was possible everywhere and caused misery in any context.

Seebohm Rowntree created a measure of poverty based on what he believed were necessary purchases: “a sum of money to enable families to secure the necessities of a healthy life” (Seebohm Rowntree 1901). Any family that did not have this amount of money was deemed poor. However 1901 presents a very different zeitgeist; the ‘laissez-faire’ politics of the era meant that there was no safety net for the poor, or ill, or otherwise suffering. Poverty mitigation was the domain of the philanthropist rather than the politician. As society has evolved, so has the concept of poverty.

Jumping ahead 80 years, when the Thatcher government came to power in income inequality and poverty were near to an all-time low. Many politicians of that era denied the existence of poverty: John Moore, the then Secretary of State for Social Security declared that UK poverty had been abolished and that those who suggested it had not were pursuing the goal of full financial equality rather than living standards (Gordon, Pantazis et al. 2000). However his judgement was arguably based on years when the welfare state and the provision of post-war food subsidies was compensating for a lot of hardships people of low income might experience (unemployment, poor health and nutrition, lack of education).

Economic growth and growth of average living standards had also been at post-war lows since the oil shocks of 1973, and many politicians and economists connected the low poverty and inequality measures with this low growth, blaming over-spending on social insurance. Thatcher's government therefore committed itself to reducing spending across the board, particularly on welfare¹, so individuals struggling with low incomes were forced deeper into poverty and the already low living standards decreased further (Glennerster, Hills et al. 2004).

¹ In striking similarity to the current Conservative-Liberal coalition, the administrations chose to reduce welfare spending and undertake measures to encourage people to take up paid employment rather than rely on benefits, which were, from 1981, linked only to price-inflation, contributing to a fall in quality of life for those affected (Glennerster, Hills et al. 2004).

This may be explained by the assumption that, in theory and despite cuts in spending, the extent of the welfare system in the UK means that poverty should not fundamentally affect the quality of a poor individual's life to the extent that their health or life expectancy is limited. However people who are poor continue to have worse health and have lower life expectancy (Glennister, Hills et al. 2004).

That poverty exists is indisputable, yet despite centuries of attention from philanthropy, philosophy, politics and economics there has been no remedy to poverty either in the developed world or less developed countries. It has attracted the attention of thinkers from the time of classical Greece², having negative consequences for individuals' health, life expectancy housing, education, employment, integration with society and overall quality of life.

Despite its re-emergence in the Thatcher years and subsequently, little *direct* attention has been given to poverty, other than that instigated by the European Community in 1995 in the Copenhagen Agreement at the World Summit for Social Development, which seems to be the origin of modern poverty targets. Signatories to this agreement, including most EU countries, pledged to prepare national anti-poverty plans and establish targets for poverty reduction. Some countries, such as Ireland, adopted whole-population targets whereas others targeted sub-groups (for example child poverty in the case of the UK).

In terms of poverty policy, the UK - despite having policies and metrics and task forces – is seen to exemplify the discrepancy between debate and action: academic research aims to achieve empirical discovery, but politicians have long denied the validity of any empirical poverty approach (Veit-Wilson 2000), leaving the state of poverty policy in the UK worryingly inconsistent with the most recent research and – more importantly – the population.

A poverty line – a cut-off point separating the poor from the non-poor – is often used as a way of identifying the size and characteristics of the poor population. In the UK and many other OECD countries, poverty is officially measured as the percentage of households living below 60% of the median income. Recession “inevitably leads to lower employment, which in turn increases poverty” (Parekh, MacInnes et al. 2010); with the IMF downgrading UK growth forecasts (International Monetary Fund 2013), we cannot currently hope that the rising poverty rate can be addressed by economic progress. Given recent condition, research expects that absolute poverty will increase by approximately 600,000 children and

² In 'Republic' Plato considers the dynamics between poverty and wealth, suggesting that it is not just the status of poverty itself that is the problem but poverty in comparison to riches (although Plato also considered riches to be a problem, through the indulgent behaviour he associated with those with wealth).

800,000 working-age adults by 2020, with median income expected to fall by around 7% in real terms over the same time period (Brewer, Browne et al. 2011).

Literature suggests that many of the results of poverty listed above are determinants of happiness (Stutzer, Frey 2012), but despite this, research has provided less focus on what being poor actually means on an individual basis; do people know they are poor and if they do, does it matter to their happiness?

As Layard (Layard 2011) argues, there is need of a “revolution” in social science where every academic should be attempting to understand what makes people happy, and furthermore happiness should be the explicit aim of government intervention. If we have increasing poverty, will it follow that there will be changes in the impacts of poverty, specifically wellbeing³?

Despite recent policy attention on wellbeing, with the Happy Planet Index including wellbeing in its indicator set, the Young Foundation undertaking research into localised wellbeing in case study areas in England, the French Commission on the Measurement of Economic Performance and Social Progress⁴ recommending measurement of wellbeing in a suite of economic indicators and the UK coalition government establishing the General WellBeing survey, there is little indication that the bodies behind these studies will actually be able to do anything with the results.

Happiness is a notoriously difficult concept to capture in survey data (for discussion, see DiTella and MacCulloch, (Di Tella, MacCulloch 2006), Dolan et al (Dolan, Peasgood et al. 2008) and Frey and Stutzer (Frey, Stutzer 2010)). A wide range of approaches can be taken depending on what aspect of happiness is subject to measurement. For example, one could investigate the hedonic responses (happiness, sadness etc) to events as they happen, or the satisfaction individuals have with particular aspects of their lives (job satisfaction for example), or examine how their bodies respond to positive and negative stresses. All of these examples would require different types of measurement, and between the different social sciences methodologies vary in acceptance.

Economists tend to see wellbeing as a loose measure of utility that is ordinally comparable rather than cardinal (Ferrer-i-Carbonell, Frijters 2004, Clark, Frijters et al. 2008). Without

³ In Section 2, the concepts of wellbeing/ happiness is discussed, arriving at a definition used throughout the proceeding pages. In the introduction, for simplicity, the terms are used interchangeably with the interpretation left to the reader.

⁴ Including research undertaken by Joseph Stiglitz, Amartya Sen and Jean-Paul Fitoussi

getting into discussion regarding the merits of various measures⁵, panel data surveys tend to have advantages for economic research as the effects of personality – generally assumed to be largely fixed for any individual – can be accounted for in a fixed-effects model specification.

Personality has been found to have a direct influence on an individual's wellbeing (Lykken, Tellegen 1996) and may also influence individual wellbeing responses to external stimulus. Therefore controlling for it in any wellbeing investigation is wise to avoid omitted variables bias. Tied in with personality is gender; women appear to have a greater propensity for experiencing and expressing emotion and they have a more polarised wellbeing distribution (Wood, Rhodes et al. 1989). For this reason, throughout the empirical analysis, separate regressions are undertaken for men and women.

Other than individual specific effects, the determinants of wellbeing are wide ranging, and thanks to increasing investigation into happiness we now understand a lot more about what makes people better off in this sense (Stutzer, Frey 2012). Employment is understood to be beneficial across the board, and on the other hand unemployment is universally damaging. Marriage also increases wellbeing, for both men and women. The effects of age and education are more uncertain, but health contributes positively to wellbeing (although, wellbeing may also contribute positively to health).

One of the more controversial influences on wellbeing is income, in its various forms. Since Easterlin published his paradoxical research, observing that despite increases in wealth in the US there had been no corresponding increases in wellbeing (Easterlin 1974), economists have sought to understand the relationship between income and happiness.

The current consensus is that the income-wellbeing relationship is complicated by adaptation – people get used to new, higher incomes, comparison – people compare themselves to their peers and their positions in the past, and aspiration – people revise their expectations upwards as previous expectations are met. The acceptance of comparison within human behaviour means that absolute income is out of favour with economists researching happiness in favour of relative income, which is widely recognised to be more important to individuals (Tversky, Griffin 1991).

⁵ Psychologists, sociologists, economists and other social scientists may have very different ideas about what is an appropriate measure. Although there is a growing volume of overlapping-discipline work (many of the references for this paper are written by economists and published in psychological journals, and vice versa – see bibliography), determining which is the 'best' overall would be a gargantuan task.

Furthermore, there is evidence that income does not have the same effect across the income distribution; Frey and Stutzer found that doubling of income within the bottom five deciles of income resulted in an increase of 0.05 score points of happiness, whereas a doubling of income in the top five deciles results in an increase of 0.03 score points (Frey, Stutzer 2002). It would be prudent to test whether the data in the sample used here exhibits a similar phenomenon: that poorer people have different marginal benefits from income.

The focus of this paper will be on whether poverty has an effect on individual wellbeing, and whether those in poverty have a different wellbeing function to those not in poverty, thus bringing about a debate as to whether the poverty line is a meaningful measure for individuals, and whether mitigation based on this line should be at the forefront of poverty policy and research.

This paper continues as follows. Section 2 discusses literature on various measures of monetary poverty, as well as those of subjective wellbeing. Section 3 uses information on poverty measurement to feed into the development of a methodology to analyse how poverty affects a given definition of life satisfaction. Section 4 presents the data to be used in the analysis that is undertaken in Section 5. Section 6 summarises this paper and discusses the potential implications.

2 Concepts and Measurement

The purpose of this paper is to focus on the poverty line and how it affects individuals, rather than epistemological issues regarding happiness. The genesis and aspects of the concept have already given great attention in the economic and psychological literature (Kahneman, Diener et al. 2003), (McMahon 2006), (Layard 2011)) however it would be remiss not to define precisely what is being analysed here.

Below, the concepts of wellbeing and poverty are discussed⁶.

2.1 Happiness, Well-being, Welfare

The difficulty in pinpointing exactly what is meant by individual wellbeing is well known:

One could be well off, without being well. One could be well, without being able to lead the life he or she wanted. One could have got the life he or she wanted, without being happy. One could be happy, without having much freedom. One could have a good deal of freedom, without achieving much. We can go on. (Sen 1999) p3

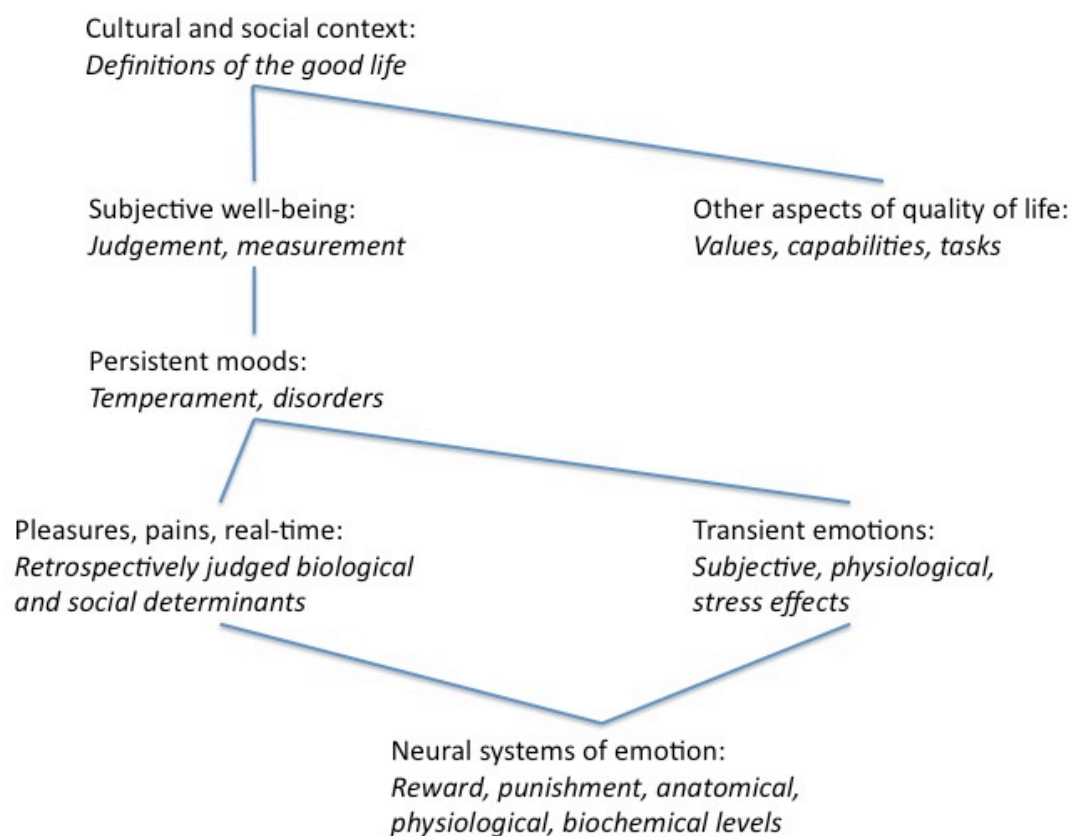
Wellbeing (subjective and objective), happiness and welfare can often be seen as interchangeable. Frey and Stutzer define subjective wellbeing as “scientific term used in psychology for an individual’s evaluation of his or her experienced positive and negative affect, happiness and satisfaction with life(Frey, Stutzer 2002). However, referring back to Sen’s quote above, wellbeing should be seen as a separable construct.

The terminology used to define the concept of wellbeing differs frustratingly from paper to paper. Kahneman, Diener and Schwartz address this issue when they discuss the different levels of quality of life when applied to what they term hedonic psychology – the study of what makes experiences and life pleasant or unpleasant (Kahneman, Diener et al. 2003).

Life does not involve simply a balance of pleasant versus unpleasent experiences, it involves several aspects – including happiness and subjective well-being – as detailed in figure 1 below taken from Kahneman et al (Kahneman, Diener et al. 2003). Here we can see that establishing a concept of a good life – arguably what everyone wishes to achieve for themselves and their loved ones – is not straightforward.

⁶ This section is largely stand-alone, so can easily be skipped if readers are happy to accept the adopted definitions of wellbeing and poverty used in Section 3.

Figure 2.1 – Levels in the analysis of quality of life



Source:(Kahneman, Diener et al. 2003)

At the uppermost level of the diagram above, cultural and social context come into play, along with exogenous characteristics such as poverty incidence, infant mortality, crime or pollution. What Kahneman et al term subjective well-being involves a component of judgement and comparison with the ideals, aspirations of other people and oneself. It represents individuals' *perception* of their position related to these subjective values (Kahneman, Diener et al. 2003).

All of these aspects so far are inextricably influenced by persistent moods; this represents the characteristics and personalities of individuals (some people might be chronically happy, others generally miserable regardless of the other aspects of their quality of life) that will differ widely between individuals⁷. Obviously this will be an important factor for measurement, one that we will return to in Section 3.1.

At the lower levels of the diagram, real-time affective states are related to the current situation – pleasure or displeasure (happiness/ unhappiness). There are multiple aspects to

⁷ Given the enormity of the literature, and its specialised nature, this paper does not aim to analyse how personality affects wellbeing at any deeper than the most superficial level.

this; the influence of both past and present situations and the transient physiological and chemical changes involved in the experience.

Finally, underpinning all other components of quality of life, neural systems and the biochemistry together regulate the way we respond to situations; this level is arguably the foundation of all the others, and it will differ on an individual basis, adding complexity and uncertainty to any quality of life judgement. Given this multi-level and individual-specific description of a good life, that we hope to measure it on an individual basis is highly ambitious.

Welfare is another concept altogether, and is more commonly associated with output-based measures of quality of life; traditionally welfare refers to utility and it is determined by efficiency in economic activity. Within happiness economics, particularly the Leyden school of thought, welfare can be seen as utility of income (on the assumption that individuals are able to assess that utility) rather than the states of mind or emotion (Van Praag, Frijters 1999) discussed above. As this paper does not focus on utility, we will not return to the concept of welfare within this paper.

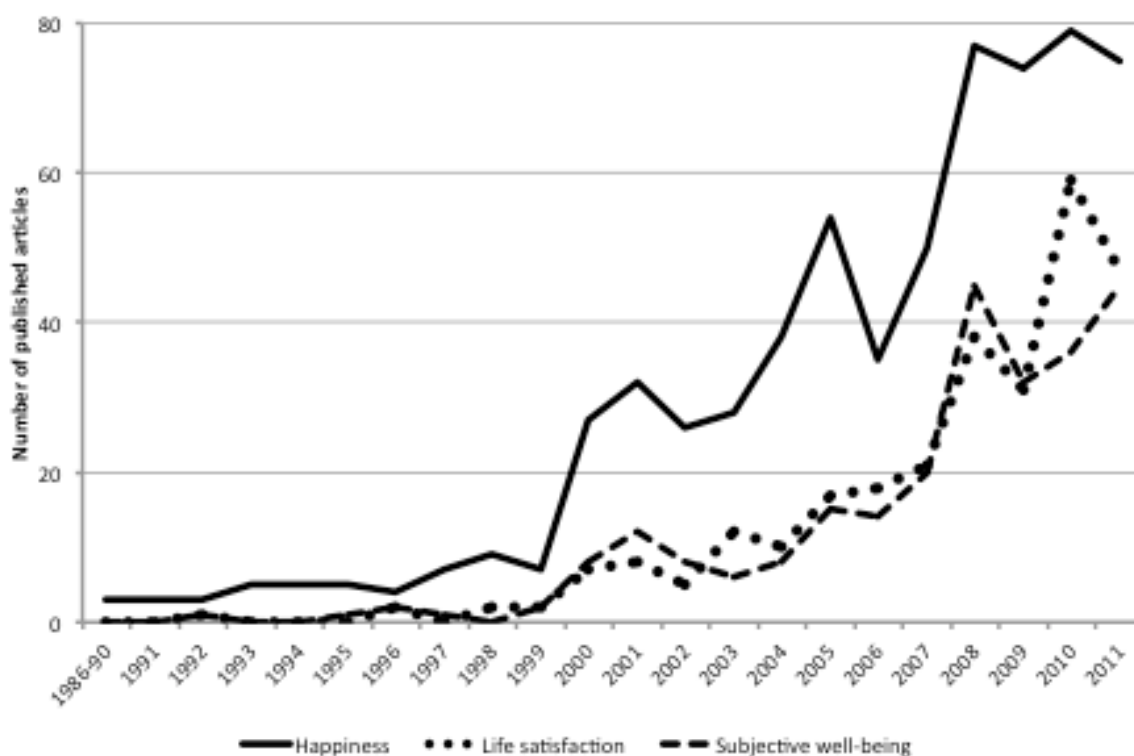
Without making any statements or judgements regarding other definitions, this paper instead will focus on the concept of subjective well-being (henceforth referred to as wellbeing) used by Kahneman et al (Kahneman, Diener et al. 2003); they argue that this is the “centre of the story” along with happiness, however happiness (as in the affective state) is not particularly suited to assessing the impact of poverty as it is primarily a real-time emotion. What is needed here is an evaluative position regarding ones position relative to ideals, aspirations, past and peers as poverty is not a momentary event, it is a state. In a later section we will relate this concept to the data used in this study.

Various determinants for the whole spectrum of wellbeing are discussed below, with the issue of personality discussed later.

2.1.1 Determinants and influences

Interest in happiness economics has increased significantly according to the number of journal articles published focusing on happiness, wellbeing or life satisfaction (Figure 2.1 below) (Stutzer, Frey 2012). There has never been more research into the economics of happiness, and this has led to a vastly increased understanding of the determinants and influences on individual wellbeing: personality and genetic factors, socio-demographic factors, economic factors, contextual and situational factors and institutional factors (Frey, Stutzer 2010). In this paper we will focus on the effect of income poverty – one of the economic determinants – controlling for as many of the other factors as possible.

Figure 2.2 – Journal articles focusing on economics of happiness



Source: (Stutzer, Frey 2012)

Argyle(Argyle 2003) suggests that much of the information we now have about the causes and correlates of happiness is founded on Cantril’s 1965 study(Cantril 1965) and the myriad social surveys that followed. Most of the studies Argyle cites find that demographic variables all correlate with subjective wellbeing, but Andrews and Withey (Andrews, Withey 1976) conclude that many of the relationships were fairly weak, with just 10% of the variance accounted for between variables. Diener(Diener 1984) did not contradict this position, but found explanatory variables responsible for 15% of the variance. This is somewhat explained by Inglehart(Inglehart 1990) who suggests that aspirations and expectations may have a greater role to play than raw observations alone. The effects of aspirations, achievements, adaptation and relativity are now well recognised as important determinants of wellbeing and determinants of the role other explanatory variables have to play. We will refer to these factors as we discuss the determinants commonly included in wellbeing analyses.

2.1.1.1 Economic Factors

2.1.1.1.1 Income and Consumption

The relationship between income and wellbeing is controversial and complex, with the finding of the Easterlin paradox well widely recognised and regularly discussed (Frey,

Stutzer 2002). One of the main reasons that income does not translate particularly easily to greater wellbeing, a reason that Easterlin accepts as valid (Easterlin 2001), is that individuals compare: They compare their incomes, jobs, education, purchases, statuses and so on to, both, other people they deem 'peers' and to other times within their own lives. The concepts of aspiration and interdependent preferences are recognised complications in the happiness-income relationship and are supported by experimental studies showing the importance of relative judgements for happiness outcomes ((Smith, Diener et al. 1989) and (Tversky, Griffin 1991)).

Following on from the concept of comparison, it is widely recognised that individuals 'adapt'. As Frey and Stutzer state:

"One of the most important processes people go through is that of adjusting to past experiences. Human beings are unable and unwilling to make absolute judgements. Rather, they are constantly drawing comparisons from the past of from their expectations of the future. Thus, we notice and react to deviations from aspiration levels." (Frey, Stutzer 2002)

Frederick and Loewenstein (Frederick, Loewenstein 1999) suggest that although adaptation is typically to retrospective stimuli, it can also depend on anticipation of future stimuli (aspirations). This is reflected in Goedhart et al (Goedhart, Halberstadt et al. 1977) who finds that what income people deem "sufficient" depends partially on their expectations for the future. These phenomena have, as mentioned above, been found to be important but are difficult to include in wellbeing models as they are inherently hard to measure and are context specific.

In addition, people tend to make judgements about their lives based on an aspiration level that is formed by their hopes and expectations. How they are progressing towards their aspirations determines in part how satisfied they are with their lives (Frey, Stutzer 2010). The problem is that because people adapt, and that they compare, inevitably leads to the development of new aspirations. This 'hedonic treadmill', where people constantly strive to better their position but then adapt and raise their goals, thus gaining no additional satisfaction, is widely acknowledged in happiness literature.

A further issue is that consumption may be a greater influence on wellbeing than income; people may be affected more by what their income allows them to purchase than the income itself (sitting unused in a bank account). Weinzierl ((Weinzierl 2005) suggests that income is only a "noisy proxy" for consumption however consumption is difficult to measure for several reasons.

Firstly, consumption occurs not only in the direct form (purchases) but also in deferred (via savings) and indirect (public goods, transfers in kind) forms. Secondly, people spend not only their personal income from wages/ interest/ dividends and so on, they also spend on credit. It is entirely possible that someone could have a poverty-level income but a non-poor level of consumption. Of course credit has to be re-paid but how these repayments are classified in terms of consumption is not clear.

Thirdly, individuals are unlikely to recall how much of their income they have saved and how much they have spent, and that they are unlikely to be able to discern how to count consumption of durable goods like cars or cookers; these are purchased at time T but used for many periods after that – are they still being consumed as they are used or is consumption just the act of purchasing? It is impossible to say how long an individual intends to extract utility from a durable purchase and even if asked, that individual may not know themselves (for example, they may not know that their tastes will change or other events may force the item to be replaced).

In addition, it is widely recognised that the income-consumption relationship is not constant across individuals, particularly with regard to age. In general it is assumed that younger people save more than older people, meaning that consumption wouldn't have to same coefficient across all ages, but the switchover between saving and dis-saving is likely to be highly individual (Clark, Frijters et al. 2008).

Heady and Wooden (Headey, Wooden 2004) use net worth in the Household, Income and Labour Dynamics in Australia survey, as a measure of consumption and found that it matters at least as much as income, arguing that net worth is a better proxy than the household income measure which they saw as transitory. Equivalised disposable income might also represent a more meaningful proxy for consumption, particularly in developed countries where basic needs (food, shelter, water, heat and so on) can usually be met with minimum income, supplemented by social transfers.

The effect of income on wellbeing will also vary across the income distribution. Although income generally has a positive significant coefficient in wellbeing regressions, the income-wellbeing relationship is not linear; they observe that a doubling of income within the bottom five deciles if income resulted in an increase of 0.05 score points of happiness, whereas a doubling of income in the top five deciles results in an increase of 0.03 score points; there appear to be diminishing marginal returns to income (Frey, Stutzer 2002). In estimating the marginal utility of income, Layard et al (Layard, Mayraz et al. 2008) found that elasticity with respect to income is smaller than negative-one.

Measurement concerns can limit the strength of any conclusions; Frey and Stutzer (Stutzer, Frey 2012) raise the issues of reverse causality and omitted variable bias, along with limitations on the information available explaining variation in individual or household income. For example, they differentiate between the increased earnings from working longer hours or having a more stressful job and increased income from a windfall; these would obviously have different impacts on wellbeing but income data in panel surveys does not often provide the information needed to make these kind of distinctions.

If it is the case that poor people respond differently to income (amongst other wellbeing determinants) than non-poor people then estimating a relationship for the whole sample will have omitted variable bias. As well as investigating whether poverty is significant in determining wellbeing, this paper will therefore investigate whether the poor have a different wellbeing function from the non-poor.

Omitting personality variables may mean that income is potentially endogenous (happier people get better jobs); this can be mitigated somewhat by using fixed effects models for panel data but even then time-varying factors that lead to both greater happiness and greater income (for example a cure for a life-affecting illness) are difficult to control for. Partially exogenous income changes (through lottery participation) have been analysed by Gardner and Oswald and Brickman et al (Brickman, Coates et al. 1978, Gardner, Oswald 2007); both of these studies suggest that income does bring about greater wellbeing but only for larger sums of money (£1,000 and upwards) and only in the short term.

Missing variables can lead to slope heterogeneity⁸, in this case suggesting that individuals have different marginal benefit from income. Clark et al suggest that there are more often than not such omitted variables but that we can't hope to always know what they are (Clark, Frijters et al. 2008). They cite Lelkes (Lelkes 2006) as an example; Lelkes found that those who were religious were less affected in wellbeing terms by income changes during economic transition in Hungary. Clark et al found four different 'classes' (using latent class analysis) in terms of both intercept and the coefficient on income within the European Community Household Panel so it is likely that slope heterogeneity is present in most settings and should be recognised within analyses (Clark, Etilé et al. 2005).

For such an important determinant of wellbeing, income is a complex one. Further discussion of the form of income used in this analysis will be undertaken in the methodology section.

⁸ We will return to this in Section 3.

2.1.1.1.2 *Employment and Leisure*

Employment is a less complex concept than income, with regard to wellbeing at least, however as with all data we need to be sure about what we are measuring. Unemployment in particular could take one of several definitions: simply not working (regardless of ability), being disengaged from the labour market (able to work but not looking), being economically active but unable to find a job despite looking or being in receipt of unemployment benefit. It is the penultimate definition that is most commonly accepted and this is the definition used in this study⁹. It is differentiated from other forms of not-working, specifically family care, retirement, training or long-term sickness.

The benefits of employment and ills of unemployment are well recognised throughout the happiness literature, although it does affect people differently. For example unemployment has greater negative effects on men, those who are single and those who are working-class, and the negative effects increase as the period of unemployment increases.

Even when controlling for income, education and marital status, employment still has significant effects on wellbeing (causes and correlations). Di Tella et al found that life satisfaction was much lower for those who were unemployed than those in employment with otherwise similar characteristics (Di Tella, MacCulloch et al. 2001).

As employment brings about significant effects on wellbeing even when other happiness determinants are included, individual unemployment involves psychic costs due to a loss of social status, self-esteem, personal relationships and the time structure involved in working (Frey, Stutzer 2010). The adaptation effects individuals may have to income are not present in the wellbeing-employment relationship; long-term studies reveal limited adaptation to unemployment as well as negative effects even after re-employment indicating that unemployment is particularly and persistently damaging to subjective wellbeing (Clark, Georgellis 2012, Knabe, Rätzel 2011).

Regarding those who are not employed due to exit from the labour market (economically inactive), the wellbeing effects on those who choose not to work are not well understood, for example, in the case of parents who stay at home, because of a limited analysis of the interactions between family life and work in the economics literature (Argyle 2003).

The wellbeing effects of retirement are usually positive (Argyle 2003, Veenhoven 2004) however this may be due to a larger amount of leisure time being available; it is recognised

⁹ The penultimate and the final definitions are often synonymous, but the ever-changing nature of the benefits system means the final definition is not consistent. The data used in this study is in panel format, with the employment categories closely matched between years, even if political definitions change.

that engaging in activities and/ or sports have a positive effect on wellbeing which persists even after controlling for employment, class and income (Biddle, Mutrie 2008, Thayer 1989).

2.1.1.2 Socio-demographic Factors

2.1.1.2.1 Education

Education does not have a consistently strong or consistently positive effect on wellbeing. In the US and Europe it has a very weak (positive) effect, but a much stronger effect in developing countries (Veenhoven 2004). Education is closely linked with income and occupational status, and in a meta study Witter et al found that it affects subjective wellbeing primarily by influencing occupational status (Witter, Okun et al. 1984).

Clark and Oswald found that education in developed countries can have a negative effect on wellbeing as it creates aspirations and expectations of higher income that don't necessarily materialise. Argyle notes that the anecdotal self-esteem and optimism effects of education are unproven (Argyle 2003), and Clark and Oswald back this up, reporting that the highly educated are more distressed and adapt less than the less well educated to spells of unemployment (Clark, Oswald 1994).

2.1.1.2.2 Age

The relationship between age and wellbeing is interesting, in that there is no clear consensus in the literature regarding its form. Horley and Lavery found that the old were less happy than the young (Horley, Lavery 1995), and in some ways they may appear to be 'worse off' (poorer health, lower income, diminishing social circle), however many studies (such as Argyle 1989) found that age had a positive coefficient in happiness regressions. This discrepancy may be due to non-linearity; Blanchflower and Oswald identified a U-shaped relationship between age and happiness, where the young and the old are happier than those who are middle aged (Blanchflower, Oswald 2008). There is a large caveat attached to this however; happiness in old age depends on health, although even controlling for health leaves older people generally happier than those around 40 years old.

The aforementioned U-shape may be attributed to adaptation and changing aspirations: older people have more life experience, know themselves better, have more realistic expectations and fewer life-goals (for example 'get a good job', 'get married') to achieve, as well as having had time to pre-adapt to ageing and retirement – unlike redundancy, retirement tends to be expected. Although their income is (most likely) lower, they will have more leisure time, health allowing, and their peers may be in the same position meaning that

the psychic costs of not working can be mitigated (their reference group is retired/ older too) (Frey, Stutzer 2010).

Frey and Stutzer note the general difficulty of capturing the effect of age on wellbeing (Frey, Stutzer 2010). Firstly the interpretation of any wellbeing questions may change over time, even within the same individual. Looking back at Figure 2.1 we can see that there are dynamic elements within quality of life assessments that will change over time. The reference group individuals use to compare themselves with may also change. There is also a cohort effect that may be interfering with the age effect; Blanchflower and Oswald found, in a study of young Americans and Europeans, that individuals get happier over time, implying it is time elapsed and not age that increases wellbeing (Blanchflower, Oswald 2000). Finally, we cannot assume that the causation is unidirectional; happy people may well live longer (Diener, Chan 2011).

In summary age is another difficult factor to control for. The general consensus from the literature on age and happiness is that different age cohorts have differently shaped happiness functions, and that the young and old have greater wellbeing than the middle-aged. Other than that, we cannot say much.

2.1.1.2.3 Gender

In World Values Survey data, Inglehart (Inglehart 1990) found that women had higher levels of self-reported happiness than men, albeit only slightly, however Kessler et al revealed that women had a higher incidence of mood and anxiety disorders (Kessler, McGonagle et al. 1993), and Blanchflower and Oswald found that American women exhibited a decline in wellbeing between the 1970s and 1990s (Blanchflower, Oswald 2004). These observations appear contradictory at first glance, but it could be due to a greater propensity for women to experience emotion; indeed women on average experience both more extreme positive emotions and more extreme negative emotions so when they experience negative emotions they are very unhappy (as opposed to unhappy) and when they experience positive emotions they are very happy (as opposed to happy) meaning the distribution is more polarised than that for men ((Wood, Rhodes et al. 1989) cited in (Frey, Stutzer 2010)).

Another possible explanation for gender differences is that the reduction in discrimination against women in all spheres of life has raised aspirations, and created expectations that have overshot reality; for example wage equality has not yet been achieved on aggregate, and earning less than a man for the same work would make women less happy.

Regardless of the reasons, there are obvious differences between male and female happiness functions, and as a result in this study separate analyses will be conducted¹⁰.

2.1.1.2.4 Marriage

Marriage is one of the most frequently observed strong correlates of wellbeing, with positive effects remaining after controlling for income, age, gender and so on (Argyle 2003). Argyle goes on to suggest the main reasons for this relationship are that marriage provides an additional source of self-esteem and support, and that married people suffer less from loneliness; man is, according to Aristotle, a “social animal” (Frey, Stutzer 2010).

A selection effect – happy people are more likely to get and stay married – is possible however the effect is not thought to be strong, so the positive effect of marriage on wellbeing is mainly assumed to be due to marriage itself (Frey, Stutzer 2010). Married people report experiencing greater wellbeing than those who have never married (so are single, or cohabiting for example), those who are divorced, separated or widowed, and the effects are similar for both men and women (Diener, Biswas-Diener 2002).

2.1.1.3 Contextual and Situational Factors

2.1.1.3.1 Health

The causal effects going from health to happiness are not clear: one may easily assume that healthy people have greater wellbeing, however one could just as easily argue that happy people may forget about or ignore physical health problems; as mentioned previously, Diener and Chan suggest that happiness is beneficial for health and for increasing longevity (Diener, Chan 2011). Omitted variables – particularly personality, or genetic make-up, both of which can effect physical and mental health – will come into play again.

Oswald and Powdthavee found that people can adapt (albeit only partially) to health conditions: they observed that 50% of the wellbeing effect for moderate disability and 30% of the effect for severe disability had dissipated within three years (Oswald, Powdthavee 2008).

The severity of health conditions will obviously influence the effect on wellbeing, as will individual tolerances. Generally, we can assume that the less severe the health condition, the more likely the individual can adapt to it however in all cases it is possible that even for severe health conditions, individuals are not as unhappy as they expected they would be (Brickman, Coates et al. 1978).

¹⁰ In Table 3.3 a range of statistics for male and female wellbeing are displayed to illustrate this point.

All of these observations could be influenced by personality effects, both in terms of health itself and adaptation to health changes; those with a generally optimistic outlook might adapt to a greater extent (or tolerate more) than those who are serially pessimistic. Using a fixed effects specification will in some way mitigate these effects, meaning that health should then be independent of personality.

2.2 Poverty

Obviously the relationship between income and wellbeing is of paramount importance to that between poverty and wellbeing and attention given to the relationship between income and happiness has increased significantly in recent years (Kahneman, Krueger 2006, Stutzer, Frey 2012) meaning that there are myriad opinions regarding its form. Since Easterlin catalytically examined the relationship between economic growth and wellbeing, there have been a variety of explanations purported for his 'paradox', with the consensus (see (Clark, Frijters et al. 2008) and (Diener, Suh et al. 1999)) being that the income-happiness relationship is complicated by social comparisons, adaptation and aspirations, suggesting that relative income is more relevant to individual wellbeing than absolute income. In addition it is suggested that absolute income matters at extreme poverty levels (Freedman 1978) after which other factors become more important.

According to Hagenaars and De Vos, all poverty definitions fit into one of the following categories:

- A. Poverty is having less than an objectively defined, absolute minimum.
- B. Poverty is having less than others in society.
- C. Poverty is feeling you do not have enough to get along.(Hagenaars, De Vos 1988)

These categories are, in the order of the list above, absolute, relative and somewhere-in-between. They go on to say that the choice of definition is often made on the basis of availability of data, on that of politics or on the basis of historical arguments, and that research tends to disregard all other definitions once the choice has been made (Hagenaars, De Vos 1988). The implication of their argument is that the poverty measure should be appropriate for the task at hand, as well as relevant to the individuals subject to measurement.

In this section the various forms of poverty are discussed, with reference to the form of income they are based on.

2.2.1 Absolute Income Poverty

Given the evidence against the importance of absolute income for wellbeing, absolute measures of poverty are not ideal for meaningful measurement. Absolute standards – for example the often referred to ‘dollar-a-day’ measure of the World Bank – do not take into account the income distribution or the purchasing power of that ‘dollar’, or what an individual should do with it. Given the discussion of absolute income already provided, this section will refrain from analysis this further and instead focus on other aspects of the absolute poverty measure.

In its purest form, the economic definition of poverty is an absolute measure. Watts states that poverty is a situation in which the consumption set of the individual is severely constricted, to the extent that command over resources falls below a given level. That given level is one which is fixed in terms of the indicator being used, and fixed over the entire domain of the poverty comparison (Watts 1968). Someone has to fix the level of consumption or income; that someone is probably not poor, and is basing their judgement on global assessments of what poverty is¹¹.

The merits of absolute poverty measures are that they can indicate whether an individual is living at a level of consumption of various goods (for example food, clothing and shelter) below which survival beyond short periods is threatened¹². For example, if we were to ascertain the minimum amount of income/ consumption necessary to house oneself, stay warm, have acceptable levels of hygiene and eat basic but nutritious meals every day we could identify those who are at risk of limiting their survival by not achieving this. However, that involves the assumption that every individual would prioritise those things. Some individuals may prefer to forego some of the nutrition to instead purchase cigarettes, or give up some warmth to buy lottery tickets.

A further criticism is that absolute poverty may be at different levels in different parts of the same country. For example, if one is destitute in the Scottish Highlands survival may be much harder (due to logistics and climate) than in the centre of an affluent city. The poverty line for an individual in the Scottish Highlands would have to take into account the cost of travel to source the basic food, shelter and clothing needed. In an affluent city not only are there more likely to be available facilities to acquire basic goods, it is more likely that charitable organisations will be operating to compensate for very low income (for example

¹¹ This analysis applies to all absolute measures, including food gap poverty, basic needs approach, food-income ratio, fixed cost-income ratio and total expenditure-income ratio. For a discussion of the relative merits of these approaches see Hanenaars and De Vos (Hagenaars, De Vos 1988).

¹² This was Seebom Rowntree's concern, along with that of his counterpart poverty crusader in London, Charles Booth.

food banks). If someone were to move from the Scottish Highlands to London, they would still be poor, but one could make a case that in many ways the individual would be better off.

It is obvious that a certain degree of arbitrariness in setting the absolute poverty measures is unavoidable (Ravallion 1992), however the more arbitrary the measure becomes the less relevant it is to any given individual. Furthermore the information requirement to comprehensively assess poverty lines in different contexts may be prohibitive. There is evidently a trade off between the tractability of a measure and its meaningfulness at an individual level.

2.2.2 Relative Income Poverty

One of the primary criticisms of absolute poverty is that it cannot capture the inequality in income; someone may be poor by an absolute income measure, but if income inequality is low in that context, poverty may not be such a horror. Relative measures of income poverty – using a person's income compared to an average measure of income for one country in one year – attempts to capture that dimension.

As consensus is that relative income is more important to individual wellbeing, it is therefore easy to assume that relative poverty would also be more important, but this measure still involves an arbitrary threshold. An alternative to the threshold is to examine individual welfare functions, although this has only been trialled in limited contexts. Both approaches are discussed below.

2.2.2.1 OECD – Less than 60% of the median income

The concept of comparing incomes against an average measure arguably came from Peter Townsend, first in 1954 (comparing families against the average income of the lowest 25% households of the household income distribution who achieve a nutritional standard) and again in 1973, stating that “individuals and families are in poverty whose resources, over time, fall seriously short of the resources commanded by the average individual or family in the community in which they live” (Townsend 1954, Townsend 1973).

As stated previously, the origin of modern specific poverty targets seems to be the 1995 Copenhagen Agreement. The official measure of poverty within the OECD, the European Community and the UK is a household that has less than 60% of the median national equivalised disposable income. ,

The Households Below Average Income survey in the UK uses as its threshold 60% of the median annual household equivalised disposable income in any particular year. This measure has a key advantage over absolute measures in that it makes the threshold,

although still arbitrary, more relevant to the population. Setting a poverty line at a fixed percentage of the national median income in any given year means that all households' incomes have already been taken into account when setting the line; it involves no judgement on what households should/ could spend money on to live an 'acceptable' life. It is a socially realistic threshold(Gordon 2000)¹³.

One problem with this measure is that, unless every household has the same income, there will always be relative poverty. Furthermore, as mentioned above, relative poverty targeting does still involve a degree of arbitrariness that limits the applications of absolute poverty targets; it can be seen – as with all fixed measures – as an “empirical operationalisation aimed at dividing the population into two subgroups, the poor and the non-poor” (Halleröd 2000), thus, it still does not tell us what it means to be poor.

Although poverty avoidance remains a target of the UK government, the focus is almost bipartite, with policy designed to address social exclusion and also child poverty, but with little association between the two or dedicated whole-of-society poverty policy. The official measure¹⁴ remains at 60% of the median disposable equivalised household income, but evidence regarding the selection of the 60% measure is not forthcoming. In some analysis of poverty in the UK, Townsend speaks of thresholds at 40%, 50% and 60% of the median income before settling on 50% based on his own analysis of the sample he was using.

This measure is a curious combination of relative (the relationship of the measure to an average) and the absolute (imposing that relationship as a constant 60%). Some developed countries set the threshold at 50%, emphasising the arbitrariness of the measure. This means that even the relative income version of the poverty line may not be wholly relevant for individuals.

2.2.2.2 Leyden School

The Leyden approach to poverty measurement involves conducting research into individual welfare functions with the aim of finding out what income is acceptable to different individuals. This tries to cover both the absolute and relative aspects of poverty, as income is acceptable on a consumption basis (i.e. what individuals need to get by) and a social comparison basis – a what individuals would be satisfied with in relation to past income, aspirations and the income of their peers (Van Praag, Kapteyn 1973, Van Praag, Frijters 1999).

¹³ Politically therefore it is difficult to show progress in reducing poverty.

¹⁴ Mainly used for measuring child poverty

The cardinal relationship between income and welfare is established by asking individuals to add income ranges to a number of qualitatively characterised income levels ranging from “excellent” to “very bad”, on an interval scale from 0 to 1. The goal is that they should take into account their own situation with respect to family and job in answering this. From this information it is possible to estimate the income required for the individuals to reach a mean welfare level, and the sensitivity of reported economic welfare to ex ante income changes. This approach addresses many of the limitations of arbitrary poverty lines, and has been tried successfully in some countries but as yet no such data is available in the UK. For it to be nationally relevant the exercise would need to be completed with a fully representative sample of the population.

2.2.3 Non-monetary Poverty

The previous sections have discussed the limitations of monetary poverty measurement. Sen suggests that non-monetary aspects of poverty need to be considered in assessments of its prevalence and impact in order for a true picture of poverty to emerge (Sen 1979). This is supported by Freedman (Freedman 1978) who reports that income only has a positive effect at extreme levels of poverty (i.e. those observed in developing countries), but that when basic needs (food, water, shelter and so on) where met further increases in income would not bring about greater wellbeing.

Lane also takes this stance, observing that once an individual rises above subsistence level income the main source of happiness is not income but friends and a good family life (whatever ‘good’ may mean) (Lane 2000). Given that in the UK, poverty is at least partially compensated for with social transfers and in-kind service provision, we cannot say that extreme poverty here is the same as extreme poverty in the poorest countries in the world, thus, however this leads to the obvious question: do poor people in the UK respond differently to income than those who are not poor?

The United Nations uses various non-monetary aspects of poverty in its Millennium Development Goals, stating that poverty can be seen as:

“...[the] lack of income and productive resources to ensure sustainable livelihoods; hunger and malnutrition; ill health; limited or lack of access to education and other basic services; increased morbidity and mortality from illness; homelessness and inadequate housing; unsafe environments and social discrimination and exclusion. It is also characterised by lack of participation in decision making and in civil, social and cultural life. It occurs in all countries: as mass poverty in many developing countries, pockets of poverty amid wealth in developed countries, loss of livelihoods as a result of

economic recession, sudden poverty as a result of disaster or conflict, the poverty of low-wage workers, and the utter destitution of people who fall outside family support systems, social institutions and safety nets.”(United Nations 2010)

Although predominantly referring to developing countries, a lot of the aspects of poverty mentioned can be seen within the developed world too, albeit to a different extent and with different consequences.

Clark et al (Clark, Frijters et al. 2008) use the example of sunshine to illustrate the limitations of monetary poverty measures – is it better to be a rich person who suffers in a cold climate or a materially poor person who enjoys many hours of sunshine? They state that although implicitly sunshine and every other non-income factor is orthogonal to poverty, they are actually highly relevant for individual decision making.

They go on to suggest that a more happiness-based poverty measure would take into account not-material elements to provide a broader picture of wellbeing; this would jar less with their observation that people can choose outcomes that make them worse off (smoking, having children and so on) (Clark, Frijters et al. 2008). This strand of research will be taken up in a forthcoming paper.

2.3 Summary

Wellbeing, happiness, quality of life and other concepts have been given an increasing amount of attention in economics research. This has resulted in a greater understanding of the factors that affect individual wellbeing/ happiness/ quality of life. However, there is often confusion regarding what wellbeing/ happiness/ quality of life is/ are, and the concepts are often used interchangeably. In this paper ‘wellbeing’ is used as the subject of study, where wellbeing means individuals’ perception of their position related to their ideals, aspirations and judgements.

The determinants of wellbeing are wide ranging, including personality factors, socio-demographic factors, economic factors, contextual and situational factors and institutional factors. Focusing mainly on economic and socio-demographic factors, it is apparent that income has a complex effect on wellbeing, being positive in the short term but subject to interferences from adaptation, aspiration and comparison (both external and internal). We cannot assume that there is a constant coefficient on income in any wellbeing function as income may be more important for poor wellbeing than non-poor. For this reason this paper will attempt to test the existence of separate wellbeing functions within the poor/non-poor continuum.

Employment appears to be generally beneficial, and unemployment universally detrimental to individual wellbeing. Similarly, both men and women benefit in wellbeing terms from being married; those in matrimony have greater wellbeing than single individuals, cohabiting partners, or those who are divorced or widowed. The effect of education is not consistent, however it may affect wellbeing through increasing earnings or likelihood of employment.

The effects of age are not constant across the age spectrum, with the younger and older individuals experiencing greater wellbeing than those in their middle ages. Generally women are seen to have greater wellbeing than men, but women also report more extreme negative wellbeing effects than men; it is possible that they have different physiological capacities for emotion. Given gender differences in wellbeing determination this paper will analyse male and female responses separately.

The direction of correlation between health and wellbeing is ambiguous. Those with better health tend to have better wellbeing, but those with better wellbeing may experience better health or just perceive their health to be better. Health is also subject to adaptation effects, meaning that individuals with injury can recover some of the lost wellbeing, however this depends on the severity of injury.

The main complication with wellbeing research is that there are personality effects between wellbeing and arguably all of its determinants. In the methodology section this will be addressed further.

As discussed at length, income and wellbeing have a complex relationship. It follows therefore that poverty and wellbeing are subject to the same issues. To analyse this relationship we need to know what we mean by poverty. Several forms of poverty are considered, including absolute income poverty, relative income poverty and non-monetary poverty. Monetary measures prevail amongst economists, despite almost universal acceptance in sociology and other social sciences that poverty is about more than just low income (Gordon, Pantazis et al. 2000). Poverty has not received a great deal of concerted political attention in the UK since the late 1970s, and the attention it has been subject to has been patchy¹⁵; indeed there is no evidence that the 60% median income threshold is anything but arbitrary.

As mentioned previously, the non-monetary aspects of poverty will be taken up in future research; the purpose of this paper is to focus on the prevailing measure of poverty – relative income poverty, where to be poor is to have less than 60% of the median disposable

¹⁵ See Glennerster et al (2004) for a comprehensive review of poverty trends and policy within the UK

equivalised household income – and its relationship with wellbeing, in order to assess whether it is relevant to individuals' wellbeing.

Given the evidence that income matters more to wellbeing below a poverty line, this paper will also examine whether there are differences in the relationship between income and wellbeing between poor and non-poor individuals.

3 Methodology

There are two particular issues that this research aims to address:

1. Does being poor affect individual wellbeing?
2. Does being poor change the form of the wellbeing function?

where poverty is taken to be income less than 60% of the median disposable equivalised income. The answers may well be different for men and women so gender specific analysis will be undertaken for both questions.

Capturing wellbeing within data is not an easy task, particularly when one cannot be sure of the aspect of quality of life being examined. In Section 2 the different levels of quality of life were discussed and the concept of wellbeing was chosen as the subject of this analysis, based on the strength of argument from authors such as Kahneman and Diener, who argue that wellbeing is the “centre of the [quality of life] story” (Kahneman, Diener et al. 2003).

Wellbeing in the context of this research is defined as an individual's judgement of their life quality, related to the ideals, aspirations of oneself and one's peers. It represents individuals' perception of their position related to these subjective values. There are a variety of approaches one could take in capturing this concept¹⁶, and as Townsend notes, “any single study must be handicapped by the virtue of its methodology” (Townsend 1979). This section will outline the techniques used in addressing the questions above.

3.1 Dealing with heterogeneous personalities in wellbeing investigations

One of the main difficulties in conducting wellbeing research is the unavoidable omission of personality effects. Genes and psychological traits have been found to have a correlation of up to 80% with wellbeing reports (Lykken, Tellegen 1996), so personality effects could arguably affect the relationship between wellbeing and any of the determinants discussed in Section 2.

Self-reported wellbeing questions, first directly asked in a survey by Cantril, usually ask individuals to rate how satisfied they are with their lives on the whole on a given scale that could be numerical (for example, zero to seven) or verbal ('very dissatisfied' to 'very satisfied'). The main problem with this approach is that the interpretation of the question and the response scale is down to the individual. It is often purported that there are differences

¹⁶ For examples, see Di Tella and MacCulloch (2006), Dolan et al. (2008) and Stutzer and Frey (2010)

in interpretation of wellbeing questions across countries¹⁷, and indeed personality could also affect interpretation; optimists may generally report higher scores than pessimists.

Within social sciences there are different assumptions made about the response scale, depending on what assumptions are made about interpretation (and therefore personality effects). Ferrer-i-Carbonell and Frijters outline how important this is for making conclusions in any wellbeing research. In sociology and psychology, cardinality is often assumed; that is, the difference between 0 and 2 on a scale is the same as the difference between 4 and 6. Economists on the other hand tend to prefer the assumption of ordinal comparability, where the relative difference between the points on the scale is unknown but that all individuals share the same interpretation (Ferrer-i-Carbonell, Frijters 2004). Given the strength of personality effects, even this is perhaps a precarious assumption, however the treatment of wellbeing as either cardinal or ordinal or anywhere in between does not appear to affect regression results (Ferrer-i-Carbonell, Frijters 2004).

As mentioned previously, omission of personality from any analysis will inevitably bias the results; slope heterogeneity – meaning that the intercept and coefficients of a regression line are different for different individuals – in a cross-section can yield inconsistent estimates. As mentioned above the cardinality assumptions regarding wellbeing do not affect regression results however unobserved time-invariant effects do, and therefore should be addressed in any specification.

There are other methodological approaches to personality effects in econometrics, however the use of fixed effects specifications appears to present greater advantages over techniques such as using first differences (which cannot process unobserved individual heterogeneity) or ordinal fixed effects models (which involve rescaling the dependent variable to two categories)¹⁸ (Ferrer-i-Carbonell, Frijters 2004).

Fixed effects specifications allow us to assume the presence of personality effects, on the basis that they are fixed over time. The assumption of fixed personality is generally accepted within economic literature, even if psychological literature is more mixed in opinion (Boyce, Wood et al. 2013).

Depending on what measure of wellbeing is used, this assumption may be more or less important; for example, a measure asking individuals to rate their satisfaction with life might be more subject to the effects of personality change or regularly fluctuating affective states

¹⁷ Post-communist countries may tend to report lower wellbeing scores whereas historically Protestant, island and south-American nations may tend to report higher ones (MacKerron 2012)

¹⁸ For a more discussion of the relative merits and drawbacks, and listings of the literature using each approach, see Ferrer-i-Carbonell and Frijters (2004)

than one that uses incidence of physiological effects like sleeplessness, blood pressure, cortisol levels and so on.

To allow for consistency with economic research, whilst giving personality effects due attention, a fixed effects model will be used in testing the effects of relative income poverty on wellbeing¹⁹. Estimating separate regressions for men and women will contribute in part to allowing for this, as gender specific personality effects (such as the greater propensity for women to experience emotion) will not become additional unobserved characteristics.

3.2 Decomposing differences between groups

The second question this research aims to address is whether there are differences between the poor and non-poor in terms of the wellbeing response to exogenous changes: in other words, are there different wellbeing functions for the poor and non-poor? This is based on suggestions from the literature that income matters more to wellbeing at very low levels (Freedman 1978, Lane 2000), indicating that by raising the income of the poor, policy can raise the wellbeing of that group.

As stated previously, poverty in the UK is unlikely to be comparable to poverty in the worlds most under-developed countries, however it may still be the case that low income in the UK limits individual abilities to meet basic needs and for that reason, amongst others, increasing their income may bring about greater wellbeing. This would imply that the poor and non-poor have either different characteristics (i.e. different means and variances of independent variables) or different coefficients on independent variables (i.e. how wellbeing for individuals in their group in particular responds to exogenous factors), particularly with regard to income. Decomposition analysis aims to understand these differences.

Decomposition was first undertaken by Oaxaca, who investigated gender discrimination in wages in the US labour market (Oaxaca 1973). His investigation involve empirical analysis of the following form:

$$Y_a - Y_b = (X_a - X_b)\beta^* + X_a(\beta_a - \beta^*) + X_b(\beta^* - \beta_b) \quad (1)$$

Where:

$$\beta^* = \Omega\beta_a + (I - \Omega)\beta_b \quad (1a)$$

¹⁹ Ferreri-i-Carbonell and Frijters suggest using a fixed effects ordered logit model for categorical happiness data (Ferrer-i-Carbonell, Frijters 2004), however this is based on Chamberlain (Chamberlain 1980) and involves collapsing the dependent variable to two outcomes. Given the use of GHQ12 (see Section 3.4.1 below for discussion) this huge information loss is not an acceptable compromise for data that isn't strictly categorical. Thus a linear fixed effects form is assumed.

Here, Y is the wage rate, X represents a set of characteristics (education, work experience and so on) and the two groups are denoted ‘a’ and ‘b’. In equation 1a, Ω is a weighting matrix and I an identity matrix. Depending on which way we believe the discrimination goes (e.g. are women discriminated against in workplace wages or are men receiving a bonus? Or is it a combination of both?) Ω is weighted differently and therefore will have a different effect on the results.

In Section 7 the various options for Ω are considered, arriving at the adoption of a pooled set of coefficients (including the poor and non-poor in the same model) (Neumark 1988). The coefficients in Ω therefore represent the counterfactual household where the poor and non-poor are equal in their abilities to convert income and other factors to wellbeing; there is no poor discrimination with regard to wellbeing.

To decompose the wellbeing function for the poor and non-poor the specification will therefore be:

$$W_{\text{poor},i,j} - W_{\text{non-poor},i,j} = (X_{\text{poor},i,j} - X_{\text{non-poor},i,j})\beta^* + X_{\text{poor},i,j} (\beta_{\text{poor},i,j} - \beta^*) + X_{\text{non-poor},i,j} (\beta^* - \beta_{\text{non-poor},i,j}) \quad (2)$$

$$\beta^* = \Omega_{i,j} \beta_{\text{poor},i,j} + (I - \Omega_{i,j}) \beta_{\text{non-poor},i,j} \quad (2a)$$

where W is wellbeing, X is a vector of explanatory variables, i represents the individual and j the wave, Ω is a matrix of pooled-model coefficients and I is an identity matrix. The interpretation of this is explained further in Section 7 and in the analysis in Section 4.2.

3.3 Data Source

This paper uses data from the British Household Panel Survey (BHPS). As a multi-purpose study, it provides a wealth of information about a set of individuals, including several measures that could be used to analyse wellbeing.

BHPS is a panel dataset established in 1991 to provide a nationally representative sample of about 5,500 households, containing a total of approximately 10,000 interviewed individuals. These same individuals are re-interviewed each successive year²⁰ and, if they separate from original households to form new households, they are then followed and all adult members of the new households can then be interviewed. New additions to existing households are also included in the survey. Including a boost in 1999 (to allow independent analysis of UK

²⁰ BHPS surveys were done in ‘waves’ that frequently crossed year boundaries.

countries), the total sample size for the BHPS is between 10,000-14,000 households across the UK in any given wave.

The dataset used for this study consists of all adult (16 and above, and completed compulsory education) individuals interviewed and all waves available: 1991 to 2007/8²¹, with around 14,000 observations per wave, however not all variables are available in every wave, not all individuals respond to the survey every wave (for example due to illness, overseas travel etc) and not all individuals will answer all the questions for the survey they complete.

This analysis uses an unbalanced panel, which includes all responses even if individuals did not complete the survey in one or more wave(s); because the sample is nationally representative and chosen at random, it is unlikely that any systematic factors will cause individuals to drop out, so the risk of selection bias is low and is more than compensated by having a more representative sample (Taylor, Brice et al. 2010).

3.4 A wellbeing function

The basic form of the model to be used in this paper is:

$$W_{,it} = X_{it}\beta + f_i + \varepsilon_{it}$$

Where W is wellbeing, i represents the individual and t the time, X is a vector of explanatory variables, f is the fixed effect associated with the individual (correlated with X) and ε is the error term²². W is a categorical variable, and the explanatory variables are in various forms.

The form of this model will feed into both analyses, the effect of being poor on wellbeing and the differences between the poor and non-poor with respect to income and wellbeing (although it is not currently possible to use a widely accepted method of including fixed effects in a decomposition²³).

3.4.1 Dependent Variable

We have already stated that by wellbeing we mean an individual's judgement of their life quality, related to the ideals, aspirations of oneself and ones peers. The next issue is how to

²¹ Since then the BHPS has been subsumed into the Understanding Society survey, which includes the original BHPS questions plus many more.

²² This is based on the specification used by Ferrer-i-Carbonell and Frijters (Ferrer-i-Carbonell, Frijters 2004)

²³ Fixed effects decomposition techniques are not yet at the stage where they are accepted at more than a local level. See the arguments between (Plümper, Troeger 2011, Breusch, Ward et al. 2011, Greene 2011). The main problem is that the unexplained part of the decomposition may well contain the unobserved effects (like personalities).

choose data that best suits this definition. As mentioned above, BHPS contains a number of variables that could be used to represent wellbeing. These range from life satisfaction questions to General Health Questionnaire (GHQ) components.

In selecting a measure of wellbeing, one can refer to Office for National Statistics research examining what an appropriate measure of wellbeing is. There it is stated that a wellbeing measure (for public policy) must be:

1. Theoretically rigorous;
2. Policy relevant; and
3. Empirically robust(Dolan, Layard et al. 2011).

In the recommendations of the report, Dolan et al suggest that an evaluative wellbeing measure, that of life satisfaction, be used along side other aspects such as experience and eudaimonic measures of wellbeing(Dolan, Layard et al. 2011).

As discussed in Section 2.1, this paper will use an evaluative measure of wellbeing as it is more suited to the assessment of the impacts of poverty; it provides a global assessment of an individual's satisfaction with their position relative to their own judgements about quality of life. BHPS provides two measures that could meet the needs of this study:

1. Life satisfaction question: How dissatisfied or satisfied are you with your life overall?
2. GHQ question: Have you recently been feeling reasonably happy, all things considered?

Both the questions listed above are in the self-completion portion of BHPS, meaning that individuals may be more likely to report truthful answers(Pudney 2010). In addition they both ask for a global assessment: the life satisfaction question by using the term 'overall' and the GHQ question by using the phrase 'all things considered'.

The life satisfaction question is answered on a verbal scale with seven options, from 'not satisfied at all' to 'completely satisfied' (coded 7). There are no time qualifications to the life satisfaction, indicating that the question refers to the point in time when the questionnaire is being completed²⁴. One further problem with this question is that it has not been asked throughout the lifetime of the BHPS, only in 11 of the 18 years.

²⁴ Postive and negative affect may influence responses to life satisfaction questions(Diener 1984).

In contrast, the GHQ question has been asked in every wave. Regarding the temporal reference, this question uses the term 'recently'; this gives the individual a time context to frame their answer within, however how the individual interprets 'recently' is not certain. The main limitation with the GHQ question is the limited (four) response categories: 'more than usual', 'same as usual', 'less so' and 'much less'. These do not lend themselves particularly well to assessing the level of wellbeing. Also, by using the term 'happy' it may be inciting people to think about the amount of time they have spent in affective states, rather than the global quality of their lives.

Although not a directly asked question about wellbeing, an index created using responses to the full set of 12 GHQ components in BHPS may provide a better measure. It includes the GHQ 'happiness' question above along with a range of others aimed at providing context to complement an individual's answer to overall happiness. In comparison to the two questions discussed above, using GHQ12 has the advantage of being less likely to be affected by mood²⁶, retaining a temporal context and providing information about other aspects (than feeling happy) of an individual's wellbeing. As it is a sum variable rather than categorical, we can be more comfortable with the assumption of ordinal comparability, and in addition it is more normally distributed than the individual component responses (Banks, Clegg et al. 1980).

There are many versions of the GHQ; the original, developed by Goldberg (Goldberg 1978), included 60 questions designed to screen for psychiatric illness. The full questionnaire is occasionally used as an indicator of subjective wellbeing, but for cost and efficiency purposes, many versions are shorter than the original; BHPS has used the same format of GHQ12 since its inception²⁷ and it has been used in many studies of wellbeing, including Gardner and Oswald, who list more than a dozen other papers that use this dependent variable (Gardner, Oswald 2007).

The GHQ12 questionnaire asks individuals:

"Have you recently:

1. Been able to concentrate on whatever you are doing?

²⁵ The life satisfaction question is supplemented with an additional question asking individuals to state whether their life satisfaction has changed since 'this time last year' (answered on a verbal three-point scale: more satisfied, less satisfied, about the same) which may provide a more evaluative context.

²⁶ An individual's mood might influence their answer to 'how happy are you?' but when asked something like 'how often do you lose sleep?', mood might play less of a role in determining the answer as it is asking about behaviour rather than pure affective state.

²⁷ This is accepted as consistent in the long term (Pevalin 2000), meaning personality effects may be more-or-less fixed within this measure

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 couldn't 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?"

In a self-completion part of the BHPS interview, respondents select one of four options for each component of GHQ12 from 0 to 3, with those reporting 0 having the highest wellbeing and those reporting 3 the lowest. Rather than use each question individually, we can use a simple summation of the responses to all 12 questions, providing a 36-point Likert scale²⁸²⁹.

The two additional categories within the dataset are 'missing/ wild' (for missing or obviously erroneous responses) and 'proxy' (where an individual's response is completed by another).

For reasons of analytical simplicity, this scale is inverted to be increasing in wellbeing, so those with values of zero had lowest wellbeing and those with scores of 36 had the highest.

²⁸ Typically, mentally 'healthy' individuals will have a score of between 10 and 13, whereas numbers approaching 36 may indicate problems like clinical depression. (Gardner, Oswald 2007). When the scale is inverted to be increasing in wellbeing, 'healthy' scores would be between 23 and 26.

²⁹ There is another scale that runs from 0 to 12, where responses coded 1 and 2 are set to 0, and responses coded 3 and 4 are set to 1. This is then summed over the 12 questions. This tends to be used more in determining "psychiatric caseness" where, if the responses were presented in a medical context and crossed a predetermined threshold, the individual would more likely than not (51%) receive further attention (Goldberg 1978).

3.4.2 Poverty indicator

Creating a poverty dummy based on the relative income poverty line is accomplished by, for each wave of BHPS, computing the median household equivalised disposable income³⁰. For each wave, a relative income poverty line is constructed by multiplying the median household disposable equivalised income by 60%. Finally a dummy variable is created by, for each household in each year, setting a value of '1' if its income is below the relative income poverty line.

A full list of median household incomes, poverty lines and percentage of households that are 'poor' for each wave of data is provided in Table 9.1.

3.4.3 Control Variables

Using examples of wellbeing investigations within economic literature, the model in this study is based on the assumption that individual wellbeing depends on a range of factors which have been discussed previously.

- Age (continuous and squared to account for the 'u' shaped relationship – this form was used in Blanchflower and Oswald(Blanchflower, Oswald 2008))
- Income (annual equivalised disposable household income; expressed in natural log form to account for potentially non-linear relationship, henceforth referred to as 'income')
- Gender (categorical, see Table 3.1)
- Marital status (categorical, see Table 3.1)
- Highest educational level attained (categorical, henceforth referred to as 'education', see Table 3.1)
- Employment status (categorical, see Table 3.1)
- Health (binary – 0 if individual has at least one health problem, 1 if individual has no reported health problems)

Using the categorical data listed above, a series of dummy variables were created to control for economic and socio-demographic effects on wellbeing; the omitted categories are first in the list in Table 3.1. As mentioned above, health is a binary variable, age is included in its

³⁰ Equivalised disposable income, where disposable is income minus direct taxes (using the McClements Before Housing Costs equivalence scale) is not included in the main BHPS dataset however is available from an add-on (Levy, Jenkins 2012).

continuous form as well as squared and income is expressed as a natural log. As separate regressions will be estimated for men and women there is no need for dummy variables for gender. The summary statistics for the dependent and control variables are shown in Table 3.2.

Table 3.1 – Dummy variables

Variable	Employment status	Education	Marital status
Reference category:	Training/ education	No qualifications	Never married
Dummies:	Retired	Basic qualifications	Married
	Family care	Further education	Divorced/ separated
	Long term sick	Higher education	Widowed
	Unemployed		
	Employed		

Source: Author's analysis of BHPS data

Table 3.2 – Summary statistics

Variable	N	Mean	Std.Dev	Min	Max
Dependent variable					
Wellbeing	193,141	24.81	5.43	0	36
Independent variables					
Income	199,462	24,017.45	16,130.39	0	871,801.60
Poverty	199,462	0.17	0.38	0	1
Education	196,956	1.36	0.98	0	3
Employment status	198,626	3.77	1.58	0	5
Marital status	199,436	1.03	0.76	0	3
Sex	199,462	1.53	0.50	1	2
Age	199,462	45.82	18.73	15	100

Source: Author's analysis of BHPS data

As mentioned previously, the analysis will assume different regressions for men and women based on the inherent wellbeing differences in wellbeing. Table 3.3 illustrates this point: there is a whole wellbeing point difference in the median wellbeing between men and women, and 1.4 points between the means. The higher standard deviation of female wellbeing could relate to the greater polarisation of the female wellbeing distribution, as they have more frequent reports of extreme levels of wellbeing.

Table 3.3 – Gender differences in average wellbeing

	Mean wellbeing	Median wellbeing	Standard deviation	Min wellbeing	Max wellbeing
Male	25.55	26.00	5.03	0	36.00
Female	24.15	25.00	5.68	0	36.00

Source: Author's analysis of BHPS data

3.4.4 Data adjustments

Very few adjustments to the data were made. Responses from proxy respondents and those from individuals aged under 16 and still in compulsory education³¹ were dropped; these respondents would be less likely to have knowledge and experience of the household income either for assumptions of age/ life-stage (they are still 'taken care of' by their parent(s)/guardian(s)³²), or – for proxy responses – because the respondent may not be fully aware of the individual subject's situation and feelings.

For employment status, some changes were made to the coding of the answers between Waves 1 and 2; the model accounts for these changes and ensures that all coding is consistent.

For all variables, as stated above for wellbeing, 'wild' responses were recoded to missing.

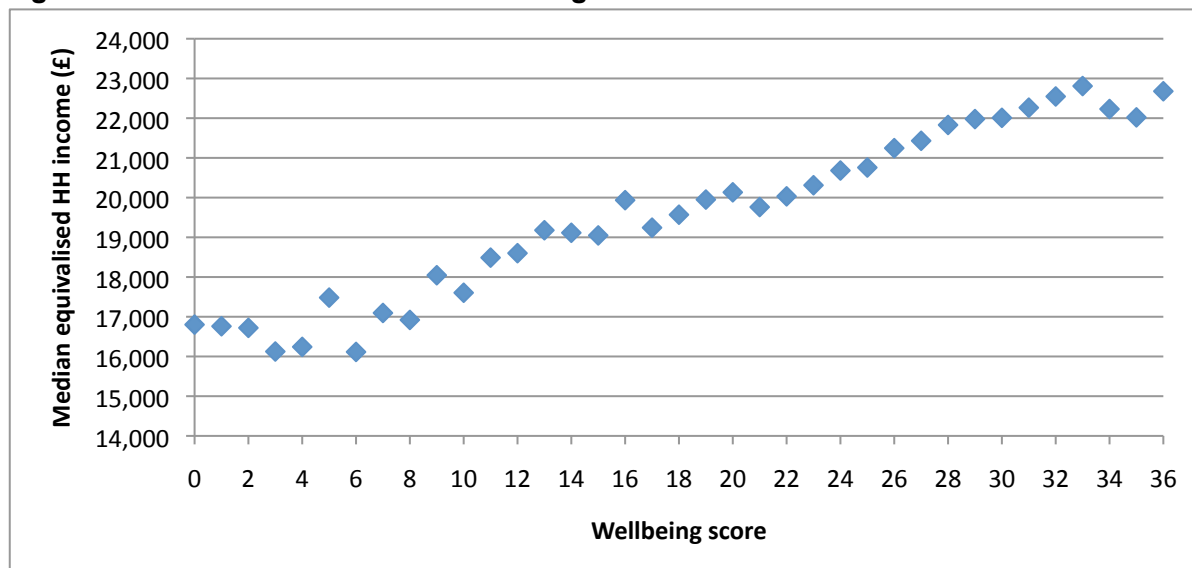
3.5 A brief analysis of wellbeing, income and poverty

To begin the analysis some cross-tabulations were created for wellbeing with income and wellbeing with poverty. As is evident in Figure 3.1 below, higher subjective wellbeing levels are generally associated with higher income.

³¹ There are around 140 individuals aged 15 in the sample; these individuals are either coded as 'unemployed', 'in training or education' or 'employed' rather than 'in compulsory education'. It is possible that individuals can finish their compulsory education – thus enter the labour market. On this basis there is no justification to remove these observations from the sample.

³² Child poverty is a highly emotive and well-researched issue already; the relationship between child poverty and wellbeing deserves its own analysis, which this paper cannot give sufficient and deserved attention to.

Figure 3.1 – Income within each wellbeing score

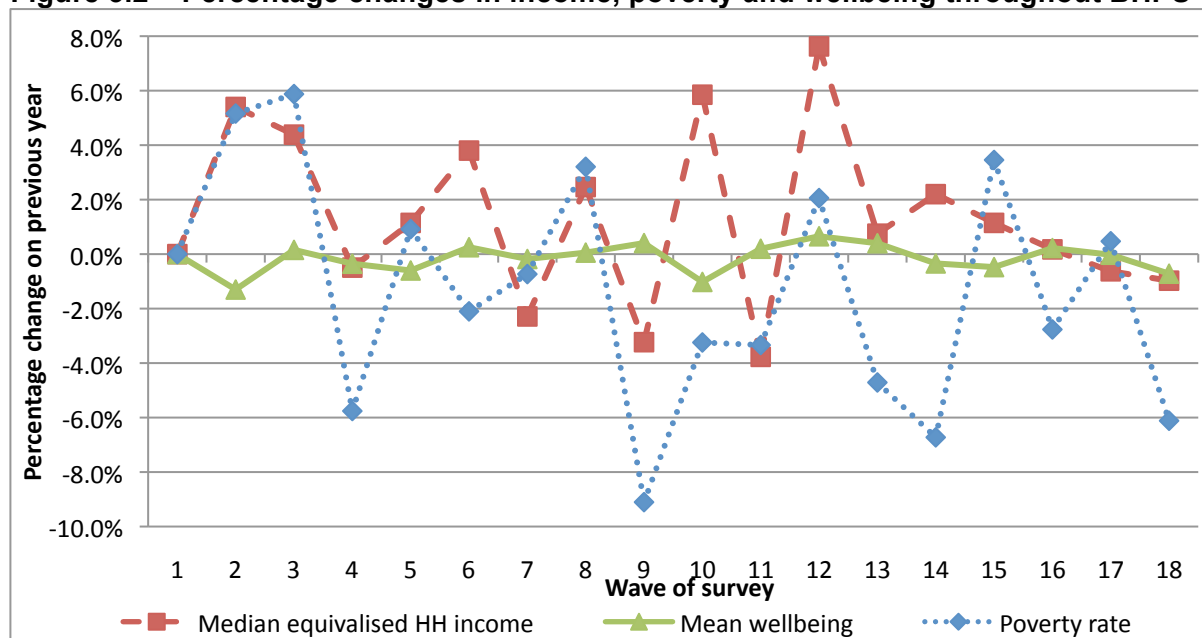


Source: Author's analysis of BHPS data

However on analysing the changes in these variables over time, (see Figure 3.2) it appears that changes in household income are not reflected in changes in wellbeing. The same can be said for changes in the poverty rate (calculated as the proportion of individuals with household income below 60% of the median equivalised household income in any given wave).

Looking at waves nine and 10 in particular, there was approximately a 1% fall in mean wellbeing however income increased by 6% on the previous year, and the poverty rate had decreased by around 3%. Obviously this is a very simplistic presentation, however by comparing waves nine and 10 with the changes between waves 17 and 18, where all wellbeing, income and the poverty rate decreased, would lead us to suggest that the changes are not closely linked.

Figure 3.2 – Percentage changes in income, poverty and wellbeing throughout BHPS



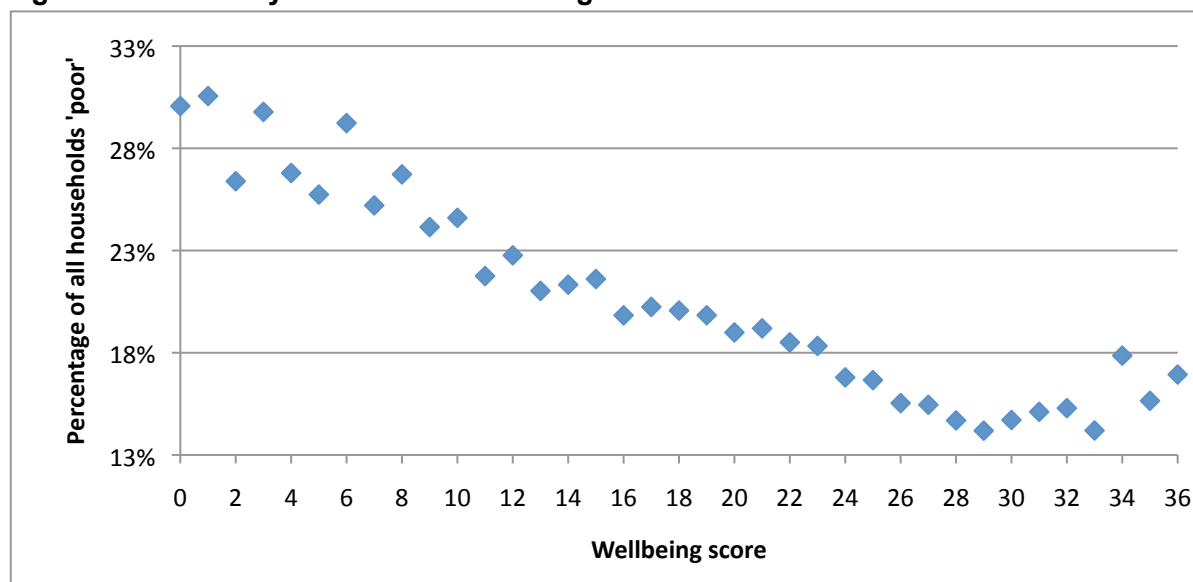
Source: Author's analysis of BHPS data

As stated previously, the poverty measure is that of household equivalised income less than 60% of the national median in any particular year³³.

Figure 3.3 indicates that within each level of wellbeing – from 0 to 36 – there is a generally declining proportion of individuals living in households deemed ‘poor’. This data suggests that the poor are concentrated at the lower end of the SWB scale, reinforcing the assumption that poorer people are generally less happy than those who are not.

³³ Again, see Table 7.1 in Appendix B for poverty thresholds and percentages in poverty in any given wave.

Figure 3.3 – Poverty within each wellbeing score



Source: Author's analysis of BHPS data

Finally, in concordance with all the data so far, we can see from Table 3.4 that the median wellbeing of those who are not poor is one point higher than those that are poor.

Table 3.4 – Poverty, income and wellbeing

Poverty status	Median income	Median wellbeing
No – non-poor	23,290.04	26
Yes – poor	9,548.14	25

Source: Author's analysis of BHPS data

3.6 Summary

This section set out to describe the methodology and data used in the study. It began by restating the definition of wellbeing (an individual's judgement of his or her life quality, related to the ideas and aspirations of that individual and their peers), then considering the pitfalls of capturing wellbeing data; primarily, the influence of personality.

Drawing on research from Ferrer-i-Carbonell and Frijters (Ferrer-i-Carbonell, Frijters 2004), it was assumed that personality could bias any results when omitted from a regression; the solution – based on an assumption of fixed personality – is to use fixed effects specifications in analysing wellbeing, in consistence with other economic investigations into wellbeing. Fixed effects cannot reliably be incorporated to decomposition analysis.

The data source and model were then discussed, with the intention to select a measure of wellbeing that is as close as possible to being “theoretically rigorous, policy relevant and empirically robust” (Dolan, Layard et al. 2011).

The BHPS contains several possible measures of wellbeing, including a specific question from GHQ12, a question on life satisfaction and a scale created from the GHQ12 itself. All three possibilities could arguably represent wellbeing, however the summation of the GHQ12 responses to create a 36-point Likert scale is considered to be preferable to the other two options because it has the advantage of being less likely to be affected by mood, it retains a temporal context and it provides information about other aspects of an individual's wellbeing as well being possibly more likely to be ordinally comparable than any of the categorical responses.

The independent variables would include those already discussed in Section 2. Annual household equivalised income will be transformed into a natural log, age will be included in its continuous form and as age-squared, categorical data will be included to represent gender, marital status, education and employment status, with a binary variable for health. Poverty will be indicated by a dummy variable, that takes the value 1 when, for each household in each year, the equivalised income is less than 60% of the national median for that year.

Finally, some graphs were created to summarise the cross-tabulations of wellbeing with income and wellbeing with poverty, as well as plotting income and wellbeing over time. The data suggested that, where income and poverty rates exhibited large fluctuations from wave-to-wave, the changes in wellbeing were much smaller and did not seem to be related to movements in income or poverty. In a cross section however, higher wellbeing seemed to be observed where income was higher.

Similarly, a greater proportion of those in 'poor' households seemed to report lower wellbeing; the mean wellbeing for those who were not poor was almost one point higher on the wellbeing scale. With these observations as a starting point, the next section will undertake more in depth analysis.

4 Empirical Analysis

As with other sections, the analysis begins by restating the research questions for this study:

1. Does being poor affect individual wellbeing?
2. Does being poor change the form of the wellbeing function?

In Section 3 the methods for addressing these questions were discussed.

For both these questions, different analysis will be undertaken for men and women.

4.1 Analysis of the effect of poverty on wellbeing

In order to assess the importance of being in poverty to individual wellbeing, a fixed effects panel data analysis will be undertaken. This will allow the relationship between relative-income-poverty and wellbeing to be investigated whilst allowing for the influence of personality.

Looking first at the gender differences in Table 4.1 and Table 4.2, we can see that there are distinct differences between men and women in the size and significance of almost all the explanatory variables, and in some cases different directions.

The income variable (natural log of annual equivalised household income) is significant for both men and women, but only at the 5% level for the latter. The coefficients are both positive, suggesting that income may have a positive effect on wellbeing. However the coefficients on poverty indicators are in different directions (although only significant for men and at 5%); it appears that where poverty has a no significant effect on female wellbeing, it has a positive effect for men.

Explanations behind this are not easily arrived at; it could be that men are quicker to adapt to lower incomes, or that a low income provides greater motivation for men than women, or perhaps even that income has absorbed the effect of the poverty indicator, however this is all speculative.

Age, in both formats, is insignificant for women but highly significant and negative for men in its continuous form. Given the complexities regarding the age-wellbeing relationship this is not surprising. Also as a retired dummy is also included there may be some overlap with age effects. For education no education dummy is significant, possibly because it may affect wellbeing through income or employment as suggested in the literature review.

Being married is negative for both men and women; this is at odds with literature that suggests both should experience positive wellbeing from matrimony. Being divorced or widowed on the other hand, is negative for both men and women, as expected.

Another striking departure from expectations is that employment has a negative coefficient for men and women, although is only significant for the latter. Again it could be that there is some interference with income, or that women may not necessarily benefit (in wellbeing terms) from being employed if it is taking them away from family commitments.

For other explanatory variables, including dummies for unemployment, long-term sickness, and health, are significant for both genders and are in the direction expected: the former two have negative effects on wellbeing and the latter a positive one. Family care also has a significant effect on both men and women.

Table 4.1 – Fixed effects models for men and women, whole income distribution

	Women	Men
Income	0.130** (0.0465)	0.185*** (0.0430)
Age	-0.0130 (0.0172)	-0.0617*** (0.0166)
Age ²	-0.000160 (0.000161)	0.000308 (0.000166)
Married	-0.227* (0.114)	-0.382*** (0.0922)
Divorced	-0.935*** (0.184)	-1.163*** (0.185)
Widowed	-1.810*** (0.195)	-1.446*** (0.220)
Higher ed.	0.0802 (0.297)	0.116 (0.269)
Further ed.	0.0703 (0.235)	-0.178 (0.208)
Basic quals.	-0.113 (0.251)	-0.197 (0.222)
Employed	-0.371** (0.128)	-0.221 (0.125)
Unemployed	-1.821*** (0.180)	-2.063*** (0.155)
Long-term sick	-3.187*** (0.235)	-2.972*** (0.223)
Family care	-0.991*** (0.147)	-1.105*** (0.312)
Retired	-0.470** (0.157)	-0.160 (0.160)
Good health	0.981*** (0.0510)	0.694*** (0.0471)
Poverty	-0.108 (0.0628)	0.169** (0.0638)
Constant	25.06*** (0.507)	27.02*** (0.458)
<i>N</i>	100492	88586
<i>R</i> ²	0.020	0.024

Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

Moving on to the reduced sample, where we look at the wellbeing-poverty relationship close to the poverty line (within 10 percentage points either way), we can see that the poverty

indicator is still positive for men but is only significant at 10% instead of 5%. This is to be expected, as it is likely that extreme levels of poverty (which we assume would be associated with much lower wellbeing) would have a strong influence on the relationship, so where incomes are around the poverty line there may not be distinct differences to individuals living above and below it.

Similarly, income is no longer significant for women but retains 5% significance with a positive effect for men. When including both income and a poverty indicator in the specification it is possible that there will be some overlapping effects so it is perhaps not surprising that at least one of the variables is not as significant as literature might have led us to expect.

To test this, both sets of regressions were re-estimated excluding income but retaining poverty; there were no differences in the directions or significances of the coefficients, and the few changes in the size of coefficients were negligible.

The analysis for other dummies remains largely the same for the reduced income distribution.

On the whole, comparing Table 4.1 with Table 4.2 suggests that the effect of poverty on wellbeing comes mainly from extremes of income (both extreme poverty and higher than average income). Poverty itself is only (partially) significant for men in the whole income sample, and even then has opposite effect to what we would expect; no immediately obvious explanation for this is arrived at and excluding income from the model does not change the result.

Table 4.2 – Fixed effects models for men and women, income distribution limited to 50%-70% of the median

	Women		Men	
Income	0.258	(0.199)	0.543**	(0.187)
Age	-0.0599	(0.0482)	-0.0453	(0.0536)
Age ²	0.0000693	(0.000396)	-0.000504	(0.000464)
Married	-0.00257	(0.476)	-0.726*	(0.360)
Divorced	-1.176	(0.632)	-1.371*	(0.566)
Widowed	-1.804**	(0.610)	-1.097	(0.618)
Higher ed.	0.261	(1.157)	1.985	(1.030)
Further ed.	0.822	(0.649)	-0.356	(0.645)
Basic quals.	0.870	(0.694)	-0.416	(0.718)
Employed	0.0328	(0.412)	-0.313	(0.446)
Unemployed	-1.638***	(0.492)	-2.339***	(0.477)
Long-term sick	-2.569***	(0.586)	-2.996***	(0.579)
Family care	-0.981*	(0.425)	-1.389*	(0.682)
Retired	-0.361	(0.464)	-0.563	(0.547)
Good health	0.942***	(0.153)	0.740***	(0.143)
Poverty	-0.103	(0.100)	0.203*	(0.100)
Constant	25.30***	(1.637)	26.82***	(1.640)
N	16377		11884	
R ²	0.023		0.040	

Standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

4.2 Analysis of the wellbeing differences between poor and non-poor individuals

The fixed effects analysis above suggests that poverty either alone or in conjunction with income does not have a very significant relationship with wellbeing. That could be because, as well as gender differences, there are 'poverty status' differences in the wellbeing function. To test this, a decomposition analysis will be performed; this will indicate whether there are different characteristics or coefficients (or both) between the two groups.

As stated previously, the decomposition used here is based on Neumark (Neumark 1988), and takes the form:

$$W_{\text{poor},i,j} - W_{\text{non-poor},i,j} = (X_{\text{poor},i,j} - X_{\text{non-poor},i,j})\beta^* + X_{\text{poor},i,j} (\beta_{\text{poor},i,j} - \beta^*) + X_{\text{non-poor},i,j} (\beta^* - \beta_{\text{non-poor},i,j})$$

$$\beta^* = \Omega_{i,j} \beta_{\text{poor},i,j} + (I - \Omega_{i,j}) \beta_{\text{non-poor},i,j}$$

where X is a vector of explanatory variables (in this case, the categorical dummies in combination with age and income), i represents the individual, j represents wave, Ω is a matrix of coefficients from the pooled model of both poor and non-poor individuals and I is an identity matrix.

In all the four tables below, there are three subheadings, for $\Omega=1$ (the wellbeing function is that of the poor), $\Omega=0$ (the wellbeing function is that of the non-poor) and $\Omega=\text{pooled}$ (the wellbeing function comes from the whole population). The subheadings each explain the right hand side depending on the value of Ω . As mentioned previously, and explained fully in Section 7, in the absence of any justification for choosing $\Omega=1$ or $\Omega=0$, we set Ω equal to a matrix of pooled coefficients from a model containing all poor and non-poor respondents.

In the bottom row of each table there is a raw difference; this is the left hand side of the equation above. Beginning with the income distribution as a whole, in the female decomposition (Table 4.3) it is evident that the raw difference between the poor and non-poor wellbeing scores is -0.8969; that is, the wellbeing of the poor is 0.8969 points lower (on the 0-36 scale) than the wellbeing of the non-poor.

Within the weighted model (where the poor and non-poor wellbeing functions are identical) the characteristics account for a difference of -0.7866 between poor and non-poor wellbeing. This is in the direction to that expected and it is a significant result. It is also explained predominantly by characteristics; 88% of the difference is down to the raw data rather than the coefficients (the differences between which are only to be interpreted with extreme caution – see Section 7.2).

Comparing the same analysis for men, the raw difference is slightly smaller at -0.7466, suggesting that men who are poor are 0.7466 wellbeing points further down the scale than those who are not poor. As with the result for women, this is significant.

Here the difference in the characteristics (-0.8315) is of greater magnitude than the raw difference between the wellbeing scores: the coefficients are offsetting the effect of the characteristics. This can arise when one group has a relative advantage in one or more of the observable factors, for example if people who are poor are more likely to extract greater wellbeing benefits from higher education than those who are not poor, however this is purely speculation.

These tables suggest that the wellbeing functions for poor individuals are not the same as those for non-poor individuals, with the differences mainly comprising of different characteristics (data).

Although it is unwise to interpret the effect of the poor and non-poor coefficients, (the part of the difference due to the non-poor's happiness bonus and that due to the poor's happiness penalty respectively) one could say that, as they are both non-zero numbers, there is more than just characteristic factors determining the wellbeing of poor and non-poor individuals.

Table 4.3 – Female decomposition results, whole income distribution

	Coefficient	Standard Error	z	P> z	95% Confidence Interval	
Ω = 1						
Characteristics	-0.6273	0.0818	-7.6700	0.0000	-0.7877	-0.4670
Coefficients	-0.2696	0.0819	-3.2900	0.0010	-0.4302	-0.1090
Ω = 0						
Characteristics	-0.7961	0.0453	-17.5800	0.0000	-0.8848	-0.7073
Coefficients	-0.1009	0.0576	-1.7500	0.0800	-0.2138	0.0121
Ω = pooled (Neumark)						
Characteristics	-0.7866	0.0351	-22.4100	0.0000	-0.8554	-0.7178
Poor coef	-0.0896	0.0266	-3.3800	0.0010	-0.1417	-0.0376
Non-poor coef	-0.0206	0.0062	-3.3500	0.0010	-0.0327	-0.0086
Raw	-0.8969	0.0474	-18.9300	0.0000	-0.9898	-0.8040

Table 4.4 – Male decomposition results, whole income distribution

	Coefficient	Standard Error	z	P> z	95% Confidence Interval	
Ω = 1						
Characteristics	-0.5432	0.0921	-5.9000	0.0000	-0.7237	-0.3627
Coefficients	-0.2034	0.0876	-2.3200	0.0200	-0.3751	-0.0317
Ω = 0						
Characteristics	-0.9575	0.0415	-23.0600	0.0000	-1.0389	-0.8761
Coefficients	0.2109	0.0595	3.5400	0.0000	0.0942	0.3275
Ω = pooled (Neumark)						
Characteristics	-0.8315	0.0333	-24.9800	0.0000	-0.8968	-0.7663
Poor coef	0.0729	0.0294	2.4800	0.0130	0.0153	0.1306
Non-poor coef	0.0120	0.0048	2.4800	0.0130	0.0025	0.0215
Raw	-0.7466	0.0479	-15.6000	0.0000	-0.8404	-0.6528

Turning to the smaller income distribution we can see that there are some differences in the raw differential. For both men and women, the raw difference between poor and non-poor

wellbeing is significantly smaller, and for men, has changed direction. However, none of the results are significant (except for some of the alternate values of Ω). This suggests that, within 10 percentage points of the poverty line, there is no difference between the wellbeing functions of poor individuals and non-poor individuals.

Table 4.5 – Female decomposition results, income distribution limited to 50%-70% of the median

	Coefficient	Standard Error	z	P> z	95% Confidence Interval	
$\Omega = 1$						
Characteristics	-0.0256	0.0503	-0.5100	0.6100	-0.1241	0.0728
Coefficients	-0.0719	0.1023	-0.7000	0.4820	-0.2724	0.1287
$\Omega = 0$						
Characteristics	-0.1252	0.0475	-2.6400	0.0080	-0.2183	-0.0322
Coefficients	0.0277	0.0997	0.2800	0.7810	-0.1677	0.2231
$\Omega =$ pooled (Neumark)						
Characteristics	-0.0776	0.0410	-1.8900	0.0580	-0.1580	0.0027
Poor coef	-0.0108	0.0489	-0.2200	0.8250	-0.1066	0.0850
Non-poor coef	-0.0091	0.0409	-0.2200	0.8250	-0.0893	0.0712
Raw	-0.0975	0.0953	-1.0200	0.3060	-0.2843	0.0893

Table 4.6 – Male decomposition results, income distribution limited to 50%-70% of the median

	Coefficient	Standard Error	z	P> z	95% Confidence Interval	
$\Omega = 1$						
Characteristics	-0.1597	0.0496	-3.2200	0.0010	-0.2569	-0.0625
Coefficients	0.1843	0.0946	1.9500	0.0510	-0.0010	0.3697
$\Omega = 0$						
Characteristics	-0.1799	0.0483	-3.7300	0.0000	-0.2746	-0.0852
Coefficients	0.2045	0.0857	2.3900	0.0170	0.0366	0.3725
$\Omega =$ pooled (Neumark)						
Characteristics	-0.1624	0.0406	-4.0000	0.0000	-0.2419	-0.0828
Poor coef	0.1046	0.0452	2.3100	0.0210	0.0160	0.1932
Non-poor coef	0.0824	0.0356	2.3100	0.0210	0.0125	0.1522
Raw	0.0246	0.0897	0.2700	0.7840	-0.1512	0.2005

4.3 Summary

In this section, the theory of previous chapters was built on, putting the methodology for this study into action.

The analysis began by considering fixed effects models for men and women, firstly including the whole income distribution and secondly with a reduced income distribution – between 50% and 70% of the annual median equivalised household income for any given year – to focus more intensively on the poverty line.

In the first specification, the income variable (natural log of annual equivalised household income) is significant and positive for both men (1% significance) and women (5% significance), suggesting that income may have a positive effect on wellbeing.

The coefficients on poverty indicators were in different directions (although only significant for men and only at 5%); it appears that although poverty has a no obvious effect on female wellbeing, it has a positive effect for men. Given the theory discussed in this paper – that generally lower income results in lower wellbeing – this observation is unexpected and difficult to account for. It could be that men adapt quicker and more fully to lower incomes, or that a low income provides greater motivation for men than women (i.e. their income aspirations provide greater positive wellbeing effects), or perhaps even that raising income would involve raising hours worked (thus decreasing leisure time and thus, assumedly, wellbeing), however again this is speculation. Statistically, it is possible that including income in the regressions has absorbed some of the effect of the poverty indicator; we will return to this point.

In the second specification, analysing the reduced income distribution sample, the poverty indicator is still positive for men but is only significant at 10% instead of 5%. This is to be expected, as it is likely that extreme levels of poverty (which we assume would be associated with much lower wellbeing) would have distorted the relationship, so where incomes are around the poverty line there may not be distinct differences to individuals living above and below it.

Within the latter specification, income is no longer significant for women but retains 5% significance with a positive effect for men. Returning to the speculation that the income variable has absorbed the effect of the poverty indicator, all sets of regressions were re-estimated excluding income but retaining poverty; there were no differences in the directions or significances of the coefficients, and the few changes in the sizes of coefficients were negligible.

To address the second question in this paper – whether the wellbeing function is the same for both poor and non-poor people – decomposition analyses suggested that, with high significance for both genders, poor individuals had lower wellbeing, with deficits of 0.8315 points on the wellbeing scale (of 0 to 36) for the men and 0.8969 points for the women.

Repeating these analyses on the reduced income distribution indicated that there were no differences between the poor and non poor when income falls between 50% and 70% of the median.

5 Conclusions

Poverty is one of the most persistent economic ills blighting the whole world. Yet despite centuries of attention, it has not been banished. When Benjamin Seebohm Rowntree and Charles Booth were investigating, and despairing of, poverty in the late Victorian era, cholera, TB, smallpox and polio were common, particularly amongst those in poverty. We have now medicine to deal with all these diseases, but no remedy for poverty, which is still linked to ill health and increased mortality, poor education and high joblessness and general social exclusion even in developed countries like the UK, where there has been a generally upward trend in income since the industrial revolution.

One of the greatest controversies in economics is whether more income gives people greater wellbeing. Since Easterlin published his 'paradox' in 1973 interest in happiness economics has increased significantly, particularly within the last decade, yet we still don't fully understand it and there are still divisions between the social sciences in how wellbeing should be treated.

As stated in the introduction, there is a school of thought calling for a "revolution" in social science where every academic should be attempting to understand what makes people happy, and furthermore happiness should be the explicit aim of government intervention. Indeed there is evidence that governments are engaging with wellbeing research, with the UK and France setting out to specifically measure wellbeing.

One of the main issues with this is that not everyone has the same concept of wellbeing in mind. Definitions in the wellbeing spectrum range from quality of life, life satisfaction, satisfaction with components of life, evaluative judgements about wellbeing, affective states (happiness), biomarkers (cortisol levels or blood pressure) and so on. A convincing case could be made for any of these concepts being a measure of wellbeing, and indeed they are occasionally used interchangeably without much care given to relating the concept to varying interpretations or even to individuals.

Different concepts of wellbeing will be suited to different analyses, and if we hope to understand what increases wellbeing, it is important to understand firstly, that happiness is individual, and secondly, that it has many levels, which apply to different spheres of an individual's life at different times. In this analysis, examining the impact of a particular form of poverty, an evaluative and relative judgement rather than moment-based emotional concept of wellbeing was needed: the 36-point Likert scale using GHQ data in the BHPS provided that measure.

As well as discussing a concept of wellbeing, the definition of poverty was also considered. Like wellbeing, poverty has a number of possible meanings; most people would arguably assume poverty to be “a bad thing” yet there seems to be little reflection in poverty policy regarding what it actually means to be poor. Most ‘official’ poverty measures used by governments and international organisations are either absolute or relative poverty lines. These lines have the benefit of being policy-accessible (i.e. they are easily measured and updated) however the positioning of the lines appears to be entirely arbitrary.

One of the main criticisms of absolute poverty approaches is that they involve the setting of an arbitrary standard, for example a sum of money any individual should have to ensure their basic needs are met, but what if the preferences of the individual differ from those assumed in the poverty line? The line may be totally irrelevant to those actually living in poverty. Relative poverty lines – were the income distribution of a population – attempt to avoid this by being socially relevant, taking into account all incomes when setting the line.

The official UK (and EU, and OECD) poverty line is set at 60% of the median household equivalised disposable income, but there is no justification why this particular threshold was chosen. Even if this 60% threshold is socially relevant, is it individually relevant? Specifically, does living below the poverty line decrease ones wellbeing? This one of the questions this paper set out to investigate.

Reviewing the literature on income and wellbeing provided a few clues to how poverty may relate to individual wellbeing. Relative income has long been accepted as the more relevant measure of income with regard to happiness. Studies suggest that relative settlements are more important than the absolute, but that there may not be a constant effect of any form of income across the income distribution: income may well matter more to poor people than those who are wealthier. If the poor and non-poor are two distinct groups, then very different policy treatment would be required, and decomposition analysis aimed to test the theory, providing this paper its second aim.

Using controls for the usually-included variables in wellbeing models – annual household equivalised income (in a natural logarithmic form to account for non-linearity in the income-wellbeing relationship), age (both in continuous and squared forms, to represent a potential U-shaped relationship), employment status, marital status and education – separate regressions were computed for men and women, given the evidence that each gender has a differently-shaped wellbeing distribution. Two samples of the BHPS data were used, one including all members of each household that were over 16 and completed compulsory education, and one where just households with annual incomes between 50% and 70% of

the median equivalised income. This was in order to see whether poverty extremes (and indeed wealth extremes) would affect the regression results.

Using fixed effects specifications, to account for unobserved personality effects thought to affect wellbeing directly and indirectly (by affecting responses to other factor), a poverty dummy was tested in a wellbeing function, but was only found to be significant for men. Strangely, the coefficient was in the opposite direction to that expected given the literature: it was positive.

Explanations for this are not easily arrived at. Thinking at first about the ways in which aspirations, adaptation and comparison affect responses to income, we could guess that men adapt quicker and more fully to lower incomes, or that a low income provides greater motivation for men than women. Perhaps men only *favourably* compare their incomes (i.e. they only compare to people they know to be poorer), so poverty doesn't matter, or that raising income would involve raising hours worked so they accept a lower income, however again this is speculation.

One of the other reasons for the positive coefficient on poverty was that the inclusion of income in the regressions has absorbed some of the effect of the poverty indicator; to test this the regressions were repeated without income, but retaining the poverty dummy, but there were negligible changes. This issue is obviously something that could provide further research directions.

Repeating the regressions for a reduced sample with household incomes between 50% and 70% of the median equivalised household income did not substantially change the outcome: poverty was still insignificant for women, but less significant for men. This suggests that the possibility that extremes of income are behind the significance of the poverty dummy may be valid.

We can see that from and Figure 3.3 the lowest wellbeing scores (below 10) are associated with poverty rates of over 30%. Table 3.4 tells us that the median income of the 'poor' group is just £9,548 per year, compared to £23,290 for the non-poor. This is a large difference that arguably has an impact on the wellbeing scores of those individuals. By removing those below 50% of the median income, many of the individuals in the poor group will drop out, taking their arguably lower wellbeing score out too.

With regard to the paper's first aim therefore, to test whether the relative income poverty line was significant for individual wellbeing, we cannot generate many insights, other than reducing the sample to focus intensively on the poverty line reduces the significance of the

poverty dummy, and that more research regarding the effects of poverty on different genders may be worthwhile.

Regarding the second aim, to test whether the poor and non poor were fundamentally different groups with different wellbeing functions, there was slightly greater success, although limited again by the reduction of the sample.

Firstly using the whole income distribution, decomposition analyses suggested that for both genders, poor individuals had lower wellbeing, with deficits of 0.8315 points on the wellbeing scale for the men and 0.8969 points for the women. Both of these deficits were explained predominantly by differences in the characteristics of the individuals; what this means is that independent variables have different means and variances for the poor and non poor. With regard to income the explanation is obvious: if an individual is poor, of course they have lower average income than an identical-in-every-other-way individual who is not poor, but they also have differences in education, health, employment status and marital status. That the effects of poverty are this wide ranging – yet poverty remains essentially unchecked in society – should be of great concern.

Although it is unwise to interpret the coefficient differences of the decomposition, in the first decomposition for both men and women the coefficients were all non-zero and were also significant. Without engaging in any speculation, this suggests that there is more to the story than just means and variances of explanatory variables.

Reducing the sample to the 50% to 70% renders all the differences, between the coefficients and the characteristics, insignificant for both men and women. This concurs with the result from the fixed effects regression that suggested the significance of the poverty variable was driven by extreme low incomes which may be associated with extreme low wellbeing scores.

The empirical analysis from this paper tells us a few things: inexplicably at this stage, that male wellbeing appears to respond positively to poverty when we consider individuals across the whole income distribution, and that within that distribution the poor and non-poor do have different wellbeing functions. However, when we focus the sample more narrowly around the poverty line, there are no significant results.

Papers are always limited by their methodology, and this one is no exception. Although we were able to control for fixed effects in the OLS model, one could argue that by not including fixed effects in the decomposition, those analyses may be biased. The main issue is that there is no widely accepted way to incorporate fixed effects in decomposition, primarily because the fixed effects may well end up in the unexplained part of the output, with no easy

way to tell them from the differences between the groups being tested. That said, as we only interpret the explained part of decomposition – the characteristics – omitted variables may not have biased the analysis enough to disregard the results.

One of the main motivations for this paper was to examine the significance of the 60% median income threshold in determining wellbeing. Although we can make only limited conclusions, the analysis appears to suggest that this arbitrary poverty line is not relevant for individuals. This would be easy to imagine: individuals may not care whether they are above or below a possibly uninformed standard that they may or may not be aware of, rather they may be more affected by what their neighbours' quality of life and income is, and their own historical incomes as well as expectations of future incomes.

The relationship between poverty and ill health, mortality, low education, joblessness and so on may well be subject to positive feedback meaning that increasing the incomes of adults may not make any difference in their personal poverty cycle as the initial conditions have already determined the most likely path for their lives. This is perhaps why child poverty is targeted specifically in the UK; investing in breaking the poverty cycle at an early stage may allow children to avoid the ill effects of poverty.

The poverty line creates a dichotomy where individuals are either poor or not poor. This is misrepresentative of the nature of poverty. Poverty should be a continuous concept, from extreme to mild, with different analysis and treatments given to each group. Obviously it has uses as a policy tool, as it focuses on the worst-off parts of the population, but, as Halleröd asserts, if we had a individually-meaningful measure of poverty in the first place we would not need a poverty line (Halleröd 2000).

Given the suggestion here that an arbitrary poverty line is not relevant at an individual level, the growing enthusiasm behind wellbeing research, policy and intervention, and the strength of evidence that wellbeing is about more than just income, we cannot hope to address poverty by focusing on arbitrary income-based standards. An obvious extension to this paper is therefore to investigate the significance of multi-dimensional poverty measures.

Making poverty measures individually meaningful is arguably the best way to identify when individuals are suffering. Non-monetary and multi-dimensional measures of poverty – discussed briefly in Section 2.2.3 – are believed by many to be the way forward. The capability approach championed by Sen, amongst others, attempts to build concepts of poverty that grasp its multidimensional nature, and although it is well received in development economics it is yet to be fully accepted for use in industrialised countries.

Widely credited with inspiring the Human Development Index (Anand, Krishnakumar et al. 2011), the capability approach has at its centre the individual, focusing on the 'beings' and 'doings' that individuals value.

These multi-dimensional approaches retain the socially relevant aspect that is important at a population level, but identify components of life within that population that make up 'a good life' and ensure that access to these components is not limited to those with higher wealth.

6 Appendix A – References

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7 Appendix B – Decomposition Theory

Decomposition techniques, based on the premise that there are two distinct groups in a population that have different characteristics, are commonly attributed to Blinder (Blinder 1973) and Oaxaca(Oaxaca 1973). For example Oaxaca tested whether white and non-white individuals received different wages simply on the basis of their skin colour(Oaxaca 1973).

Here we want to test whether the income-wellbeing relationship differs according to whether an individual is above or below the poverty line. In this section the origins and basic theory of decomposition will be covered, along with some potential pitfalls that will be mitigated against in the analysis. Finally a decomposition specification is developed for use in this paper.

7.1 Basic technique

Decomposition is used to analyse the differences between the groups in terms of their endowments and the coefficients on those endowments.

For example, if we assume that Y and X are two related variables, but that the relationship may differ between poor and non-poor individuals:

$$Y = \beta_0 + X\beta_1 + \varepsilon \quad (1)$$

Then we can say:

$$Y = \beta_{0\text{poor}} + X_{\text{poor}}\beta_{1\text{poor}} + \varepsilon_1 \quad (2)$$

if the individual is 'poor'; and:

$$Y = \beta_{0\text{non-poor}} + X_{\text{non-poor}}\beta_{2\text{non-poor}} + \varepsilon_2 \quad (3)$$

if the individual is non-poor, and the difference (assuming error terms are zero) is:

$$Y_{\text{np}} - Y_{\text{p}} = (\beta_{0\text{p}} - \beta_{0\text{np}}) + (\beta_{\text{np}}X_{\text{np}} - \beta_{\text{p}}X_{\text{p}}) \quad (4)$$

If we have two components, for example X_1 and X_2 , the equation becomes:

$$Y_{\text{np}} - Y_{\text{p}} = (\beta_{0\text{np}} - \beta_{0\text{p}}) + (\beta_{1\text{np}}X_{1\text{np}} - \beta_{1\text{p}}X_{1\text{p}}) + (\beta_{2\text{np}}X_{2\text{np}} - \beta_{2\text{p}}X_{2\text{p}}) \quad (5)$$

and so on. So the overall difference is comprised of the gap between intercepts, the gap between $x_1\beta_1$ and the gap between $X_2\beta_2$.

The next step is to look at the differences between the X s (the endowments, the explained component) and the β s (the coefficients, the unexplained component).

It is possible to reduce equation 5 further, into two permissible formats:

$$Y_{np} - Y_p = \Delta X \beta_p + \Delta \beta X_{np} \quad (6)$$

or

$$Y_{np} - Y_p = \Delta X \beta_{np} + \Delta \beta X_p \quad (7)$$

Where:

$$\Delta X = X_{np} - X_p \quad (7a)$$

and

$$\Delta \beta = \beta_{np} - \beta_p. \quad (7b)$$

Either solution provides us with a way of partitioning the gap in outcomes between the poor and non-poor into a part attributable to the fact that the poor have worse endowments than the non-poor, and a part attributable to the fact that they have (assumedly) worse coefficients than the non-poor.

In the first version, equation 6, differences in the endowments (ΔX) are weighted by the coefficients of the poor group (β_p) and the differences in the coefficients ($\Delta \beta$) are weighted by the endowments of the non-poor group (X_{np}).

In the second version, equation 7, the opposite is true: the differences in the endowments (ΔX) are weighted by the coefficients of the non-poor (β_{np}) and the differences in the coefficients ($\Delta \beta$) are weighted by the endowments of the poor group.

7.2 Complications

7.2.1 Overestimation

Jann (Jann 2008) points out that Oaxaca's method can lead to overestimation of the importance of the explained component in decomposition (some group differences can spill over into the slope parameters in a pooled model – which has both groups together as a reference group with combined coefficients), and suggests using a variation which includes a group indicator in the model. Jann also notes however that this issue has received little

attention in the literature so it cannot be said to have been of paramount concern in other studies (Jann 2008).

7.2.2 Measurement error and the unexplained component of decomposition

In 1983, Jones suggested that researchers may wish to avoid using the unexplained component of decomposition, stating that it ...”is in most applications arbitrary and uninterpretable...” if the results “...depend on arbitrary decisions about how to impose a metric on the variables...” (Jones 1983). In other words, any kind of measurement error can lead to the unexplained component being erroneously calculated. With no mitigation currently available for this factor, the unexplained component of decomposition is ignored in most cases, as suggested by Jones and, amongst others, Cain (Cain 1986) and Fairlie (Fairlie 2005).

7.2.3 Model specification

A number of options exist that may allow the use of categorical, discrete or binary data in decomposition. Fairlie developed a method that allowed the use of categorical data in the analysis of racial discrepancies in self-employment rates (Fairlie 1999). This method, further developed by Fairlie (Fairlie 2005), allows the use of logit or probit models as the basis of the decomposition, rather than OLS, however he found that the non-linear decomposition technique he employed did not present significantly different results in all applications.

Sinning et al (Sinning, Hahn et al. 2008) developed a method of applying a Blinder-Oaxaca decomposition technique which (amongst other flexibilities) allows bootstrapping standard errors. This method uses generalised linear decomposition developed by Oaxaca and Blinder (Blinder 1973, Oaxaca 1973) in the following form:

$$Y_a - Y_b = (X_a - X_b)\beta^* + X_a(\beta_a - \beta^*) + X_b(\beta^* - \beta_b) \quad (8)$$

Where:

$$\beta^* = \Omega\beta_a + (I - \Omega)\beta_b \quad (8a)$$

Here, the two groups are denoted ‘a’ and ‘b’, Ω is a weighting matrix and I an identity matrix. Different values of Ω will therefore change the importance placed on β_a and β_b respectively, thus altering the way we interpret the decomposition. The original Blinder and Oaxaca models set Ω equal to I and a null matrix respectively. Using Blinder’s example, the decomposition would be:

$$Y_a - Y_b = (X_a - X_b)\beta_a + X_b(\beta_a - \beta_b) \quad (9)$$

So, the difference in the endowments is weighted by the coefficient(s) of group 'a' and the difference in the coefficients is weighted by the endowment(s) of group 'b'.

Using Oaxaca's specification:

$$Y_a - Y_b = (X_a - X_b)\beta_b + X_a(\beta_a - \beta_b) \quad (10)$$

the opposite is true; the difference in the endowments is weighted by the coefficient(s) of group 'b' and the difference in the coefficients is weighted by the endowment(s) of group 'a'. Which value of Ω we choose depends on which group you treat as the reference group, however there is no clear consensus in the literature as to how this should be done.

Jann (Jann 2008) suggests that decomposition can be done threefold – where results are calculated using each of the groups and a combined model as reference groups – or as a pooled model which just uses the combination of the two groups as a reference group (so assumes that there are no differences between the two groups) but does not fully explain in which context each specification would be applicable. As each version would provide different estimates, Fairlie (Fairlie 2005) suggests that just using the pooled model may relieve the researcher of the need to choose between specifications, but even that has potential pitfalls (see Section 7.2.1).

7.3 Direction of 'discrimination'

Neumark (Neumark 1988) applied Oaxaca's method (Oaxaca 1973) to wage differentials between men and women, with the following analysis: If we use a specification where the difference in endowments is weighted by the coefficient(s) of group 'a' (in his study, this was men), we assume that if there were no discrimination the male wage rate would be applied to both men and women (so in the data women are discriminated against). If the coefficients of group 'b' (women) were used we would be assuming that the female wage rate would prevail, therefore in Oaxaca's model men receive a wage 'bonus' just for being men.

For the decomposition analysis, it could be beneficial to analyse whether poor people should be less happy because they are poor (they face happiness 'discrimination') or that non-poor people are happier because they are not poor (the higher income brings them 'bonus' happiness), however as discussed in the main section of this paper, wellbeing arguably has time-invariant components that individuals cannot consciously change, so determining whether there is 'happiness discrimination' against the poor, or 'happiness nepotism' for the non-poor or anywhere in between would be a paper unto itself.

Neumark (Neumark 1988) took the middle ground and said that for his data, employers were both discriminatory towards women and nepotistic towards men. Given that Oaxaca and Ransom also use a pooled model(Oaxaca, Ransom 1994), and Fairlie (Fairlie 2005) suggests its use to avoid mis-specifying ones model, a pooled model is on balance the most appropriate choice³⁴.

7.4 Poor/ non-poor decomposition

The decomposition method employed here will analyse whether an individual living in a 'poor' household has lower subjective wellbeing than a similar individual living in a 'counterfactual' household – where we assume there are no differences between the poor and non-poor. A decomposition process for linear and non-linear models, developed by Sinning et al (Sinning, Hahn et al. 2008), will be used with an ordered logit base to make the results at least partially consistent with the fixed effects regression.

The form of the model – where W is wellbeing, X is a vector of explanatory variables, i represents the individual and j the wave – will be:

$$W_{\text{poor},i,j} - W_{\text{non-poor},i,j} = (X_{\text{poor},i,j} - X_{\text{non-poor},i,j})\beta^* + X_{\text{poor},i,j} (\beta_{\text{poor},i,j} - \beta^*) + X_{\text{non-poor},i,j} (\beta^* - \beta_{\text{non-poor},i,j}) \quad (11)$$

$$\beta^* = \Omega_{i,j} \beta_{\text{poor},i,j} + (I - \Omega_{i,j}) \beta_{\text{non-poor},i,j} \quad (11a)$$

Furthermore this analysis will follow Neumark's example, setting Ω equal to the coefficients of the pooled model (both groups estimated together) and I an identity matrix(Neumark 1988).

³⁴ The Stata routine nldecompose, created by Sinning et al (Sinning, Hahn et al. 2008), allows the estimation of pooled models in addition to the default values $\Omega=0$ and $\Omega=1$; all will be presented in the analysis.

8 Appendix C – Additional Tables

Table 8.1 – Income and Poverty Thresholds

Wave	Median HH Income	Poverty threshold	Total number of respondents	% of respondents 'poor'	Net change in poverty rate (adjusted for population change)
1	17,686.98	10,612.19	8,911	18%	0
2	18,642.34	11,185.40	8,453	19%	5%
3	19,459.85	11,675.91	8,077	20%	6%
4	19,363.47	11,618.08	8,082	19%	-6%
5	19,585.29	11,751.17	7,823	19%	1%
6	20,329.59	12,197.75	8,154	19%	-2%
7	19,864.41	11,918.65	9,767	19%	-1%
8	20,353.17	12,211.90	9,515	19%	3%
9	19,695.31	11,817.19	13,383	18%	-13%
10	20,847.71	12,508.63	13,347	17%	-3%
11	20,061.46	12,036.88	15,638	17%	-4%
12	21,590.94	12,954.56	13,488	17%	2%
13	21,752.70	13,051.62	13,335	16%	-5%
14	22,231.49	13,338.89	12,765	15%	-6%
15	22,486.30	13,491.78	12,712	16%	3%
16	22,525.32	13,515.19	12,438	15%	-3%
17	22,383.35	13,430.01	12,037	15%	0%
18	22,165.10	13,299.06	11,537	14%	-6%