

Essays on Poverty and Wellbeing

*A thesis submitted to the University of Stirling for the degree of Doctor of Philosophy in
Economics*

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DECLARATION

In accordance with the Regulations for Higher Degrees by Research, I hereby declare that the whole thesis now submitted for the candidature of Doctor of Philosophy is a result of my own research and independent work except where reference is made to published literature. I also hereby certify that the work embodied in this thesis has not already been submitted in any substance for any degree and is not currently submitted in candidature for any degree from any other institute of higher learning. I am responsible for any errors and omissions present in the thesis.

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ABSTRACT

Although economic growth has brought significant improvements in the standard of living in the UK over recent decades, there are still individuals living in poverty. Furthermore poverty in the UK is expected to rise. Although monetary poverty has wide ranging impacts such as poor health, low educational attainment and employability and reduced life expectancy, it does not (in the form of a poverty line at 60% of the median equivalised household income) appear to have an impact on wellbeing when the threshold was tested. Instead, multidimensional poverty – that purported by the Capabilities Approach – is a more individually relevant measure of poverty. Using a list, developed by Nussbaum, of core capabilities seen as essential for human life, capability measures were taken from the British Household Panel Survey. In analysis, some are found to be significant determinants of wellbeing, individually and in sum. Furthermore, individuals within the dataset experience loss aversion to capabilities. This thesis concludes that poverty measurement should be meaningful at the individual level, and to that aim, the Capabilities Approach provides a richer and more relevant evaluation of what poverty really means.

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Chapter 1: Introduction

"What reason have you to be merry? You're poor enough!" (Ebenezer to his nephew, 'A Christmas Carol', Charles Dickens, Stave 1)

"The great end of all human industry is the attainment of happiness. For this were arts invented, sciences cultivated, laws ordained, and societies modelled, by the most profound wisdom of patriots and legislators." (The Stoic, in Hume 1742, paragraph 5)

"What have wealth or grandeur to do with happiness?" (Marianne to Elinor, 'Sense and Sensibility', Jane Austen, Chapter 17)

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 that happiness should be the explicit aim of government intervention. His statement agrees with that of Hume made almost 270 years before:

"The great end of all human industry is the attainment of happiness" (Hume 1742, paragraph 5).

In addition, Kahneman and Sugden (2005) believe happiness should have a prominent role in politics – it should be a policy goal. Indeed Bentham claimed that society was only as good as its citizens were happy (1907). Layard (2011) believes that human beings have an innate desire to be happy and this makes a happy society therefore a good society. But we need to make a good society our goal; if we are to promote the greatest happiness, we need to know what affects it.

One of the greatest 'controversies' regarding wellbeing in economics is that presented by Easterlin (1974), who found that despite decades of economic growth, US citizens were no happier. More recently Easterlin et al (2012) observed that despite a four-fold increase in real GDP in China (from a low baseline), life satisfaction had not improved. Blanchflower and Oswald (2004) observed roughly similar phenomena in the UK and the US. In a world where the fruits of economic growth – at least in the developed world – do not automatically

lead to greater happiness at the individual level, we have to wonder if there is something missing.

Furthermore despite centuries of attention, persistent low income – poverty – remains a social ill. Although it does not necessarily follow that increasing income results in increasing wellbeing, it is evident that in both developed and undeveloped countries, extreme poverty has a significant negative effect on wellbeing (Blanchflower, Oswald 2004).

This thesis began as an exploration of the nature and causes of poverty in the UK, and how it affected wellbeing. However despite extensive research, I could not find any theoretical justification for the current EU and UK measure – household income less than 60% of the median equivalised income at a national level – other than it has its origins in a data collection looking at the characteristics of households below average income, where households below 50%, 60% and 70% of national average income.

This led to several important questions that inspired the papers that follow: what does the poverty line mean for individuals? If we cannot assume that having lower income (at least, when we are talking about those in the 59th percentile compared to those in the 61st) means individuals have lower wellbeing, why do we have that measure at all? Is there a better measure of what it means to be poor?

On Poverty

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 frequently measured as the percentage of households living below 60% of the median income. Brewer et al expect that absolute poverty will increase by approximately 600,000 children and 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).

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.

Modern poverty targets appear to have been developed by the European Community in the Copenhagen Agreement at the World Summit for Social Development in 1995 (United Nations 1995). 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) (Veit-Wilson 2000): in 1999 the Blair administration pledged to eradicate child poverty by 2020, and this target was made legally binding in 2010 in the Child Poverty Act. There is no chance that this 2020 target will be met (Belfield, Cribb et al. 2014) and no clear way forward for poverty alleviation: the fixed-percentage measures are highly sensitive to fiscal redistribution, so there may be a case for other measures of poverty to be employed.

Within developed countries, low income remains associated with lower wellbeing, as does poverty: but the association is not as direct as one might think. Money – at least in the main part – has no intrinsic value unless it can be exchanged for goods and services. Goods and services have no price unless they are demanded. There is no demand for something that is not needed or desired.

From the above, we can see that low income – and/ or poverty – would obviously affect wellbeing where wellbeing depends on things that can be bought. Problems may arise when the things that are needed or desired cannot be bought because of restrictions other than money: the ability to achieve ends – functionings – depends on capabilities and poverty within this context is seen as capability deprivation (Sen 1979). The capabilities approach

has as its ends 'a good life'. Alkire argues that multidimensional poverty approaches, like the capabilities approach, focus on an aspect of life neglected by financial poverty treatment:

“To increase income we need to invest in education so that people can have more productive working lives and we need to invest in health so that they’re not absent from their jobs so much. So there are multiple investments that we have to make to increase income – and many of these are valuable for their own sake. If we measure these things directly we can see in the very short term who does and does not have these functionings and it helps us to target poverty reduction activities...more actively.”
(Alkire 2010, audio recording of 2010 Thulin Lecture accessed via University of Illinois)

The Capabilities Approach

As mentioned above, the Capabilities Approach focuses on what individuals are able to be and do in their lives (Sen 1985). It can be seen as approach to comparative quality of life assessment and to theorising about basic social justice, where each person’s overall life is an end, not just as part of a total or average wellbeing of a nation.

It has the benefits of not being restricted to material outcomes (everything that has intrinsic importance to an individual is valued within the approach), not being victim to adaptation criticisms (that Sen believes afflict the analysis of wellbeing alone), is based on the individual and can be applied to any circumstance where individuals live and can take part in the empowerment process (Alkire 2008).

The approach is centred on choice or freedom, holding that the crucial good that societies should be promoting for their people is a set of opportunities, or substantial freedoms, which people then may or may not exercise in action: the choice is in the hands of the individual (Nussbaum 2011). The two core components of the capabilities approach are capabilities and functionings, the former being what people are able to be and do and the latter what they actually achieve, where functionings vary from the basic, such as having sufficient nutrition, to the more complex activities such as feeling self-esteem within your community.

Freedom of opportunity should be the goal of a good society, according to the capabilities approach (Nussbaum 2011), but Sen has not specified what those opportunities should comprise. Instead he sees capabilities as a comparison space, where what constitutes a good life should be arrived at through consensus in democratic discussion. Nussbaum however, does believe there are some central capabilities, including health, bodily integrity, ability to play, feel emotion and so on (Nussbaum 2011), without which a life has no human dignity – that is, without them we are not living a human life. Layard (2011) also notes seven determinants of wellbeing that can be seen as similar to the capabilities implied by Sen and developed by Nussbaum.

Anand, Hunter and Smith (2005) and Veenhoven (2010) set a precedent by extracting capability information from the British Household Panel Survey's wide range of questions. Although this doesn't represent the democratic consensus building approach that Sen envisaged – the practicability of which may be limited at the national level – it should constitute an improvement in poverty measurement when compared to an arbitrary standard such as a poverty line.

Procedure

In the sections above I presented a brief overview of monetary poverty in the UK and the Capabilities Approach to poverty, created for less developed countries. That overview will be expanded in the core chapter. In this thesis I aim to make the case that monetary poverty – determined at an arbitrary level – is not relevant to wellbeing; that capabilities are determinants of wellbeing; and finally that multidimensional poverty – capability deprivation – is relevant to wellbeing. This aim is undertaken through three papers using a range of analytical techniques to test the hypotheses above.

It should be noted that this thesis is – rather than a traditional five chapters – a collection of three papers, each of which can largely stand alone. Each paper has its own introduction,

literature review, conclusions and appendices. For that reason this chapter – an overall introduction – and Chapter 5 (conclusions) are relatively short.

In the first paper, Chapter 2, I construct an 18 ‘year’ panel dataset and create a poverty indicator using a frequently used poverty definition: annual household income less than 60% of the the median equivalised national figure. I then use decomposition analysis and regression discontinuity analysis to test the importance of the poverty line on wellbeing for individual within the dataset. This chapter finds that being poor – at least having an income below the poverty line mentioned – does not significantly affect individual wellbeing. The majority of wellbeing differences (96%) between the poor and non-poor – as designated by the 60% median equivalised income threshold – are due to characteristics such as health, education and so on, rather than there being some tangible effect of the status of being poor itself.

On the basis of this finding, Chapter 3 goes on to assess the importance of multidimensional poverty as an alternative to financial poverty: capabilities – both individual and in sum – are measured by extracting capability factors from a range of BHPS indicators, building on work by Anand et al (2005). I then apply principle components analysis to the set of indicators to focus on the underlying factors; these factors are used in fixed effects regressions to examine their significance for wellbeing. The results suggest that some capabilities (practical reason, bodily health and control) are significant in the model of wellbeing, and that the total number of capabilities is positively associated with higher wellbeing.

The third paper looks at positive and negative changes in capabilities looking for asymmetric wellbeing responses via fixed effects regression. Loss aversion is often identified in expected utility when income changes are suggested, but has thus far not been investigated for changes in capabilities. Given that Chapter 3 finds some association between capabilities and wellbeing, Chapter 4 aims to make a contribution towards that gap by looking for loss aversion. This paper finds that there are indeed asymmetric wellbeing

responses to capabilities: capability losses appear to have a statistically significant – albeit small - negative effect on wellbeing, where removing one capability from an individual reduces their wellbeing by 0.1 points on the wellbeing scale; a gain of one capability increasing wellbeing by 0.01.

In Chapter 5 of this thesis, overall conclusions from these investigations will be presented, along with consideration of the implications for poverty policy in the UK.

Notes:

All three studies use data taken from the British Household Panel Survey (BHPS) with all analyses being performed using Stata versions 11 to 13.

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Chapter 2: The poverty line: A step change in wellbeing?

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 interacts with 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 whether this seemingly arbitrary indicator divides those with low well-being from those with high levels of well-being. Using the British Household Panel Survey, I apply fixed effects regression and decomposition and regression discontinuity techniques to investigate this issue. The analysis suggests that this definition of poverty does not appear to separate two populations with distinctively different levels of well-being. Instead, I suggest that multi-dimensional poverty may produce a clearer division.

Acknowledgements:

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1 Introduction

In 1901 Benjamin Seebohm Rowntree created a measure of poverty based on what he believed were necessary purchases: a sum of money “insufficient to obtain the minimum necessities for the maintenance of merely physical efficiency” (Seebohm Rowntree 1901). Any family that did not have this amount of money was deemed poor. This is one of the first incarnations of a poverty line. However 1901 presents a very different context; 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, even though its impacts remain the same: poverty is thought to result in, amongst other issues lower educational attainment (thus, lower in-work earnings and lower rate of employment), poorer health, higher risk of infant mortality, teenage pregnancy and suicide, poor housing quality and increased risk of homelessness, greater probability of being a victim of crime (or indeed engaging in criminal activity) and higher risk of substance abuse (Parekh, MacInnes and Kenway, 2010).

Despite these impacts, in recent decades little direct attention has been given to poverty in the UK, other than that instigated at the World Summit for Social Development in 1995, which seems to be the origin of modern poverty targets (United Nations 1995). 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) (Gordon, Townsend 2000).

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 frequently measured as the percentage of households living below 60% of the median income (Gordon, Townsend 2000). However there is little

critical assessment of this threshold and even less evidence justifying the choice of 60% over, for example, 50% or 40%.

As stated in the introduction to this thesis, 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 (Layard 2011). Indeed there is evidence that governments are engaging with wellbeing research, with the UK and France setting out to specifically measure wellbeing (for example the Sen-Fitoussi-Stiglitz commission).

One of the main complications with wellbeing research is the scope of the concept, and 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)

In this study a continuum of wellbeing measures is considered, from affective states (angry, happy, sad and so on) to biochemical reactions to stimuli. It is important for any study to focus on concepts that are appropriate to the task at hand, and for the purpose of investigating the impact of poverty – which is arguably a state of being, rather than a momentary event – an evaluative measure of wellbeing is needed rather than momentary emotions.

Based on Kahneman, Diener and Schwartz (2003), the concept of wellbeing used here involves a component of judgement and comparison with the ideals, aspirations of other people and oneself, ultimately represents individuals’ perception of their position related to these subjective values.

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 addressing it in any wellbeing study is wise. A fixed effects regression analysis, controlling for individual specific effects, is undertaken to investigate the significance of a poverty indicated, followed by decomposition and regression discontinuity analyses which aim to examine whether the poor and non-poor are heterogeneous groups with regard to wellbeing, and therefore whether there is a step change in wellbeing at the level of the poverty line. Ultimately this paper aims to bring 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 poverty and 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. This latter section also presents the data to be used in the analysis that is undertaken in Section 4. Section 5 summarises this paper and discusses the potential implications.

2 Wellbeing and Poverty

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, p403).

The terminology used to define the concept of wellbeing differs frustratingly from paper to paper. Kahneman et al (2003) 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.

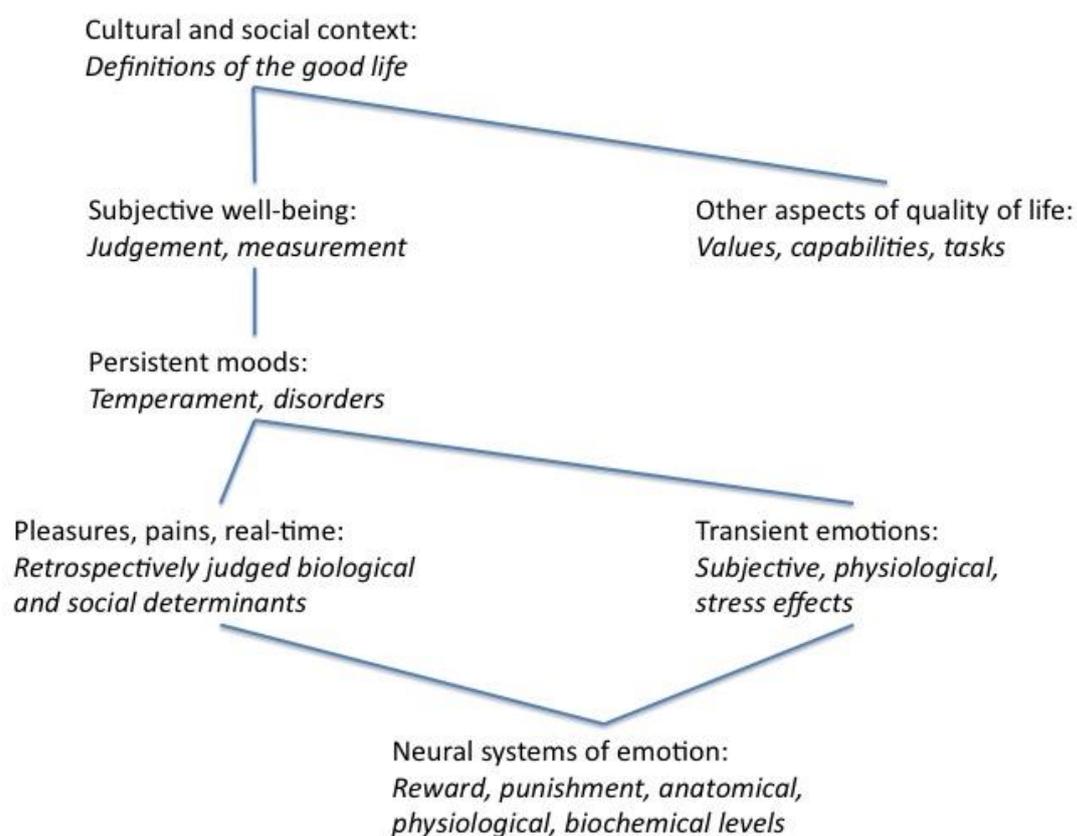
Poverty may be seen as a state that develops over time, rather than an event that comes and goes between minutes. As a result it may only affect certain components of the wellbeing-happiness-life satisfaction continuum of measures, so choosing an appropriate measure of wellbeing is paramount to the success of any investigation.

In this section the concept of wellbeing used in this study is explained, followed by commentary on the particular measure of poverty. I review some historical poverty issues, and discuss how the current measure was arrived at.

2.1 Wellbeing measurement

Life does not involve simply a balance of pleasant versus unpleasant experiences, it involves several aspects – including happiness and subjective well-being – as detailed in Figure 2.1 below, taken from Kahneman 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.

Figure 2.1 – Levels in the analysis of quality of life



Source: Kahneman et al (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 – how individuals view a good life. This is followed by subjective well-being – a judgement of the overall quality of ones life.

The 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 individuals¹. Obviously this will be an important factor for measurement, one that I will return to in Section 3.1.

¹ 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.

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 this; the influence of both past and present situations and the transient physiological and biochemical 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.

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 (Stutzer, Frey 2012). 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).

Argyle (2003) suggests that much of the information we now have about the causes and correlates of happiness is founded in Cantril (1965) and the myriad social surveys that followed. Frey and Stutzer (2010), amongst others, have published comprehensive reviews of the determinants of happiness. Based on the latter source, along with survey articles by Diener, Suh, Lucas and Smith (1999), Argyle (2003) and MacKerron (2012) we understand the determinants of wellbeing to include²:

- Income – the income-wellbeing relationship is one of the most frequently analysed in the wellbeing literature; relative income rather than absolute income is thought to be more important, but has a diminishing marginal utility; the effects of income are disrupted by comparison, adaptation and aspirations, as explained below;

² For an expanded discussion, see Appendix D of this paper

- Age – the young and the old appear to be happier than those who are middle aged; the age-wellbeing relation may be U-shaped, but at the very least is not linear;
- Gender – women have been suggested to report higher wellbeing, but the difference is not consistently observed;
- Health – people who are healthier tend to be happier, but there may be some reverse causation, where happier people tend to be healthier (or report that they are healthier);
- Relationships – there may be a correlation between marriage and greater happiness, but again, this is not a consistent or clear observation;
- Employment – unemployment is regarded as generally negative for wellbeing, however employment may have positive or negative effects depending on factors such as hours worked and job satisfaction; the effects retirement and home-making are not well understood;
- Education – suggestions that higher education brings about higher wellbeing may only be true in the indirect sense, where higher education increases income or employment prospects; the self-esteem benefits of education are not thought to be significant.

In this paper I will focus on the effect of income poverty – one of the economic determinants – controlling for as many of the other possible determinants as possible.

Demographic variables are often found to correlate with subjective wellbeing (Argyle 2003), but Andrews and Withey (1976) conclude that many of the relationships are fairly weak, with just 10% of the variance accounted for by the explanatory variables. Diener (1984) did not contradict this position, but found explanatory variables responsible for 15% of the variance. This is somewhat explained by Inglehart (1990) who suggests that aspirations and expectations may have a greater role to play than raw observations alone.

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 explanation to Diener (1984) and Andrews and Withey's (1976) observations could be 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 and Wedell, 1989, 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 or from their expectations of the future. Thus, we notice and react to deviations from aspiration levels." (Frey, Stutzer 2002, p414)

Frederick and 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, Halberstadt, Kapteyn and Van Praag (1977) who finds that what income people deem "sufficient" depends partially on their expectations for the future.

The effects of aspirations, achievements, adaptation and relativity are now well recognised as important determinants of wellbeing and determinants of the role of other explanatory

variables have to play. The difficulty is, however, capturing these effects in models: these concepts are difficult to include in wellbeing models as they are inherently hard to measure and are context specific. Although authors such as Clark and Oswald (1996) have done some work to examine reference group comparison effects, it is at best an approximation as we are assuming a priori that we know to whom individuals refer as their peers.

2.2 The poverty line

The term “the poverty line” is probably familiar to most economists, and indeed much of the population, however it may not necessarily be fully understood. Logically, it would seem to be a threshold below which people are deemed poor. But how is the threshold arrived at? And what does it mean to the individuals who are ‘poor’? This paper aims to focus on the wellbeing impact of this line.

According to Hagenaars and De Vos (1988), all poverty definitions fit into one of the following categories:

- Poverty is having less than an objectively defined, absolute minimum.
- Poverty is having less than others in society.
- Poverty is feeling you do not have enough to get along.

These categories are, in the order of the list above, absolute, relative and somewhere-in-between. 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.

2.2.1 UK poverty measurement

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).

This was commensurate with Booth and Rowntree, both of whom set out to review minimally acceptable levels of income. Although the term ‘poverty line’ is frequently attributed to Booth, it was never actually present in his published works (Glennerster, Hills et al. 2004). The origin is unclear, and there is believed to be no exact calculation that says this is a threshold relevant to society (Seymour 2009)

Townsend and Wedderburn used Family Expenditure Survey (FES) data to look at low-income families in the 1960s and 1970s (Townsend 1979). The FES was used to measure RPI, but held potential to identify what level of consumption families could achieve in different parts of the country with different incomes. In 1972 the Households Below Average Income survey was launched, with the aim of reviewing aspects of life in the lower half of the income distribution, with analysis focusing on groups below 50% of the national household income and 60% of the national household income (Glennerster, Hills et al. 2004). This approach was endorsed by the 1999 Department of Social Security when it adopted the 60% measure as part of a set of poverty indicators in 1990 (Gordon, Townsend 2000).

As mentioned previously, the origin of modern poverty targets seems to be the 1995 Copenhagen Agreement. At this meeting, countries pledged to a range of poverty alleviation measures, including giving “greater focus to public efforts to eradicate absolute poverty and reduce poverty substantially”. (United Nations 2000, chapter 2 paragraph 25) They committed to do this through several measures, including “elaborating, at the national level, the measurements, criteria and indicators for determining the extent and distribution of absolute poverty.” (ibid.)

Within a few years, the Blair administration in the UK had pledged to eradicate child poverty by 2020. Indeed it was reduced by 25% between 1998 and 1999, and by 50% by 2010. In 2010 the Child Poverty Act made the 2020 target legally binding, however there is believed to be no chance that this target will be achieved (Belfield, Cribb et al. 2014). What happens next is unknown; there is still no change in the way poverty is measured, despite the weakness of the fixed-percentage measure to fiscal redistribution.

The current 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, where equivalence scales are used to convert household income to an income value proportional to its needs, taking into account the household size and the age of its members. This allows us to compare the incomes of, for example, a retired couple in a five-bedroom house and a single parent in a two-bedroom house with four children.

The Households Below Average Income survey in the UK now 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 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. However this doesn't necessarily mean that households are aware of their position in the income distribution; they may see themselves as having adequate income for their own needs, or they may be totally unaware of what societal incomes are.

One further problem with this measure is that by its mathematical nature this measure can show poverty falling if everyone's incomes are also falling, so during a recession it may appear that there is a reduction in poverty when in fact everyone could just be poorer – the average income is falling. It is also highly sensitive to fiscal redistribution, so government

policies on taxes and credits can affect it (meaning the impact of a policy on that measure of poverty may not be accurately assessed).

Relative poverty targeting does still involve a degree of the arbitrariness that limits the applications of absolute poverty targets (Townsend 1979); it can be seen – as with all fixed measures – as an empirical tool 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' measure remains at 60% of the median disposable equivalised household income, but evidence regarding the selection of the 60% measure is not forthcoming.

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.

2.3 Wellbeing and poverty

The majority of the investigations into poverty and wellbeing are very much development focused. The poverty measure tends to be abject poverty or severe deprivation, that which causes significant limitations to life expectancy in developing countries. Within the developed world, greater focus is given to income and wellbeing, on the assumption that the sort of poverty prevalent in under developed countries is not present. Because of this, there is little in the literature that examines current poverty thresholds and their impact on wellbeing or happiness.

The impacts of extreme poverty – that seen in less developed countries – are extensive: Poor individuals are likely to have significantly lower life expectancies, are malnourished, uneducated, suffering from avoidable diseases, live in poor conditions with no access to sanitation, unlikely to find employment to name just a few (Sen 1999). All of these impacts may well be linked, and generational, in that poor parents are likely to have poor children. All of these impacts are also associated with wellbeing; individuals living in these conditions are likely to have very low wellbeing compared to individuals in developed countries, but often this low wellbeing is not that different from national averages as large proportions of the population suffer similar circumstances.

The UK presents a completely different context. The impacts of poverty are less well understood, particularly the impacts on wellbeing. If, as Layard (2011) argues, happiness should be the focus of all policy, this lack of understanding is surely a significant omission; one that warrants further attention.

2.4 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. The main complications with wellbeing research are that adaptation, aspirations and comparison add complexity to an already challenging concept, and that there are personality

effects between wellbeing and arguably all of its determinants. In the methodology section this will be addressed further.

As discussed income and wellbeing have a complex and often-examined relationship. It follows therefore that poverty and wellbeing are subject to the same issues. 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 patchy; indeed there is no evidence that the 60% median income threshold is anything but arbitrary.

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 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:

- Does being poor affect individual wellbeing?
- 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 et al (2003), who argue that wellbeing is the central concept in the quality of life spectrum.

Wellbeing in the context of this research is defined a subjective judgement of ones overall wellbeing. There are a variety of approaches one could take in capturing this concept³, and as Townsend (1979) notes, any study can be limited by its methodology. This section will outline the techniques used in addressing the questions above.

3.1 Unobserved heterogeneity in wellbeing investigations

One of the main difficulties in conducting wellbeing research is the unavoidable omission of individual specific effects, such as personality and genetics. 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 (1965), usually ask individuals to rate how satisfied they are with their lives on the whole on a given scale

³ For examples, see Di Tella and MacCulloch (2006), Dolan et al. (2008) and Stutzer and Frey (2010)

that could be numerical (for example, zero to seven) or normative ('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 possible that there are differences in interpretation of wellbeing questions across countries⁴, 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 (2004) 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. 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

⁴ 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)

heterogeneity) or ordinal fixed effects models (which involve rescaling the dependent variable to two categories) (Ferrer-i-Carbonell, Frijters 2004). Fixed effects analysis is also less efficient than assuming random effects but the results are generally more robust.

Fixed effects specifications allow us to assume the presence of individual specific effects, on the basis that they are fixed over time. The assumption of fixed personality and genetic components of wellbeing is generally accepted within economic literature (Pevalin 2000, Ferrer-i-Carbonell, Frijters 2004), even if psychological literature is more mixed in opinion (Boyce, Wood and Powdthavee, 2013). In any case, the impact of personality changes will be testing the fixed effects assumption that there is a time-invariant unobserved component biasing the coefficients: where a Hausman test suggests that there is no time-invariant unobserved component, a random effects model will be used.

3.2 Looking for a step-change in wellbeing

This paper will also examine the wellbeing differences of individuals with incomes just above and just below poverty line. One would think, if the poverty line is relevant (and indeed obvious) to individuals, it would have some sort of significance on how income and wellbeing are related. If there was some kind of discontinuity, we would expect to see a step-change in the relationship when we look at basic plots of the data in the first instance. Then if there is any evidence of a change in the position of the observations on either side of the poverty line, it would give us some belief in the presence of a discontinuity.

Using a basic linear specification:

$$y_i = x_i\beta + \rho D_i + \varepsilon_{it}$$

the outcome, y , will be determined by explanatory variable x as well as D , which is a binary variable indicating whether or not there was ‘treatment’⁵.

⁵ Although there needs to be enough data within the bandwidth to actually perform the analysis, so we can’t always have as small a bandwidth as desired

Treatment in this case is whether or not the individual is 'poor' according to the 60% threshold. The importance of ρ – the coefficient on the treatment variable – is determined by a Wald test at different bandwidths from the poverty line; using the chi-square distribution, this tells us whether ρ is statistically different from zero.

Regression discontinuity aims to test whether assignment to the poor or non-poor group, when income is close to the poverty line, has an effect on wellbeing. It compares individuals directly above and directly below the line (because extremes at high and low levels will bias the effects), within a chosen bandwidth – the distance above and below the line where we look for a step-change; an interval of wellbeing, designated so that no bandwidth straddles the poverty line. The smaller the bandwidth, the less interference from extremes, however there needs to be sufficient data within the bandwidth to be able to make adequate conclusions: if there are not enough observations, the size of the bandwidth will have to be increased. This means there may be more interference from extremes, however using a large dataset such as the BHPS should mean that this issue is not problematic. Stata program RD is utilised to undertake the examination of discontinuity (Nichols 2007). This program automatically searches for the smallest bandwidth for the available data, meaning that a researcher's subjective choice of bandwidth – which could be fallible – is not necessary. However, I will also set bandwidths at 100, 50 and 200 points away from the line, in order to ensure the Stata routine has minimised MSE

There are two possible approaches to consider: 'sharp' design or 'fuzzy' design, as discussed in Angrist and Pischke (2008). Here a sharp design is assumed, as the 'treatment' we are looking at (poverty status) is a deterministic function of income. If we were to assume a fuzzy design, we would assume that poverty status is only partially determined by income and the predetermined cut-point, so that the probability of becoming poor changes by less than a value of one as the household income becomes greater than the threshold; in this case, as poverty status is determined wholly by the 60% threshold, we

use a sharp design – as soon as your income becomes lower than 60% of the median equivalised household income your status in the poverty dichotomy is ‘poor’.

For this investigation therefore, the specification is:

$$W_{it} = X_{it}\beta + \rho P_i + \varepsilon_{it}$$

where W_{it} is wellbeing for individual i at time t , X represents a range of explanatory variables for individual i at time t and P is the poverty ‘treatment’ – whether individual i is in poverty or not at time t . ε is an error term.

The alternative hypothesis of regression discontinuity (RD) analysis in this context is that there is a discontinuity in the (otherwise roughly linear) relationship between income and wellbeing at a cut-off point (the poverty line), so that there is a step-change in wellbeing at that point. This allows us to focus on the line in particular, removing the effects of extreme wealth and extreme poverty on the analysis.

One of the potential limitations with using this approach is that the poverty line does not appear to be founded on any theory or evidence in particular, so there is no prior expectation of any effect. As a potentially randomly chosen figure, we have no reason to think that there will indeed be a discontinuity present: this technique should inform the analysis by indicating whether or not there is any change in the relationship between income and wellbeing at 60% of the median equivalised income.

Furthermore RD is generally used to assess the outcome of experiments and trials, where treatment is administered to one group but not to another, where assignment to a group is random. Assignment to income is arguably not random, as it can be determined by employment status, education for example, however where the poverty line is on an annual basis is exogenous to an individual – getting an additional qualification will not make a difference to where the poverty line sits. This is similar to the local randomisation approach

to RD, whereby it is assumed that people who are just above and just below a treatment line are random, perhaps due to random error (Lee, Lemieux 2009).

3.3 Decomposing differences between groups

The second question this paper 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 world's 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 (1973), who investigated gender discrimination in wages in the US labour market. 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:

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

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:

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

And:

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

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, with the analysis in Section 4.2.

3.4 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.

The 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 year⁶ 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 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 2007/8⁷, 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).

The main limitation of the BHPS for this particular purpose is that it is a household survey, that is, only those who have a place residence are included. Those who do not have a residence, for example the homeless or those in shelters or institutions, may be more likely to experience poverty but these individuals are not sampled.

3.5 A wellbeing function

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

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

⁶ BHPS surveys were done in 'waves' that frequently crossed year boundaries.

⁷ Since then the BHPS has been subsumed into the Understanding Society survey, which includes the original BHPS questions plus many more.

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 term⁸. 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 decomposition⁹).

3.5.1 Dependent variable

I have already stated that by wellbeing we mean an individual's self-judged assessment of their wellbeing, as described by Kahnemann (2003). As mentioned above, the 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:

- Theoretically rigorous;
- Policy relevant; and
- Empirically robust (Dolan, Layard and Metcalfe, 2011).

In the recommendations of the report, Dolan et al (2011) suggest that an evaluative wellbeing measure be used.

The BHPS provides several measures that could meet the needs of this study:

⁸ This is based on the specification used by Ferrer-i-Carbonell and Frijters (Ferrer-i-Carbonell, Frijters 2004)

⁹ Fixed effects decomposition techniques are not yet at the stage where they are widely accepted. See the arguments between, for example, (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) and there is currently no way of separating these effects.

- Life satisfaction question: How dissatisfied or satisfied are you with your life overall?
- GHQ question: Have you recently been feeling reasonably happy, all things considered?
- GHQ12: a composite measure of “lack of wellbeing” (Gardner, Oswald 2006, p317) or “disutility” (Clark, Oswald 1994, p649)

All 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).

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 completed, and it may be subject to positive or negative affect at the time of completion (Diener 1984). One further problem with this question is that it only has a 7 point semi-verbal scale as its answer, meaning that the interpretation is not ordinal. Finally, it has not been asked throughout the lifetime of the BHPS, only in 11 of the 18 years.

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. It also suffers the same criticism as the life satisfaction question, in that affective state may cause under or over reporting of how happy an individual is. 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 subjective quality of their wellbeing. Finally, as with the life satisfaction question, this one has very limited (four) response categories: ‘more than usual’, ‘same as usual’, ‘less so’ and ‘much less’. These limited categorical outcomes do not lend themselves particularly well to assessing the level of wellbeing econometrically. We cannot assume ordinal comparability or suitability for linear methods of analysis.

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 the overall happiness question, making it a more holistic wellbeing concept; but also one that can be computed into a zero to 36 Likert scale, much closer to the concept of a continuous variable with greater ordinal comparability.

There are many versions of the GHQ; the original, developed by 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 inception¹⁰ and it has been used in many studies of wellbeing, including Gardner and Oswald (2007), who list more than a dozen other papers that use this dependent variable.

The GHQ12 questionnaire asks individuals:

"Have you recently:

- Been able to concentrate on whatever you are doing?
- Lost much sleep over worry?
- Felt that you are playing a useful part in things?
- Felt capable of making decisions about things?
- Felt constantly under strain?
- Felt you couldn't overcome your difficulties?
- Been able to enjoy your normal day-to-day activities?

¹⁰ This is accepted as consistent in the long term (Pevalin 2000), meaning personality effects may be more-or-less fixed within this measure

- Been able to face up to your problems?
- Been feeling unhappy and depressed?
- Been losing confidence in yourself?
- Been thinking of yourself as a worthless person?
- 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 scale¹.

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. This turns a measure of mental distress, seen by Gardner and Oswald (2004, 2006, 2007) and Clark and Oswald (1994, 1996) to be lack of wellbeing or disutility, into a scale increasing in wellbeing.

As it is a sum variable rather than categorical, one can be more comfortable with the assumption of ordinal comparability¹¹, and in addition it is more normally distributed than the individual component responses (Banks, Clegg, Jackson, Kemp, Stafford and Wall, 1980) meaning we have a wider range of econometric methods available for analysis.

¹¹ Where numbers are 'natural', meaning they can be compared (e.g. 1 is smaller than 2, 2 is half of 4 and so on). Much econometric analysis is based on ordinal rather than cardinal data, and interpretation of cardinal data is, by the nature of the data itself, more subjective.

3.5.2 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 income¹². 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.

3.5.3 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 (Section 2, categories described below and in Table 3.1).

- Age (continuous and squared to account for the 'u' shaped relationship – this form was used in Blanchflower and 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)
- Marital status (categorical)
- Highest educational level attained (categorical, henceforth referred to as 'education')
- Employment status (categorical)

¹² 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).

- Health (binary – 0 if individual has at least one health problem, 1 if individual has no reported health problems)
- Area (categorical)

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 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	Area
Reference category:	Training/ education	No qualifications	Never married	Northern Ireland
Dummies:	Retired	Basic qualifications	Married	North
	Family care	Further education	Divorced/ separated	South
	Long term sick	Higher education	Widowed	London
	Unemployed			Wales
	Employed			Scotland
				Midlands

Source: Author's analysis of BHPS data

Table 3.2 – Summary statistics across all waves

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
Age	199,462	45.82	18.73	15	100
Dummy variables					
Training/ education	195,772	.050	.219	0	1
Retired	195,772	.205	.403	0	1
Family care	195,772	.084	.277	0	1
Long term sick	195,772	.043	.202	0	1
Unemployed	195,772	.038	.191	0	1
Employed	195,772	.576	.494	0	1
Never married	199,370	.306	.461	0	1
Married	199,370	.536	.499	0	1
Divorced/ separated	199,370	.075	.263	0	1
Widowed	199,370	.084	.277	0	1
Northern Ireland	224,861	.081	.273	0	1
North	224,861	.198	.399	0	1
South	224,861	.174	.379	0	1
London	224,861	.065	.246	0	1
Wales	224,861	.130	.336	0	1
Scotland	224,861	.151	.358	0	1
Midlands	224,861	.201	.401	0	1

Source: Author's analysis of BHPS data. Means for dummy variables are proportions of sample that have the dummy present, this are equivalent to proportion in that category.

3.5.4 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 education 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)), or – for proxy responses – because the respondent may not be fully aware of the individual subject's situation and feelings.

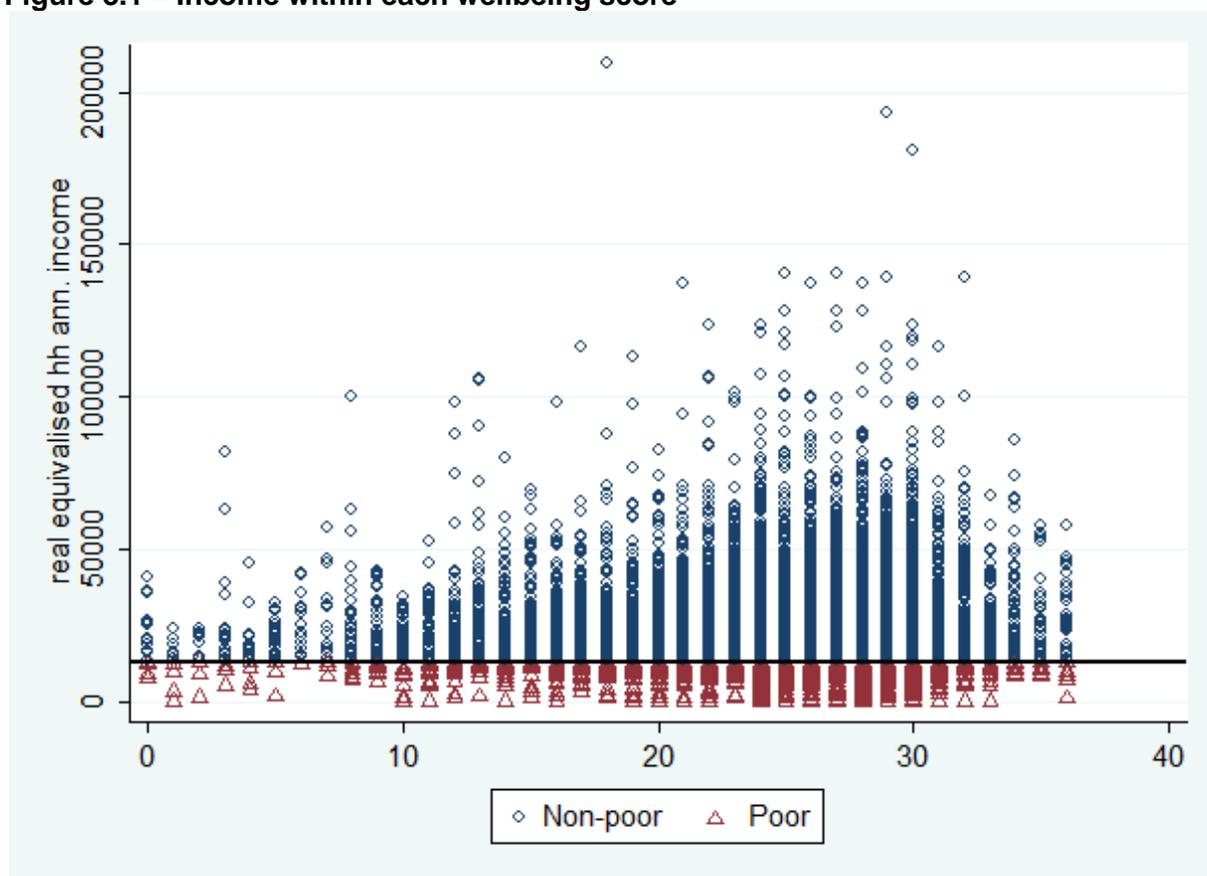
For employment status, some changes were made to the coding of the answers between Waves 1 and 2; the model accounts for these changes and ensures that all coding is consistent.

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

3.6 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, which plots median household income within each wellbeing score for Wave 18 of the study. The poverty line is also shown on the graph as the black line between the poor (red) and non-poor (blue) observations.

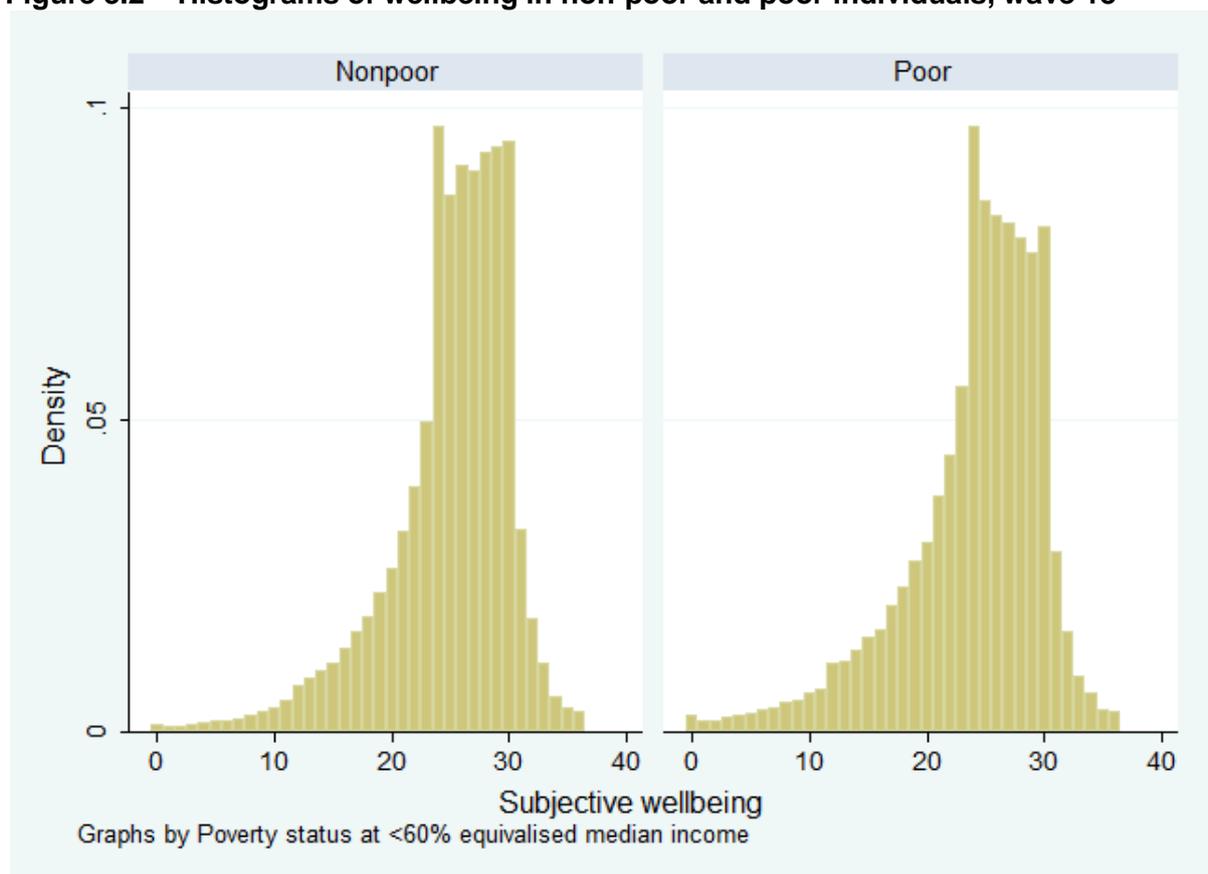
Figure 3.1 – Income within each wellbeing score



Source: Author's analysis of BHPS data. N = 10,725

Looking at frequency distributions of the wellbeing of the poor and non-poor (Figure 3.2), it appears that the shape has some differences. The poor distribution is slightly denser at levels below 20, whereas the non-poor distribution has a greater concentration of individuals reporting wellbeing between 20 and 30. The poor distribution and has a lower-in-wellbeing second peak (29, compared with than 30 for the non-poor), however both peak at a wellbeing score of 23.

Figure 3.2 – Histograms of wellbeing in non-poor and poor individuals, wave 18

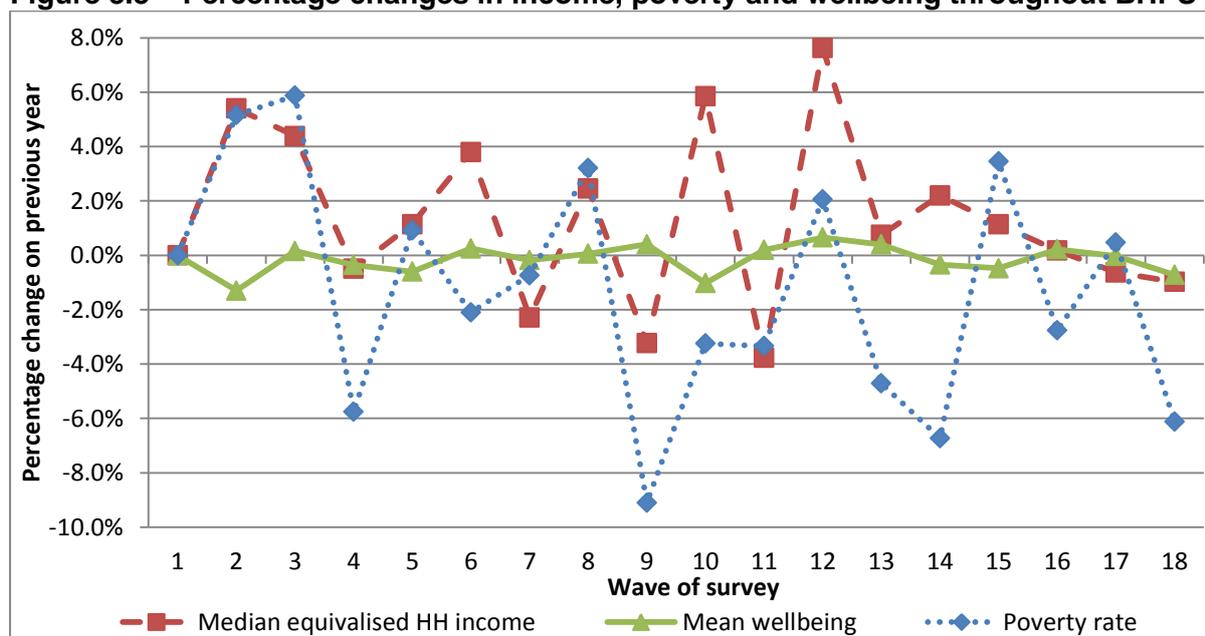


Source: Author's analysis of BHPS data. $N = 10,725$

Upon analysing the changes in these variables over time, (see Figure 3.3) 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 3.3 – Percentage changes in income, poverty and wellbeing throughout BHPS



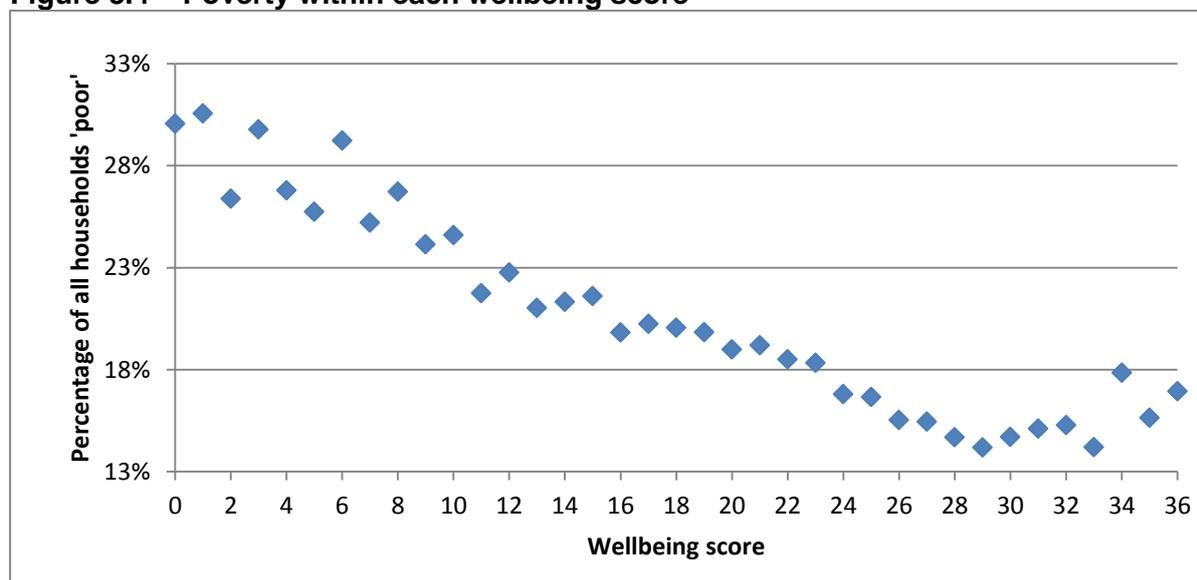
Source: Author's analysis of BHPS data. N = 10,275

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

Figure 3.4 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 scale, reinforcing the assumption that poorer people are generally less happy than those who are not. There is a curious observation of a larger percentage of poor households at higher wellbeing levels; this could be due to the small number of individuals reporting this level of wellbeing, or that some of those who report very high levels of wellbeing do so for reasons other than their relative

income position, for example, someone who has self-selected into a life of low-income, (priests and those in religious orders), whose non-monetary quality of life is high through excellent health, someone who has high job satisfaction despite low or unpredictable pay (artists and creative types - see Bille, Fjællegaard, Frey and Steiner (2013)), a particularly effective social life, or just someone who has a particularly strong propensity to be happy.

Figure 3.4 – Poverty within each wellbeing score



Source: Author's analysis of BHPS data. N = 10,725 individuals.

Finally, in concordance with all the data so far, we can see from Table 3.3 that the median wellbeing of those who are not poor is one point higher than those that are poor, however the income of the poor is less than half of that of the non-poor.

Table 3.3 – 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

3.7 Summary

This section set out to describe the methodology and data used in the study. Drawing on research from Ferrer-i-Carbonell and 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. Random effects will be compared to fixed effects using a Sargan-Hansen test.

The data source and model were then discussed, with the intention to select a measure of wellbeing that is 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 asked in every wave, being a larger more ordinal scale and being more normally distributed. The multitude of papers that use this dependent variable (see Clark and Oswald, 2007) as a measure of wellbeing (either in increasing or decreasing form) reassure us that it is an acceptable measure of wellbeing, and its mathematical properties allow a greater range of econometric applications to be used.

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:

- Does being poor affect individual wellbeing?
- Does being poor change the form of the wellbeing function?

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

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.

Before embarking on this analysis, it would be prudent to determine whether fixed or random effects assumptions are more appropriate for this model. By computing each specification, then running a Sargan-Hansen test¹³, I arrive at a statistic of 951.755 with a p-value of 0.0000. This test indicates that residuals are correlated with the exogenous variables, so a fixed effects specification is more appropriate. Henceforth only the fixed effects model is interpreted but a random effects model is included here for comparison (Table 4.1).

Taking each variable in turn, looking first at the income variable (natural log of annual equivalised household income) one can see that it is highly significant (at the 1% level) and positive in direction. Age in its continuous form is significant at 5% but negative the squared form of age is not significant; these observations are not surprising given the difficulty of determining the effect of age on wellbeing.

The first departure from expectation is the coefficient on the marriage dummy, which is significant and negative. The literature detailed previously indicated that marriage should

¹³ An alternative to a Hausman test, that allows clustering at group level to permit the calculation of robust standard errors in panel data models.

bring about positive wellbeing effects for both genders. Less controversial are the coefficients on the dummies for divorce and widowhood, which are both negative as expected.

None of the dummies for education level are significant; due to the lack of clarity surrounding the direct effects of education on wellbeing – the literature suggests that the effects are indirect – this is not surprising.

The coefficient on employment is negative and significant; this is the second departure from expectations. Literature suggests that employment should bring about positive wellbeing effects, however this may depend on job satisfaction and hours worked. If job satisfaction is low, or hours too high (thus limiting leisure time), one cannot assume that employment would bring about a positive effect.

The coefficients on all the employment statuses included in the model are negative and – in all but one case – highly significant. The coefficients on unemployment and long-term sickness are both negative and significant as expected. I had no reason to expect either a positive or negative coefficient for the dummies for family care and retirement, however they are significant.

Unsurprisingly, good health is associated with greater wellbeing, with a highly significant coefficient.

Only three out of six regional dummies are significant, and even then those that are significant are only so at the 10% level.

Finally, the coefficient on poverty is not significant. When including both income and a poverty indicator in the specification it is possible that there will be some overlapping effects. To test this, the fixed effects regression was re-estimated excluding income but retaining poverty; this resulted in the poverty indicator becoming significant at the 10% level, with a

negative coefficient, however the size of the coefficient is relatively small. There were no differences in the directions or significances of the other coefficients.

This analysis suggests that being poor by the poverty definition used here is not a significant contributor to wellbeing, particularly in comparison to other effects such as employment or marital status.

Table 4.1 – Fixed effects and random effects models controls and poverty status regressed on GHQ12 wellbeing

	Fixed effects		Random effects	
	Coefficient	Standard error	Coefficient	Standard error
Poverty	0.012	(0.045)	-0.0295	(0.042)
Income	0.160***	(0.032)	0.199***	(0.029)
Age	-0.036**	(0.012)	-0.039***	(0.007)
Age2	0.000	(0.000)	0.000***	(0.000)
Married+	-0.313***	(0.074)	-0.145**	(0.054)
Divorced+	-1.043***	(0.132)	-1.156***	(0.099)
Widowed+	-1.753***	(0.147)	-1.379***	(0.105)
Higher ed.+	0.076	(0.203)	0.124	(0.085)
Further ed.+	-0.065	(0.158)	0.167*	(0.067)
Basic quals.+	-0.170	(0.170)	0.220**	(0.070)
Employed+	-0.305***	(0.091)	-0.172*	(0.071)
Unemployed+	-1.959***	(0.119)	-1.904***	(0.010)
Long-term sick+	-3.082***	(0.163)	-3.679***	(0.139)
Family care+	-0.936***	(0.115)	-1.057***	(0.094)
Retired+	-0.340**	(0.114)	-0.300**	(0.094)
Good health+	0.843***	(0.035)	1.180***	(0.031)
North +	1.655	(0.891)	0.128	(0.089)
South +	1.709	(0.911)	0.0495	(0.092)
London+	1.552	(0.918)	-0.0291	(0.117)
Wales+	1.892*	(0.930)	-0.127	(0.096)
Scotland+	2.166*	(0.949)	0.253**	(0.091)
Midlands+	1.892*	(0.902)	0.240**	(0.088)
Constant	24.290***	(0.896)	24.340***	(0.238)
N	187,945		187,945	
R2	0.021			

Note: Dependent variable: Inverted GHQ12 (wellbeing). $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors (clustered at PID level) in parentheses. Variables marked + are dummies. Omitted categories: 'training/education', 'no qualifications', 'never married' and 'Northern Ireland'.

Table 4.2 – Fixed effects model removing income variable – controls and poverty status regressed on GHQ12 wellbeing

	Fixed effects	
	Coefficient	Standard error
Poverty	-0.083*	(0.042)
Age	-0.035**	(0.012)
Age2	0.000	(0.000)
Married+	-0.308***	(0.074)
Divorced+	-1.053***	(0.131)
Widowed+	-1.750***	(0.147)
Higher ed.+	0.107	(0.203)
Further ed.+	-0.062	(0.158)
Basic quals.+	-0.154	(0.170)
Employed+	-0.257**	(0.090)
Unemployed+	-1.978***	(0.118)
Long-term sick+	-3.088***	(0.163)
Family care+	-0.928***	(0.115)
Retired+	-0.343**	(0.113)
Good health+	0.844***	(0.035)
North +	-0.778	(1.524)
South +	-0.754	(1.535)
London+	-0.886	(1.538)
Wales+	-0.559	(1.546)
Scotland+	-0.281	(1.550)
Midlands+	-0.561	(1.530)
Constant	27.410***	(1.439)
N	188,793	
R2	0.021	

Note: Dependent variable: Inverted GHQ12 (wellbeing). $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors (clustered at PID level) in parentheses. Variables marked + are dummies. Omitted categories: 'training/ education', 'no qualifications', 'never married' and 'Northern Ireland'.

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

The fixed effects analysis above suggests that poverty does not have a very significant relationship with wellbeing. That could be because 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 (1988), and takes the form:

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

and:

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

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 the table 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 $\Omega=0$, I 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 -0.9533; that is, the wellbeing of the poor is 0.9533 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 -0.9165 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; 96% 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).

This analysis suggests that the wellbeing determinants for poor individuals are not the same as those for non-poor individuals, however the differences mainly comprising of different characteristics (data) rather than different coefficients. This in turn suggests that other than the effects of poverty – lower education, greater likelihood of unemployment, poorer health and so on – are to blame for any wellbeing differences rather than the poverty status itself.

Of course one could argue that lower educational attainment, greater likelihood and poorer health could be causes of poverty, and that is indeed true, but as with all analysis we look at poverty status all other things being constant. So all things being equal, if someone became poor, would their wellbeing decrease? The results here suggest that it would, but only because poverty is associated with values of the controls that result in lower wellbeing, rather than, values of the controls having no effect but the simple status of being poor (somewhat like the simple status of being female) reduces wellbeing regardless of other factors. The results suggest that there is no poor discrimination in wellbeing, nor is there a non-poor wellbeing bonus.

Table 4.3 – Decomposition results of the GHQ12 wellbeing-poverty relationship

	Coefficient	Standard Error	Z	P> z	95% Confidence Interval	
$\Omega = 1$						
Characteristics	-0.714	0.063	-11.350	0.000	-0.837	-0.591
Coefficients	-0.240	0.072	-3.350	0.001	-0.380	-0.099
$\Omega = 0$						
Characteristics	-0.972	0.027	-35.680	0.000	-1.025	-0.918
Coefficients	0.018	0.043	0.420	0.674	-0.067	0.103
$\Omega =$ pooled (Neumark)						
Characteristics	-0.917	0.024	-38.150	0.000	-0.964	-0.869
Poor coef	-0.031	0.023	-1.330	0.182	-0.076	0.014
Non-poor coef	-0.006	0.005	-1.330	0.184	-0.015	0.003
Raw	-0.953	0.040	-23.740	0.000	-1.032	-0.875

4.3 Regression discontinuity analysis

Using Stata programme RD, one can examine Wald estimator to determine whether or not there may be a jump at the poverty line. The rationale for using this method was discussed in Section 3.2, however in sum, if we assume that the poverty line designates you 'poor' therefore you receive some kind of policy 'treatment', we should observe a jump in wellbeing at the poverty line (on the basis that wellbeing is increasing in income and from our brief analysis in Section 3.6 appears to be roughly linear).

Using standard bandwidths either side of the line, it is evident that I cannot reject the null hypothesis of zero difference at the jump (Table 4.4). The Wald test looks for differences in wellbeing within the bandwidths above and below the line, by testing whether the ρ coefficient on the treatment indicator is significant, where the null hypothesis is that the difference is zero. Table 4.4 therefore indicates that for all cases we accept the null hypothesis – there is no statistical difference in wellbeing immediately above and below the poverty line. Treatment does not have an effect on wellbeing. This is complementary to the results above, leading us to suspect that at this particular poverty line, there is no jump up or down in wellbeing dependent on poverty status.

As discussed previously, there was no expectation of a positive finding with this test. Looking at a linear plot of the data, there seemed to be no discontinuity in the relationship between wellbeing and income around the poverty line. Similarly to the decomposition analysis, if there was some wellbeing penalty that – ceteris paribus – resulted on falling below the poverty line, we would expect to see some evidence of this in the raw data. There was none.

RD analysis is looking for a treatment effect at a specified threshold. We have not found one here. There are several reasons why this could be. The first is that – as discussed in Section 2 – the poverty line appears to have no theoretical foundation. The second is that the line is in the wrong place; it could be 55%, or 50%. There has been no calculation to

suggest what – if any – line exists (Seymour 2009). Finally it could be that the RD test is not suitable for analysing the poverty line, as income is partially endogenous, even if . On its own, the test would not be sufficient evidence to cast doubt on the poverty line, however combined I could say it has at least been supportive of the decomposition results.

Table 4.4 – Wald test results comparing wellbeing above and below the poverty line

	ρ estimate	Bootstrap standard error	z	P>z	95% Confidence Interval	
Bandwidth 100	1.380	2.354	0.590	0.558	-3.233	5.994
Bandwidth 50	1.005	3.915	0.260	0.797	-6.668	8.678
Bandwidth 200	2.563	1.545	1.660	0.097	-0.466	5.592

4.4 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 and random effects models, to determine which would yield the most efficient (and consistent) results. A Sargan-Hansen statistic of 951.755, with a p-value of 0.0000, indicated that a fixed effects specification was most appropriate.

Focusing on the poverty line, the poverty dummy is not in Table 4.1 significant. Removing income from the specification (Table 4.2) resulted in the poverty dummy becoming significant at 10% level, however the size of the coefficient was small in comparison to the coefficients on, for example, employment and marital status dummies.

Decomposition analysis, to test for different wellbeing functions, indicated that there was a difference in the raw wellbeing between poor and non-poor individuals, of 0.9533 points on the scale of 0 to 36, however the majority (96%) of the difference is due to characteristics – data – rather than coefficients.

Finally, a regression discontinuity analysis (Table 4.4) aimed to determine whether there was a step-change in wellbeing around the poverty line. Wald tests at three different bandwidths rejected this possibility, accepting the null hypothesis that there was no discernible difference in wellbeing on either side of the poverty line.

In sum, this section suggests that although there may be mean differences in wellbeing above and below the poverty line, this is unlikely to be related to the line itself, rather to extremes of poverty and wealth. The implications of this are discussed in the following section.

5 Conclusions

Poverty is one of the most persistent economic ills blighting the whole world. 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 to this thesis, 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 (Layard, 2011). 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, a subjective wellbeing judgement was needed: the 36-point Likert scale using GHQ data in the BHPS provided that measure, inverted to be increasing in well being.

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 frequently-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, gender and education – a panel dataset was constructed with BHPS data, including all members of each household that were over 16 and completed compulsory education, between the years of 1991 and 2008.

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 when income was not included in the specification, and even then it was only significant at 10%. The size of the coefficient was small – -0.083, compared with 0.844 for health or -1.978 for unemployment.

With regard to the paper's first aim therefore, to test whether the relative income poverty line was significant for individual wellbeing, I cannot say that this particular form of poverty appears to be an important determinant.

Regarding the second aim, to test whether the poor and non poor were fundamentally different groups with different wellbeing functions, the decomposition analysis suggested that there was a difference in wellbeing between the two groups (0.9533 points on the

wellbeing scale of 0 to 36) however 96% of the difference is due to characteristics rather than coefficients.

With regard to income the explanation is intuitive: 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.

In the final component of the analysis, a regression discontinuity examination aimed to determine whether there was a step-change in wellbeing around the poverty line. Wald tests at three different bandwidths rejected this possibility, accepting the null hypothesis that there was no discernible difference in wellbeing on either side of the poverty line.

Papers are always limited by their methodology, and this one is no exception. Although I was able to control for fixed effects in the OLS model, one could argue that by not including fixed effects in the decomposition or regression discontinuity analyses, they may be exposed to biases. The main issue with decomposition is that there is no widely accepted way to incorporate fixed effects, primarily because the fixed effects in question 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 I only interpreted 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 I 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).

The observation that individuals adapt to their income – indeed this may be part of the reason why there appears to be no effect of poverty status on wellbeing in this investigation – means that people make do with persistent low income. What they may not make do with is the effects that this low income has: poor health and increased joblessness are both amongst the impacts of poverty, and are associated with lower wellbeing.

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 solely 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 are

believed by many to be the way forward as they are not believe to suffer from the adaptation issues that income poverty does. Furthermore if we cannot assume that increasing income will improve wellbeing, we must look at aspects of life other than income to bring about improvements in individual happiness. The Capabilities Approach championed by Amartya Sen and Martha Nussbaum, 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 Capabilities 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 (1973) and Oaxaca (1973). For example Oaxaca (1973) tested whether white and non-white individuals received different wages simply on the basis of their skin colour.

Here I 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' (p); 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' (np), 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:

$$Y_{np} - Y_p = (\beta_{0np} - \beta_{0p}) + (\beta_{1np}X_{1np} - \beta_{1p}X_{1p})$$

$$+ (\beta_{2np}X_{2np} - \beta_{2p}X_{2p}) \quad (5)$$

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 Xs (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 (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 (2008) 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.

7.2.2 Measurement error and the unexplained component of decomposition

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, p126). 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 (1986) and 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 (1999). This method, further developed by 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 (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 (1973) and Blinder (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 I 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 one should 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 (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 (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 (1988) applied Oaxaca's method (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 would 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 (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 (1994) use a pooled model, and Fairlie (2005) suggests its use to avoid mis-specifying ones model, a pooled model is on balance the most appropriate choice.

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 I 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 (1988) example, setting Ω equal to the coefficients of the pooled model (both groups estimated together) and I an identity matrix.

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%

9 Appendix D – Notes on Happiness

Author's note: This appendix is an extended version of Section 2 of this thesis. If you have read Section 2, you do not need to read this section: there is substantial repetition of Section 2, but this appendix contains more discussion and a wider range of evidence, particularly regarding correlates of wellbeing. Much of the latter is not important for the progression of the paper, hence why it has been relegated here, but is included to show that I have done my due diligence in investigating wellbeing issues.

9.1 Utility, 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 (2002, p408) 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”. However, referring back to Sen's quote above, different components 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 (2003) 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.

9.1.1 Utility

Bentham (1907) originally envisaged utility to be a balance of pleasure and pain, which should be the guiding influence to our actions. However his intention was for the term to be used much more broadly than we would even consider pleasure and pain (experienced

utility) today (Stigler 1950): he intended it to be the foundation of a rational system for civil and criminal law. Rather than being a straightforward calculation, he purported that pleasure or pain would be measured in a context-specific manner that would take into account an individual's sensibility – dependent on age, gender, education, health and so on (Stigler 1950). So we can already see that experienced utility as we see it is less subjective, and Bentham's version suffers the criticism of non-intra-comparability which drove neoclassical economists to depart from the subjective concept altogether¹⁴.

The 'Ordinalist Revolution' as Kimball and Willis (2006) refer to it, converted the 'positive feeling' or 'greatest good' notion of utility to a version that only represented individuals' preferences over alternatives. Utility became computable and comparable: individuals were assumed to maximise their utility, subject to constraints, and that governed their behaviour – they maximised their utility by exchange (Stigler 1950). This new concept of utility became formalised over the recent history of economics, becoming an unavoidable (and valuable, in many cases) part of the discipline, however it was now a significant departure from how Bentham intended. Its limitations – such as being essentially un-measurable – also began to appear.

Classical economists, such as Jevons (1888), wanted to directly measure happiness, stating "in this work I have attempted to treat Economy as a Calculus of Pleasure and Pain." (ibid., p3). In the absence of that direct measurement, they believed that the closest alternative was observing economic behaviour, where choices were made on the basis of utility. Following that, marginal utility (as opposed to total utility – total pleasure or pain) replaced total utility and happiness as the subject of economic analysis; what economists, such as Marshall, became interested in was the additional utility gained from market actions (Read 2007).

¹⁴ Bentham, however, assumed comparability for his concept anyway on the basis that it was desirable (Stigler 1950)

Although marginal utility told us nothing about the amount of utility, it did intend to give some idea of the change in utility, however it became the belief of some that utility did not need any type of measurement to be useful. Demand functions could be computed from observing consumer choices, and utility became an entity that was mathematicised (Stigler 1950). It bore little relation to Bentham's pleasure-pain indicator.

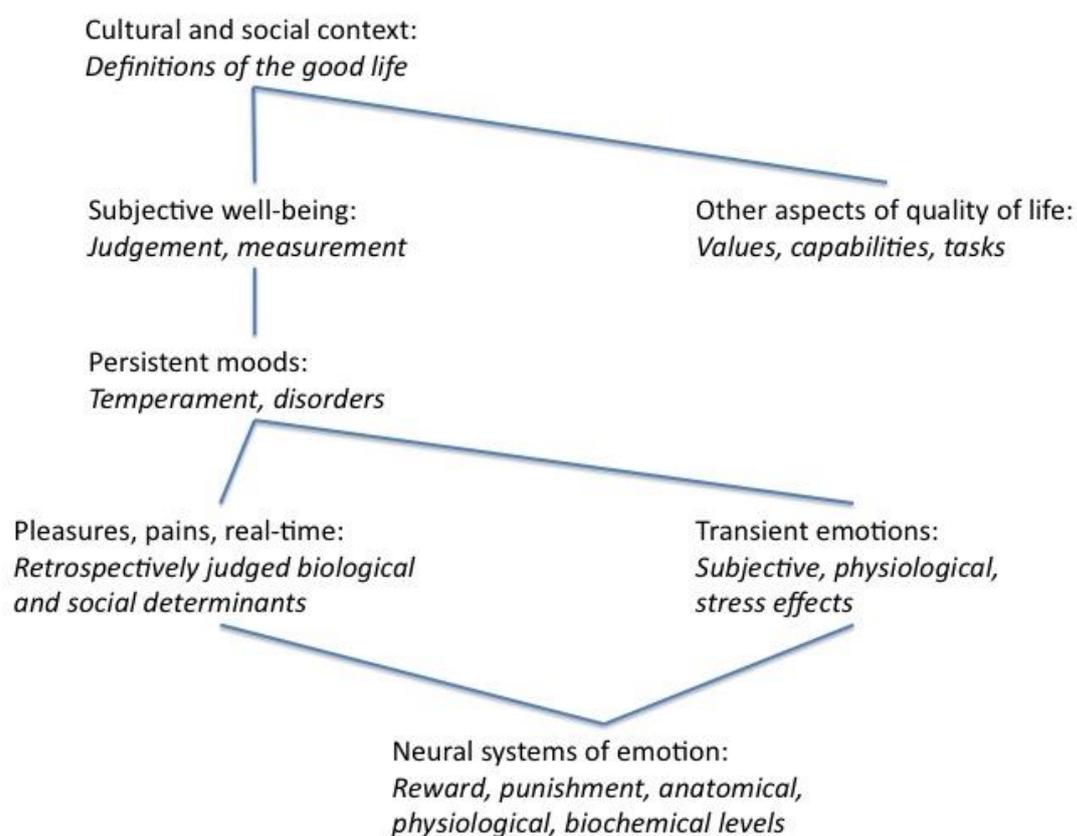
For some time, Easterlin was the only modern economist giving any attention to happiness¹⁵ (Read 2007), but, as discussed above, it has attracted a significant increase in attention in recent years, with growing interest in its measurement (Ferrer-i-Carbonell, Frijters 2004). There is a stream of economics, inspired partly by Kahneman (1999), which believes that there is measurable good that comes out of choices – experienced utility. Although it doesn't represent what Bentham envisaged, it does allow hedonic interpretation of utility. Kahneman is quite careful, however, to precisely define what it is he is referring to (Read 2007). Part of the difficulty in research happiness is that not everyone takes such care, and this leads to contradictory findings between papers. In the section below, Kahneman's continuum of wellbeing is discussed.

9.1.2 Wellbeing and Happiness

Life does not involve simply a balance of pleasant versus unpleasant experiences, it involves several aspects – including happiness and subjective well-being – as detailed in Figure 9.1 below, taken from Kahneman 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.

¹⁵ In his 1974 paper he looked at life satisfaction on a 1-10 scale, rather than moment based happiness

Figure 9.1 – Levels in the analysis of quality of life



Source: Kahneman et al (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 – how individuals view a good life. This is followed by subjective well-being – a judgement of the overall quality of ones life.

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 individuals.

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

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.

9.1.3 Welfare

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, however Kahneman and Deaton (2010) find that although income buys people's life evaluations, it does not buy their daily emotional well-being, after a threshold, somewhat invalidating this view.

Without making any statements or judgements regarding other definitions, this thesis focuses on the concept of subjective well-being (henceforth referred to as wellbeing) used by Kahneman 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 or capabilities as it is primarily a real-time emotion, and the factors I measure change over the space of a year. What is needed here is a higher level (with reference to Figure 9.1) measure, as poverty is not a momentary event, it is a state.

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

9.2 Determinants and influences

Interest in happiness economics has increased significantly according to the number of journal articles published focusing on happiness, leading 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).

Argyle (2003) suggests that much of the information we now have about the causes and correlates of happiness is founded on 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 (1976) conclude that many of the relationships were fairly weak, with just 10% of the variance accounted for between variables. Diener (1984) did not contradict this position, but found explanatory variables responsible for 15% of the variance. This is somewhat explained by 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. I will refer to these factors as I discuss the determinants commonly included in wellbeing analyses.

9.3 Economic Factors

9.3.1 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, 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 or from their expectations of the future. Thus, we notice and react to deviations from aspiration levels." (Frey, Stutzer 2002)

Frederick and 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, Halberstadt, Kapteyn and Van Praag (1977) who find 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 (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 (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 (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 (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.

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 heterogeneity, 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 (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 (Clark, Etilé et al. 2005).

9.3.2 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 study¹⁶. 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 (2001) found that life

¹⁶ 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.

satisfaction was much lower for those who were unemployed than those in employment with otherwise similar characteristics.

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 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).

9.4 Socio-demographic Factors

9.4.1 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, Okun, Stock and Haring (1984) found that it affects subjective wellbeing primarily by influencing occupational status.

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 (2003) notes that the anecdotal self-esteem and optimism effects of education are unproven, and Clark and Oswald (1994) back this up, reporting that the highly educated are more distressed and adapt less than the less well educated to spells of unemployment.

9.4.2 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 (1995) found that the old were less happy than the young, and in some ways they may appear to be 'worse off' (poorer health, lower income, diminishing social circle), however many studies (such as Argyle 2003) found that age had a positive coefficient in happiness regressions. This discrepancy may be due to non-linearity; Blanchflower and Oswald (2008) identified a U-shaped relationship between age and happiness, where the young and the old are happier than those who are middle aged. 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 (2010) note the general difficulty of capturing the effect of age on wellbeing. Firstly the interpretation of any wellbeing questions may change over time, even within the same individual. Looking back at Figure 9.1 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 (2000) 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. 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.

9.4.3 Gender

In World Values Survey data, Inglehart (1990) found that women had higher levels of self-reported happiness than men, albeit only slightly, however Kessler, McGonagal, Swartz, Blazer and Nelson (1993) revealed that women had a higher incidence of mood and anxiety disorders, and Blanchflower and Oswald (2004) found that American women exhibited a decline in wellbeing between the 1970s and 1990s. 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 the 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.

9.4.4 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 therefore 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).

9.4.5 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 (2011) suggest that happiness is beneficial for health and for increasing longevity. 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 (2008) 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.

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 and Janoff-Bulman, 1978).

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. Fixed effects regressions are used throughout this study, in places compared with random effects models to confirm the correct specification.

Chapter 3: Capabilities and wellbeing: A new direction for poverty policy?

Abstract

Multidimensional poverty, such as that identified within the Capabilities Approach, has a wider realm of impacts than a ‘traditional’ monetary poverty measure like as a poverty line, which only focuses on what people can buy. The Capabilities Approach, which focuses on what they can be and do, may be more relevant on an individual basis, and may therefore affect wellbeing. Here, capability information is extracted from the British Household Panel Survey, and underlying capability factors (created using principal components analysis) are found to be significant both in sum and individually. Capability poverty may therefore be a more accurate representation of what poverty is, and thus monetary transfers – without access to freedoms – may have limited use in poverty mitigation.

Acknowledgements:

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. Some data processing was done using PanelWhiz.

10 Introduction

Over the past few decades the concept of capabilities and the Capabilities Approach have become accepted as quality of life tools in developing countries, influencing the creation and structure of the Human Development Index (Anand, Krishnakumar et al. 2011). Created by Amartya Sen (1979, 1985, 1992, 1999 amongst others) as an alternative to welfare economics, capabilities are beginning to enter the economics of the developed world, with authors such as Anand, Hunter and Smith (2005), Anand, Santos and Hunter (2007) and Veenhoven (2011) examining capabilities in Europe.

Sen's objections to the use of the principles of welfare economics in assessing quality of life are numerous and complex but can be summarised into a few key points. Traditionally, welfare economics was based on assessment of utility, which was intended to be the aspect of life all consumers wished to maximise, so that overall quality of life was essentially measured by the contribution of each activity in which the individual was engaged to his/her utility. This eventually became a tautology – because individuals are engaged in an activity and individuals are rational utility maximisers, this activity must be a utility maximising activity. However this process says nothing about individuals' freedoms, choices, opportunities or abilities. Secondly 'welfarism', as Sen (1979) refers to it, is based on models, equations and principles that – in order to formalise them – are highly abstract from reality. Even if they did resemble one reality, it is unlikely that with the social differentiation within countries, let alone across the world, the models would be relevant in many realities. These assertions, along with the dissatisfaction with welfare-based development policy and treatment of poverty in developing countries, have led to the development of the Capabilities Approach and its growing operationalisation.

The Capabilities Approach, henceforth CA, has within it two core concepts: capabilities and functionings. The approach focuses on what people are able to be and do – the beings and doings are functionings, and capabilities are what underlie these functionings: they provide individuals with the means to achieve functionings, via the utilisation of resources such as

money. Resources can only be converted to functionings if there is a capability present, and functionings are only valuable if the individual has had the freedom to achieve them. This provides the foundation of multidimensional approach that the CA embodies: there are many things that people can be and do, but to be 'well' and to have 'a good life' they need to be able to choose beings and doings from a bundle of possibilities. The multitude of beings and doings gives rise to multidimensionality of capabilities, and highlights the weakness in traditional monetary assessment of poverty, which only focuses on what people can buy.

In Chapter 2 the limitations of the standard poverty measure in the UK, and indeed many developed countries, were discussed, arriving at a conclusion that this standard measure seemed unimportant for individual wellbeing and furthermore may be an inappropriate measure of poverty as it focuses on only one sphere of life – financial resources. There appeared to be no difference in wellbeing above and below the specified poverty line, and it was hypothesised that poverty meant more than having less money than others: it was multidimensional, and the impact of being 'poor' in any one of those domains may be more important than money itself, particularly when benefits act as a financial safety net.

The CA is usually applied in development economics, where very limited economic resources often means that individuals are not able to realise the potential functionings from their capabilities, however this paper is written on the basis that it also applies in developed countries: a good life as arguably something that all humans strive for, and the CA, as an analytical tool for of quality of life, can therefore be applied anywhere where quality of life is important; certainly Sen gave no indication that its use was to be restricted to developing countries only.

Futhermore, the capability failures in the UK may not, unless in very extreme cases, result in starvation, premature death from treatable illness or exposure to the elements, but they can affect individual lives in the developed world nonetheless (through deprivation in multiple

aspects, such as health – mental and physical, education or environment), and this paper hypothesises that capability failures can lead to lower wellbeing.

Sen argues that the CA and what he terms the happiness approach to quality of life are almost rival, however this paper, along with others such as Binder (2013) believe that this does not have to be the case. As I will discuss, adaptation need not be a limitation to happiness research; in fact it may prove useful as adaptation leads to revised aspirations, which could be a positive influence on wellbeing. Another limitation with wellbeing research is that happiness, wellbeing - subjective and otherwise - and quality of life are so frequently used interchangeably without prior definition of the concept being analysed, leading to confusion in the understanding of its determinants (the Easterlin Paradox being perhaps the most famous controversy that can be challenged by using a different measure of happiness).

On this basis, it is not contradictory to say that capabilities may influence wellbeing, where wellbeing is taken as a component of an individual's life – here, the perception of her position related to her personal ideals, aspirations and judgements (as defined in Chapter 2). In the same way it is not contradictory to say that having an overall greater quality of life may mean that at any one time an individual is more likely to experience higher momentary happiness than they would have done when their overall quality of life was lower. Of course we cannot assume that this is the always case, but it is not illogical to conclude that it is possible, and this provides the foundation for this paper: do capabilities result in greater wellbeing?

This question is addressed by Anand et al (2005), who set a precedent for extracting capability information from an established dataset, specifically, the British Household Panel Survey (henceforth BHPS). Using a list of core capabilities (Nussbaum 2011), they find that capabilities are important for individual wellbeing in one particular year of the survey.

This paper aims to investigate the importance of capabilities for individual wellbeing, furthering Anand et al's work by employing principal components analysis to target the

capability underlying the chosen BHPS variables and by using the whole duration of the survey (rather than one year).

The paper continues as follows: Section 11 discusses literature on the Capabilities Approach and how it relates to wellbeing. Section 12 uses information on this latter relationship to feed into the development of a methodology to analyse how individual and total capabilities affect a given definition of life satisfaction. This section also presents the data to be used in the empirical analysis, which is undertaken in Section 13. Section 14 summarises this paper and discusses the potential implications.

11 Capabilities, Poverty and Wellbeing

The Capabilities Approach has been seen for some decades as an important alternative to quality of life assessment in developing countries, avoiding the arbitrariness of threshold-style poverty measurements and the adaptation problem associated with happiness measurement. In this section, the Capabilities Approach will be described, before discussing the relationship between capabilities and happiness, and the difference between capability poverty and income poverty, providing the foundations for the subsequent analysis.

11.1 The Capabilities Approach

The Capabilities Approach (henceforth CA) focuses on what individuals are able to be and do in their lives (Sen 1985). It can be seen as an approach to comparative quality of life assessment and to theorising about basic social justice, where each person is an ‘end’¹⁷, not just as part of a total or average wellbeing of a nation. The approach is centred on choice or freedom, holding that the crucial good that societies should be promoting for their people is a set of opportunities, or substantial freedoms, which people then may or may not exercise in action: the choice is theirs (Nussbaum 2011).

The two core concepts of the CA are capabilities and functionings. Sen (1985) sees capabilities as what people are able to do or able to be. These are different from what individuals actually do and experience; this latter concept is termed functioning, where functionings can vary from the elementary, such as having sufficient nutrition, to more complex activities such as feeling no shame within a community. The concept of capability therefore refers to the feasible alternative combinations of these functionings to bring about a certain outcome (Anand et al, 2005).

The CA can be synthesised into a chain of different concepts linking goods to utility:

¹⁷ By ends, the CA doesn’t just mean existence, it means flourishing – so a flourishing human life should be the ends of social justice and therefore policy.

- Non market goods e.g. environment, are in the set of available goods for choice;
- Goods are transformed into characteristics as ultimate desirable properties, so that the same properties can be found in different goods;
- The functioning set is the individual's actual achievement in enjoying the characteristics of the chosen goods (like the body's functioning of absorbing nutrition from food);
- The capability set is the individual's potential achievement in enjoying the characteristics, e.g. fasting for health or religious reasons;
- Evaluation is the ability to rank the capability sets. (Sen 1985)

The 'core' capabilities that should be the goal of a good society, as seen by Nussbaum (2011), can be either internal or combined, where internal capabilities represent a person's intrinsic ability (also referred to as basic capabilities) and combined capabilities are those created by a combination of internal capabilities the political, social and economic environment an individual is part of. Functionings in this context are the active realisations of capabilities, but do not alone indicate the presence of capability; in the CA, choice is an important component. We can illustrate this by considering two individuals, neither of whom is receiving treatment for a medical condition. Both have the same functioning – an illness – but they do not have the same capability if one individual chooses not to receive treatment but the other would prefer treatment but is denied it for whatever reason. Only the individual whose choice is realised has a functioning that derives from a capability.

Sen's (1985) assertions that choice provides the functioning derived from a capability, are replicated in Sudgen's (1998) opinion that it is the opportunity to achieve a functioning that is valuable, rather than the functioning itself. He sees opportunity as valuable for three reasons:

- Individuals lead richer lives, more closely resembling their own desires, if the set of opportunities they can choose from is richer;
- Having choice and making decisions is important for mental wellbeing;
- A greater range of choices provides individuals with a greater number of possibilities for achieving her or his 'ends'. (Sudgen 1998)

We cannot assume that functionings follow from capabilities, thus, measurement of capabilities will have to address the issue of whether it is a capability or a functioning being measured. This is an aspect that will be taken up in Section 12.

If we say that c is an n -dimensional vector measuring capabilities, giving rise to a value measured by a real scalar, then:

$$f: \mathbb{R}^n \rightarrow \mathbb{R}$$

$$c \mapsto \Sigma c \text{ (Anand, Hunter et al. 2005)}$$

But this raises the issue of what c consists of: Sen maintains that the CA should function as a comparison space, thus opposes the prior specification of any list or range of capabilities without reference to individual communities and without democratic discussion. However, if we see the CA as a pluralistic approach with Aristotelian foundations, as Nussbaum does as part of a theory of basic social justice (Anand, Hunter et al. 2005), this permits the development of a concept of a good life along with its constituent components.

Drawing on Aristotle, Marx and Rawls, Nussbaum (2001) bases development of a list of central capabilities on two tenets: first, that certain functions are so intrinsically human that the absence of them would indicate a lack of human life. Secondly, "that there is something that it is to do these functions in a truly human way, not merely an animal way" (Nussbaum 2001, p72), for example a starving person will grab and eat anything potentially nourishing,

much like an animal, so that many of the social elements of human feeding are not present. This is the foundation for her concept of human dignity.

Here the lack of any one component renders a life not worthy of human dignity, thus, Nussbaum's list is irreducibly heterogeneous and the omission of one component cannot be compensated for by the presence of another. Nussbaum purports that to experience human dignity, and individual must have:

- life - being able to live to the end of a human life of normal length; not dying prematurely, or before one's life is so reduced as to be not worth living.
- bodily health - being able to have good health, including reproductive health; to be adequately nourished; to have adequate shelter.
- bodily integrity - being able to move freely from place to place; to be secure against violent assault, including sexual assault and domestic violence; having opportunities for sexual satisfaction and for choice in matters of reproduction.
- senses, imagination and thought - being able to use the senses, to imagine, think, and reason – and to do these things in a 'truly human' way, a way informed and cultivated by an adequate education, including, but by no means limited to, literacy and basic mathematical and scientific training. Being able to use imagination and thought in connection with experiencing and producing works and events of one's own choice, religious, literary, musical, and so forth. Being able to use one's mind in ways protected by guarantees of freedom of expression with respect to both political and artistic speech, and freedom of religious exercise. Being able to have pleasurable experiences and to avoid non-beneficial pain.
- emotions - being able to have attachments to things and people outside ourselves; to love those who love and care for us, to grieve at their absence; in general, to love, to

grieve, to experience longing, gratitude, and justified anger. Not having one's emotional development blighted by fear and anxiety.

- practical reason - being able to form a conception of the good and to engage in critical reflection about the planning of one's life.
- Affiliation
 - A: being able to live with and toward others, to recognize and' show concern for other human beings, to engage in various forms of social interaction; to be able to imagine the situation of another (Protecting this capability means protecting institutions that constitute and nourish such forms of affiliation, and also protecting the freedom of assembly and political speech);
 - B: having the social bases of self-respect and non-humiliation; being able to be treated as a dignified being whose worth is equal to that of others. This entails provisions of non-discrimination on the basis of race, sex, sexual orientation, ethnicity, caste, religion, and national origin.
- other species - being able to live with concern for and in relation to animals, plants, and the world of nature.
- play - being able to laugh, to play, and to enjoy recreational activities.
- control over one's environment:
 - A: political - being able to participate effectively in political choices that govern one's life; having the right of political participation, protection of free speech and association.
 - B: material - being able to hold property (both land and movable goods), and having property rights on an equal basis with others; having the right to seek employment on an equal basis with others; having the freedom from

unwarranted search and seizure. In work, being able to work as a human being, exercising practical reason and entering into meaningful relationships of mutual recognition with other workers. (Nussbaum 2011)

This list is seen as a threshold – it does not seek to solve all distributional problems, rather it specifies a social minimum for human dignity. The list can be specified further for each context, meaning that there is scope to elaborate upon it differently where tradition and history requires (Nussbaum 2011). Thus it does not fully encompass life, but provides a starting point whereby we can assess whether an individual has access to that social minimum and therefore experiences human dignity. The list is not exhaustive, but, as I show in Section 12.3, wellbeing increases along with the number of capabilities (as measured using the list above) in a near linear fashion; this indicates that it is additive and is a suitable measure for further analysis.

Thus far I have accepted the assumption that, as Nussbaum (2011) intended, the list of central capabilities is non-compensatory, in other words, more of one cannot compensate for lack of another. This is an assumption that is questioned in Anand et al (2005) who find that some capabilities have a greater effect on wellbeing than others (although this, they say, is due to the functional form of the analysis). Indeed Veenhoven (2010) notes the possibility of there being different effects from general capability as well as from specific capabilities and Alkire, Qizilbash and Comim (2008) state that capabilities have intrinsic values, so they are valuable themselves rather than instrumental.

Thus, it may be possible that, on an individual level, some capabilities do matter more for wellbeing; it may be considered arrogant to presume that all capabilities are equally as important for all people, who should have the freedom to value capabilities individuals alongside the freedom to convert capabilities into functionings. This is part of Sen's reluctance to specify particular capabilities: democratic processes and social choice procedures – such as consensus building – within each society should be responsible for

developing any list of capabilities, however even then one cannot assume that all the chosen capabilities are equally important to every individual.

If one assumes that Nussbaum's list is a reasonable starting point, without assuming it is anything more than the humble open-ended list she intended it to be, it can serve as a set of basic capability indicators. Viewing it in this way, we may be able to relax the non-compensating aspect of the list, that is, I could allow one capability to compensate for another: I can include in our analysis the search for a threshold number of capabilities, akin to the poverty line income thresholds discussed in Chapter 2. This will be further elaborated in Section 12.2.2.

11.2 Capabilities and Wellbeing

As mentioned above, the inherent measurability issues with the capabilities concept means that empirical evidence concerning its role in wellbeing is very limited. Another issue that complicates the relationship is that some research has used wellbeing as a measure of capabilities and vice versa: some scholars assume they come from the same concept, after all, if one was unhappy they must be not living 'a good life' and if one is happy they must think they are living 'a good life'.

Sen does not support this view of capabilities, and goes as far as to say that wellbeing is not as good a measure of 'a good life' being lived as capabilities are, mainly due to the propensity for humans to adapt to conditions, whether good or bad, meaning that in research, the happiness and capabilities approaches seem to be competitors (Comim 2008): happiness research appears to be more applied, exploring positive psychological features related to wellbeing and quantifies causes and processes underlying happiness. The CA, by comparison, is more philosophically founded, and emphasises functionings and capabilities as ways of evaluating advantages, often criticising the reliability of happiness measures as being 'informationally narrow' (Comim 2008).

The informational criticism of happiness as an approach to measuring 'a good life' assumes that by measuring happiness we are measuring the 'outcome' of a person's being, which would be an unwise act when we don't know how that outcome arose or what is behind it. This – in the main – follows from an additional criticism: the ability of individuals to adapt to even severe deprivation. Research has suggested that individuals can and will adapt to a range of conditions including disability (Oswald, Powdthavee 2008) and life events (Lucas 2007). This issue needs to be addressed; if individuals can adapt to negative stimuli, this will arguably affect the way capabilities influence wellbeing.

Although it has been suggested in some studies that adaptation occurs, others have reported that adaptation is far from universal, affects different measurements of wellbeing differently, affects different aspects of life differently, is highly individual and is dependent on other factors, for example climate (Ubel, Loewenstein et al. 2005, Powdthavee 2009, Diener, Lucas et al. 2006). This leads to the suggestion that adaptation is not certain.

Furthermore the adaptation 'problem' may be more present in development applications than in Western economies: in rich countries, with higher standards of opulence and liberty, a significant and increasing part of the population suffers from issues such as depression or anxiety (Putnam 2001, Fombonne, Simmons et al. 2001). CA theory would have us suggest that these people must have impaired functionings or capabilities, but in developed economies, these impediments must be special in character as they usually imply some kind of constraint, such as lack of access to healthcare, that may not be the case (Pugno 2008). Indeed in developed economies, wellbeing is often lower than material indices (such as GDP growth, income or consumption measures) would have us believe, so ignoring wellbeing on the basis of affluence would be unwise.

Additionally, with adaptation comes aspiration, so even if individuals do adapt to situations, this does not negate the ability of those same individuals to have aspirations of a better life and to strive to achieve those aspirations. Indeed adaptation may be a positive as well as

negative phenomenon (Teschl, Comim 2005). Although adaptation is therefore an issue worth considering, the evidence above suggests that it is not so significant a problem in many applications, including this one.

This combined evidence allows us to assume that, in this situation, wellbeing and capabilities are not competitors for quality of life judgements. Rather wellbeing – in terms of the definition purported above - is a justifiable thing to measure and analyse, despite its limitations, and Binder (2013) goes as far as to suggest a fusion between both approaches could overcome the weaknesses of both individual approaches, which would not be possible if they were fundamentally incompatible.

Moving on to evidence examining the relationship between capabilities and wellbeing, Anand et al (2005) summarise some literature that touches on capabilities and their relation to wellbeing, citing Martinetti (2000) and Brandolini and D'Alessio (1998) who found positive relations between functionings and wellbeing, however note that “by concentrating on functionings alone, the analysis might do no more than multivariate work on poverty does already and it fails to exploit one of the most distinctive elements of the capabilities approach.” (Anand, Hunter et al. 2005, pp14-15)

In research using the World Database of Happiness, Veenhoven (2010) suggests that happiness is affected by most of the capabilities in his study, based on the Nussbaum list of capabilities, with particularly strong effects from socially based capabilities and those involving aspects of health and mental health. Only ‘intellectual’ capabilities were observed to have no effect.

In Anand, Santos and Smith (2007), capabilities are targeted using a custom designed survey conducted within a roughly representative sample of 1,000 adults in the UK, finding that many of their capability dimensions were significant correlates of happiness. A study with a larger sample – Anand et al (2005) - uses information in the British Household Panel Survey to represent individual capabilities, with reference to Nussbaum’s (2011) list. In this

paper they selected questions for analysis from this survey which were related to those substantive values reflected in the aforementioned list, with due consideration given to the distinction between capabilities and functionings.

Anand et al (2005) find that many of the capabilities do appear to affect wellbeing. Health is observed to affect wellbeing negatively where it restricts activities, as does access to adequate nutrition and adequate shelter. The absence of crime and freedom of movement have smaller – but still positive effects – whereas higher education reduces wellbeing (suggested by, for example, Argyle (2003) and Veenhoven (1997) to be due to raised expectations). Emotions, such as fear and anxiety, have a strong relationship with wellbeing, as do being able to concentrate, to sleep or to be free from strain. Being able to overcome difficulties, an example of practical reason, has a small positive effect along with being able to make decisions.

Affiliation, which allows individuals to feel part of society, has a positive effect on wellbeing, as does the ability to 'play'. The ability to vote – indication of control over individual environments – was not significant, however the ability to work does limit wellbeing. As this analysis suggests, capabilities do appear to be important for wellbeing, although to varying extents and with some gender differences.

11.3 Capability Poverty versus Income Poverty

Income as a measure of poverty is widely used in various forms, as described in Chapter 2. One of the most common forms is that of a poverty line, due to its simplicity (Sen 1992): a poverty line is a minimum level of income, below which an individual (or household) will be said to be living in poverty. The measure often used in the UK is 60% of the median equivalised household income; in Chapter 2, it was suggested that this standard did not have any meaning to individuals in terms of their wellbeing.

The simplicity of the poverty line, as well as being a benefit, is also its main criticism: it arises from a narrow definition, limiting the interpretation of the measure to any more than a

head-count of those below and above a pre-defined threshold. It tells us nothing about how poor individuals are and how that affects their lives, but more importantly, lacks the context needed to tell whether those identified as poor are actually deprived. Sen (1992) differentiates between the descriptive and policy forms of poverty, where the former deals involves an acceptance of the existence of deprivation and an attempt to understand it within the relevant social context, whereas the latter is an operationalised view, with the assumption that something should be done about it, and thus lacks context.

The descriptive view of poverty recognises that there are multiple hardships involved in deprivation that may vary between societies. Sen (1992) suggests that this is one reason why poverty is better measured in terms of capabilities: it is likely that within societies there may be agreement on what constitutes significant deprivation (for example acute hunger) rather than on monetary measures, where agreement on a threshold for deprivation may be difficult and perhaps unwise.

In Sen's approach, poverty is capability failure, where one of the failures is inadequacy of economic means (the means to prevent capability failure). This associates income with the causal requirements of minimal capabilities, for individual groups. To illustrate this, Sen uses the example of two individuals who are hungry and may end up malnourished, but one is hungry because she is fasting and the other because he has not the means to purchase food (Sen 1992). Both have the same functioning (being hungry) but only one (the faster) has a capability, and income poverty is the cause of the capability failure. Here one can see that income is only part of the poverty 'story'.

Empirical evidence comparing income and capability poverty is limited, not least because of the openness of the concept of capabilities and the inherent measurability issues that brings. Evidence that compares the effect of these concepts on happiness is even more limited. In a paper comparing capability poverty, wellbeing poverty and income poverty, Kingdon and Knight (2006) find that income poverty in their South African data is not a good

representation of capability poverty, as the capability measures appear to matter to happiness even after controlling for income and assets.

11.4 Summary

The Capabilities Approach (CA) is a framework for analysing quality of life, looking at what individuals are able to be and do in their lives. The two core concepts – capability and functioning – are linked by a critical component: choice. One may appear to exhibit a functioning, but if an individual has not chosen it, it does not result from a capability, therefore that individual has a capability failure.

The CA originated from Sen's dissatisfaction with poverty and quality of life assessment in developing countries, but one can apply this pluralistic approach to developed countries using a list of central capabilities developed by Nussbaum (2011) and adapted in papers such as Anand et al (2005) and Veenhoven (2010), which suggest that capabilities do affect wellbeing and that there are different impacts from different capabilities. This, along with research by Alkire et al (2008), allows us to relax the irreducible heterogeneity assumption that Nussbaum suggests for her list.

This paper is based on Anand et al's (2005) work, with several key differences. Firstly, they use a different dependent variable – that asking individuals to rate their life satisfaction on a one to seven scale, whereas here the 36-point likert scale is used. The reasons for choosing this latter variable are discussed in depth in Chapter 2 of this thesis, arriving at the conclusion that the information gain from the larger and more ordinally comparable scale provides more flexibility for statistical investigations, along with the observations being more normally distributed than the individual component responses (Banks, Clegg et al. 1980).

The second key difference is that Anand et al (2005) do not use panel data, on the basis that they cannot accept the assumption of fixed personality effects. However, Pevalin (2000) finds that within the GHQ12 measure of wellbeing, personality effects are more-or-less constant over time. The growing use of this wellbeing variable in panel data investigations

(for example, Gardner and Oswald (2007), who list more than a dozen other papers that use this same variable) supports this observation, and on this basis, this paper assumes constant personality effects and uses panel data methods (described in Section 12).

Finally, although many of the variables are the same, there are some differences in the variables chosen to represent the capabilities used in the analysis. For each capability, the variables used are described in Appendix B. Anand et al (2005) find statistically significant effects on wellbeing from at least one of the variables from each capability 'category', although in varying magnitudes and with gender differences. Following on from Anand et al (2005), this paper aims to investigate the importance of capabilities for individual wellbeing, using a list of core capabilities (Nussbaum 2011).

12 Methodology

So far this paper has discussed the differences between income poverty and capability poverty, and considered the nature and specification of a capabilities list and the justification of using it to assess whether an individual has a good life – ultimately leading to greater wellbeing. Central capabilities are paramount to human dignity, assuring individuals a minimum social standard of life. Yet there is little research focusing on capabilities and their impact on individuals.

This paper aims to contribute to the literature on capabilities, by investigating the importance of central capabilities for individual wellbeing through econometric analysis: Using a list of core capabilities (Nussbaum 2011) and the precedent set by Anand et al (2005), I extract capability information from questions within the BHPS and use it to create a range of capability indicators to be used in analysis, which are then subject to principal components analysis to target the factors underlying the BHPS measures. These factors are then used in an assessment of the impact of capabilities on wellbeing, with the ultimate aim of suggesting further investigations into capabilities for policy purposes.

12.1 Dataset

This study, like Chapter 2, uses BHPS data to provide its variables. As a multi-purpose study, established in 1991, the BHPS provides a wealth of information about a set of individuals, belonging to 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 year 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 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 2007/8, 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.

12.1.1 Wellbeing measurement

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 term¹⁸. W is a categorical variable, and the explanatory variables are in various forms.

In Chapter 2 the potential wellbeing measurements contained within the BHPS are discussed, arriving at the conclusion that the GHQ12 measure, which we will retain in this analysis.

There are many versions of the GHQ; the original, developed by 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 inception and it has been used in many studies of wellbeing, including Gardner and Oswald (2007), who list more than a dozen other papers that use this dependent variable.

The GHQ12 questionnaire asks individuals:

¹⁸ This is based on the specification used by Ferrer-i-Carbonell and Frijters (2004)

“Have you recently:

- Been able to concentrate on whatever you are doing?
- Lost much sleep over worry?
- Felt that you are playing a useful part in things?
- Felt capable of making decisions about things?
- Felt constantly under strain?
- Felt you couldn't overcome your difficulties?
- Been able to enjoy your normal day-to-day activities?
- Been able to face up to your problems?
- Been feeling unhappy and depressed?
- Been losing confidence in yourself?
- Been thinking of yourself as a worthless person?
- 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 scale.

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. This approach was used by Clark and Oswald (1994) and Gardner and Oswald (2006).

12.1.2 Measuring Capabilities

As mentioned previously, there is a risk in measuring capabilities that we may be measuring functionings instead, and the risk of measuring functionings is that you see a functioning and assume capability where there may be none: Fleurbaey (2002) highlights the difficulty of determining the notion of access, and supposing that we can tell whether someone genuinely has access to a bundle of functionings.

The key to focusing on capabilities is to focus on choice, and through examining the questions behind each variable used in detail, we can gauge how much choice we can assume.

If we are going to target 'a good life' we need to undertake an evaluative exercise to distinguish between two different questions (Nussbaum, Sen 1993): what are objects of value? And, how valuable are they? Sen (1992) states that the assessment of capability sets is negatively related to their number of elements: the value of a set can be reduced when the number of elements is reduced, but it could not be enhanced by an increase in trivial choices. Evaluation of possible capability sets can be undertaken by a variety of means, including the assessment of/ by:

- the value of highest-value (weighted) element;
- the number of elements;
- a combination of a maximal element x with the number of members of the set (x, n) ;
- the option ultimately chosen; and/ or
- an a priori definition of a set of basic capabilities.

According to Sen (1992), neither option 1 nor option 2 could provide straightforward empirical counterparts for measuring capabilities. Option 3 and Option 4, the latter of which is based on Samuelson's revealed preference, are limited by data (specifically, the lack of counterfactual information). Finally, he believes option 5 should generally be avoided if the set is not context specific, however it can be justified in, for example, poverty assessment, thus giving 'permission' for a list of central capabilities to be used in this situation. Nussbaum's (2011) list therefore forms the foundation of the analysis here, as it does for Anand et al (2005) and Veenhoven (2010).

The list of central capabilities mentioned above is matched to indicators in **Error! Reference source not found.**, where a range of BHPS variables are linked to core capabilities (further details of coding are supplied in Appendix B). This short list of capability indicators was refined from a longer list on criteria such as availability in multiple waves, number of respondents to the question, whether it focuses on a capability or a functioning and how well it could fit within the description of Nussbaum's capabilities. The long list was created from a trawl of the BHPS documentation, comparing the wording of questions to the descriptions of Nussbaum's capabilities.

In order to create capability indicators, each variable is converted to a binary scale if not already binary, for reasons of analytical simplicity: in this study I aim to look at the wellbeing differences between the 'haves' and 'have-nots' of capabilities, so rather than suggest that individuals have a partial capability achievement, I assume that capability achievement is binary.

One complication with this assumption is that individuals may have different capability thresholds, whereby some have perceive they 'have' a capability at a different level to others, however Nussbaum (2011) implies that capability achievement is indeed dichotomous, as a partially achieved capability is still not totally achieved. Using some judgement and also the method used in Anand et al. (2005), the variables chosen for

analysis are converted to a binary scale. This way I can say a capability is either present or not present, drawing thresholds for variables as described in Appendix B. Using Anand et al. (2005) as a starting point, care has been taken to – as much as possible with secondary data – ensure that the variables are measuring capabilities rather than functionings. Full details of which codes are included in each variable are provided in Appendix B.

One of the key benefits of the BHPS is that it returns to the same respondents in each wave of the survey, allowing us to control for personality effects in question responses. Anand et al (2005) find that personality does influence wellbeing, and may influence the impact of capabilities, but that controlling for personality did not change the results in their one-wave cross-section. Nonetheless the longitudinal nature of the data means that I can be more confident that personality effects on any relationship between capabilities and wellbeing are accounted for.

One of the critical points that must be made here is that I have not selected exactly the same variables as previous authors adopting this method have. The refining criteria are partly to blame for this (in choosing a panel dataset, I limit myself to variables that are available in more than one year; and in choosing one form of a dependent variable I cannot use closely related components as regressors) but it is important to note that by and large, the selection of variables from the BHPS – or indeed any dataset – will be down to the researchers. My interpretation of, for example, the emotions capability might be different to someone else's.

This is an unavoidable complication of extracting capability information from an existing dataset not designed to measure capabilities, however, as discussed above, great care has been taken to ensure that – as much as possible – the variables selected do represent the core capabilities.

Table 12.1 – Capability Indicators Selected from BHPS

Capability	Variables (including BHPS title*)
Life	No data available
Bodily health 1	wHLLT – Health limits daily activities
Bodily health 2	wHLLTW – health limits type or amount of work
Bodily health 3	wLFSAT1 – satisfaction with health
Bodily integrity 1	wCARUSE – have access to car
Bodily integrity 2	wCRDARK – feel safe walking alone at night
Bodily integrity 3	wHSPRBQ – accommodation has vandalism/ crime in the area
Bodily integrity 4	wCRMUGG – extent of people being attacked
Bodily integrity 5	wCRWORA – worry about being a victim of crime
Senses, imagination and thought	wQFEDHI – highest qualification held
Emotions 1	wSSUPA – is there someone who will listen to you?
Emotions 2	wSSUPB – is there someone who will help in a crisis?
Emotions 3	wSSUPC – is there someone you can relax with?
Emotions 4	wSSUPD – is there someone who really appreciates you?
Emotions 5	wSSUPE – is there someone you can count on to offer support?
Practical reason	wLFSATO – satisfied with life overall
Affiliation 1	wORGA – active in organisations
Affiliation 2	wFRNA – frequency of talking to neighbours
Affiliation 3	wFRNB – frequency of meeting people
Affiliation 4	wHSCNTF – would like to socialise but must do without because I cannot afford it

Other species	No data available
Play 1	wLFSAT6 – satisfied with social life
Play 2	wLFSAT7 – satisfied with amount of leisure time
Play 3	wLFSAT8 – satisfied with use of leisure time
Play 4	wJBHRLK – preference over hours worked
Control (over one's environment) 1	wVOTE7 – voted in May 2005 (or previous) general election
Control 2	wLFSAT2 – satisfaction with income
Control 3	wLFSAT3 – satisfaction with house
Control 4	wLFSAT4 – satisfaction with spouse/ partner
Control 5	wLFSAT5 – satisfaction with job.

* The 'w' prefix at the beginning of each variable title indicates the 'wave' of the survey the variable is from.

12.1.3 Control variables

In addition to capabilities, there is a range of variables that are recognised in the economic literature (Clark, Frijters et al. 2008, Argyle 2003) as affecting wellbeing (Table 12.2). Using this literature, the model in this study is therefore based on the assumption that individual wellbeing depends on factors which include:

- Age (continuous and squared to account for the 'u' shaped relationship – this form was used in Blanchflower and Oswald (2008) amongst others)
- 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)
- Marital status (categorical)

- Highest educational level attained (categorical, henceforth referred to as ‘education’)
- Employment status (categorical)
- Health (binary – 0 if individual has at least one health problem, 1 if individual has no reported health problems)
- Area (categorical)

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 12.3. As mentioned above, health is a binary variable, age is included in its continuous form as well as squared and income is expressed as a natural log.

Although seen as a potential determinant of wellbeing, education will not be included in the analysis in Chapter 4. This is because educational status is used to determine the senses, imagination and thought capability indicator, so this indicator would be highly correlated with any education dummies.

The summary statistics for the dependent and control variables, including dummy variables, are shown in Table 12.3.

Table 12.2 – Dummy variables

Variable	Employment status	Marital status	Area
Reference category:	Training/ education	Never married	Northern Ireland
Dummies:	Retired	Married	North
	Family care	Divorced/ separated	South
	Long term sick	Widowed	London
	Unemployed		Wales
	Employed		Scotland
			Midlands

Source: Author’s analysis of BHPS data

Table 12.3 – Summary statistics

Variable	N	Mean	Std.Dev	Min	Max
Dependent variable					
Wellbeing	193,051	24.805	5.430	0	36
Independent variables					
Equivalentised income	226,040	23,350.93	15,791.65	0	871,802
Age	199,395	45.840	18.721	16	100
Dummy variables					
Training/ education	195,772	.050	.219	0	1
Retired	195,772	.205	.403	0	1
Family care	195,772	.084	.277	0	1
Long term sick	195,772	.043	.202	0	1
Unemployed	195,772	.038	.191	0	1
Employed	195,772	.576	.494	0	1
Never married	199,370	.306	.461	0	1
Married	199,370	.536	.499	0	1
Divorced/ separated	199,370	.075	.263	0	1
Widowed	199,370	.084	.277	0	1
Northern Ireland	224,861	.081	.273	0	1
North	224,861	.198	.399	0	1
South	224,861	.174	.379	0	1
London	224,861	.065	.246	0	1
Wales	224,861	.130	.336	0	1
Scotland	224,861	.151	.358	0	1
Midlands	224,861	.201	.401	0	1

Source: Author's analysis of BHPS data. Means for dummy variables are proportions of sample that have the dummy present, this are equivalent to proportion in that category.

12.1.4 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 education 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)), 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 'wild' responses were recoded to missing.

12.2 Methods of analysis

12.2.1 Principal Components Analysis

Principal components analysis (henceforth PCA) is one of the core methods of factor analysis, where we endeavour to uncover underlying relationships between observed and unobserved latent variables (see for example Morciano, Hancock and Pudney (2012)). If we have an unobserved variable that we want to analyse (Y), but only have two related variables (f_1 and f_2), we can analyse the relationship:

$$Y = b_1f_1 + b_2f_2 + \gamma$$

where f_1 and f_2 are unobserved factors that are correlated with Y , b_1 and b_2 are correlation coefficients and γ is a unique component of variation not covered by either factor.

This technique is appropriate and useful in this investigation, as there is a large number of capability indicators that have not been specifically designed to extract information about the capability; rather, most capabilities have a number of indicators to cover all potential aspects of that capability. As such, there are more indicators than capabilities, and the indicators are imprecise. Using PCA allows variable reduction as well as the ability to focus on the nature of the individual capability more closely.

Focusing on one capability in particular, for example health, there are three capability indicators within the BHPS that I believe are correlated with the actual, but unobserved, capability. So one can say the health capability is:

$$\text{Health} = \omega_1l_1 + \omega_2l_2 + \omega_3l_3 + \gamma$$

where ω represents the 'weight' for each indicator (I) and γ is a random component. The key therefore is to identify the weights, which is the goal of factor analysis techniques. Here, the three indicators are correlated with the underlying factor, which helps determine the amount of variation. The correlation will determine how much the indicators change as the factor changes: if health is correlated with I_1 , I_2 and I_3 , even if there is no intrinsic connection between I_1 , I_2 and I_3 they will still be correlated because of their common relationship to health.

In using factor analysis techniques, we can reduce a range of capability data into one factor/ a number of factors that cover the majority of the variation. The number of factors estimated is usually equal to the number of variables used to measure the underlying concept, but not all factors will be equal in importance. The Kaiser Test is one way of determining which factors to take forward. This test is based on inspection of the eigenvalues (where eigenvalues represent the amount of variance accounted for by each factor, where the sum of the eigenvalues is equal to the number of indicators): the recommendation is to retain only those components that have an eigenvalue above one, where one is the average size of the eigenvalues (Kaiser 1960). Parallel analysis (Horn 1965) is undertaken to confirm that the eigenvalue rule holds, or if it doesn't, to determine what the threshold for inclusion is (Dinno 2009). After using PCA on the long list of capability indicators, for each capability individually, the factors to be used in analysis are selected using this test. All the capability indicators are transformed to the same scale using z-scores prior to undertaking PCA.

The retained factors are then used in the analysis stage to represent individual capabilities, however they first must be rotated to find the simple structure for the factor loadings (i.e. creating a solution that allows factors to load close to 1 if important or close to 0 in unimportant). This is required because some factors can be affected to a greater (or lesser) extent by particular variables, which can make it difficult to interpret factors in some situations. By rotating the factors, we find a solution whereby each variable affects only a small number of factors – those retained after the Kaiser and Scree tests. Varimax rotation

is the standard procedure for rotation, as it keeps the 'axes' orthogonal and maximises the variance retained (rotation unavoidably loses some variance as the rotations are within the 'factor' space rather than the 'data' space (Lewis-Beck, Bryman et al. 2004). Once rotated, the factors can then be used in further analysis.

12.2.2 Applying a capability 'poverty line'

Assuming, as previously discussed, that capabilities are not irreducibly heterogeneous, we can examine the relationship between the number of capabilities present, the sum of the capability indicators belonging to an individual, and her or his wellbeing. The simplest way of looking for a threshold is to plot the dependent variable against the independent variable, in this case, I plot wellbeing against a sum variable that indicates the number of capabilities an individual has. This will give an idea of any relationship that might exist, and if it is linear, whether there are any obvious 'jumps', which might indicate thresholds. Further analysis could then include regression discontinuity analysis, around the hypothesised threshold should one appear obvious.

12.2.3 Fixed effects analysis

Wellbeing research has the unavoidable complication of the existence of individual unobserved heterogeneity in reporting, in other words, personality is known to affect wellbeing responses: indeed, genes and psychological traits have been found to have a correlation of up to 80% with wellbeing reports (Lykken, Tellegen 1996). To counteract this, the use of panel data has the advantage of being able to control for time-invariant determinants of wellbeing, such as personality, allowing us to focus on how changes in capability possession can affect wellbeing. As with previous chapters, I use a fixed effects model in testing the effects of capabilities on wellbeing. Two versions of analysis will be conducted: one with all capability indicators and one with the capability factors calculated through PCA. A random effects model will also be estimated and compared to the fixed effects model with a Sargan-Hansen test.

12.3 A brief analysis of wellbeing and capabilities

From Figure 12.1 we can see that the mean wellbeing is higher when an individual possess a larger number of capabilities. This provides some vindication of the hypothesis of this paper: having more capabilities does seem to result in greater wellbeing.

The scatter plot indicates that there is a near-linear relation between the number of capabilities and median wellbeing, with some disturbance below 4 capabilities and above 24 capabilities; indeed above 24 capabilities, the slope of the fitted line is shallower, indicating that the marginal increase in wellbeing due to increasing capabilities is lower after this point.

Similarly in Figure 12.2, it is evident that within increasing wellbeing scores the median number of capabilities rises, however there appears to be some fluctuations, with the increase in median capabilities smaller between wellbeing scores below 14, and scores above 24, with the largest increases observed between scores for the middle range of wellbeing.

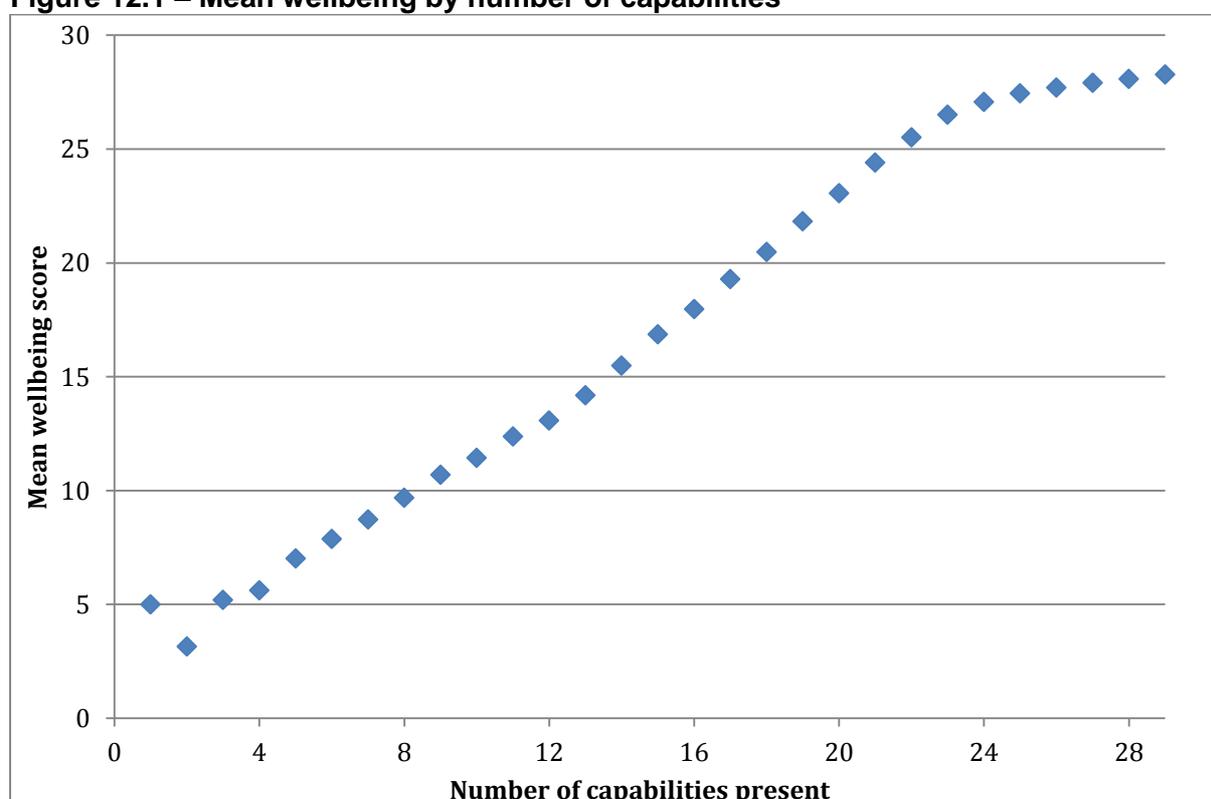
In Section 12.2.2 it was suggested that any significant discontinuity in the relationship between capabilities and wellbeing could be observed by looking at scatter diagrams of the two variables. From Figure 12.1 and Figure 12.2 it is not evident that there is any significant jump that would indicate a threshold, and there is no current evidence for there being any threshold in the number of capabilities an individual should have to be poor or not poor.

Nussbaum (2011) suggests that all capabilities are equally important, so that if even one is missing for an individual, that person may have a lower quality of life thus lower wellbeing, however looking at Figure 12.1 it would appear that the mean wellbeing score rises along with the number of capabilities achieved. Furthermore, the incremental rise in wellbeing is lower above capabilities of 24 than below it, indicating that the assertion above may not be reflected in data and that at some point (here, 24 capabilities) the marginal increase in wellbeing is lower. In addition, we reasoned in Section 11.1 that some capabilities may matter more to wellbeing than others, so where capabilities are diverse, this method of

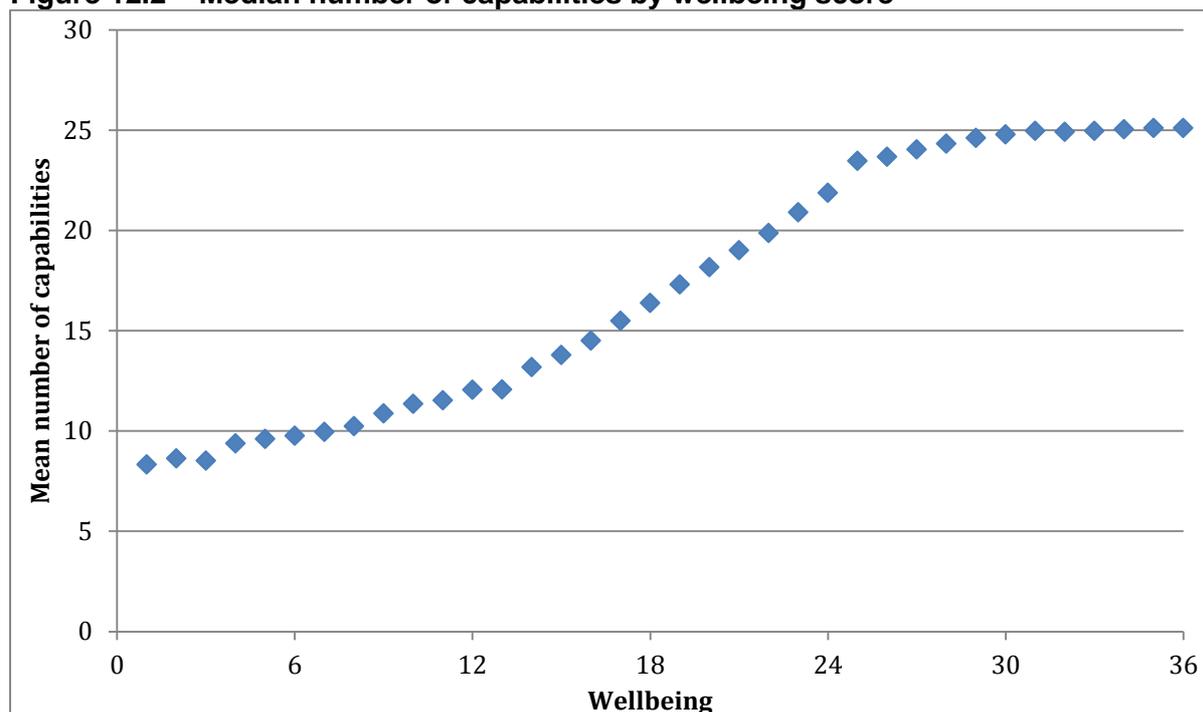
investigation may not highlight any thresholds as they may be in different places for different capabilities.

These observations suggest that there is not a single threshold in the number of capabilities that dichotomises wellbeing into high and low categories: Nussbaum's assertion that the loss of one capability is enough to render a life not worthy of human dignity appears to be contrary to the almost-linear relationship. As a result, there is no clear capability poverty line, so the analysis in Section 13 will focus on individual capabilities rather than a sum.

Figure 12.1 – Mean wellbeing by number of capabilities



Source: Author's analysis of BHPS data. N = 10,725 individuals

Figure 12.2 – Median number of capabilities by wellbeing score

Source: Author's analysis of BHPS data. $N = 10,725$ individuals

12.4 Summary

In this section I set out the methodology for undertaking the analysis in this paper. I discussed the dataset to be used – the British Household Panel Survey (BHPS) – and the variables to be included. The dependent variable – wellbeing – was described, following on from discussion in Chapter 2 that concluded it was theoretically rigorous, policy relevant and empirically robust. The measurement of capabilities was then covered, basing the selection on research done by Anand et al (2005) keeping as close as possible to the concept of capabilities rather than functionings. Summary statistics for a range of control variables were then presented, including age, income, employment, education, marital status, region and gender.

Moving on to the techniques to be used for analysis, beginning with principal components analysis (PCA). PCA allows us to uncover underlying relationships between observed and unobserved factors. As I am using existing data and 'matching' questions from BHPS it is likely that the variables are not precisely measuring the concepts, for example by only

measuring specific aspects of health, so by using more than one variable for each concept, and then using PCA to measure the underlying factor, I can reduce the number of variables to a number of factors that measure the majority of the variation. The factors are then used as independent variables.

I also discussed the possibility of doing regression discontinuity analysis on any threshold that appeared in the data that indicated a 'break' in the relationship between capabilities and wellbeing, however none was obvious. There is no evidence that any threshold exists in this data or in any data used in other investigations. On this basis the investigation here focuses on the impact of the individual capabilities and the sum of all capabilities.

One of the major benefits of the BHPS is that it returns to the same individuals year-on-year, allowing us to observe the same person's responses in each wave in which they participate. This means that unobserved heterogeneity – for example from personality effects – can be controlled for, as this paper can assume that personality is more-or-less constant over time. For this paper, the effects of capabilities on wellbeing will be investigated using fixed effects regression (although random effects will be estimated and compared before selecting fixed effects for final analysis).

Looking briefly at the distribution of wellbeing and capabilities, it appears that higher levels of wellbeing are associated with a higher number of capabilities, and vice versa. This seemingly positive association of more capabilities with greater wellbeing provides a useful basis for the investigations in the following section.

13 Empirical Analysis

This paper aims to contribute to the literature on capabilities, by investigating the importance of a list of central capabilities – both as a whole and individually – for individual wellbeing. The outcome of Chapter 2 has suggested monetary poverty in the form of an arbitrary dichotomy may not be a significant determinant of wellbeing; if this is true, we can hypothesise that multidimensional poverty – capability deprivation – may be a more individually relevant determinant.

Building on work by Anand et al (2005), a range of BHPS variables have been selected to represent – some individually, others collaboratively – capabilities drawn from a list developed by Nussbaum (2011). In Section 12, this paper noted that higher wellbeing is associated with larger numbers of capabilities held by an individual, and vice versa providing a foundation for the analysis undertaken here. In this section, the collection of capability indicators is reduced to a smaller number of factors to represent capabilities. These factors are then used as independent variables in fixed effects regression to appraise the impact of the capabilities on wellbeing.

13.1 Principal Components Analysis

As discussed in Section 12.2.1, Principal Components Analysis (PCA) allow us to reduce a long list of capability indicators (shown in **Error! Reference source not found.**) to a smaller number, focusing on the common factor underlying the data (the capability itself). The factors for inclusion are selected based on their eigenvalues – that is, the amount of variance accounted for by each factor – with confirmation by parallel analysis.

Three variables were used for the bodily health capability, and from these, one underlying factor was retained with an eigenvalue of 1.933, accounting for 65% of all variation. Parallel analysis confirms – by reporting adjusted eigenvalues – that only one component should be retained, as only component 1 has an eigenvalue that is greater than the corresponding

adjusted eigenvalue. There is a roughly equal factor loading for each variable on component 1.

Table 13.1 – Principal Components Analysis of Bodily Health Capabilities

Factor loadings	Component 1	Component 2	Component 3
Bodily health 1	0.576	-0.605	0.549
Bodily health 2	0.589	-0.159	-0.792
Bodily health 3	0.567	0.780	0.264
	Eigenvalue	Adj. eigenvalue	Proportion
Component 1	1.933	1.010	0.645
Component 2	0.564	0.999	0.118
Component 3	0.502	0.995	0.127

Source: Author's analysis of BHPS data

For bodily integrity, five variables were input. Of these, two were retained with eigenvalues above one, confirmed by adjusted eigenvalues also above one. Together these two components account for 50% of the variation. There is a relatively small loading of the first bodily integrity variable on component 1, but a relatively high loading on component 2; the same applies for the fifth bodily integrity variable (although to a lesser extent). The other variables load relatively higher on component 1, and lower on component 2.

Table 13.2 – Principal Components of Bodily Integrity Capabilities

Factor loadings	Component 1	Component 2	Component 3	Component 4	Component 5
Body integrity 1	0.268	0.818	0.277	0.403	0.144
Bodily integrity 2	0.510	-0.094	-0.480	0.391	-0.589
Bodily integrity 3	0.503	0.070	0.438	-0.647	-0.362
Bodily integrity 4	0.517	0.020	-0.481	-0.284	0.648
Bodily integrity 5	0.384	-0.564	0.519	0.430	0.285
	Eigenvalue		Adj. eigenvalue		Proportion
Component 1	1.543		1.016		0.309
Component 2	1.011		1.007		0.202
Component 3	0.910		1.000		0.182
Component 4	0.793		0.993		0.159
Component 5	0.743		0.984		0.149

Source: Author's analysis of BHPS data

For emotion again five variables were analysed. Component 1 alone accounted for over 50% of the variation, and was retained with an eigenvalue of 2.5; the other components had adjusted eigenvalues below the unadjusted ones thus were rejected. The retained component has roughly equal loadings from each emotion variable.

Table 13.3 – Principal Components of Emotion Capabilities

Factor loadings	Component 1	Component 2	Component 3	Component 4	Component 5
Emotion 1	0.460	-0.434	0.084	-0.550	0.539
Emotion 2	0.441	-0.531	-0.246	0.676	-0.075
Emotion 3	0.431	0.298	0.814	0.249	-0.001
Emotion 4	0.417	0.661	-0.495	0.107	0.364
Emotion 5	0.484	0.061	-0.155	-0.408	-0.756
	Eigenvalue		Adj. eigenvalue		Proportion
Component 1	2.526		1.007		0.505
Component 2	0.747		1.003		0.149
Component 3	0.647		1.000		0.130
Component 4	0.559		0.997		0.112
Component 5	0.521		0.993		0.104

Source: Author's analysis of BHPS data

Affiliation had four variables to be analysed. Of these, there were two that were retained, accounting for 75% of the variation. The first affiliation variable only loads slightly onto these two components, meaning the latter three variables make up the majority of the retained factors.

Table 13.4 – Principal Components of Affiliation Capabilities

Factor loadings	Component 1	Component 2	Component 3	Component 4
Affiliation 1	-0.0302	0.0876	0.9943	0.0476
Affiliation 2	0.5101	0.2733	-0.0491	0.6049
Affiliation 3	0.5413	0.2225	0.0061	0.1595
Affiliation 4	0.5106	0.2522	0.025	-0.7787
	Eigenvalue	Adj. eigenvalue	Proportion	
Component 1	2.378	1.079	0.418	
Component 2	1.928	1.037	0.339	
Component 3	0.993	1.013	0.175	
Component 4	0.388	0.990	0.068	

Source: Author's analysis of BHPS data

As with affiliation, there were four variables subject to PCA for play. One component – with an eigenvalue of 2.1 – was retained, accounting for 52% of the variation. The first three variables load more on this component – with loadings over 0.5 – compared to the fourth play variable with a loading of only 0.1.

Table 13.5 – Principal Components of Play Capabilities

Factor loadings	Component 1	Component 2	Component 3	Component 4
Play 1	0.556	- 0.133	0.762	- 0.305
Play 2	0.572	0.013	- 0.627	- 0.529
Play 3	0.589	- 0.107	- 0.132	0.790
Play 4	0.131	0.985	0.097	0.051
	Eigenvalue	Adj. eigenvalue	Proportion	
Component 1	2.092	1.008	0.523	
Component 2	0.987	1.002	0.247	
Component 3	0.514	0.998	0.129	
Component 4	0.407	0.993	0.102	

Source: Author's analysis of BHPS data

For control, five variables were analysed. Two components – with a combined variation of 56% - were retained. The first control variable loads relatively lightly on component 1, but

more heavily on component two. There are no variables that are particularly under-represented in the two retained components.

Table 13.6 – Principal Components of Control Capabilities

Factor loadings	Component 1	Component 2	Component 3	Component 4	Component 5
Control 1	0.121	0.739	0.568	0.329	0.095
Control 2	0.536	- 0.336	0.155	0.463	- 0.601
Control 3	0.450	- 0.361	0.556	- 0.434	0.413
Control 4	0.525	0.078	- 0.517	0.359	0.568
Control 5	0.469	0.453	- 0.280	- 0.600	- 0.370
	Eigenvalue		Adj. eigenvalue		Proportion
Component 1	1.682		1.006		0.3365
Component 2	1.102		1.003		0.2204
Component 3	0.911		1.000		0.1821
Component 4	0.692		0.997		0.1384
Component 5	0.613		0.994		0.1227

Source: Author's analysis of BHPS data

For the senses and the practical reason capabilities, I had only one representative variable, so there was no need to undertake PCA.

After PCA has been conducted and the retained factors identified, all the factors extracted are rotated. As discussed above, this is to remove any undue influence that come components may have. In the tables below, basic information on all the capability indicators that will be used in the panel data analysis are provided.

Table 13.7 – Summary statistics for retained factors

Variable	N	Mean (e-09)	Std.Dev	Min	Max
Bodily health	113,064	- 0.006	1.396	- 4.247	0.727
Bodily integrity 1	32,580	- 0.694	2.776	- 0.502	0.267
Bodily integrity 2	32,580	0.106	1.102	- 3.064	2.714
Emotion	111,555	0.003	1.585	- 10.430	0.479
Practical reason	268,380	0.950	0.219	0.000	1.000
Affiliation 1	19,713	- 0.049	1.438	- 2.646	0.889
Affiliation 2	19,713	- 0.191	1.317	- 2.068	1.227
Play	103,824	- 0.237	1.666	- 5.360	0.642
Control 1	163,737	- 0.400	1.516	- 5.776	0.807
Control 2	163,737	- 0.110	1.185	- 3.564	3.656
Senses	226,165	0.316	0.465	0.000	1.000

Source: Author's analysis of BHPS data

13.2 Analysing the effect of capabilities on wellbeing

Three different model specifications using wellbeing as dependent variable are analysed in this section:

Model 1: Wellbeing and capability factors - $W_{it} = Cf_{it}\beta_1 + f_i + \varepsilon_{it}$

Model 2: Wellbeing and capability factors with controls - $W_{it} = Cf_{it}\beta_1 + X_{it}\beta_{xit} + f_i + \varepsilon_{it}$

Model 3: Wellbeing and a sum of total capabilities (original capability variables in Table 12.1, not the capability factors developed above) with controls - $W_{it} = Csum_{it}\beta_1 + X_{it}\beta_{xit} + f_i + \varepsilon_{it}$

Where W is wellbeing for individual i in time t , Cf is a vector of capability factors relating to that individual in time t , $Csum$ is a sum of capabilities held by individual i at time t , X is a vector of control variables, f is a time-invariant component and ε is an error term.

Before embarking on this analysis, it is prudent to determine whether fixed or random effects assumptions are more appropriate for this model. By computing each model specification in both fixed and random effects, then running a Hausman test, this paper can conclude that in model 2 and model 3, residuals are correlated with the exogenous variables (see Table

13.8), so fixed effects specifications are more appropriate for these models. However, for model 1, there is no evidence that the error term is correlated with the explanatory variables.

The intuition behind this could be that time invariant bias – from personality effects for example – only affects the control variables rather than the capability indicators, which may largely be exogenous, rather than marital status which personality may interact with (Lucas 2007). For model 1 therefore, we will use a random effects specification, and for models 2 and 3, a fixed effects specification.

Table 13.8 – Hausman test results for fixed vs random effects models

Specification	Chi-square	Prob>chi2
Model 1	0.291	13.040
Model 2	0.001	42.440
Model 3	0.000	2,504.660

Source: Author's analysis of BHPS data

In the following table, the output from fixed effects analysis of the three models is presented. One obvious difference between models 1 and 2 and model 3 is the number of observations: model 3, which doesn't include the capability factors, and instead includes the number of capabilities achieved, has over 185,000 observations, compared to just 1,700 and 1,500 respectively for models 1 and 2. This is due to the limited number of instances where all the original capability variables are available at the same time. This makes models 1 and 2 relatively less robust than model 3. All three models have 0.000 p-values for the F (models 2 and 3) and chi-square (model 1) joint-significance tests.

Looking first at model 1, which regresses capability indicators on wellbeing, it is evident that, as in Anand et al (2005), not all capabilities have the same effect on wellbeing, as the significant coefficients on the capability factors have different magnitudes. Health, with a coefficient of 2.010, senses (4.301), affiliation (0.970) and the two control factors (2.250 and 1.211) all have significant effects on wellbeing; none of the other capability factors do. Health is a widely accepted determinant of wellbeing, as discussed in Section 2 of this thesis. Senses – the ability to think freely – allows us to imagine, be creative and explore

learning; measured here as educational attainment, it is often known in the literature to have a positive effect on wellbeing, even if not consistent. Affiliation allows people to feel self-esteem amongst their peers, and control allows individuals power over their lives and the environments in which they live.

In Model 2, where control variables are included, more capabilities become significant. Bodily integrity now has a significant positive coefficient on wellbeing (0.281); senses (9.847) and practical reason (39.67) both become highly significant. Affiliation becomes highly significant (1.13), as does the second affiliation measure, but the coefficient becomes negative (-4.77). This factor has the same factor loadings as factor 1, but with lower correlations to the original variables. The factors themselves are uncorrelated, so it could be that in an expanded model there is some interaction with the control variables. An iteration of the model was run testing for interactions, however none were significant. It could be that only one affiliation factor is needed, even though parallel analysis suggested two were appropriate. Retaining just one affiliation factor and rerunning the model does not significantly change any output other than the coefficient on affiliation, which becomes slightly larger in model 1 and slightly smaller in model 2, without any changes in significances. The first play factor also has a negative coefficient (11.46) but is only significant at the 5% level. Play – made up of variables looking at amount and satisfaction with leisure time – may be inversely related to employment status and age. As one gets older, it may become harder to enjoy leisure time. Similarly if one must work more hours and desired, and attending social events/ taking part in leisure activities becomes stressful rather than enjoyable, there may be a more complicated effect on wellbeing.

Finally, health remains significant but the coefficient reverses in direction. This is unexpected, as literature suggests (as discussed in Chapter 2) health should have an effect on wellbeing. The variables used to represent the capabilities – health that limits activities or work, and satisfaction with health – should be focusing on the capability aspect of health, whereby it prevents a functioning from occurring, however it may be that simpler variable (for

example, “are you in good health?”) may be more appropriate. It could also be that some of the information regarding health was lost in the PCA. To test the former theory, a different health dummy was included instead of the health capability factor, however it was insignificant. Testing the latter theory, by replacing the health capability factor with the original health capability variables, also produced insignificant results.

One possible explanation is that where health limits work, there may be compensation in the form of social transfers, which could mean that at least the financial effects of work-limiting health may be mitigated, with other effects mitigated indirectly as the financial assistance may help individuals achieve functionings that otherwise they would not have access to. Another explanation is that the impact of the health capability is being picked up by other capabilities, or simply that the original variables used do not focus accurately enough on the health capability. This is perhaps not unexpected given that we are using imprecise secondary measures of capabilities which, by their nature, should be context specific.

With fixed effects regression, the changes in the dependent variable and the changes in the explanatory variables are examined. It might be that the changes in ones life that result in gaining the play capability, or the second affiliation capability, or health capability, once controls are included, may not have an immediate positive impact on wellbeing: if we think about leisure time, if one retires, one might be more satisfied with the amount of leisure time available, but still suffer the ill effects (peer group isolation, change in pace of life, feeling of redundancy and so on) of leaving the workforce. So in this instance, we might not see a positive change in wellbeing straight away. Similarly with health, if one becomes healthy after a period of illness, one might not instantly recover a previous level of wellbeing; illness may have persistent effects. A limited number of waves in the dataset means this cannot be tested within this model.

In terms of the control variables, income was highly significant, as expected, with a coefficient of 9.131. Age was also highly significant both in its log and normal forms,

indicating the u-shaped functional form may be present in this model, whereby the younger and older sample participants are happier than those in the middle; this is consistent with the literature (Blanchflower, Oswald 2008). Interpreting the effects of the control dummies is difficult as the limited sample size results in many variables dropped out due to there being no change within the sample time frame. The marriage dummy is significant and positive, indicating that those who are married have higher wellbeing than those who have never been married. The London dummy is highly significant and negative, meaning that those living in London are have significantly lower wellbeing than those living in Northern Ireland. The only employment status dummy that remained – that for being employed – was not significant.

In Model 3, the total number of capabilities an individual possesses is included as a regressor along with the control variables, but individual capability indicators are excluded. The number of capabilities is highly significant, with a coefficient of 0.153.

In this model several of the marital status and employment status controls were significant, although none of the regional controls were. Age becomes more significant than in model 2. All the marital status dummies have significant negative coefficients; for divorce or widowhood this is perhaps understandable, but one might have expected a positive coefficient on marriage. The reason behind this could be that because these are dummies – thus only have an effect on wellbeing when they are changed – they do not represent the state of being divorced or being married, only becoming divorced or becoming married, the effects of which may not be in line with the longer term effects.

This analysis applies to all dummy variables used in this paper including those for employment status where becoming employed has a slightly negative coefficient when one would assume that employment would bring about positive wellbeing effects.

The capability measure here – the sum of all the capability indicators a person has in each wave – is highly significant, with a positive coefficient of 0.153, indicating that an individual

who gains one more capability indicator could stand to experience greater wellbeing, by an increase of 0.153 on the scale of 0 to 36.

The limited number of observations for models 1 and 2 means that one cannot read much into these results, but the significance of at least some capability factors could be taken as an indication that there might be some underlying relationship worth looking at in future research.

Table 13.9 – Panel data models of capabilities and wellbeing (GHQ12)

	Model 1	Model 2	Model 3
Health factor 1	2.010*	-11.10*	
	(1.059)	(4.931)	
Bodily integrity factor 1	-0.255	7.281**	
	(0.489)	(2.725)	
Bodily integrity factor 2	-2.190	-0.00456	
	(1.186)	(0.797)	
Senses indicator	4.301**	9.847***	
	(1.643)	(1.794)	
Practical reason indicator	-4.325	39.67***	
	(4.712)	(9.994)	
Emotions factor 1	0.112	-0.339	
	(0.781)	(0.672)	
Affiliation factor 1	0.970*	1.133***	
	(0.433)	(0.334)	
Affiliation factor 2	0.260	-4.777***	
	(0.479)	(1.344)	
Play factor 1	-0.131	-11.46***	
	(0.861)	(2.806)	
Control factor 1	2.250**	1.266	
	(0.850)	(0.825)	
Control factor 2	1.211*	-1.442	
	(0.571)	(1.696)	
Total capabilities			0.153***
			(0.003)
Log equivalised income		9.131***	0.045
		(2.684)	(0.028)
Age		-2.502***	-0.072***
		(0.619)	(0.011)
Age squared		0.0185***	0.000
		(0.00506)	(0.000)
Married+		5.831**	-0.289***
		(2.104)	(0.072)
Divorced+		0	-0.916***
		(.)	(0.128)
Widowed+		0	-1.647***
		(.)	(0.148)

Employed+		13.88	-0.074
		(11.89)	(0.080)
Unemployed+		0	-1.354***
		(.)	(0.110)
Long-term sick/ disabled+		0	-2.289***
		(.)	(0.149)
Family care+		0	-0.379***
		(.)	(0.098)
Retired+		0	0.0416
		(.)	(0.101)
North+		0	0.004
		(.)	(1.780)
South+		0	0.019
		(.)	(1.787)
London+		-38.07***	-0.116
		(7.086)	(1.790)
Wales+		-19.18	0.160
		(11.89)	(1.798)
Scotland+		0	0.498
		(.)	(1.800)
Midlands+		0	0.205
		(.)	(1.784)
Constant	19.400***	-54.21	25.160***
	(0.584)	(29.00)	(1.685)
N	1,857	1,523	188,114
adj. R2		0.880	0.546
P value (chi square/ wald)	0.000	0.000	0.000

Notes: Dependent variable: inverted GHQ12. Significance: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors in parentheses. Variables marked with + are dummies. Omitted categories: 'training/ education', 'no qualifications', 'never married' and 'Northern Ireland'. \$ Omitted due to collinearity – not enough observations in the panel; symptom of small sample size.

13.3 Summary

In this section I undertook two analyses: one extracting underlying capability variables drawn from the BHPS and one using those factors in fixed effects regression. The aim of the investigation was to assess whether capability deprivation was a significant determinant of wellbeing, both for capabilities as a whole and for individual capabilities. The analysis suggests that capabilities are indeed determinants of wellbeing.

The principal components analysis, PCA, found that for most of the capability variables there was at least one underlying factor. The retained factors – those that exceeded the Kaiser test eigenvalue threshold of 1 with confirmation through parallel analysis - accounted for between 50% and 75% of the variance in the original variables.

The panel data analysis focused on three model specifications: one testing just the capability factors, one adding controls and one that was a sum of an individual's capabilities with controls (the controls being for education, age, marital status, employment and so on).

Model 1 looked at the effect of capability factors on wellbeing, and found that some were significant and positive, including health, senses, affiliation and the two control factors, with coefficients of 2.010, 4.301, 0.970, 2.250 and 1.211 respectively. This is in line with the hypothesis of this paper, where the presence of a capability should increase a person's quality of life, thus improving their wellbeing.

In Model 2, a number of control variables were added to account for the effects of income, employment, age, marital status, age and region. The majority of these were dropped from model 2 due to collinearity, itself due to a limited number of observations for this model. In this model, senses became highly significant, as did practical reason and affiliation, however the second affiliation factor was highly significant and negative; play also had a negative coefficient. Health remained significant but its coefficient became negative; no explanation for these negative coefficients can be arrived at, other than speculation about potential interactions between capabilities and control variables, or this model having a relatively

small number of observations; furthermore despite testing potential alternative variables, the results remained confusing. This is a possibly inevitable consequence of using secondary data to measure what is in essence a context specific concept. Bodily integrity became significant in this model (7.281), however the control factors became insignificant.

In model 3, rather than have a range of capability factors, a sum variable that adds up the number of capabilities an individual possesses is included. This sum variable is highly significant, with a coefficient of 0.153. Controls are included in this model, with marital status and employment status dummy categories all being significant, along with age. Income however, was not significant.

There are several limitations to this analysis. Firstly the limited number of variables means that models 1 and 2 are not as robust as model 3. Also, as much as I have attempted to ensure that the capability indicators focus on capabilities rather than functionings, it is possible that I have not been entirely successful; this is a criticism of any work (including Anand et al (2005) and Veenhoven (2010) that extracts capability information from a dataset which did not intend to measure capabilities. In addition it is possible that some of the control variables – income, employment status, marital status for example – could be functionings too, so by including them as controls we are measuring both a capability and a functioning at the same time. This may account for the differences between models 1 and 2.

The analysis undertaken in this section has allowed us to do two things: firstly, using a range of capability variables from the BHPS, I have reduced these to capability factors, in measurement of an underlying concept(s) common to each set of capability indicators. Secondly, using these factors in fixed effects regression has allowed us to analyse the effect of capabilities on wellbeing, which seems to be – with the caveats above – positive and somewhat significant.

14 Conclusions

Inspired by the potential for the operationalisation of the Capabilities Approach in developed countries, this paper set out to examine whether capabilities, in sum and individually, affected our adopted definition of wellbeing. The results suggest some positive association between measures of capabilities and wellbeing.

Although further research is needed – particularly in measuring capabilities and working with thresholds and degrees of capability achievement – it suggests that a good life in terms of capability achievement can result in greater wellbeing. Where the Capabilities Approach and happiness approach had been seen by some (including Sen 1999) to be competing measures of quality of life, this paper views them as focusing on different aspects of life, where one's wellbeing (in terms of satisfaction with life as a whole) can depend on the capabilities one has achieved.

The appeal of the CA in poverty measurement is centred on its multidimensionality. Monetary measures of poverty focus on only one aspect, which in the capabilities framework is a resource to be utilised to achieve functionings. But without capabilities, and the freedom to choose a functioning, money may lose one of its core benefits – the ability to exchange it to achieve ends. When one views 'a good life' as ends most people arguably have, capability failures seem intrinsically important.

This paper began by considering what the CA is and how it came to being, observing that the CA is a framework for analysing quality of life, looking at what individuals are able to be and do in their lives. The two core concepts – capability and functioning – are linked by a critical component: choice. One may appear to exhibit a functioning, but if an individual has not chosen it, it does not result from a capability, therefore that individual has a capability failure.

The CA originated from Sen's dissatisfaction with poverty and quality of life assessment in developing countries, but as a pluralistic approach one can use reasoning to apply it to

poverty in the UK with a few caveats. Sen views the CA as a quality of life tool, and that measuring wellbeing as a representation of quality of life is unwise due to the effects of adaptation, whereby individuals 'learn' to tolerate substandard lives.

In this paper I can mitigate Sen's concerns with two particular actions: firstly, defining a concept of wellbeing which is not attempting to represent overall quality of life (rather it inverts the disutility presented by the GHQ12, so it focuses particularly on mental wellbeing without making judgements on other aspects of the wellbeing spectrum – momentary happiness for example, life satisfaction, or more material wellbeing) and secondly, by arguing that adaptation is not universal, may be more of a concern in development applications, and that with adaptation come aspirations: even if individuals do get used to a particular level of deprivation, it does not limit the ability of individuals to aspire to greater or better things.

Armed with a measure of wellbeing used in Chapter 2, this paper investigates how capabilities affect it. Although Sen has not specified what capabilities are needed for a good life, on the basis that any list should be arrived at democratically by individual communities, Nussbaum believes that there is a role for a list of basic capabilities that should be present to achieve a core 'good life', with others added when society requires. Along with Anand et al (2005) and Veenhoven (2010), this paper uses Nussbaum's list as the basis of analysis.

The methodology for this study involved several stages. After the concept of wellbeing being analysed was discussed in Chapter 2, heavily in its Appendix D, I limited the discussion here, retaining the same concept. The capabilities however warranted specification. Using Anand et al (2005) as an example, I searched the British Household Panel Survey (BHPS) database for questions that could pertain to capabilities, being careful to – as much as possible – ensure that the element of choice was present in the question, to avoid the possibility that the variable is measuring a functioning rather than a capability. The BHPS also provided variables that control for age, income, employment, marital status,

region and gender – factors recognised in the economic literature as affecting wellbeing. Being a longitudinal survey, I can use panel data techniques to control for unobserved heterogeneity – i.e. personality effects – in wellbeing.

Moving on to the techniques to be used for analysis, I began with principal components analysis (PCA), which allows us to uncover underlying relationships between observed and unobserved factors. The retained factors from PCA were then used in further analysis. The panel data analysis focused on three model specifications: one testing just the capability factors, one adding controls and one that was a sum of an individual's capabilities with controls. Each model was estimated using fixed effects and random effects, and for all models a fixed effects specification was found to be more appropriate.

Model 1 regressed the capability factors on wellbeing, finding that some capabilities were indeed significant - including health, senses, affiliation and the two control factors, with coefficients of 2.010, 4.301, 0.970, 2.250 and 1.211 respectively. In Model 2, a number of control variables were added to account for the effects of education, employment, age, marital status, age and region, however the majority dropped out due to collinearity from the limited number of observations. Bodily integrity became significant in this model, and practical reason and senses both became highly significant. The first affiliation factor became highly significant along with the second, but the second acquired a negative coefficient, along with health and play. There is no forthcoming explanation for these unexpected results.

The ultimate conclusion from the analysis here is that the capability factors drawn from principal components analysis of BHPS data do appear to have some effect on wellbeing, which seems to be – with caveats and exceptions – positive and significant. Combining this with our conclusion from Chapter 2, that the standard poverty measurement used in policy does not appear to affect wellbeing, it leads to the possibility that multidimensional poverty

may be what matters more to individual wellbeing in the UK: specifically, capabilities could matter.

This presents important policy considerations, particularly where interventions tend to be in the form of monetary transfers. In model 3, it was indicated that when capabilities in sum are included in a wellbeing specification, income is not significant. So at a holistic level, policymakers may find an eventual limit to the effect of social transfers on wellbeing. Returning to the concept of income as being a means to achieve ends, if there are barriers blocking the achievement of ends, income arguably loses one of its main functions. Similarly, if there is a lack of choice regarding capabilities and functionings, income again loses one of its main functions: the element of choice is paramount to capability achievement, as forcing a capability on someone who did not choose (or want) it should be seen to be as negative as a capability failure in the first place.

Freedom to choose the ends that are important to an individual is arguably subjective. Different capabilities may have greater importance to one person than to another. Although Nussbaum's (2011) list is a starting point, she argues that the list is a minimum, open to interpretation and further specification. This gives us the possibility to consider further development of lists at community level, where capability failures are seen to be significant and detrimental to wellbeing.

Ultimately, without capabilities being present, monetary transfers will arguably result in no increase in quality of life, therefore what policy should be focusing on is providing, and insuring against the barriers to, capabilities. This is therefore an area where intervention has the potential to make a difference: it would require a further understanding of why capabilities fail at the level of communities and individuals, and would represent a departure from the traditional form of policy intervention in the UK (Townsend 1979), but might be an area where interventions could bring about much more tangible results for individuals.

15 Appendix A – References

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16 Appendix B – Capability Variables in BHPS

This short list of capability indicators was refined from a longer list on criteria such as availability in multiple waves, number of respondents to the question, whether it focuses on a capability or a functioning and how well it could fit within the description of Nussbaum's capabilities. The long list was created from a trawl of the BHPS documentation, comparing the wording of questions to the descriptions of Nussbaum's capabilities.

In order to create capability indicators, each variable is converted to a binary scale if not already binary, for reasons of analytical simplicity: in this study I aim to look at the wellbeing differences between the 'haves' and 'have-nots' of capabilities, so rather than suggest that individuals have a partial capability achievement, I assume that capability achievement is binary.

Using judgement, the descriptions of Nussbaum's capabilities and the method used in Anand et al (2005), I draw thresholds for variables where it seems most appropriate.

Table 16.1 – Capability indicators and source variables

Capability	Variables (including BHPS title*)
Life	No data available
Bodily health 1	wHLLT – Health limits daily activities - Yes (1) coded to 0; no (2) coded to 1
Bodily health 2	wHLLTW – health limits type or amount of work - Yes (1) coded to 0; no (2) coded to 1
Bodily health 3	wLFSAT1 – satisfaction with health - 7 (completely satisfied) to 4 (neither satisfied nor dissatisfied) were coded to 1; 3 (slightly dissatisfied) to 1 (not satisfied at all) were coded to 0
Bodily integrity 1	wCARUSE – have access to car - Yes (1) remained as 1; no (2) coded to 0
Bodily integrity 2	wCRDARK – feel safe walking alone at night - Very safe (1) and fairly safe (2) coded to 1; a bit unsafe (3), very unsafe (4) and never go out after dark (5) coded to 0
Bodily integrity 3	wHSPRBQ – accommodation has vandalism/ crime in the area - Yes (1) coded to 0; no (2) coded to 1
Bodily integrity 4	wCRMUGG – extent of people being attacked - Very common (1) and fairly common (2) coded to 0; not very common (3) and not at all common (4) coded to 1
Bodily integrity 5	wCRWORA – worry about being a victim of crime - Yes (1) coded to 0; no (2) coded to 1
Senses, imagination and thought	wQFEDHI – highest qualification held - Higher degree (1) to a-levels (6) coded to 1; o-levels/ GCSEs and below coded to 0
Emotions 1	wSSUPA – is there someone who will listen to you? - Yes (1) remained as 1; yes, more than one (2) coded as 1; no-one (3) coded as 0
Emotions 2	wSSUPB – is there someone who will help in a crisis? - Yes (1) remained as 1; yes, more than one (2) coded as 1; no-one (3) coded as 0
Emotions 3	wSSUPC – is there someone you can relax with? - Yes (1) remained as 1; yes, more than one (2) coded as 1; no-one (3) coded as 0
Emotions 4	wSSUPD – is there someone who really appreciates you? - Yes (1) remained as 1; yes, more than one (2) coded as 1; no-one (3) coded as 0
Emotions 5	wSSUPE – is there someone you can count on to offer support? - Yes (1) remained as 1; yes, more than one (2) coded as 1; no-one (3) coded as 0
Practical reason	wLFSATO – satisfied with life overall - 7 (completely satisfied) to 4 (neither satisfied nor dissatisfied) were coded to 1; 3 (slightly dissatisfied) to 1 (not satisfied at all) were coded to 0
Affiliation 1	wORGA – active in organisations - Yes (1) remained as 1; no (2) coded to 0
Affiliation 2	wFRNA – frequency of talking to neighbours - Most days (1) remained as 1; once or twice a week (2) coded to 1; once or twice a month (3) coded as 0; less than once a month (4) coded as 0; never (5) coded as zero

Affiliation 3	wFRNB – frequency of meeting people - Most days (1) remained as 1; once or twice a week (2) coded to 1; once or twice a month (3) coded as 0; less than once a month (4) coded as 0; never (5) coded as zero
Affiliation 4	wHSCNTF – would like to socialise but must do without because I cannot afford it - Yes (1) coded to 0; no (2) coded to 1
Other species	No data available
Play 1	wLFSAT6 – satisfied with social life - 7 (completely satisfied) to 4 (neither satisfied nor dissatisfied) were coded to 1; 3 (slightly dissatisfied) to 1 (not satisfied at all) were coded to 0
Play 2	wLFSAT7 – satisfied with amount of leisure time - 7 (completely satisfied) to 4 (neither satisfied nor dissatisfied) were coded to 1; 3 (slightly dissatisfied) to 1 (not satisfied at all) were coded to 0
Play 3	wLFSAT8 – satisfied with use of leisure time - 7 (completely satisfied) to 4 (neither satisfied nor dissatisfied) were coded to 1; 3 (slightly dissatisfied) to 1 (not satisfied at all) were coded to 0
Play 4	wJBHRLK – preference over hours worked - Work more hours (1) and work fewer hours (2) coded to 0; keep the same hours (3) coded to 1
Control (over one's environment) 1	wVOTE7 – voted in May 2005 (or previous) general election - 1 (voted) remained as 1; 2 (didn't vote but could have) was coded to 0
Control 2	wLFSAT2 – satisfaction with income - 7 (completely satisfied) to 4 (neither satisfied nor dissatisfied) were coded to 1; 3 (slightly dissatisfied) to 1 (not satisfied at all) were coded to 0
Control 3	wLFSAT3 – satisfaction with house - 7 (completely satisfied) to 4 (neither satisfied nor dissatisfied) were coded to 1; 3 (slightly dissatisfied) to 1 (not satisfied at all) were coded to 0
Control 4	wLFSAT4 – satisfaction with spouse/ partner - 7 (completely satisfied) to 4 (neither satisfied nor dissatisfied) were coded to 1; 3 (slightly dissatisfied) to 1 (not satisfied at all) were coded to 0
Control 5	wLFSAT5 – satisfaction with job. - 7 (completely satisfied) to 4 (neither satisfied nor dissatisfied) were coded to 1; 3 (slightly dissatisfied) to 1 (not satisfied at all) were coded to 0

Chapter 4: Knowing what you've got: Capability loss aversion and wellbeing

Abstract

Loss aversion with regard to income is a well-established phenomenon, however as the wellbeing responses to income have been called into question in recent decades, it follows that one should consider whether loss aversion is present for capabilities, which this thesis has argued so far may be more important to wellbeing compared to income. Capabilities are 'ends' and income is only a means to achieve those ends, so if loss aversion is often found in studies investigating utility responses to income changes, it must also be present in the relationship between capabilities and wellbeing. This study finds, through using fixed-effects regression analysis of BHPS data, that loss aversion to capabilities is indeed present.

Acknowledgements:

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. Some data processing was done using PanelWhiz.

17 Introduction

In previous chapters of this thesis, income deprivation (poverty) has not been found to be significant for individual wellbeing; instead, capabilities appear to have greater importance. Potential reasons for this could include poverty standards being irrelevant to individuals (particularly the poverty line, which is an arbitrary and national measure, unlikely to be conceivable to the individual), the welfare system compensating for very low income through social transfers and benefits in kind, or that income only matters when it is a means to an ends: if the ends are not achievable (capability failure), income may not be so important.

If income poverty is seen as 'a bad thing' in any setting, capability failure should therefore be seen in the same negative light, as the analysis in Chapter 3 indicates that greater wellbeing is associated with the achievement of more capabilities, with regression results placing significance on both some individual capabilities and on the total number of capabilities achieved, even when income is accounted for.

So far however the analysis has been static, so I have not specifically addressed what happens when the capabilities one possesses changes: if capabilities are as important to wellbeing as previous chapter have suggested, understanding what happens when we gain or lose them will be essential for policy applications that affect them.

In policy evaluation, costs and benefits are generally considered in monetary terms and the welfare analysis in terms of decision utility; Kahneman and Sugden (2005) suggest that experienced utility would be better used as it is immune to some of the problems human psychology causes in stated preference analysis – such as forecasting errors or framing effects. Furthermore, analysis is often undertaken on a 'willingness to pay' to either gain or avoid losing something: it is generally accepted (Vendrik, Woltjer 2007) that utility responses to losses and gains are asymmetric – as prospect theory purports – but also that people may make errors in forecasting their utility (Kermer, Driver-Linn, Wilson and Gilbert, 2006).

This loss aversion with regard to income is widely recognised in the choice theory literature (Kahneman, Tversky 2000) but focuses on decision utility. As a psychological phenomenon (Köbberling, Wakker 2005) it should follow that loss aversion can affect experienced utility – and specifically, the concept that I have been analysing thus far: wellbeing. Similarly, given the responsiveness of wellbeing to capabilities it should also follow that there may be loss aversion in individual wellbeing responses to changes in capabilities.

In Section 18, I present loss aversion theory and discuss the literature focusing on wellbeing responses to income changes and the potential for loss aversion to capabilities. In Section 19 the study methodology is then introduced, discussing the dataset – the British Household Panel Survey (BHPS), – variables and methods of analysis. A brief summary of the relationship between capability gains and losses and wellbeing is also presented, after which, in Section 20, more detailed analysis of the relationship is undertaken using fixed effects regressions. Finally, in Section 21, some concluding remarks are made.

18 Loss aversion, wellbeing and capabilities

In Chapter 2 of this thesis, I considered the role of the poverty line in determining wellbeing, then contrasted this with the effects of capability achievement in Chapter 3. The research so far suggests that an arbitrarily set poverty line is not important for individual wellbeing, but some individual capabilities and the total number of individual capabilities possessed by an individual do matter for wellbeing. In this paper, I look at whether capability loss has an effect on wellbeing, greater than the effect of an equivalent capability gain.

In this section, I will review the loss aversion literature, before considering it with respect to wellbeing and capabilities, and finally developing a theory of capability loss aversion and why it might matter for wellbeing.

18.1 Loss aversion

Traditionally in economics, expected utility theory assumed the role of a model of rational choice: individuals make choices based on the expectation of the benefits they will extract from a range of options available to them, itself based on the probability of each option's potential benefits. Risk aversion is one of the central tenets of this theory, whereby individuals who prefer more certain prospects are risk averse (equivalent to the concavity of a utility function), however it, along with the tenets of asset integration and expectation were found to fail in certain situations (the best known, perhaps, being Allais' paradox). Prospect theory developed by Kahneman and Tversky (1979) in response to these failures, maintains that the foundation of choice is not so much the final outcome of a decision but the change it creates from some reference point, for example a status quo, an individual ideal or a social standard.

In prospect theory, decisions are made based on differences (gains or losses) from a reference point, and the value function represents these gains (where it is concave) and losses (convex). A steeper slope for losses than for gains in the value function represents loss aversion, and a diminishing marginal sensitivity to increasing gains and increasing

losses is represented by the convexity and concavity. Kahneman and Tversky hypothesised that the value function would be as convex in losses as it is concave in gains, due to the reflection effect – the reflection of different prospects around zero reverses the preference order.

Although prospect theory has been tested frequently (see Köbberling and Wakker (2005) for an overview), Kahneman himself admits “the extent to which loss aversion is also found in experience is not yet known” (Kahneman 1999, p.19). Experienced utility, often suggested to be a representation of happiness (see Appendix D of Chapter 2 of this thesis for a discussion), is generally assumed to be increasing in income and in particular in the level of income relative to others (see Easterlin 1974, Clark, Frijters et al. 2008 for example). However research has found that expected and decision utility (wanting or desiring something (Carter, McBride 2013)) often depart from experienced utility – actually enjoying it (ibid.): as loss aversion theory originally focused on decision utility and peoples' preferences over expected outcomes, it does not follow that experienced utility will be subject to the same phenomenon. Indeed one of the criticisms of prospect theory is it cannot prove that the asymmetric effects of losses and gains are not affective forecasting errors (Kermer, Driver-Linn et al. 2006). A number of papers have attempted therefore to examine whether loss aversion is prevalent in experienced utility as well as decision utility, although the evidence is still limited in volume (ibid.).

Before the availability of wellbeing data in large datasets, much of the evidence for loss aversion was gathered from experimental studies. I believe that experimental studies cannot replicate reality; this is linked to the criticism of loss aversion that it is an affective forecasting error when looking at expected utility. On this basis I think making generalisations from experimental data is unwise. In addition much experimental evidence involves participants making choices, and in reality we are unlikely to choose to be made redundant or choose to have a capability – such as our health – taken away from us. Again, this limits the generalisations of experimental evidence. However the literature involving this

methodology generally supports the presence of loss aversion: Schmidt and Traub (2002) find evidence of loss aversion in an experiment using preferences and choices regarding lotteries. Novemsky and Kahneman (2005) seek boundaries for loss aversion, in an experiment designed to look at loss aversion in risky and risk-less situations, and find that there is not loss aversion to something an individual 'planned' to lose, for example exchanging money (a loss) for a good or service.

Finally in Abdellaoui, Bleichrodt and Paraschiv (2007) a range of studies into loss aversion are examined, and the authors cite a number of papers positively finding loss aversion in experimental data, with ratios (of the impact of losses to the impact of gains) ranging from 1.8 (Booij, Van de Kuilen 2009, cited in, Abdellaoui, Bleichrodt et al. 2007) to 4.8 (Fishburn, Kochenberger 1979, cited in, Abdellaoui, Bleichrodt et al. 2007). They also undertake their own experiment that also suggested that utility is convex for losses and concave for gains.

As will be discussed, research into loss aversion in experienced utility is less prevalent than that focusing on decision utility (which is all one really can assess in experimental settings, as the situations are not 'live' for the individuals taking part), and research into loss aversion in capabilities seems – at least in the published literature – sparse. This study aims to contribute towards that gap.

18.2 Wellbeing and loss aversion

The subject of analysis in prospect theory, as mentioned above, is decision utility – decisions are made on the basis not of the number value of an outcome but on the basis of the deviation from a point of reference, be it the status quo or a source of comparison. In Chapter 2, Appendix D I discussed the concept of happiness in relation to utility; as others (Boyce, Wood et al. 2013, Di Tella, Haisken-De New et al. 2010, Vendrik, Woltjer 2007) have purported, experienced utility and decision utility are different types of utility. They are however aspects of happiness, so it follows that I can legitimately use experienced utility in place of decision utility in investigations.

Senik (2009) tests loss aversion effects on experienced utility indirectly, through examining the effects of internal (e.g. ones own past) and external (e.g. reference group) comparisons – she finds that internal (and dynamic rather than static) comparisons are more important to individual wellbeing; the effects are believed to be due to lost opportunities, so although the paper is not a specific test for loss aversion, it does indicated that losses are felt disproportionately.

Di Tella, Haisken-De New and MacCulloch (2010) examine the effect of anticipated changes in income, and find evidence, albeit weak, in favour of loss aversion affecting decision utility. Deaton (2012) investigates the effects of the financial crisis on wellbeing, using the self reported wellbeing of Americans as a dependent variable and assessing the effects of the stock market, GDP and unemployment. As expected, when these variables perform poorly, or suffer declines, wellbeing is negatively affected, but the paper does not explicitly test for asymmetric effects of negative and positive changes in economic conditions.

Two papers do investigate asymmetric effects. Vendrik and Woltjer (2007) use fixed effects least squares estimations to test a number of assumptions regarding loss aversion, with a focus on whether (decision) utility is concave or convex in relative income. They note, as others have done, that there is little empirical evidence of loss aversion concerning experienced utility as opposed to decision utility.

Using the hypothesis that wellbeing (decision utility) is as concave in gains as it is convex in losses, they test the effects of departures of income from an average of a reference group, using a panel of German data. Specifically, Vendrik and Woltjer (2007) test whether the characteristics of the value function (what Kahneman and Tversky (1979) refer to instead of a utility function) hold for the dependence of life satisfaction on relative income.

They find, contrary to expectations, that life satisfaction is concave in losses as well as gains, meaning that there is an increasing marginal sensitivity of life satisfaction to losses, where losses are negative departures of one's own income from an average. Prospect

theory would have it that sensitivity decreases as losses increase, however Vendrik and Woltjer (2007) suggest that this increasing sensitivity may be due to losses not only in income but in social participation – the further ones income falls compared to the reference group, the more difficult it will be to maintain ones level of social activities. They equate this to Sen's (1985) concept of objective functioning, providing a convenient lead for this study.

Moving on from Vendrik and Woltjer, Boyce et al (2013) used German and British datasets to test for the presence of loss aversion. Using multi-level modelling (with lagged wellbeing to address personality factors) they include a dummy that focuses on the effect of negative changes in income between the current year and the previous year.

Boyce et al (2013) estimate two forms of a model for each dataset (British and German), one with control variables and one without, and find that a one unit decrease in log-transformed income resulted in a 0.11 standard deviation (SD) reduction in wellbeing (0.13 without controls) in the German data, compared to a 0.05 SD increase (both with and without controls) in wellbeing for an equivalent rise in log-transformed income. For the British data, taken from the BHPS, income gains were not significantly associated with wellbeing, but a one unit reduction in log transformed income results in a 0.03 SD rise in psychological disorder (which we can view as the inverse of mental wellbeing).

The results from Boyce et al (2013) suggest the presence of loss aversion in wellbeing with regard to income in two large social surveys, however no existing studies investigate loss aversion in capabilities. This paper will draw on the literature examining the effects of loss aversion on wellbeing and apply it to measures of both income and capabilities.

18.3 Capabilities and loss aversion

Implicit in prospect theory is that less income (therefore poverty) is bad, and more income is good. It therefore allows us to purport that becoming poor from a non-poor starting point would be a negative experience, more so than becoming poorer once one is already below the poverty line. However analysis in Chapter 2 demonstrated that the arbitrarily set poverty

line used in policy applications was not relevant for individual wellbeing. This was furthered in Chapter 3, which found that capabilities – both individually and in sum – could be significant determinants of wellbeing despite the inclusion of income in a wellbeing specification. This leads us to consider whether loss aversion would apply to capabilities in the same way that it applies to income: income (albeit with the complications discussed in Chapter 2) is positively related to wellbeing, as are capabilities. Furthermore, income is a resource (or can be, where available) that allows individuals to convert their capabilities into functionings. So capabilities alone are not the whole picture of quality of life – individuals need resources: physical, mental, societal and financial. If there is loss aversion in income, could there also be loss aversion in capabilities?

As literature on loss aversion with regard to capabilities is scant, this paper will consider the assumptions of loss aversion with regard to income and assess whether they can be applied to capabilities. Chapter 2 showed us that wellbeing was roughly linear and increasing in income; Chapter 3 showed us a similar picture for wellbeing and capabilities; see the figures below to illustrate. So the first assumption of loss aversion – that more income is generally good – is met. However whilst there is evidence – as discussed in the previous section – that income losses have a greater negative impact on wellbeing than the equivalent for gains, there is no such evidence for capabilities. Filling that gap with some information – whether confirmatory or not – will be the main aim of this paper.

Specifically, I want to examine whether losses in capabilities have larger impacts than equivalent gains. The rationale for this being possible is similar to that for income. Individuals are believed to favour the things they currently have (rather than things they could exchange for): In Kahneman, Knetsch and Thaler (1991), an experiment (conducted by Samuelson and Zeckhauser (1988)) is described whereby participants are offered a lottery ticket or \$2, and later asked if they would like to change their choice. The majority do not change. As stated previously, much of the evidence for loss aversion is experimental rather than in 'live' markets where individuals learn, and this latter study, like others, is

based on choices. The issue with capabilities is that they are not things individuals can easily manipulate; if you live in an area where you feel unsafe being out at night, your choices are to stay indoors or move. Moving isn't always an option, particularly if you are in social housing or where you cannot access the financial capital needed for house purchases, and staying indoors may violate another capability if – for example – you need to visit the shops to buy food, or buy token for the electricity meter. So by losing a capability – which may not be a choice like choosing a lottery ticket over \$2 – do we expect someone's wellbeing to be negatively affected? From the outcome of Chapter 3, where it was indicated that the number of capabilities and individual possessed was positively related to wellbeing, we can purport that yes, by losing a capability and individual may experience lower wellbeing, and vice versa for gaining a capability (to refer to the example just given, you may apply to the housing association to move to a safer area and a property becomes available, thus you can move and gain the ability to walk freely in your neighbourhood at night). The next logical question is how the negative effect on wellbeing compares to the positive effect. How I will undertake this investigation is discussed in Section 19.

18.4 Summary

Loss aversion arose as a response to the failures of expected utility theory to fully account for individuals decisions: it states that individuals make decisions based on the expected departure from some reference point – such as the status quo or a reference point – rather than on the value of the final outcome. Kahneman and Tversky state that “losses loom larger than gains” (1979, p. 279) with respect to decision utility, but although there is evidence supporting loss aversion in decision utility, the research focusing on experienced utility, which we can take as a representation of happiness, is limited.

A few studies do test income loss aversion effects on experienced utility, with positive results (Di Tella, Haisken-De New et al. 2010, Senik 2009, Vendrik, Woltjer 2007, Boyce, Wood et al. 2013). Boyce et al (2013) specifically examine the existence of loss aversion in the BHPS, using log transformed income and dummy variables to represent losses, and find that

indeed losses are felt more greatly than equivalent gains. Boyce et al however use multilevel modelling – to account for the hierarchical structure of social survey data – rather than fixed effects. Although they include a lagged version of the dependent variable, fixed effects is believed to be a more robust method for addressing time-invariant effects, given that we don't need to examine the levels of the hierarchies (neighbourhood and so on) (Allison 2009). This will feed into the methodology for the study in hand, discussed below.

19 Methodology

In this paper I attempt to use methodology applied in literature discussed above to capabilities. Firstly I regress income losses and income gains on wellbeing to test for asymmetric effects, both with and without controls, then I perform the same regressions with capability losses and capability gains. I expect to find that there are asymmetric effects indicating the presence of loss aversion, particularly for capabilities, which, previous papers have suggested, may be more important determinants of wellbeing than income.

19.1 Dataset

This study, like the others in this thesis, uses BHPS data to provide its variables. As a multi-purpose study, established in 1991, the BHPS provides a wealth of information about a set of individuals, belonging to 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 year¹⁹ 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 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 2007/8²⁰, 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.

¹⁹ BHPS surveys were done in 'waves' that frequently crossed year boundaries.

²⁰ Since then the BHPS has been subsumed into the Understanding Society survey, which includes the original BHPS questions plus many more.

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).

The main limitation of BHPS for this particular purpose is that it is a household survey, that is, only those who have a place of residence are included. Those who do not have a residence, for example the homeless or those in shelters or institutions, may be more likely to experience capability failure but these individuals are not sampled.

19.1.1 Wellbeing measurement

As with other papers, the basic form of the model to be used here 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 term²¹. W is a semi-categorical variable on an increasing scale from 0 to 36. The explanatory variables are in various forms, as depicted in Table 19.2.

In Chapter 2 the potential wellbeing measurements contained within the BHPS are discussed, arriving at the conclusion that the GHQ12 measure, which has been used as a dependent variable in Chapters 2 and 3, as well as this one.

There are many versions of the GHQ; the original, developed by 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

²¹ This is based on the specification used by Ferrer-i-Carbonell and Frijters (2004).

GHQ12 since its inception²² and it has been used in many studies of wellbeing, including Gardner and Oswald (2007), who list more than a dozen other papers that use this dependent variable. Gardner and Oswald (2006) and Clark and Oswald (1994) invert this scale as I have done, to create an increasing measure of wellbeing.

One of the key benefits of the BHPS is that it returns to the same respondents in each wave of the survey, allowing us to control for any personality effects in question responses in the GHQ12, as well as in other questions. Anand et al (2005) find that personality does influence wellbeing, and may influence the impact of capabilities, but that controlling for personality did not change the results. Nonetheless the longitudinal nature of the data means that we can be more confident that personality effects on any relationship between capabilities and wellbeing are controlled for.

19.1.2 Capability measurement

As discussed in Chapter 3, the key to focusing on capabilities is to focus on choice, and through examining the questions behind each variable used in detail, we can gauge how much choice we can assume²³. In Appendix B a list of BHPS variables is mapped against the central capabilities developed by Nussbaum (2011) using the precedent set by Anand, Hunter and Smith (2005) and Veenhoven (2010).

In order to create capability indicators for Chapter 3, each variable was then converted to a binary scale if not already binary, for reasons of analytical simplicity: in this study I focus on the 'haves' and 'have-nots' of capabilities rather than suggest that individuals have a partial capability achievement, I assume that capability achievement is binary. As such, when an individual 'has' a capability the binary variable is 1 or 0 otherwise. These binary variables are then summed for each individual within each time period to create a variable that indicates

²² This is accepted as consistent in the long term (Pevalin 2000), meaning personality effects may be more-or-less fixed within this measure

²³ One of the risks of this study is that, like the previous paper, we cannot be entirely sure that we are looking at capabilities rather than functionings; with functionings, there is no assumption of choice, and imposing a functioning that has not been chosen may be as bad as restricting access to a functioning that has been chosen.

how many capabilities an individual benefits from during each time period. The coding details are presented in Appendix B, with greater discussion in Chapter 3.

19.1.3 Control variables

The happiness literature discussed in Chapter 2 (see, for example, Clark, Frijters et al. 2008, Argyle 2003) details a wide range of factors that are suggested to influence wellbeing. These include employment status, marital status, the region in which one lives, age and gender. The volume of research that has found these factors to be significant in wellbeing determination leads us to include them in the wellbeing regressions, so I create a range of dummy variables for the categories within each factor (Table 19.1). Education would normally be included, however the education data in the BHPS is used to create the senses, imagination and thought capability variable, so it is not used as a control here. Summary statistics for all the variables included in the empirical analysis are presented in Table 19.2.

Table 19.1 – Dummy variables

Variable	Employment status	Marital status	Area
Reference category:	Training/ education	Never married	Northern Ireland
Dummies:	Retired	Married	North
	Family care	Divorced/ separated	South
	Long term sick	Widowed	London
	Unemployed		Wales
	Employed		Scotland
			Midlands

Source: Author's analysis of BHPS data

Table 19.2 – Summary statistics

Variable	N	Mean	Std.Dev	Min	Max
Dependent variable					
Wellbeing	193,051	24.805	5.430	0	36
Independent variables					
Total capabilities	226,165	20.685	5.962	1	31
Equivalised income	226,040	23,350.93	15,791.65	0	871,802
Age	199,395	45.840	18.721	16	100
Dummy variables					
Training/education	195,772	.050	.219	0	1
Retired	195,772	.205	.403	0	1
Family care	195,772	.084	.277	0	1
Long term sick	195,772	.043	.202	0	1
Unemployed	195,772	.038	.191	0	1
Employed	195,772	.576	.494	0	1
Never married	199,370	.306	.461	0	1
Married	199,370	.536	.499	0	1
Divorced/separated	199,370	.075	.263	0	1
Widowed	199,370	.084	.277	0	1
Northern Ireland	224,861	.081	.273	0	1
North	224,861	.198	.399	0	1
South	224,861	.174	.379	0	1
London	224,861	.065	.246	0	1
Wales	224,861	.130	.336	0	1
Scotland	224,861	.151	.358	0	1
Midlands	224,861	.201	.401	0	1

Source: Author's analysis of BHPS data. Means for dummy variables are proportions of sample that have the dummy present, this are equivalent to proportion in that category.

19.1.4 Data adjustments

Similar to other chapters of this thesis, very few adjustments were made to the data. Responses from proxy respondents and those from individuals aged under 16 and still in compulsory education were dropped, and 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, 'wild' responses were recoded to missing.

19.2 Looking for loss aversion

Loss aversion implies that the effect of increases in income will not be the same as the effect of decreases by the same amount; indeed it is purported that losses have a greater negative effect on wellbeing than a gain of the same amount has positive.

Two particular methods to focus on loss aversion were adopted by authors such as Vendrik and Woltjer (2007) and Boyce et al (2013). The former use social reference income as the reference point; they calculate a moving age bracket reference group combined with education, region and gender categories. They use fixed effects regression that accounts for time invariant personality factors, and although their results were positive (coefficients indicating loss aversion were significant), it does not represent actual changes in ones own income thus is vulnerable to the 'affective forecasting error' criticism. In the latter study, Boyce et al use log-transformed income and its deviation from that in a previous year, representing individual losses and gains from the previous year. As discussed previously, they use multilevel modelling rather than fixed effects, but their choice of variable allows us to focus more specifically on changes compared to the status quo. Their analysis also strongly indicated loss aversion, with coefficients on a 'losses' dummy and an interaction term both being significant. For this study, I will combine the fixed effects method adopted by Vendrik and Woltjer (2007) with the variable type – an internal reference point - used by Boyce et al (2013).

The model specification I will use is:

$$\Delta W_{it} = \Delta C_{-it}\beta_1 + \Delta C_{+it}\beta_2 + X_{it}\beta_3 + f_i + \varepsilon_{it}$$

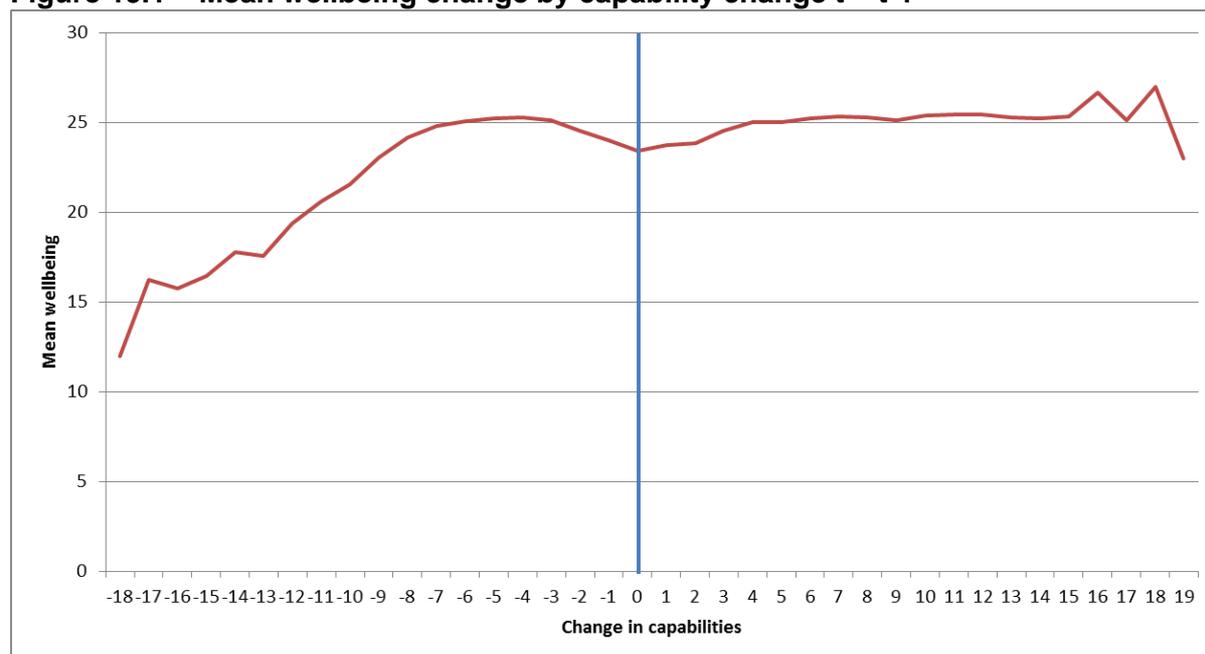
Where ΔW_{it} is the change in wellbeing for individual i at time period t (compared to $t-1$) μ_i is the time-invariant (personality) effect belonging to individual i , X_{it} is a range of control variables for individual i and time t , ε_{it} is an error term and $\Delta CY+$ and $\Delta C-$ take the value of capability losses and capability gains from the previous year. I will estimate several forms of the model – both with and without controls – and a version that just includes the change in capabilities from the previous year (so which takes both positive and negative values). To test consistency of this method with other studies, I will also look for the presence of loss aversion to income.

19.3 Losses versus gains

Undertaking a brief analysis of capability losses and gains, we can see that – as expected – capability losses are associated with lower mean wellbeing and capability gains are associated with higher mean wellbeing.

In Figure 19.1 we can see that below a capability change of zero, i.e. a capability loss, mean wellbeing is generally lower, with the slope being slightly steeper (albeit with a disturbance between -7 and 0) than that above zero.

Figure 19.1 – Mean wellbeing change by capability change $t - t-1$



Source: Author's analysis of BHPS data. $N = 10,725$ individuals.

19.4 Summary

In this section I present the methodology for approaching this investigation. Wellbeing measurement is briefly discussed (as it has been discussed extensively in previous chapters) and I present its definition as individuals' perception of their position related to their ideals, aspirations and judgements. The basic form of the models used in this analysis 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 term²⁴. I present the control variables that populate X and note some data adjustments.

The dataset used here will be an unbalanced panel from the British Household Panel Survey, using observations between the years of 1991 and 2008. The variables chosen are consistent with other papers in this thesis to maintain comparability: wellbeing is measured using an inverted version of the GHQ12 Likert scale.

As discussed above and in Section 18, there is no current research investigating loss aversion for capabilities and its impact on wellbeing, but there are some that address income loss aversion, and I borrow from their examples by setting out to undertake fixed effects least-squares analysis of models, using departures from an internal reference point (the previous periods' values) to represent losses and gains.

Finally I looked at some rough correlations between capability change and wellbeing, where Figure 19.1 suggests that capabilities exhibit similar characteristics to income with respect to loss aversion: losses appear to be felt more keenly than gains – as shown by the steeper slope for decreases in capabilities than for increases.

²⁴ The specific model structure will be presented in the following section.

20 Empirical Analysis

As mentioned previously, this paper aims to discover whether loss aversion applies to capabilities as well as income. Loss aversion to income is well tested in experimental studies as well as those using survey data, and it is mainly found to be prevalent and significant, however there is no evidence to suggest that loss aversion could also be found in capabilities. I look for loss aversion both in income and in capabilities to compare the impacts on wellbeing, partially to test the validity of the method with other studies and partially to see if there are similarities in the relationships.

In Section 19.3 we saw that gains in income are associated with higher wellbeing, but that losses are associated with lower wellbeing. The same applies for capabilities, to a seemingly greater extent. Here I use fixed effects regression to examine these initial observations further.

20.1 Capability loss aversion

As discussed in Section 18, there is no current literature that looks for the presence of capability loss aversion and examine its effects on wellbeing. There are some however that investigate the effects of income loss aversion on wellbeing, and, using the examples set by these studies (see Section 19.2) I develop a range of model specifications:

$$\text{Model 1: } \Delta W_{it} = \Delta C_{it}\beta_1 + f_i + \varepsilon_{it}$$

$$\text{Model 2: } \Delta W_{it} = \Delta C_{it}\beta_1 + X_{it}\beta_2 + f_i + \varepsilon_{it}$$

$$\text{Model 3: } \Delta W_{it} = \Delta C_{-it}\beta_1 + \Delta C_{+it}\beta_2 + f_i + \varepsilon_{it}$$

$$\text{Model 4: } \Delta W_{it} = \Delta C_{-it}\beta_1 + \Delta C_{+it}\beta_2 + X_{it}\beta_3 + f_i + \varepsilon_{it}$$

Where:

$$\Delta W = W_{it} - W_{it-1}$$

$$\Delta C = C_{it} - C_{it-1}$$

$$\Delta C+ = C_{it} - C_{it-1} \text{ if } \Delta C > 0$$

and:

$$\Delta C- = C_{it} - C_{it-1} \text{ if } \Delta C < 0$$

In the above equations, W_{it} is wellbeing for individual i at time period t , f_i is the time-invariant (personality) effect belonging to individual i , X_{it} is a range of control variables for individual i and time t and ε_{it} is an error term.

Estimating the equations above we can see that in models 1 and 2, change in capabilities is highly significant both with and without controls (Table 20.1) - β_1 is 0.045 in model 1 and 0.043 in model 2. So change in capabilities overall has a positive effect, but in models 3 and 4 (also Table 20.1) we can see that capability losses have a significantly greater negative effect than capability gains have positive: β_1 is -0.107 in model 3 and -0.086 in model 4 and are highly significant, compared to values for β_2 of 0.007 in model 3 (not significant) and 0.009 (significant at 10% level) in model 4. Although small therefore, it does appear that capability changes are significant.

Taking the ratio of these two coefficients, in model 3 we see that the negative effect from losses is 15 times greater than the positive effect of gains. The addition of controls in model 4 does diminish this slightly, as the negative effect is only 9 times greater, but this still indicates strongly that there is loss aversion for capabilities, even if the effect is small.

Table 20.1 – Capability change variables regressed on wellbeing (GHQ12)

	Model 1		Model 2		Model 3		Model 4	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Overall change in capabilities	0.045***	(0.002)	0.043***	(0.002)				
Capability losses					-0.107***	(0.005)	-0.086***	(0.005)
Capability gains					-0.007	(0.004)	0.009*	(0.004)
Ln equivalised income			0.041	(0.031)			0.049	(0.029)
Age			-0.030*	(0.013)			-0.035**	(0.012)
Age squared			-0.000	(0.000)			0.000	(0.000)
Married+			-0.312***	(0.081)			-0.250***	(0.073)
Divorced+			-1.012***	(0.141)			-0.991***	(0.131)
Widowed+			-1.725***	(0.163)			-1.715***	(0.150)
Employed+			-0.101	(0.088)			0.089	(0.080)
Unemployed+			-1.459***	(0.123)			-1.337***	(0.112)
Long-term sick/ disabled+			-2.622***	(0.168)			-2.420***	(0.152)
Family care+			-0.510***	(0.112)			-0.342***	(0.099)
Retired+			-0.126	(0.113)			0.092	(0.102)
North+			-0.906	(1.440)			-0.383	(1.635)
South+			-0.842	(1.448)			-0.334	(1.644)
London+			-1.061	(1.452)			-0.498	(1.647)
Wales+			-0.643	(1.466)			-0.157	(1.656)
Scotland+			-0.284	(1.455)			0.122	(1.655)
Midlands+			-0.650	(1.443)			-0.153	(1.640)
_cons	24.790***	(0.000)	27.090***	(1.400)	25.070***	(0.019)	26.570***	(1.555)
N	168,997		164,684		193,051		188,114	
adj. R2	0.005		0.016		0.006		0.018	
P-value (F)	0.000		0.000		0.000		0.000	

Note: Dependent variable: Inverted GHQ12 (wellbeing). $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors (clustered at PID level) in parentheses. Variables marked + are dummies. Omitted categories: 'training/ education', 'no qualifications', 'never married' and 'Northern Ireland'.

20.2 Income loss aversion

To test the consistency of this study to those looking for income loss aversion, I repeat the above analysis with income rather than capabilities. Doing this will also allow us to compare the outcome with papers, such as Boyce et al (2013) who do find the presence of income loss aversion in BHPS data. Given that there is no methodology for looking for the effects of

loss aversion in capabilities, it is important to do this to test the method here against that in other studies. If the results are wildly different it may be due to the method therefore, rather than data (as I also use the BHPS) and therefore one may have to question the method for measuring capabilities; as discussed in Section 18, preferences for the status quo and the relationship between income and capabilities (where the latter is one of many resources that individuals can use to convert capabilities into functionings) lead us to assume that there could possibly be loss aversion to capabilities as well as income. Furthermore the roughly linear relationship highlighted in Section 12, as well as the outcome of total capabilities as a significant determinant of wellbeing in a regression, confirms this possibility.

A second reason for undertaking analysis of income is to compare the effects. Although a well-established phenomenon in experimental studies, with ratios of the effects of losses to those of gains ranging from 1.8 to 4.8, I cannot say that there is a clear consensus of how much loss aversion can be expected to either income or capabilities. Comparing any ratios that come out of each analysis will therefore add context.

Using equivalised household income in natural log form, I create three variables: one variable that represents the change in income from one year to the next, one that takes all the negative changes in income and one all the positive, where:

$$\Delta Y = Y_{it} - Y_{it-1}$$

$$\Delta Y^+ = Y_{it} - Y_{it-1} \text{ if } \Delta Y > 0$$

and:

$$\Delta Y^- = Y_{it} - Y_{it-1} \text{ if } \Delta Y < 0$$

So the models to be estimated become:

$$\text{Model 1: } W_{it} = \Delta Y_{it} \beta_1 + f_i + \varepsilon_{it}$$

$$\text{Model 2: } W_{it} = \Delta Y_{it} \beta_1 + X_{it} \beta_2 + f_i + \varepsilon_{it}$$

$$\text{Model 3: } W_{it} = \Delta Y_{-it}\beta_1 + \Delta Y_{+it}\beta_2 + f_i + \varepsilon_{it}$$

$$\text{Model 4: } W_{it} = \Delta Y_{-it}\beta_1 + \Delta Y_{+it}\beta_2 + X_{it}\beta_3 + f_i + \varepsilon_{it}$$

Where W_{it} is wellbeing for individual i at time period t , f_i is the time-invariant (personality) effect belonging to individual i , X_{it} is a range of control variables for individual i and time t , ε_{it} is an error term and ΔY , $\Delta Y+$ and $\Delta Y-$ are as described above.

In Table 20.2 the results of the regressions are displayed. In model 1 it is evident that change in income is a significant determinant of wellbeing, with the coefficient on income change highly significant, exhibiting a value of 0.106. Adding controls to the regression (model 2) does not reduce the high significance of the variable but does reduce the size of the coefficient slightly to 0.101, however this tells us nothing about loss aversion – for that I need to test for differential effects on losses and gains.

Models 3 and 4 attempt to capture these effects by including different measures for income losses and income gains. Interestingly, where income losses are negative and significant ($\beta_1 = -0.239$ in model 3 and $\beta_1 = -0.182$ in model 4), income gains are not significant in either model. This is consistent with Boyce et al (2013). This result could be due to the source of the income gains, perhaps through working longer hours. It could also be that, as discussed in Chapter 4 of this thesis, that if there are capability failures, additional income will not bring about improvements in quality of life.

Table 20.2 – Income change variables regressed on wellbeing (GHQ12)

	Model 1		Model 2		Model 3		Model 4	
	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.	Coeff.	S.E.
Change in income (ln)	0.106***	(0.023)	0.101***	(0.030)				
Income loss (ln)					-0.239***	(0.044)	-0.182***	(0.051)
Income gain (ln)					-0.012	(0.038)	0.029	(0.040)
Ln. Equivalised income			-0.035	(0.043)			-0.031	(0.036)
Age			-0.042**	(0.014)			-0.051***	(0.012)
Age squared			0.000	(0.000)			0.000	(0.000)
Married			-0.274**	(0.085)			-0.258***	(0.074)
Divorced			-0.976***	(0.146)			-1.008***	(0.132)
Widowed			-1.583***	(0.167)			-1.719***	(0.151)
Higher education			0.155	(0.232)			-0.089	(0.206)
Further education			-0.044	(0.181)			-0.095	(0.160)
Basic qualifications			-0.170	(0.197)			-0.178	(0.172)
Employed			-0.122	(0.100)			0.076	(0.086)
Unemployed			-1.569***	(0.137)			-1.398***	(0.116)
Long term sick			-2.644***	(0.180)			-2.476***	(0.155)
Family care			-0.554***	(0.123)			-0.379***	(0.103)
Retired			-0.134	(0.123)			0.063	(0.106)
North			-2.305	(1.590)			-0.287	(1.607)
South			-2.210	(1.588)			-0.219	(1.616)
London			-2.429	(1.593)			-0.397	(1.620)
Wales			-1.787	(1.611)			-0.067	(1.628)
Scotland			-1.697	(1.562)			0.245	(1.628)
Midlands			-2.025	(1.584)			-0.055	(1.612)
Constant	24.800***	(0.000)	29.500***	(1.566)	24.830***	(0.001)	27.730***	(1.546)
N	160,440		154,757		193,051		185,798	
R2	0.000		0.011		0.000		0.013	

Note: Dependent variable: Inverted GHQ12 (wellbeing). $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$. Robust standard errors (clustered at PID level) in parentheses. Variables marked + are dummies. Omitted categories: 'training/education', 'no qualifications', 'never married' and 'Northern Ireland'

20.3 Analysis

In this section I use fixed effects least-squares regression to look for evidence of loss aversion to capabilities; that is, I aim to examine whether there are asymmetric effects for losses and gains in capabilities. I find that indeed there are asymmetric effects in the

wellbeing response to capability changes: both with and without controls, losses have an effect around 15 times greater than gains.

Testing these results by applying the same method to income, I found that although income losses were significant, gains were not; this outcome is supported somewhat by the findings of Boyce et al (2013) who found that income gains only had a marginally significant relationship with wellbeing without controls; gains became insignificant when controls were added. However the analysis suggests that there is loss aversion to both factors.

21 Conclusions

In this paper I set out to test whether loss aversion – one of the central tenets of prospect theory – was present in the relationship between capabilities and wellbeing. Beginning with a presentation of loss aversion theory, discussing how “losses loom larger than gains” (Kahneman, Tversky 1979, p279) – decision utility is affected to a greater extent by losses (departures from a reference point) than by gains of the same amount. Reference points can be internal – from one’s own past – or external, such as the average income of peers, and some studies (see Luttmer 2005, Ferrer-i-Carbonell 2005, Di Tella, Haisken-De New et al. 2010) suggest that income comparisons of both types do affect wellbeing. Examining wellbeing effects based on decision utility is vulnerable to the criticism of affective forecasting error, in other words, the expectation of losses might be greater than that of equivalent gains, but the reality may not be the case. The use of experienced utility – wellbeing – rather than decision utility avoids this criticism, and this is the dependent variable I use in this study.

The dataset used in this study is the BHPS – the British Household Panel Survey – and the variables chosen are consistent with other papers in this thesis to maintain comparability: wellbeing is measured using an inverted version of the GHQ12 Likert scale. The capabilities used in this study are based on Martha Nussbaum’s (2011) list of central capabilities, and the capability indicators are those developed for the previous paper in this thesis: Using Anand, Hunter and Smith (2005) and Veenhoven (2010) as a precedent, I chose a range of BHPS responses to represent capabilities, then used principal components analysis to select the core factors for each capability, which were then used as capability dummies, and summed to create a ‘total capabilities’ variable for each individual in each year.

I use a basic wellbeing specification that uses fixed effects least squares to look for asymmetric effects in wellbeing responses to changes in capabilities: there is already some initial evidence (from Figure 19.1) that negative changes in capabilities are associated with disproportionately lower wellbeing when compared with positive changes.

The empirical analysis gives further evidence to support the presence of loss aversion to capabilities; without controls, losses have an effect at least 15 times greater than for gains, and even the addition of control variables only reduces this to 9. However the coefficients are small, with a reduction of one capability resulting in a 0.1 reduction in wellbeing. Repeating this analysis for income, gains were not significant although losses were, with a coefficient of -0.2.

The caveats for this study are similar to those for Chapter 3 – the extraction of the capability variables from the BHPS is, despite endeavours to closely compare the description of each capability with the text surrounding the BHPS question, subjective. So I have not used the same variables as Anand et al (2005) and another researcher may not use the same variables as me. This is unavoidable when extracting information from a set of questions that were not designed to measure capabilities, and researchers must assure themselves that the data they are using represented the capabilities (and only the capabilities, rather than functionings) as much as possible.

Having used wellbeing as the dependent variable – something that is actually experienced rather than anticipated (as with decision utility) – the results don't suffer the criticism of affective forecasting error; indeed it does appear that for capabilities losses loom larger than gains and are felt more keenly than gains.

In Section 18 I presented the rationale for testing for loss aversion in capabilities. Implicit in prospect theory is that less of a good thing is bad, and more of a good thing is good. In Chapter 3, I found that capabilities – both individually and in sum – could be significant determinants of wellbeing despite the inclusion of income in a wellbeing specification. So, as 'good' things, do we lose wellbeing by losing capabilities? Prospect theory holds that losses loom larger than gains for income and decision utility: the wellbeing penalty from losing £10 is larger than the wellbeing gain from winning £10. Although prospect theory has not often been tested in experienced utility, those studies that do test it find a similar

outcome: losses have larger wellbeing reductions than respective gains would create. Put simply, we are averse to losses in expectation (decision utility) and reality (experienced utility).

Given the relationship between income and capabilities – income is a resource, that individuals can use to achieve ends (functionings) – we might expect a similar relation, but a lack of prior literature means there was no proven foundation for this expectation. This study was therefore exploratory. The positive outcome – that there was a greater wellbeing loss from capability reduction than wellbeing gain for capability addition – supports the existence of loss aversion in something other than income or assets.

The implications of these results also support those of other papers in this thesis, specifically, that capabilities do appear to matter to wellbeing, even if the loss aversion affects appear to be smaller than those for income: if there are capability failures, individuals may be prevented from using their income to achieve ends that they need or desire to bring them closer to their own view of 'a good life'. Thus, even though there was no prior expectation of a significant result, it is perhaps unsurprising that we find loss aversion in capabilities, particularly when income is controlled for.

22 Appendix A – References

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23 Appendix B – Capability Variables in BHPS

This short list of capability indicators was refined from a longer list on criteria such as availability in multiple waves, number of respondents to the question, whether it focuses on a capability or a functioning and how well it could fit within the description of Nussbaum's capabilities. The long list was created from a trawl of the BHPS documentation, comparing the wording of questions to the descriptions of Nussbaum's capabilities.

In order to create capability indicators, each variable is converted to a binary scale if not already binary, for reasons of analytical simplicity: in this study I aim to look at the wellbeing differences between the 'haves' and 'have-nots' of capabilities, so rather than suggest that individuals have a partial capability achievement, I assume that capability achievement is binary.

Using judgement, the descriptions of Nussbaum's capabilities and the method used in Anand et al (2005), I draw thresholds for variables where it seems most appropriate.

Table 23.1 – Capability indicators and source variables

Capability	Variables (including BHPS title*)
Life	No data available
Bodily health 1	wHLLT – Health limits daily activities - Yes (1) coded to 0; no (2) coded to 1
Bodily health 2	wHLLTW – health limits type or amount of work - Yes (1) coded to 0; no (2) coded to 1
Bodily health 3	wLFSAT1 – satisfaction with health - 7 (completely satisfied) to 4 (neither satisfied nor dissatisfied) were coded to 1; 3 (slightly dissatisfied) to 1 (not satisfied at all) were coded to 0
Bodily integrity 1	wCARUSE – have access to car - Yes (1) remained as 1; no (2) coded to 0
Bodily integrity 2	wCRDARK – feel safe walking alone at night - Very safe (1) and fairly safe (2) coded to 1; a bit unsafe (3), very unsafe (4) and never go out after dark (5) coded to 0
Bodily integrity 3	wHSPRBQ – accommodation has vandalism/ crime in the area - Yes (1) coded to 0; no (2) coded to 1
Bodily integrity 4	wCRMUGG – extent of people being attacked - Very common (1) and fairly common (2) coded to 0; not very common (3) and not at all common (4) coded to 1
Bodily integrity 5	wCRWORA – worry about being a victim of crime - Yes (1) coded to 0; no (2) coded to 1
Senses, imagination and thought	wQFEDHI – highest qualification held - Higher degree (1) to a-levels (6) coded to 1; o-levels/ GCSEs and below coded to 0
Emotions 1	wSSUPA – is there someone who will listen to you? - Yes (1) remained as 1; yes, more than one (2) coded as 1; no-one (3) coded as 0
Emotions 2	wSSUPB – is there someone who will help in a crisis? - Yes (1) remained as 1; yes, more than one (2) coded as 1; no-one (3) coded as 0
Emotions 3	wSSUPC – is there someone you can relax with? - Yes (1) remained as 1; yes, more than one (2) coded as 1; no-one (3) coded as 0
Emotions 4	wSSUPD – is there someone who really appreciates you? - Yes (1) remained as 1; yes, more than one (2) coded as 1; no-one (3) coded as 0
Emotions 5	wSSUPE – is there someone you can count on to offer support? - Yes (1) remained as 1; yes, more than one (2) coded as 1; no-one (3) coded as 0
Practical reason	wLFSATO – satisfied with life overall - 7 (completely satisfied) to 4 (neither satisfied nor dissatisfied) were coded to 1; 3 (slightly dissatisfied) to 1 (not satisfied at all) were coded to 0
Affiliation 1	wORGA – active in organisations - Yes (1) remained as 1; no (2) coded to 0
Affiliation 2	wFRNA – frequency of talking to neighbours - Most days (1) remained as 1; once or twice a week (2) coded to 1; once or twice a month (3) coded as 0; less than once a month (4) coded as 0; never (5) coded as zero

Affiliation 3	wFRNB – frequency of meeting people - Most days (1) remained as 1; once or twice a week (2) coded to 1; once or twice a month (3) coded as 0; less than once a month (4) coded as 0; never (5) coded as zero
Affiliation 4	wHSCNTF – would like to socialise but must do without because I cannot afford it - Yes (1) coded to 0; no (2) coded to 1
Other species	No data available
Play 1	wLFSAT6 – satisfied with social life - 7 (completely satisfied) to 4 (neither satisfied nor dissatisfied) were coded to 1; 3 (slightly dissatisfied) to 1 (not satisfied at all) were coded to 0
Play 2	wLFSAT7 – satisfied with amount of leisure time - 7 (completely satisfied) to 4 (neither satisfied nor dissatisfied) were coded to 1; 3 (slightly dissatisfied) to 1 (not satisfied at all) were coded to 0
Play 3	wLFSAT8 – satisfied with use of leisure time - 7 (completely satisfied) to 4 (neither satisfied nor dissatisfied) were coded to 1; 3 (slightly dissatisfied) to 1 (not satisfied at all) were coded to 0
Play 4	wJBHRLK – preference over hours worked - Work more hours (1) and work fewer hours (2) coded to 0; keep the same hours (3) coded to 1
Control (over one's environment) 1	wVOTE7 – voted in May 2005 (or previous) general election - 1 (voted) remained as 1; 2 (didn't vote but could have) was coded to 0
Control 2	wLFSAT2 – satisfaction with income - 7 (completely satisfied) to 4 (neither satisfied nor dissatisfied) were coded to 1; 3 (slightly dissatisfied) to 1 (not satisfied at all) were coded to 0
Control 3	wLFSAT3 – satisfaction with house - 7 (completely satisfied) to 4 (neither satisfied nor dissatisfied) were coded to 1; 3 (slightly dissatisfied) to 1 (not satisfied at all) were coded to 0
Control 4	wLFSAT4 – satisfaction with spouse/ partner - 7 (completely satisfied) to 4 (neither satisfied nor dissatisfied) were coded to 1; 3 (slightly dissatisfied) to 1 (not satisfied at all) were coded to 0
Control 5	wLFSAT5 – satisfaction with job. - 7 (completely satisfied) to 4 (neither satisfied nor dissatisfied) were coded to 1; 3 (slightly dissatisfied) to 1 (not satisfied at all) were coded to 0

Chapter 5: Conclusions

In this thesis I set out to make the case that monetary poverty – at an arbitrary level – is not relevant to individual wellbeing, that capabilities are important determinants of wellbeing, and finally that dynamic effects of capabilities influence wellbeing. In these aims, this research has had some success. In this section I summarise the results of each paper, discuss them in the context of the literature and suggest policy implications and further research.

Summary of results

The first investigation – into the significance of the poverty line for wellbeing, Chapter 2 – found that being ‘poor’ by an arbitrary standard did not affect ones wellbeing. The poverty line used here is 60% of the median household equivalised disposable income; although often referred to (as discussed in Chapter 2), there is no obvious reason why this particular threshold was chosen. This calls into questions not only its relevance to the concept at hand, but also its relevance to individuals living above or below the threshold. This doubt was vindicated by the results of fixed effects regression that indicated that poverty - arbitrarily defined - was not amongst the significant determinants of wellbeing.

The second part of Chapter 2’s poverty line investigation further tested the threshold, by examining whether the poor and non-poor were distinct populations, and decomposition analysis suggested that there was a difference in wellbeing between the two groups (0.9533 points on the wellbeing scale of 0 to 36). However 96% of the difference is due to characteristics rather than coefficients – this means that the differences were accounted for by factors such as education, health, employment status and marital status, rather than any fundamental difference in the slope or intercept of a wellbeing function. I cannot conclude therefore that there are any fundamental differences in wellbeing determination for those

living above or below a poverty line. This was supported by RDD analysis that found no evidence of a discontinuity in wellbeing either side of the poverty line.

Chapter 3 introduced the concept of capabilities – widely assumed to represent multidimensional poverty – as an alternative to the 60% threshold. Monetary poverty only focuses on the financial aspects of deprivation, whereas there is much evidence that it is multifaceted. Building on the outcome of Chapter 2 – that the 60% median income poverty line may not be important for wellbeing determination, Chapter 3 conducted principal components analysis to reduce a list of capability indicators extracted from the BHPS into principal factors that represented each capability on Nussbaum's list. Some of the capability factors included in a fixed effects regression model were significant – both with and without controls – where the coefficients range from 0.970 (affiliation) to 4.301 (senses, imagination and thought), as was a count variable of the total number of capabilities an individual possessed. This research therefore suggested that capabilities could be important determinants of wellbeing, both individually in some cases and on the whole.

Chapter 4 extended this analysis by focusing on asymmetries in the relationship between capabilities and income, and looked at how wellbeing would change when the number of capabilities was increased or reduced: would losses 'loom' larger than gains as they are often found to for income? Reference points for income can be internal – ones own past – or external (a peer group) and no studies appear to have been undertaken that examine whether this phenomenon would also apply to capabilities so I set out with no expectations as to the likelihood that the hypothesis of symmetric responses to positive and negative changes in capabilities would be accepted.

Using fixed effects regression to control for unobservable heterogeneity, this latter investigation included two capability change variables; one that contained only negative changes and one that contained only positive changes. Although the effects were small, it

was found that losses have a negative effect significantly larger than the positive effect of gains, strongly indicating the presence of loss aversion to capabilities.

Caveats

As mentioned previously, any study is limited by its methodology, and these essays are no exception, so the following issues should be taken into account when considering the conclusions. An issue prevalent throughout all three papers is unobserved time-invariant bias, from sources such as personality, which – in economics – is assumed to be roughly stable; or at least, the part of personality that would bias wellbeing responses to income, education and other controls is assumed to be roughly stable (Oswald, Powdthavee 2008). However in the psychological literature, personality is viewed as changing over the lifetime, meaning that – in the case here – there would be no time-invariant factors; personality effects that constantly change would end up in the error term of a regression. Throughout this study I have tested each regression model to see if the assumption of time-invariant omission holds, and in all but one case, Hausman tests – that look for the presence of unobserved time-invariant factors in a panel data regression – suggest that the appropriate model specification is a fixed effects one. That isn't to say that personality is fixed; it simply means that there is an unobserved component that doesn't change over time. This could be personality, or it could be part of personality. Regardless, where appropriate I used a random effects panel specification, which simply means there was no bias from omitted time-invariant factors that needed to be controlled for. In doing this I make no conclusion about whether personality is stable or not; simply, I sought to ensure my models were robust in the face of potential bias.

A second limitation, which affects Chapters 3 and 4, is the extraction of BHPS data to measure capabilities. Although this has been undertaken by Anand et al (2005) and Veenhoven (2011), the approach is not wholly vindicated by repetition: each researcher will read Nussbaum's list of core capabilities and interpret them with as objectively as possible,

but there is an unavoidable subjective component whereby our interpretations are enriched with our own experiences and beliefs. This means that not all researchers can be expected to arrive at the same range of variables to represent the central capabilities. This is the nature of extracting information from a dataset that was not designed to measure that information. I have mitigated this somewhat by undertaking principal components analysis: from a number of variables that widely represent the capability, I extract components that measure the majority of the underlying concept that is not measured.

Linked to this is the possibility that in some cases we are measuring functionings (what people do) rather than capabilities (their abilities to 'do' if they choose to). A functioning that arises without a capability being present is not believed to be valid: central to the CA is choice, so that external choices are not imposed on us against our will. We must be able to choose the functionings that we want to achieve given our set of capabilities. If there is a capability failure, we cannot achieve associated functionings, but it is only when those functionings are desired but cannot be chosen that the failure arises. If a functioning is not desired and would not be chosen, imposing it on someone is just as much a capability failure as denying it to them in the first place. As much as possible, care has been taken to ensure that the variables selected represent capabilities rather than functionings, however as I use variables not designed to measure capabilities, it is possible that there is some aspect of functioning unknowingly included.

A further limitation is that even within the CA proponents there is division as to whether a central list is permissible; Nussbaum believes it is, but Sen disagrees. His disagreement however, can be lifted in the place of poverty assessment (Sen 1992), which is the overarching theme of this thesis. In this latter case, Sen (1992) states that a specified list is tolerated within his framework. Although not ideal in Sen's view taking a pluralistic, practicable approach, as I do, does allow us to look at capabilities in the absence of any current capabilities measurements, or facility to develop a democratic consensus on what capabilities are important to our population.

The data itself presented some limitations, as BHPS variables are not present in every wave of the survey. This was particularly problematic in Chapter 3, measuring the individual capabilities. For two models, the sample size was well than 2,000 individuals over two waves. Compared to 188,000 over 18 waves for model 3 of that paper, these samples are particularly small and may be the reason why some results were unexpected. The only solution would be to abandon some capabilities altogether; there were some variables (for example the ones representing emotion) that were only available for nine waves, and of those nine waves, only six had observations for affiliation variables and so on. I could have omitted the variables present in the least number of waves, but even in this limited form, I believe the sacrifice of power for completeness is worthwhile, particularly as I then looked at capabilities as a sum.

Finally, the BHPS presents a limitation in being a household survey. Only residential addresses listed in a national postcode database are included. Traveller sites, institutions, refuges are all excluded. Individuals whose main place of residence is at one of these sites may be poor and may be capability deprived – perhaps moreso than individuals in residential addresses – however we have no way of including them in the study. The same applies for homeless individuals, who may be homeless due to poverty or capability failure (being homeless is a severe violation of the bodily integrity capability to name but one). This means that those who may be more severely affected by poverty and/ or capability failure are not included in the survey. There is unfortunately no mitigation for this.

Implications

There are two concluding statements one can make from these essays. Firstly, that the poverty line – in its arbitrary form used in this thesis, specified by government policy – has no discernible effect on individual wellbeing, other than the effects that result through associated changes like employment status or educational attainment. Secondly, capabilities – some individually and in sum – can have an effect on wellbeing in static and

dynamic aspects; in the static sense, people with more capabilities generally experience higher wellbeing and the presence of particular capabilities – senses, imagination and thought, affiliation, practical reason for example – indicates higher wellbeing. In the dynamic sense, the addition and removal of capabilities also affects wellbeing, in an asymmetric pattern: losing a capability results in a greater wellbeing loss than the increase in wellbeing resulting from gaining a capability.

As mentioned above, there is no evidence that the 60% poverty line has any theoretical founding (Seymour 2009). This is perhaps why there was no evidence for different wellbeing functions for the poor and non-poor – any wellbeing differences were accounted for by factors other than being under or over the poverty line itself. Although subject to some controversy (Blanchflower, Oswald 2004), there is frequent observation that greater income is associated with greater wellbeing, and when I plotted observed income against observed wellbeing there was an upward and roughly linear relationship between the two variables; there did not appear to be any threshold where the relationship changed to be steeper or flatter or where a discontinuity was suggested. This is perhaps intuitive: income is – to an extent, because few of us will become part of the 1% (Stiglitz 2011) – continuous, so what you can afford to buy/ do is also continuous (assuming constant preferences, rather than a switch to luxury goods). A fall of £1 in annual income could move someone below the poverty line, but this is unlikely to have any significant effect on her or his household consumption; similarly for a £1 increase that raises a household above the poverty line. The research here therefore affirms the literature suggesting the poverty line is theoretically unfounded and socially irrelevant (Belfield, Cribb et al. 2014, Seymour 2009, Townsend 1979).

The current UK poverty target, to eradicate child poverty by 2020, will not be met. However the interpretation of this is complex: the 60% median income threshold is unavoidably affected by fiscal policy (Brewer, Browne et al. 2011). In addition the general income level and income inequality both can affect how many people fall below the line. So although the

eradication of child poverty target will not be met, it does not necessarily mean that the quality of life of less well-off individuals has fallen. The nature of this poverty measurement limits what we can say about the experiences people have (heightening the importance of a relevant measurement). The Joseph Rowntree Foundation (Parekh, MacInnes et al. 2010) suggests that the numbers of people in poverty will rise, but again, we cannot be sure whether this is due to genuine falls in quality of life or whether it is due to the nature of the fixed poverty line. This alone should be enough to lead policymakers to consider alternative measures, and indeed material deprivation is now being included in the Households Below Average Income series, but this is inextricably linked to income as it focuses on what people can afford to buy, rather than what they are able to be using – for example – social capital or entrepreneurship (part of their personal resources).

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): what this means is that if we knew what it really was to be poor, and could identify the suffering and intervene at individual and societal levels, there would be no need for an unfounded dichotomy that divided a society into treatment groups, where the poor were worthy of intervention. Within that poor category, there would be such a large variety of experiences that blanket treatment would be only sufficient for some, and might be unnecessary for those in – for example – the 59th centile of median household income.

So, what is an individually meaningful indication of poverty? The capabilities approach (CA) aims to provide it, and Chapters 3 and 4 examined whether it could have an impact on wellbeing. The appeal of the CA in poverty measurement is centred on its multidimensionality. Monetary measures of poverty focus on only one aspect, which in the capabilities framework is a resource to be utilised to achieve functionings. But without capabilities, and the freedom to choose a functioning, money may lose one of its core benefits – the ability to exchange it to achieve ends. When one views ‘a good life’ as ends most people arguably have, capability failures seem intrinsically important.

In the CA, income is seen as a resource (along with other physical, societal and emotional resources) that individuals use to achieve ends (Kingdon, Knight 2006, Sen 1992) . In Chapters 3 and 4, regression models included capabilities and an income measurement as regressors on wellbeing. Income was not significant when accompanied by the sum-of-capabilities variables, however was significant on its own (as seen in the income loss aversion models in Chapter 4). This supports the literature view that income alone is not enough to ensure a good life; it instead acts as a conduit for capabilities to be converted into functionings – a means to achieve ends.

One of the complications of the CA was its limited applicability – Sen (1979) has asserted that capabilities should be context specific and relevant to communities. One of the criticisms Sen makes of wellbeing research is that individuals are believed to adapt to deprivation: after a certain amount of time living in extreme poverty, individuals ‘get used to it’ and still experience positive and negative emotions as they would if they were not in extreme poverty.

Adaptation however, is not universal (Pugno 2008). Particularly in the developed world, deprivation, that Sen is concerned individuals will adapt to, is not the same deprivation of poor individuals in Sub-Saharan Africa. Furthermore in developed countries, despite economic growth and rising average income, the incidence of anxiety is rising, even for those who are relatively well off (Fombonne, Simmons et al. 2001) so it is not necessarily true that adaptation is occurring in all societies. And finally, adaptation need not be negative, as with it comes further aspirations (Teschl, Comim 2005). Chapter 4 of this thesis suggests that dynamic changes in capabilities do affect individuals, at least in the short term; an interesting extension – not possible within these models due to limited waves of data – would be the persistence of these effects; this would allow us to make greater assertions about adaptation to capability deprivation.

Binder (2013) believes that with careful consideration there is the potential for synthesis between the CA and happiness research. The two need not be opponents. Wellbeing research can overcome the impracticality of the CA – how do you measure a good life if it is wholly individual and context specific? – and CA can overcome the adaptation criticism of wellbeing research. A synthesis may be possible with due care and attention to each approach. In this thesis I have aimed to provide that due care and attention, with the limitations mentioned above, but looking at whether the presence of capabilities is significant to wellbeing and how changes in those capabilities affects wellbeing over time; recognising that in some spheres capabilities and wellbeing are measuring the same thing – here I have tried to focus on a particular aspect of wellbeing – and inverted GHQ12 variable used by Gardner and Oswald (2004, 2006) amongst others – and separated it from the whole-of-life quality assessment contained within the CA.

In these papers I have discussed the limitations of the fixed and arbitrary poverty line (Chapter 2), and extolled the merits of a multidimensional approach like the CA (Chapters 3 and 4). The research summarised above suggests that capabilities do matter to wellbeing – an individual's wellbeing does appear to be affected by the presence of certain capabilities (play, practical reason for example) and also be the total number of capabilities she has available to her. Moreso, the loss of a capability is felt more keenly than a gain so the 'capabilities matter' observation holds in both static and dynamic contexts. This effect remains even when income is included in the wellbeing specification. The loss aversion outcome was not expected – there is no literature to suggest loss aversion in capabilities and – but adds weight to the arguments in Chapter 3 that the more aspects of an individual's life we are able to consider when assessing poverty, the more relevant and important that assessment will be. This supports the nature and intent of the CA, in providing an individually relevant measure of what it is to be poor (Nussbaum 2011, Alkire 2010) .

The simple point that arises is that ultimately, without capabilities being present, monetary transfers will arguably result in no increase in quality of life, therefore what policy should be

focusing on is providing, and insuring against the barriers to, capabilities. This is therefore an area where intervention has the potential to make a difference: it would require a further understanding of why capabilities fail at the level of communities and individuals, and would represent a departure from the traditional form of policy intervention in the UK (Parekh, MacInnes et al. 2010), but might be an area where interventions could bring about much more tangible results for individuals. Enabling someone to choose how to live her or his life is better than providing monetary social transfers when that choice is not present.

Policy relevance and extensions

The most obvious policy implication of the researched contained here is that – on the basis that policy aims to improve lives – the poverty line may not be the best treatment indicator for very low income without an idea of what the effects it has on individuals are. Individuals do not know whether they are above or below this arbitrary standard, therefore don't know they are 'poor'; simply put, it is not meaningful to them. Non-monetary and multi-dimensional measures of poverty may be more relevant individually, as Sen (1985) argues that people experience poverty as limitations on what they can be and do. Where there are barriers to beings and doings, money isn't always going to be the answer.

Capabilities have not been given a great deal of attention in the developed world, however the implications of the research here are that this should change. What people are able to be and do is not something limited to less developed countries, and limiting human potential is arguably a failure of any state. The Households Below Average Income data collected by the DWP does include the collection of some material deprivation data, but this focuses more on what people have rather than what they can do.

Other than Anand et al (2007) there has not been any attempt to measure capabilities, leaving researchers to extract capability information from datasets that are not designed with that purpose in mind. Nonetheless, some of the capabilities within Nussbaum's list are individually significant determinants of wellbeing; the majority of the capabilities measured

here were significant as was a count variable of the total capabilities; losing capabilities significantly affects individual wellbeing too, asymmetrically, and more so than losing income. Governments should not therefore ignore the potential of capabilities in improving individual lives and improving society as a whole.

Sen refrained from developing a list of capabilities on the basis that what is important should be debated and refined democratically through consensus building. Furthermore, although Nussbaum's (2011) list is a starting point, she argues that the list is a minimum, open to interpretation and further specification. This provides the possibility to consider further development of lists at community level, where capability failures are seen to be significant and detrimental to wellbeing. Repeating this exercise over time would allow researchers to investigate persistence of, and adaptation to the effects of capability failures. Individuals therefore should have a role to specify what is important to them in their quest to live a good life. Although expensive on a national scale, it is not impossible for this to happen in the UK or in any developed country: in a society where we can ask one population whether it wants to be independent from another, we can ask it what a good life is. This would be groundbreaking: a country that didn't just throw money at those with low income but instead asked people what they wanted to be and do and removed the barriers to those individuals achieving a good life regardless of their income.

Developing a set of beings and doings that would give people the opportunity to lead a good life is therefore the most important extension to this research. We could begin with Nussbaum's list, or develop our own list, and use that on a representative scale to see where society was failing. Only then would we be able to remove the barriers to human flourishing and enable society to be truly 'good'.

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