An investigation of the socio-economic relationship between civil society and social capital on subjective well-being

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Submitted to Swansea University in fulfilment of the requirements for the Degree of Doctor of Philosophy

Swansea University

2019

Summary

An increase in the government's interest in well-being over recent years has led to much new research in these fields. This thesis considers subjective well-being, exploring how it is affected by employment contracts, life events and religiosity.

Since the economic crisis of 2008/9 there has been an increase in certain employment contracts (such as zero-hour contracts). The effect of these different employment contracts has been explored here, with a focus on whether omitting unemployed individuals from such research will bias the results.

Big life events, such as unemployment, marriage, divorce, disability, etc. can have a big impact upon an individual's well-being. These impacts have been investigated here, considering also anticipation (changes in well-being in the lead up to the event) and adaptation (changes to well-being following the event). There is also a focus on how individuals at different points along the well-being distribution respond differently to these life events.

Religiosity has generally been found to have a positive impact upon well-being. However, this relationship has not considered the indirect impact that religiosity may have on well-being through its effects on social capital, income, employment status, marital status, education and health. These indirect effects are explored here, splitting the analysis by gender and religion/denomination.

The research performed here identifies many vulnerable groups who suffer strong negative effects from employment, life events or religiosity. Therefore, this research has many policy implications.

DECLARATION

This work has not been previously accepted in substance for any degree and is not being concurrently submitted in candidature for any degree.

Signed _____ (candidate)

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STATEMENT 1

This thesis is the result of my own investigations, except where otherwise stated. Where correction services have been used, the extent and nature of the correction is clearly marked in a footnote(s).

Other sources are acknowledged by footnotes giving explicit references. A bibliography is appended.

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STATEMENT 2

I hereby give consent for my thesis, if accepted, to be available for photocopying and for inter-library loan, and for the title and summary page to be made available to outside organisations.

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Acknowledgements

The author would like to thank Professors Philip Murphy, David Blackaby and Nigel O'Leary for helpful comments and advice. Not only have they provided support whenever an issue arose, they have also helped to influence and guide the author's passion for economics and academia.

The author would also like to thank the Economic and Social Research Council (ESRC) and the Wales Institute of Social and Economic Research, Data and Methods (WISERD), as well as Swansea University for funding this research. He would also like to thank the various members of these organisations who have given input and advice into this thesis. Despite not all suggestions making the final version, all were appreciated and considered greatly.

On a more personal note, the author would like to thank the friends with whom he had lunch, who helped him think about his research in different ways, listening when there was an issue and supporting through friendship.

The author is also particularly appreciative of Brynmill Coffee House for giving him the resources to continue when he was tired, and Gower Brewery for giving him the resources to stop when he needed sleep.

The author would like to thank his family for their support (both financially and prayerfully) and encouragement to continue going even when times were tough. Without such a supporting and encouraging family, this thesis would not exist (so you can blame them for this).

Finally, the author would like to anonymously give a special thanks to the individual who aided in maintaining his sanity through the last push, providing much needed love, support and cuddles.

Figures and Tables

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Abbreviations

AIPO	American Institute of Public Opinion
APS	Annual Population Survey
BHPS	British Household Panel Survey
CVD	Cardiovascular disease
GDP	Gross Domestic Product
GHQ	General Health Questionnaire
GNP	Gross National Product
GOPS	Generalized Ordered Probit with Selectivity
GSOEP	German Socio-Economic Panel
GSS	General Social Survey
HILDA	Household, Income and Labour Dynamics in Australia
LASA	Longitudinal Aging Study Amsterdam
MPR	Medication Possession Ratio
NORC	National Opinion Research Center
OLS	Ordinary Least Squares
ONS	Office for National Statistics
QWLS	Quality of Work Life Surveys
RIF	Recentred Influence Function
SCP	Dutch Social and Cultural Planningbureau
SHARE	Survey of Health, Ageing and Retirement in Europe
SHLSE	Survey of Health and Living Status of the Elderly
SPS	Supplementary Provision Survey
SWB	Subjective well-being
UQPE	Unconditional Quantile Partial Effect
VAR	Vector Autoregression
WVS	World Values Survey

Chapter 1

Introduction

It has become more and more a concern of the government to look into social and psychological issues such as well-being and civil society (Diener, 2012; Diener et al. 2015). Where in the past the main economic focuses have been on measures such as GDP, government spending, interest rates, etc. there is now a new focus on these psychological/social issues (although the aforementioned economic focuses remain important). One example of this increasing interest is the Office for National Statistics (ONS) now including questions relating to individuals' well-being and civil engagement in their Annual Population Survey (APS). This new interest in the psychological/social aspects of life, along with the new data collected, has given economists the opportunity to investigate further an area which has always been of central interest: well-being.

Subjective well-being (SWB) has been explored by psychologists and sociologists for many years. However, it was not until Easterlin (1974) and his seminal paper on the relationship between income and SWB that this research became mainstream in the economics literature. Since that paper, much research has been given to defining and measuring SWB (see Cooke et al. 2016) as well as to exploring further the determinants of SWB (Diener, 1984; Diener et al., 1999; Ferrer-i-Carbonell and Frijters, 2004). With several journals now being devoted to this one issue, it highlights the importance and impact of the research that is being performed in this area.

The aim of this thesis is to build upon the existing literature, exploring the relationships between SWB and its determinants through the use of different econometric methods and large UK-based datasets. This thesis will consist of three empirical studies, looking at the effects of different employment contracts, major life events and religiosity upon an individual's SWB. While all of these areas have been explored to some degree, this thesis will use new data, methodologies and variables to bring greater insight into the true nature of these relationships.

It has been found that employment is an important determinant of well-being (Warr, 1987). However, much of the research into employment and well-being considers only full-/part-time employment, self-employment and unemployment (Beham et al., 2012; Buehler and O'Brien, 2011; Olsen and Dahl, 2010; Van Rijswijk et al., 2004). While this research has found a clear link between unemployment and lower levels of well-being, and self-employment leading to greater levels of well-being, little evidence is provided for how alternative employment contracts affect well-being[1]. The first empirical study performed here (Chapter 3) will build upon the existing research with the specific focus upon previously under-explored employment contracts.

Utilising the Annual Population Survey (APS), this study will explore how four well-being measures (happiness, life satisfaction, worthwhileness of life and anxiety) are affected by different employment contracts. However, the employment contracts considered (full-time versus part-time, permanent versus temporary and regular versus varying hours contracts) may lead to an issue of selectivity bias. Due to the negative correlation between unemployment and well-being, and the exclusion of unemployed individuals within this study (due to lack of employment contract), there could be overestimation of the results. To overcome this bias and identify a truer relationship between employment contracts and well-being, the Heckman ordered probit will be used (Heckman, 1979), which will take into account those previously excluded from the analysis.

The second empirical study (Chapter 4) will consider Brickman and Campbell's hedonic treadmill (Brickman and Campbell, 1971). This is the idea that individuals have a base level of well-being, and when something happens to change that well-being (either positive or negative), the individual will return to that base level. This idea has been explored previously in the economics literature (Clark et al., 2008; Clark and Georgellis, 2013; Gupta et al., 2015; Qari, 2014), yet there is room for the expansion of this research, specifically through looking at different points along the well-being distribution.

Building upon the research by Clark and Georgellis (2013), this this study will look at the effects of unemployment, marriage, divorce, birth of a child and widowhood, with an investigation into anticipation and adaptation to these events at the 10^{th}, 25^{th}, 50^{th}, 75^{th} and 90^{th} quantile. With research

[1] With some exceptions that will be explained in greater detail within Chapter 3.

suggesting that well-being is affected differently for the birth of the first child than the birth of subsequent children (Myrskylä and Margolis, 2014), there will be further analysis considering the birth of the first child. Building upon the research by Gupta et al. (2015), illness will also be considered in this analysis. However, this analysis will go further by considering the major life event of becoming disabled, which has been explored previously with inconclusive results (Lucas, 2007; Oswald and Powdthavee, 2008). Retirement will also be included in this analysis, which is another major life event that has been explored with inconclusive results (Bosang and Klein, 2012; Clark and Fawaz, 2009).

While some research in this area has considered adaptation and anticipation at different points along the distribution (Gupta et al., 2015; Qari, 2014), the analysis used conditional quantile analysis. For this analysis, unconditional quantile analysis will be utilised, which will consider the point along the well-being distribution unconditional upon any other characteristics (Firpo et al., 2009). This will shed some light on the true adaptation and anticipation effects experienced by the average individual, but also the happiest and unhappiest individuals, which may help to inform policy setters, allowing them to target certain vulnerable groups more effectively.

The relationship between religiosity and SWB has generally been found to be positive (Koenig et al., 2001, 2012; Rizvi and Hossain, 2017). However, there are many other variables that affect well-being (Diener, 1984; Diener et al., 1999; Ferrer-i-Carbonell and Frijters, 2004) that are also influenced by religiosity. For example, good health has been found to have a positive effect upon well-being (e.g. Graham et al., 2011), and religiosity has been found to have a positive effect upon health (Koenig et al., 2001, 2012). With this being the case, it is important to take into account how religiosity affects SWB indirectly. The final empirical study (Chapter 5) will therefore explore the relationship between religiosity and SWB, not only looking at the direct relationship, but also considering indirect effects.

Using a pooled-cross section from Understanding Society, structural equation modelling (Baron and Kenny, 1986; Hayes, 2009) will be used to look at how religiosity effects well-being through social capital, income, employment status, health, marital status and education. With females being more prone to religiosity than males (Thompson, 1991), it is expected for there to be clear gender differences, and as such the analysis will be split by gender. Similarly, there are likely to be differences between those of different religions/denominations, so a similar split will be made along this

specification. This will also enable exploration into how members of majority and minority religions are affected differently.

The research that will be performed here will help to build upon the current literature, bringing clarity where some uncertainty exists, or even exploring the viability of using previously unused methodologies when considering well-being. On top of improving the academic literature, the research performed here should help to inform policy. It is the aim of this thesis to identify many vulnerable groups who suffer lower or negative well-being effects, such that policies may be better targeted and more efficiently implemented to help these groups.

Chapter 2

Literature review

2.1 A history of well-being research

It was the belief of many neo-classical economists over the past century (see Pigou, 1932) that the well-being (or welfare) of a country was determined by the wealth of that country, and so was measured through GDP or GNP per capita. Similarly, an individual's well-being could be determined by their utility, which was derived by the quantity of goods and services they were able to purchase, and thusly their income. It was suggested that the greater an individual's income, the greater their well-being.

However, Pigou (1932) himself recognises the flaw in these assumptions. In his desire to improve the quantitative research in economics, he has to forgo certain accuracies.

> 'The range of our inquiry becomes restricted to that part of social welfare that can be brought directly or indirectly into relation with the measuring-rod of money. This part of welfare may be called economic welfare. It is not, indeed, possible to separate it in any rigid way from other parts, for the part which can be brought into relation with a money measure will be different according as we mean by can, "can easily" or "can with mild straining" or "can with violent straining." The outline of our territory is, therefore, necessarily vague.' (Pigou, 1932: 11)

Hart (1945) also recognises the issue as so,

> 'While money prices, in a perfect market, would represent accurately the marginal valuation, relative to one another, of the various objects for sale, it would not be possible to measure by prices asked or offered the true value of given experiences to individual personalities or organizations. First, the payment offered by a person for a given experience depends not only on the extent to which he values that experience, but also upon: (a) the amount of money which he has available; and (b) the price set by the sellers. No one would claim, for example, that the money price charged in a hospital for a blood transfusion was an accurate measure of the value of that transfusion to the person receiving it.' (Hart, 1945: 473)

These beliefs suggest that more is necessary to accurately measure well-being. Hart goes on to use another measure for well-being, which had been used by psychologists for many years (Hartmann, 1934; Jasper, 1930; Watson, 1930): subjective well-being (SWB). As the name suggests, this measure for well-being considers how the individual views their own well-being, with the assumption that an individual is the best judge of their own well-being.

Easterlin (1974) was one of the first economists to use SWB as a measure of well-being. He considers the accuracy of the previous assumption made by economists, that income and happiness are positively and significantly correlated. He considers the potential issues of using SWB as a measure of happiness, such as differences in cultural attitudes, differences in perceived social norms, differences in emotions over time, etc[2]. However, he concludes that it is a good measure to use, stating that, "perhaps the most important basis for this judgement [to use SWB] is the impressive consistency of the results in a variety of times and places with widely differing cultural and socioeconomic circumstances." (Easterlin, 1974: 99).

Having decided upon two measures for SWB, a Gallup-poll type survey (by the American Institute of Public Opinion, AIPO) and the measure used by Cantril (1965)[3], Easterlin (1974) proceeds to consider the impact that income has on happiness within a country and between countries. He looks at 19 different countries and finds that, within a country, there is clear evidence suggesting that higher income leads to greater happiness. However, when considering happiness between countries of varying economic performance, he finds that, "if there is a positive association among countries between income and happiness it is not very clear." (Easterlin, 1974: 108).

Easterlin (1974) also considers how happiness may change over time, which would shine a light on the effect that economic growth has on happiness. The only country that he is able to study with the data available is the US. He looks at the Gallup-poll type happiness data for 10 periods between 1946 and 1970 and finds that there is no significant change in happiness over time, despite the fact that there

[2] These issues will be discussed in greater detail when considering how to measure SWB.
[3] This will be described later in section 2.2 Measuring subjective well-being.

is positive economic growth over these periods. This suggests that economic growth does not necessarily affect happiness[4].

The fact that the within-country study reveals a strong relationship, whereas the between-country study reveals a weak, if any, relationship, led Easterlin (1974) to consider that happiness is based not on absolute income, but rather on relative income. This is also supported by the lack of evidence for economic growth positively affecting happiness over time. He argues that, "the reconciliation between the 'objective facts' and 'subjective states of mind' lies in the mediating role of the social norm… This norm varies among societies both in time and space." (Easterlin, 1974: 117). In other words, an individual may consider themselves to be poor due to the fact that their neighbours are wealthy, even when they have a greater than average income for another neighbourhood or group.

From Easterlin's study comes two revelations. First, that SWB is an acceptable, perhaps even an advisable, measure to use when considering the economics of happiness[5]. His study shows that using SWB to measure well-being fits with economic theory, but also reveals something new, which to this point was largely unconsidered by economists. That is the second revelation from this study, that when considering income in relation to happiness or well-being it is important to consider not only absolute wealth/income, but also relative measures.

Following Easterlin's study a sizeable literature has been created looking at the effects that income has on well-being. These studies generally corroborate the findings of Easterlin (1974) by considering different countries, different time-periods, or different measures for well-being (Blanchflower and Oswald, 2004; Inglehart and Klingemann, 2000; Inglehart and Rabier, 1986; Kenny, 1999; Smith, 1979). These studies also conclude that there appears to be no change in well-being from an absolute change in income, yet there is some evidence to suggest that there is a positive relationship between relative income and well-being.

[4] Easterlin (1995) also finds this to be the case with more current data. This study considers 9 European countries and Japan, finding a similar result.

[5] This was corroborated by Ng (1997) who argues that the more objective measures that had previously been used to determine well-being, such as choice, preference and income, have hampered the research into well-being and that a more subjective measure is necessary. A similar case is also made by Kahneman et al. (1997), bringing utility theory back to its origins under Bentham (1789), which considers a more subjective definition of utility (or, experienced utility, rather than the more modern concept of decision utility).

Ferrer-i-Carbonell and Frijters (2004) also look into this issue of income, with a focus on micro analysis. They use the German Socio-Economic Panel (GSOEP) to consider how general satisfaction is affected by income and various other micro variables. For this they use the natural log of household income. They find that income has a positive impact upon general satisfaction, with a one-year change in income having a positive, but reduced impact (confirming the findings of Easterlin, 1974). However, when individual fixed effects are included in the analysis, these effects are reduced. Nevertheless, this shows that, while possibly not the most important determinant of SWB, it is still important to consider income, even when performing micro-level analysis.

This new interest in SWB as a measure for well-being has led to economists considering what other economic factors may have an effect on an individual's happiness levels. While income was initially one of the main considerations for economists when researching well-being, the studies mentioned here opened up doors to other possibilities. Psychologists and other social scientists had been considering how different factors can affect well-being for many years.

2.2 Measuring subjective well-being

There are many different measures that may be used for SWB. While indicators such as income or wealth have very few options for how they can be measured, SWB is a lot less clear-cut as a variable, and therefore leads to many different, and no standard, measurements. A consideration of the measures of SWB used by researchers is covered in this literature review to give an overview of some of the measures that exist. This is, however, not an exhaustive list as there are many measures that will not be covered here (for a comprehensive review of the measures of well-being see Cooke et al., 2016).

One of the earliest measures for SWB used by economists was the survey used by the AIPO. This survey asks the question "In general, how happy would you say that you are – very happy, fairly happy or not very happy?" The individual would then respond with their current state of well-being. Similar to this survey was one by the National Opinion Research Center (NORC) in which the middle option was changed from "fairly happy" to "pretty happy" and the negative option was changed from "not very happy" to "not too happy".

It is suggested (and examined) by Easterlin (1974) that these two surveys, while similar, would yield slightly different results. Easterlin suggests that, although the positive and negative responses are fairly synonymous, the response "pretty happy" is closer to the positive response than to the negative. This would mean that some of those who would respond as "very happy" in the AIPO survey, as the other two options don't quite express their level of happiness, would instead put "pretty happy". Testing this hypothesis, Easterlin finds it to be true that the data collected from these two surveys shows a slight shift from the positive option to the middle option in the NORC survey. Similarly, there are more individuals responding that they are "not very happy" in the NORC survey, as some who would have previously responded as "fairly happy" now find that "pretty happy" isn't close enough to their true feelings. This discrepancy in the results has naturally led to questions on the validity of the surveys being used and has led to more intricate surveys being produced. While this is a good start and does indeed reflect some aspect of SWB, the other surveys mentioned in this section build on these initial surveys and alleviate some of the issues.

A more complex measure for SWB was devised by Cantril (1965), named by him as the "Self-Anchoring Striving Scale". The idea of this measure for SWB is to get the respondent to first consider the extreme situations, e.g. the situation in which the individual would experience the greatest happiness and the situation in which the individual would experience the least happiness. They then put this on a scale from 0 to 10, where the least is 0 and the greatest is 10. The respondent is then asked to give a number along this scale where they feel they are currently at. In this study Cantril also asks for an evaluation of past feelings and feelings of the nation as a whole.

The Self-Anchoring Striving Scale is a good improvement upon the previous methods used for measuring SWB as it allows for more variability of answers. While this could create more work for researchers in interpreting results, it allows for a greater degree of accuracy than in the previous methods, where between 3 and 5 responses are available. This method also allows the interviewer to get an idea of what people believe would make them happy or sad (having a job, going for regular holidays, losing a family member, being homeless, etc.), which is useful for further research.

The measure that is used by Clark and Oswald (1994), rather than being a happiness measure, is an unhappiness measure. This measure is found through the General Health Questionnaire (GHQ) in the British Household Panel Survey (BHPS). For this measure the respondent is asked 12 different

questions on their mental well-being and is asked to respond on a scale of 0 to 3, with 0 being "disagree strongly" and 3 being "agree strongly"[6]. This gives the individual an "unhappiness" level, where the higher the score, the greater the level of unhappiness. One of the methods used to evaluate the data collected through this survey is to give each score of 2 or 3 a value of 1, and all others a value of 0. This means that any negative answer, no matter how strong, will be recorded. This would mean that an individual's unhappiness level would range from 0 to 12.

Another set of questions that is used for SWB is that found in the APS. This survey asks four questions with regards to SWB. These are:

(i) Overall, how satisfied are you with your life nowadays?

(ii) Overall, to what extent do you feel the things you do in your life are worthwhile?

(iii) Overall, how happy did you feel yesterday?

(iv) Overall, how anxious did you feel yesterday?

Respondents are then asked to give an answer from 0 to 10, where 0 is "not at all" and 10 is "completely". This splits SWB into four different categories: life satisfaction, worthwhileness of life, happiness and anxiety.

Other surveys have asked different questions or used different response options to determine SWB. This could be due to language or cultural differences (e.g. for surveys in non-English speaking countries), differences in research interest or differences in academic discipline. One important consideration is comparing well-being measures when the questions or response options vary. This issue will be covered in the next section.

2.3 Issues when measuring subjective well-being

As mentioned previously, there are many considerations that need to be made by economists with regards to using SWB as a measure for well-being. Easterlin (1974) discusses these issues at great length, explaining why it is acceptable to use SWB as a measure for well-being.

[6] Some questions were coded in reverse (i.e. 3 = disagree strongly and 0 = agree strongly). For more details on the GHQ see Chapter 4 and Chapter 5. For a full list of the questions asked see Appendix 4.A.

The first issue that is considered by Easterlin (1974) is that of stability in the responses. With emotions not being constant it is an understandable concern that, when collecting the data, the results may be skewed by the fact that some of the respondents are in an emotional state that does not reflect their true thoughts or feelings regarding their well-being. Easterlin finds that this is not actually an issue as when testing and re-testing it is found that the responses are almost identical in 3 different rounds of the AIPO survey (where the second round happened 2 weeks after the first and the third round happened six months later).

Another issue is the accuracy of self-reports. It was a concern that when an individual gives a response to a question asked about their well-being that they would not be able to adequately evaluate their situation, and thus give an inaccurate result. Also of consideration would be whether they would give an accurate response even if they were able to accurately judge their situation, as they may not want to reveal their true thoughts or feelings to the interviewer. Both of these issues are considered and tested by comparing the self-reported responses to responses given by others (such as the respondent's family/friends/doctor/etc.). It is found that there is reasonable consistency among the responses which, while not conclusive, suggests that respondents are able to accurately judge their own thoughts and feelings and would be willing to share them with the interviewer.

Another issue previously mentioned is that of social norms. It is suggested by Easterlin (1974) that some individuals may respond differently because they feel that it is how they should respond. For example, a rich person may feel more pressured to respond in the positive with regards to well-being simply because they feel that they are supposed to have greater well-being than poorer individuals. One problem with this suggestion is that it is hard to know what the social norm is, and whether that social norm is consistent over space and time.

Nevertheless, one solution for this issue comes from how the questions are asked regarding issues like well-being and income. If well-being questions are asked immediately after questions on income, it may be more likely for the respondent to consider social norms, as they may feel there is a clear link in the interviewer's mind between these two variables. However, if the questions are separated then there would be less chance for the respondent to consider the two questions linked and therefore less chance that they would adhere to the social norm for the sake of the interviewer.

The last two issues that Easterlin (1974) specifically covers both have to do with the wording of the questions. First, if a question is asked in a slightly different way, will it affect the results and to what extent? And second, can these questions be accurately translated to be used in other languages, considering differences in word meanings and cultural understandings?

There is clearly an issue when selecting the wording as is evidenced by the difference between the AIPO and the NORC surveys. As mentioned previously, the difference between these two surveys is subtle, where one asks if the respondent is “fairly happy”, while the other asks if the respondent is “pretty happy”. Despite these differences being subtle, the results of these two surveys clearly reveal that they could be interpreted differently, with one being interpreted as being more positive than the other. While this makes comparison between surveys hard, the solution to this issue would be to carefully consider the question to be asked in the initial situation and then use that same question in each subsequent survey/round of a survey, ensuring that responses would remain consistent. Although this doesn’t aid research between different measures of well-being, it aids in longitudinal research.

The issue of translating the surveys into foreign languages, while maintaining meaning and considering cultural differences, is one that was tackled by Cantril (1965). Cantril was interested in looking at how well-being differs between countries. In order to do this his survey needed to be translated into 26 other languages. To do this he worked carefully with experts in translating his survey, attempting to maintain the nuances. He got a native of the country whose mother tongue was the language of interest, but who also had a perfect grasp of English, to translate the survey into the foreign language. He would then get a native English speaker with a perfect grasp of the foreign language to translate it back to English again. By doing this he was able to ensure that no meaning was lost in translation.

The results of Cantril’s survey suggests that this effort is successful, as there is an extremely low nonresponse rate. However, while this appears to be a successful attempt at translation of a survey, it is suggested by Easterlin (1974: 93) that “happiness is an idea that transcends individual cultures.” This suggests that although the happiness questions are successfully translated, it may be hard to translate other questions that are not as universal in concept as happiness.

2.4 Determinants of subjective well-being

Wilson (1967) considers various psychological studies that look into happiness, in an attempt to determine the measurement, reliability and validity of happiness studies, the dimensions of the studies and the correlates of happiness. He finds that the key determinants of an individual's well-being are health, income, religion, marital status, age, gender, job morale and education[7]. With these different determinants being found to have a significant effect on well-being, it was in the interest of economists to research further into the causes of changes in well-being, and which determinants have the greatest effects. For a review of the literature on health and marital status see the literature review in Chapter 4. For a review of the literature on religion see the literature review in Chapter 5. Job morale has been reviewed through the employment contracts reviewed in Chapter 3. Income has been reviewed earlier in this chapter, looking at the history of well-being research.

2.4.1 Age

Early research tended to find that old age would lead to a lower well-being (e.g. Wilson, 1967), suggesting that age has a negative relationship with subjective well-being. However, this finding has been contested. Herzog and Rodgers (1981) look at eight large datasets and explore the effect that age has on the different measures of subjective well-being that was available to them. Performing bivariate regression analysis they find that age actually has a significantly positive impact on satisfaction with finances/income, job, family life, marriage, spare time, house/apartment, community, friendships and standard of living in 50% or more of the surveys. They do find that age has a significantly negative impact upon satisfaction with health, which is an unsurprising finding. Only one survey finds a relationship between age and happiness, yet does find it to be positive. Age is found to have a positive impact upon satisfaction with life in three of the surveys, but a negative relationship in one. These findings generally hold (although to a lesser extent) when other variables are controlled for. Overall, it can be suggested from this study that well-being may not actually decrease with age but increase.

When looking at unemployment and how it effects happiness, Clark and Oswald (1994) also consider age. They use the GHQ in the BHPS to determine how around 6,000 Britons are affected by

[7] Other studies have since been performed considering these variables with similar outcomes (Diener, 1984; Diener et al., 1999; Ferrer-i-Carbonell and Frijters, 2004).

unemployment, accounting also for age. They split age into 3 categories: Aged less than 30, aged 30 to 49 and aged 50 and over. They find that those in the middle age category are negatively affected more by unemployment than those in the younger and older age groups, suggesting a U-shaped relationship between age and well-being. They find that well-being tends to be lowest around the mid-thirties. This finding has since been supported by various other studies (e.g. Blanchflower and Oswald, 2004; Clark and Oswald, 2006; Helliwell, 2003). It is now generally accepted practise to consider age and its square to account for the U-shaped nature of age's affect upon subjective well-being.

2.4.2 Gender

Gender's effect upon subjective well-being has been contested greatly over the years (see Batz and Tay (2017) for a review). Several early studies find no significant difference between the genders (e.g. Gurin et al. 1960; Okun and George, 1984), with other studies finding that women experience greater well-being (e.g. Fujita et al., 1991) and some finding men to have the greater well-being (e.g. Stevenson and Wolfers, 2009). However, it has been argued (Fujita et al., 1991) that the reason for these inconsistencies may result from how intense the experience of positive and negative affect is for males and females. It is argued that females experience both positive and negative affect more intensely than males, leading to males and females on average having the same well-being, but females having greater variation. This idea has since received much support (e.g. Diener et al., 1999; Parker and Brotchie, 2010).

2.4.3 Education

Witter et al. (1984) perform a meta-analysis on the relationship between educational achievement and subjective well-being. They look at 90 studies comprising 176 zero-order effects and 26 studies comprising 163 first-order effects. They find that there is a positive relationship between education and subjective well-being in adult life. They also explore whether these effects hold when income and occupational status are controlled for, finding that when income is controlled for there is little change in how education affects subjective well-being but when occupational status is controlled for there is a significant reduction in the education effect (although still remaining positive). This would suggest that education does have a positive impact upon subjective well-being, but some of that may be picked up through the positive relationship between education and occupational status.

2.4.4 Other determinants of well-being

Another variable that has more recently been found to be an important determinant of well-being is social cohesion. There have been many definitions put forward for social cohesion, however that by Chan et al. (2006) appears to capture the essence of what social cohesion is:

> 'Social cohesion is a state of affairs concerning both the vertical and the horizontal interactions among members of society as characterized by a set of attitudes and norms that includes trust, a sense of belonging and the willingness to participate and help, as well as their behavioural manifestations.' (Chan et al., 2006: 290)

However, as identified by Klein (2013), social cohesion is a macro concept, with social capital focussing on the micro-level. The definition for social capital may be identical to that for social cohesion, with the focus being solely on the individual. Due to the research being performed here being at the micro level, social capital will be considered rather than social cohesion.

Exploring various different aspects of social capital, Helliwell and Putnam (2004) consider how faith and the church, friends and neighbours, community involvement and trust affect well-being. They use three different surveys (the World Values Survey, WVS; the Social Capital Benchmark Survey in the US; and a corresponding Canadian survey) to explore the effects of social capital on happiness and life satisfaction. They find that faith and the church tend to have a positive impact upon both life satisfaction and happiness at the individual level, but smaller, less significant effects at the community/national level. Family and friends both improve happiness and life satisfaction, although good relationships with neighbours only improves happiness. Community involvement has a significantly positive effect on both life satisfaction and happiness in the WVS, but is insignificant in both other surveys. Finally, high levels of trust are found to improve both happiness and life satisfaction at the individual level, but are found to be insignificant at the community/national level. These findings suggest that, not only is social capital an important determinant of SWB, but the measure used for social capital is also an important consideration to make.

Considering social relations, Binder and Coad (2011) explore how well-being is affected by social capital, health and income. They consider life satisfaction and the GHQ, both found through the BHPS. For their measure of social relations they use a measure that asks the individual their satisfaction with their social relations, as well as a measure for how much time is spent with family, friends and neighbours. They find social relations to be the greatest determinant of life satisfaction for both males

and females, having a highly positive effect on both (with females benefiting more). It is also a highly significant determinant for mental health (measured through the GHQ), having a highly positive effect (although health is a greater determinant for this measure of well-being). They then explore the effects at the 10^{th}, 25^{th}, 50^{th}, 75^{th} and 90^{th} quantiles, finding that social relations remains significantly positive for both measures of well-being at all points along the distribution. They find that those at the lower end of the distribution actually benefit greater from social relations than do those at the upper end. These findings are supported by Lamu and Olsen (2016).

2.5 Conclusion

Since Easterlin's (1974) seminal paper, SWB has become a hot topic for economists, with a large and expanding literature in the area. This growth in interest in SWB has even led to many countries considering the importance of subjective measures of well-being as a national indicator (Diener, 2012; Diener et al. 2015). Many of the conclusions drawn about the nature and measures of SWB since Easterlin's seminal paper have gone through many changes, being constantly challenged or supported by more recent literature, which will be the main purpose of this thesis.

It can be expected that income will have a positive impact upon subjective well-being, however, this relationship is unlikely to be large. On the other hand, health and social capital are likely to be the greatest determinants of subjective well-being and will both (good health and high social capital) likely have a positive impact. Being married and in employment are both also likely to have a positive impact upon well-being (although the type of employment contract will be explored further in Chapter 3). It can be expected that age will have a U-shaped influence on well-being, with those at a younger age experiencing a decline in well-being until middle-age, before experiencing a positive boost. Education will also likely have a positive impact upon well-being, although this may be an indirect impact through the positive correlation between education and employment status. While gender has been inconsistent in its findings in the literature, where possible the analysis will be split by gender to take into account any unobserved differences between the genders. When this is not possible (see Chapter 4), gender will be controlled for. Finally, religion is expected to have a positive impact upon well-being.

Chapter 3

Well-being and employment contracts

In the well-being literature there is a consistent consensus that employment status is an important determinant of well-being. Much of the earlier literature looked simply at the difference between employed and unemployed individuals (see section 4.1.2 in Chapter 4), but the nuances in employment contracts has led to a much wider body of research considering various employment contracts. However, despite the growth in this area of research there are still gaps that exist in the literature, as some contracts have been under-explored and require further attention (especially since 2008, following the financial crisis, with the growth in popularity of certain contracts, such as zero-hours contracts).

Another issue that has been under-explored in the well-being literature is the issue of selectivity bias. Where the research concerns employment contracts or job satisfaction the analysis is limited to those in employment. As such, there may be a bias from a latent variable that determines the likelihood of an individual being in employment, which may also affect their well-being. For example, it may be the case that individuals with a naturally higher level of well-being are more likely to be in employment, as they have a more optimistic attitude towards work. This naturally high well-being could then translate into higher job satisfaction, where a currently unemployed individual, were they employed in the same job, would have a naturally lower job satisfaction.

This chapter will explore in greater detail the relationship between employment status and well-being, specifically looking at 3 different types of employment contract: full-time versus part-time, temporary versus permanent and varying hours versus regular hours contracts. There will also be a focus on the selectivity issue that may exist when considering employment contracts. The first section will give an overview of the literature on well-being and different employment contracts, with a discussion on the

methodology and data following. The results of the analysis will then be displayed followed by the conclusion.

3.1 Literature review

Here, the literature on different employment contracts will be reviewed, looking first at full-time versus part-time employment, followed by permanent versus temporary employment and regular hours versus varying hours employment. These last two have been grouped together due to the shortage of research on varying hours contracts and also because each of the papers examining varying hours contracts also examine temporary employment.

3.1.1 Full-time versus part-time employment

Taking an in-depth look at employment contracts Bardasi and Francesconi (2004) consider seasonal/casual jobs, fixed-term contracts and two types of part-time employment (1 to 15 hours and 16 to 29 hours). They use around 7,000 individuals from the BHPS and look at their subjective health and life/job satisfaction. Performing logit regressions they find that job satisfaction for males is likely to be lower in mini-jobs (part-time work of 1 to 15 hours) and much lower in seasonal/casual jobs. However, they also find that life satisfaction is unaffected by employment contract. Due to using a panel dataset, Bardasi and Francesconi were also able to explore the effects of employment contracts in different periods on well-being in the current period. They find that life satisfaction is again unaffected by employment contract in the previous period. Finally, they explore whether entry into or exit from a particular employment contract affects well-being, still finding no significant impact upon life satisfaction[8].

Van Rijswijk et al. (2004) look at part-time employment's effects on work-life balance and well-being. They survey 160 part-time and 29 full-time working mothers (with a partner) in the Netherlands. They consider four measures for well-being: emotional exhaustion, cognitive failures, perceived stress and

[8] This paper may also be explored in section 3.1.2. However, due to the insignificant findings for all employment contracts on life satisfaction, the placement of this study under a certain sub-section is immaterial.

job satisfaction (with the first three being associated with negative well-being and the last being associated with positive well-being). They find no significant correlation between type of employment and any of the measures of well-being, however, they do find that there is significantly less work-to-family interference among part-time workers. Due to there being a positive correlation between work-to-family interference and all three negative well-being measures, as well as a negative correlation with job satisfaction, van Rijswijk et al. argue that work-to-family interference acts as a mediator to lower well-being for full-time employees. However, this study does only consider females in employment, and so no conclusions may be drawn on how males may experience part-time employment. This research is supported by Olsen and Dahl (2010) and Buehler and O'Brien (2011).

Including males in the research, Beham et al. (2012) explore satisfaction with the work-family balance of part-time employees in 5 European countries (Germany, the Netherlands, Portugal, Sweden and the UK). They split part-time employment into 2 categories: substantial (20-34 hours per week) and marginal (less than 20 hours per week). They find that part-time employees consistently experience greater satisfaction with work-family balance than full-time employees, with those in marginal part-time employment experiencing the greater effects. Although this doesn't translate exactly to greater life satisfaction, the correlation between work-family balance and life satisfaction found by van Rijswijk et al. (2004) would suggest that this higher satisfaction with work-family balance would improve overall life satisfaction. This research is supported by Oishi et al. (2015) who focus on East Asian countries (Hong Kong, Japan, Korea and Taiwan).

Booth and van Ours (2013) use the CentER panel to determine how married couples' life satisfaction is affected by part-time employment in the Netherlands. Contrary to the research previously reviewed here, they find that females have no preference over part-time or full-time employment. They similarly find no significant preferences for the male partner's employment contract. However, the employment contract for males and their respective partners is more important. They find that males who work between 21 and 32 hours per week receive the greatest boost to life satisfaction, followed by those who work 33 to 40 hours per week. Those who work 40+ hours per week also see a positive effect on life satisfaction, although smaller than part-time employment. They also find that the male's life satisfaction is better if their partner is in part-time employment, with the partner working 1 to 20 hours per week having the greatest positive effect upon life satisfaction, followed by those who work 21 to 32 hours per week.

Looking at a slightly different demographic, Chang and Yen (2011) explore how part-time and full-time employment affect the life satisfaction of the elderly in Taiwan. They use the Survey of Health and Living Status of the Elderly (SHLSE) and identify 3,182 adults over the age of 57. For life satisfaction they use a self-reported, 13 point measure. They find that there are many factors that influence the well-being of the elderly, including health and social capital, however, they find that employment also plays an important role. They find that part-time employment has a significantly positive effect upon the elderly. Interestingly, they also find that full-time employment can have a detrimental effect on life satisfaction when compared to no employment (especially for females and the very old). Males and those aged under 70 find no significant difference between full-time employment and no employment. This research would suggest that the older an individual becomes the more desirable and beneficial would be part-time employment.

3.1.2 Permanent versus temporary employment and regular hours versus varying hours employment

De Witte and Näswall (2003) explore how temporary employment and job insecurity can impact upon job satisfaction in four European countries (Belgium, Italy, the Netherlands and Sweden). One hypothesis of their study is that temporary employment will have a negative impact upon job satisfaction. However, they find that temporary workers in Italy, the Netherlands and Sweden all experience an increase in job satisfaction, leading them to reject their initial hypothesis. They also explore the interaction between temporary employment and job insecurity. Through this analysis they find that there is little job insecurity among those in temporary employment, whereas there is much greater variation in the job insecurity experienced by those in permanent employment, which may go some way to suggest why those in permanent employment actually experience lower job satisfaction than those in temporary employment. The argument could be made that those in temporary employment are expecting their jobs to end, and so there is less insecurity and greater job satisfaction.

A meta-analysis was performed by Virtanen et al. (2005) looking into the effects of temporary employment on various different health outcomes, 9 studies of which focused specifically on self-reported measures of psychological well-being. The studies considered various different temporary contracts, including fixed-term, seasonal, project and probationary. They also considered on call and substitute employment, which could be considered varying hours employment. Contrary to the

previous study, they find that there is generally a negative effect on psychological well-being from temporary employment contracts, however there is a great deal of variation in these studies, with some finding strong negative effects, some weak, and some finding no significant effect.

Bernhard-Oettel et al. (2008) also look at different employment contracts and their effects upon well-being. They consider 768 individuals in Sweden who were in either full-time permanent employment, part-time permanent employment, fixed term employment (temporary) or on call employment (varying hours). They use a subjective measure for well-being on a 5 point scale. Using full-time, permanent employees as their reference group they find that there are no significant differences to the well-being of any other type of employment contract. They also interact the employment contract with job preferences and contract preferences and similarly find no significant changes to well-being. This would suggest that employment contract actually has very little impact upon well-being, even when there are job or contract preferences. This study supports the findings of Bernhard et al. (2005).

Building upon this research Kauhanen and Nätti (2015) look at job insecurity in the form of threat of unemployment. They use the Finnish Quality of Work Life Surveys (QWLS) to investigate the effects of involuntary temporary employment and other temporary employment on job insecurity[9]. They find that all temporary employment has a negative impact upon job security, with the threat of unemployment being significantly positive for those in both involuntary and other temporary employment (with involuntary temporary employment being almost twice as detrimental as other temporary employment). These findings considered again in the light of the research by van Rijswijk et al. (2004) would suggest that all temporary employment will have a negative impact upon well-being through increased job insecurity.

3.1.3 Conclusion

The literature currently exploring different employment contracts has many gaps (especially that considering varying hours versus regular hours employment). There is also much uncertainty in the

[9] They also consider involuntary and other part-time employment, which may fit into the full-time versus part-time employment literature. They find that involuntary part-time employment leads to greater job insecurity (and therefore lower well-being), but other part-time employment has no effect on job insecurity.

true effects that these employment contracts have on well-being, with some studies clearly finding a positive or negative impact, with others finding no significant impact. Generally it may be expected that part-time employment, especially for females, would lead to greater well-being. Temporary employment and varying hours contracts seem to not have strong effects on well-being, but do impact upon job security, which in turn impacts upon well-being. As such, it could also be expected that temporary and varying hours contracts will have a negative effect overall on well-being.

3.2 Methodology

There are two main methods that have been used in the existing literature to perform this sort of analysis. These methods are the ordinary least squares (OLS) regression model and the ordered probit/logit model. While both of these models are valid for this form of analysis, and the results of such analyses tend to reveal similar results (Blanchflower and Oswald, 2004, Appendix A; Ferrer-i-Carbonell and Frijters, 2004; Min, 2013; Winship and Mare, 1984), the ordered probit/logit model is more accurate. The reason for this is that the OLS model would suggest that the gap between each response for the well-being variable would be the same (e.g. a response of 2 would be exactly double a response of 1). While this may be true, it is unlikely that on a scale of 1 to 10 the gaps between each well-being score are equally spaced. As the ordered probit/logit model only considers ordinal responses, where the categories need not be equally spaced, no such issue exists.

The ordered probit and ordered logit models consider the probability that an individual will give a particular ordinal response based on their characteristics (e.g. the probability that an individual will give a well-being response of “very high” depending on their age, gender, marital status, etc.). There is a difference between the ordered probit and the ordered logit model in how they work out this probability, however, the difference in the results between the ordered probit and ordered logit model are generally negligible. Therefore, in this analysis the ordered probit model shall be employed.

When analysis is performed on a particular group of individuals there can be an issue of non-random selection into the analysis, leading to selectivity bias. This issue was recognised by Heckman (1976)[10]

[10] Building upon the work of Gronau (1974) and Lewis (1974).

who proposed a method to overcome this issue[11]. This method is to consider the probability of an individual matching the selectivity criteria, before then running the analysis. As such, if there is no selectivity bias, the results will remain unchanged. However, if selectivity bias exists, it will be picked up by the probability of omission from the analysis. For the second part of the analysis here, the method employed will be the Heckman ordered probit, which will take into account the selectivity issue with regards to employment contracts only existing for those in employment (omitting unemployed individuals). This method works by first considering the probability that an individual will be included in the study (i.e. the probability that they will be in employment), before then going on to work out the probability that an individual would give a particular well-being response. This can be shown algebraically as so:

$$Y_{ij}^{*} = \beta_j^T \boldsymbol{X}_{ij} + \varepsilon_{ij} \qquad j = 1,2$$

$$Y_{i1} = I(Y_{i1}^{*} \geq 0)$$

$$Y_{i2} = \sum_{w=0}^{W} w\, I(\alpha_{w-1} < Y_{i2}^{*} \leq \alpha_w) \qquad if\ Y_{i1} = 1$$

Where Y_{i1}^{*} is the latent variable for the selectivity condition and Y_{i2}^{*} is the latent variable for the well-being outcome. $\boldsymbol{X}_{ij}$ are the individual characteristics and ε_{ij} is an error term. The unemployed individuals are therefore included through the correlation between the two error terms. If there is correlation between these two error terms there is said to be selectivity bias.

The Heckman ordered probit requires the selectivity equation to contain a variable that is exogenous to the overall dependant variable of interest, in order to avoid autocorrelation. In this analysis, the selectivity equation will determine the probability of an individual being in employment (and thusly included in the analysis), with the overall dependant variable of interest being the well-being measures. As the use of this variable leads to an exactly identified model, there are no methods to test for the validity of using said variable. Instead, the variable used for the selection equation must be correlated with the selection equation (being in employment), while being uncorrelated with the disturbance for the well-being equation. Therefore, the exogenous variable used in the selectivity equation will be the local authority unemployment rate. While this variable is not wholly exogenous

[11] Built upon by Heckman (1979).

from the well-being variables, due to the strong relationship between employment status and well-being, and due to the data limitations, finding a variable that is completely exogenous is unlikely. In support of using this variable for the selection equation, local authority unemployment rates are a strong determinant of employment, without being a key determinant of well-being (small correlation), and therefore may be used. However, future research may be conducted using other variables in the selection equation when the data becomes available or validity tests are developed.

Due to the literature showing significant differences between male and female well-being with regards to employment (Blanchflower and Oswald, 2004; Knabe et al., 2016; Stokes and Cochrane, 1984; van der Meer, 2014), the analysis here will be split by gender. By splitting the analysis like this, more insight may be gleaned as to how exactly each gender is affected when under different employment contracts.

3.3 Data

The data being used for this analysis will come from the Annual Population Survey (APS, 2015). This survey looks at the local authority level and focuses on such key topics as education, employment, health and ethnicity. The first wave was taken in 2004, with further waves coming quarterly. The survey consists of at least 510 economically active individuals from each unitary authority, and at least 450 from each Greater London Borough. The sample size for the whole survey is around 170,000 households, which contains 360,000 individuals. This vast selection of individuals from each local authority allows for in-depth analysis at a local level.

In the APS, the questions on well-being are about happiness, worthwhileness of life, life satisfaction and anxiety. The questions asked are:

(i) Overall, how satisfied are you with your life nowadays?
(ii) Overall, to what extent do you feel the things you do in your life are worthwhile?
(iii) Overall, how happy did you feel yesterday?
(iv) Overall, how anxious did you feel yesterday?

The respondents are asked to give a rating from 0 to 10 for each of these questions, with 0 being "not at all" and 10 being "completely". The three positive well-being measures (happiness, worthwhileness and life satisfaction) have 10 as the highest well-being and 0 as the lowest, whereas anxiety has 10 representing the lowest and 0 the highest. The distribution of these responses are found in Table 3.2.

For this analysis the well-being responses are recoded into 5 groups, where happiness, worthwhileness and life satisfaction each have the groups "very low" (0-2), "low" (3-4), "medium" (5-6), "high" (7-9) and "very high" (10) and anxiety has the reverse: "very low" (0), "low" (1-3) "medium" (4-5), "high" (6-7) and "very high" (8-10). The reason for recoding the responses is due to the fact that some of the responses are so close to other responses that not grouping them would reveal little more about the gaps between the responses.

Table 3.1: Distribution of well-being responses

	Life satisfaction	Happiness	Worthwhileness	Anxiety
0 - "Not at all"	0.003	0.006	0.001	0.300
1	0.002	0.006	0.001	0.101
2	0.004	0.014	0.003	0.148
3	0.008	0.018	0.005	0.095
4	0.013	0.033	0.010	0.066
5	0.057	0.078	0.043	0.101
6	0.070	0.093	0.062	0.059
7	0.209	0.176	0.188	0.056
8	0.373	0.265	0.354	0.042
9	0.146	0.168	0.182	0.016
10 - "Completely"	0.115	0.143	0.150	0.014

Recoding with these categories was done through trial-and-error, considering many different categories to find one which split the categories into the most defined groups whilst maintaining consistency. The method for this was to run various ordered probit analyses with different groupings of the well-being responses to find the natural splits. The distribution of the well-being variables by these new categories can be found in Table 3.3.

Table 3.2: Distribution of recoded well-being variables

	Life satisfaction	Happiness	Worthwhileness	Anxiety
"very low"	0.009	0.026	0.005	0.300
"low"	0.021	0.051	0.015	0.345
"medium"	0.127	0.172	0.106	0.167
"high"	0.728	0.609	0.723	0.115
"very high"	0.115	0.143	0.150	0.072

The other variables of interest for this research are variables that consider different employment contracts. There are three such variables that are the focus of this study: whether an individual is in full-time or part-time employment, whether an individual is in permanent or temporary employment and whether an individual is in regular hours employment or varying hours. Each of these variables in the APS appear as binary variables, with responses of yes or no. By looking at these three variables, a wide range of different employment contracts are covered in the analysis. The distribution of these variables can be found in Table 3.4. For this analysis, these employment contracts will all appear in each regression, in order to control for different employment contracts.

Table 3.3: Distribution of employment contracts

Category	Outcome	Whole sample	Male	Female
Full-time	Yes	0.694	0.882	0.557
	No	0.306	0.118	0.443
Permanent	Yes	0.951	0.952	0.950
	No	0.049	0.048	0.050
Varying hours	Yes	0.345	0.410	0.298
	No	0.655	0.590	0.702

As can be seen by this distribution, the responses for the questions regarding full-time employment and varying hours have many individuals in each response category, which is ideal for analysing the difference that each of these employment contracts makes to well-being. However, fewer than 5% of respondents are not in permanent employment. Despite this small number, there are enough responses to draw some inferences from the analysis. The breakdown of employment contract by well-being variable can be found in Table 3.5.

Table 3.4: Distribution of employment contracts by well-being variable

Employment Contract		Well-being	Life satisfaction	Happiness	Worthwhileness	Anxiety
Full-time	**Yes**	Very high	0.120	0.151	0.158	0.304
		High	0.706	0.596	0.698	0.344
		Medium	0.133	0.169	0.115	0.162
		Low	0.027	0.053	0.020	0.113
		Very low	0.013	0.030	0.009	0.076
	No	Very high	0.139	0.176	0.188	0.310
		High	0.683	0.591	0.682	0.325
		Medium	0.138	0.152	0.103	0.168
		Low	0.025	0.049	0.018	0.112
		Very low	0.016	0.032	0.009	0.085
Permanent	**Yes**	Very high	0.115	0.143	0.150	0.302
		High	0.732	0.610	0.727	0.351
		Medium	0.125	0.171	0.104	0.163
		Low	0.019	0.050	0.014	0.113
		Very low	0.009	0.026	0.005	0.071
	No	Very high	0.109	0.141	0.144	0.258
		High	0.716	0.615	0.708	0.346
		Medium	0.127	0.156	0.121	0.204
		Low	0.037	0.068	0.020	0.114
		Very low	0.011	0.020	0.007	0.078
Varying hours	**Yes**	Very high	0.114	0.144	0.159	0.280
		High	0.734	0.608	0.720	0.357
		Medium	0.121	0.171	0.103	0.166
		Low	0.023	0.050	0.013	0.120
		Very low	0.008	0.027	0.004	0.077
	No	Very high	0.121	0.153	0.159	0.316
		High	0.720	0.609	0.714	0.339
		Medium	0.130	0.164	0.105	0.163
		Low	0.020	0.048	0.017	0.110
		Very low	0.009	0.026	0.006	0.071

As seen by the well-being literature, there are various factors other than employment contracts that affect well-being (see Chapter 2). This being the case, there are several control variables included in the analysis. The control variables consist of age, income (hourly wage rate), health, education, relationship status, government office region (of residence) and industry. The analysis is also split by gender. For the selectivity equation there was also the inclusion of local authority unemployment rates. The descriptive statistics for these variables can be found in Table 3.6.

Due to the APS not containing a subjective measure for health, a measure has been created by considering whether an individual's health affects his/her amount and/or kind of work. Therefore, four dummy variables were created with good health comprising individuals whose health limits neither the amount nor the kind of work. A dummy variable was also created for each of the individual conditions, where health affects either the amount or the kind of work, but not both, with a final dummy variable being created for individuals whose health limits both the amount and kind of work. While this is not a perfect measure for an individual's health, this measure will be the most likely to affect their employment contracts, and will therefore give insight into those effects on well-being.

Hourly wage rate was also not readily available from the APS, and as such a variable needed to be created. To calculate hourly wage rate, gross weekly income from the main job was divided by the number of hours usually worked per week. While some individuals had more than one job, it was just the main job that was considered for hourly wage rate, because this would be the job of greatest interest when considering employment contracts (because changes to the employment contract for the second job is likely to have less of an impact on well-being than will changes to the employment contract of the main job). This variable was then split into 7 hourly wage categories, with below minimum wage being the lowest category, less than £10 per hour being the next category and increasing in £5 increments until £30 per hour and over.

For the well-being equation, age is split into 10 year categories, ranging from 16-25 to 66 and over. The continuous variable of age and its square were used instead for the selectivity equation. The 13 government office regions (recoded as 13 dummy variables) are determinants in the well-being equation, with the local authority unemployment rates are considered in the selectivity equation. These variables both pick up regional effects, with the local authority unemployment rates being assumed to be exogenous to well-being and therefore used only in the selectivity equation. The unemployment rates at the local authority level can be found from Nomis, a part of the ONS. However, in order to link these unemployment rates to the individuals in this study it is necessary to determine the local authority of each individual. These can be found in the secure version of the APS. The breakdown of local authorities and their respective unemployment rates can be found in Appendix 3.A. The local authority unemployment rate will be treated as a continuous variable. Dummy variables have been created for education (6 categories), relationship status (6 categories) and industry (9 categories).

Table 3.5: Descriptive statistics for control variables

Category	Variable	Whole sample	Male	Female
Gender	Female	0.578	-	-
Age	16-25	0.080	0.077	0.082
	26-35	0.216	0.207	0.222
	36-45	0.244	0.243	0.245
	46-55	0.273	0.264	0.279
	56-65	0.159	0.172	0.149
	66 and over	0.028	0.036	0.023
Hourly wage rate	Below minimum wage	0.088	0.062	0.108
	Below £10/hour	0.335	0.258	0.392
	Below £15/hour	0.261	0.267	0.257
	Below £20/hour	0.151	0.176	0.132
	Below £25/hour	0.076	0.098	0.061
	Below £30/hour	0.036	0.056	0.022
	£30/hour and over	0.052	0.083	0.029
Health	Good health	0.907	0.917	0.900
	Health limits amount of work	0.009	0.005	0.012
	Health limits kind of work	0.024	0.024	0.024
	Health limits amount and kind of work	0.060	0.054	0.065
Education	Degree or equivalent	0.321	0.328	0.316
	Higher education	0.114	0.110	0.116
	GCE, A-level or equivalent	0.232	0.260	0.211
	GCSE, A* - C or equivalent	0.204	0.167	0.230
	Other qualifications	0.074	0.082	0.068
	None or unknown	0.056	0.052	0.058
Relationship status	Single, never married	0.321	0.327	0.316
	Married, living with spouse	0.509	0.543	0.484
	Married, separated from spouse	0.039	0.033	0.044
	Divorced	0.108	0.080	0.128
	Widowed	0.020	0.012	0.027
	Civil Partnership	0.003	0.004	0.002
Region	North East	0.072	0.068	0.075
	North West	0.098	0.104	0.093
	Merseyside	0.026	0.023	0.027
	Yorkshire and Humberside	0.085	0.080	0.088
	East Midlands	0.048	0.048	0.048
	West Midlands	0.070	0.073	0.068
	Eastern	0.065	0.064	0.065
	London	0.086	0.090	0.082
	South East	0.123	0.127	0.120
	South West	0.081	0.090	0.075
	Wales	0.104	0.099	0.109
	Scotland	0.128	0.122	0.133
	Northern Ireland	0.015	0.012	0.017
Industry	A: Agriculture, forestry and fishing	0.005	0.007	0.004

	B,D,E: Energy and water	0.021	0.037	0.009
	C: Manufacturing	0.101	0.164	0.055
	F: Construction	0.040	0.073	0.015
	G,I: Distribution, hotels and restaurants	0.178	0.165	0.187
	H,J: Transport and communication	0.078	0.122	0.045
	K,L,M,N: Banking and finance	0.146	0.161	0.136
	O,P,Q: Public admin, education and health	0.391	0.234	0.506
	R,S,T,U: Other services	0.041	0.036	0.044

3.4 Results

The results shown here will look first at the relationship between full-time employment and well-being, followed by the relationship between permanent employment and well-being before finally considering the relationship between varying hours employment and well-being. The full results can be found in Tables 3.15 to 3.22 in Appendix 3.B. The results can be interpreted as likelihood of giving a particular well-being response (e.g. if the coefficient for very high life satisfaction is 0.05 it means the individual in that particular employment contract would be 5% more likely to respond with a very high life satisfaction than the same individual in a different employment contract).

3.4.1 Full-time employment

The results for the analysis of full-time employment on well-being (Table 3.7) reveal that males experience no real change to their well-being (with a high worthwhileness of life being the only significant value, and then only at the 10% significance level). However, females experience a significant impact on their well-being from this type of employment. For life satisfaction, happiness and worthwhileness of life, females are more likely to give a lower response when they are in full-time employment (although only at the 10% significance level for life satisfaction). Comparing the very high response for life satisfaction (-1.1%), happiness (-2.3%) and worthwhileness of life (-2.7%) with their very low (0.1%, 0.6% and 0.1% respectively), low (0.2%, 0.8% and 0.3% respectively) and medium (1%, 1.7% and 1.6% respectively) counterparts reveals that full-time employment for females would push most into a mid-to-low level of well-being. Interestingly, anxiety is unaffected by whether the individual is in full-time or part-time employment. These results follow what the literature has found – that part-time employment sees more benefit to an individual's well-being than full-time

employment does, especially for females (Buehler and O'Brien, 2011; Connolly and Gregory, 2008; van Rijswijk et al., 2004).

Table 3.6: Marginal effects of full-time employment on well-being

Full-time employment					
Female	**Very Low**	**Low**	**Medium**	**High**	**Very high**
Life satisfaction	0.001*	0.002*	0.010*	-0.002*	-0.011*
	(0.001)	(0.001)	(0.005)	(0.001)	(0.006)
Happiness	0.006***	0.008***	0.017***	-0.007***	-0.023***
	(0.002)	(0.002)	(0.005)	(0.002)	(0.007)
Worthwhileness of life	0.001***	0.003***	0.016***	0.007***	-0.027***
	(0.000)	(0.001)	(0.004)	(0.002)	(0.007)
Anxiety	-0.009	-0.001	0.002	0.003	0.004
	(0.009)	(0.001)	(0.003)	(0.003)	(0.004)
Male	**Very low**	**Low**	**Medium**	**High**	**Very high**
Life satisfaction	0.000	0.000	0.001	-0.002	-0.001
	(0.001)	(0.002)	(0.010)	(0.003)	(0.010)
Happiness	0.003	0.006	0.013	-0.007	-0.015
	(0.002)	(0.004)	(0.010)	(0.005)	(0.012)
Worthwhileness of life	0.001	0.002	0.011	-0.001*	-0.013
	(0.001)	(0.002)	(0.009)	(0.001)	(0.012)
Anxiety	0.012	0.001	-0.004	-0.005	-0.004
	(0.018)	(0.001)	(0.006)	(0.007)	(0.006)

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

When accounting for selectivity (Table 3.8), the significance of each of the results remains the same (with the exception of high worthwhileness of life for men, which is now insignificant even at the 10% significance level). With very little change in the magnitude of the coefficients, if any, these results would suggest that in the case of full-time versus part-time employment on well-being, there is no issue of selectivity bias.

3.4.2 Permanent employment

The results for the analysis on the permanency of employment on well-being (Table 3.9) show that females actually experience no effect upon their well-being, with the exception of a highly significant negative effect for a high response for worthwhileness of life (-0.4%). This suggests that females in permanent employment would be less likely to give a response of high for worthwhileness of life, but

Table 3.7: Marginal effects of full-time employment on well-being (with selectivity)

Full-time employment (with selectivity)					
Female	**Very Low**	**Low**	**Medium**	**High**	**Very high**
Life satisfaction	0.002*	0.002*	0.010*	-0.003*	-0.010*
	(0.001)	(0.001)	(0.005)	(0.002)	(0.005)
Happiness	0.006***	0.008***	0.016***	-0.008***	-0.023***
	(0.002)	(0.002)	(0.005)	(0.003)	(0.006)
Worthwhileness of life	0.001***	0.003***	0.016***	0.007***	-0.026***
	(0.000)	(0.001)	(0.004)	(0.002)	(0.007)
Anxiety	-0.009	-0.001	0.002	0.003	0.004
	(0.009)	(0.001)	(0.002)	(0.003)	(0.004)
Male	**Very low**	**Low**	**Medium**	**High**	**Very high**
Life satisfaction	0.000	0.000	-0.001	0.001	0.001
	(0.001)	(0.003)	(0.010)	(0.004)	(0.009)
Happiness	0.004	0.006	0.012	-0.008	-0.014
	(0.003)	(0.005)	(0.010)	(0.006)	(0.011)
Worthwhileness of life	0.001	0.002	0.009	-0.002	-0.010
	(0.001)	(0.003)	(0.010)	(0.002)	(0.011)
Anxiety	0.013	0.001	-0.004	-0.005	-0.004
	(0.017)	(0.001)	(0.006)	(0.007)	(0.006)

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

would be indifferent in all other responses or well-being measures. However, males experience more of an impact upon their well-being. With varying degrees of significance, males experience an impact from the permanency of their employment upon their life satisfaction and the worthwhileness of their life. Those in permanent employment are much more likely to give a response of very high for both life satisfaction (3.5%) and worthwhileness of life (3.3%), however, there is little variation in the high response (with life satisfaction (2.5%) being significant only at the 10% significance level and worthwhileness of life not being significant at all). At the lower end, those in permanent employment are much less likely to give a response of very low (-0.5% and -0.3%), low (-1.2% and -0.8%) and medium (-4.3% and -3.3%) for life satisfaction and worthwhileness of life respectively. The fact that anxiety is not affected by the permanency of employment supports the findings of De Witte and Näswall (2003), suggesting that perhaps those in temporary employment are expecting their employment to end and so don't suffer anxiety over it.

When accounting for selectivity (Table 3.10), there are some noticeable changes. Females now experience no difference in their well-being depending upon whether they have a permanent or temporary contract. Males still experience significant changes to both life satisfaction and

Table 3.8: Marginal effects of permanent employment on well-being

Permanent employment					
Female	**Very Low**	**Low**	**Medium**	**High**	**Very high**
Life satisfaction	0.000	-0.008	-0.004	0.001	0.004
	(0.001)	(0.002)	(0.011)	(0.003)	(0.012)
Happiness	-0.001	-0.002	-0.003	0.002	0.004
	(0.004)	(0.005)	(0.010)	(0.005)	(0.014)
Worthwhileness of life	-0.001	-0.003	-0.015	-0.004***	0.024
	(0.001)	(0.002)	(0.010)	(0.002)	(0.015)
Anxiety	0.029	0.004	-0.008	-0.011	-0.014
	(0.019)	(0.003)	(0.005)	(0.007)	(0.010)
Male	**Very low**	**Low**	**Medium**	**High**	**Very high**
Life satisfaction	-0.005**	-0.012**	-0.043***	0.025*	0.035***
	(0.002)	(0.005)	(0.015)	(0.012)	(0.010)
Happiness	-0.003	-0.006	-0.012	0.008	0.013
	(0.004)	(0.006)	(0.013)	(0.010)	(0.014)
Worthwhileness of life	-0.003*	-0.008**	-0.033**	0.012	0.033***
	(0.002)	(0.004)	(0.015)	(0.008)	(0.012)
Anxiety	0.031	0.002	-0.010	-0.013	-0.010
	(0.023)	(0.003)	(0.008)	(0.010)	(0.008)

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

worthwhileness of life. The very low (-0.5% and -0.3% respectively) and low (-1.2% and -0.8% respectively) responses see only a change in the increase of their significance, with the magnitude of the probabilities remaining the same. However, the magnitude of the probabilities for medium and high have both decreased (from -4.3% to -3.9% and -3.3% to -3.1% for a response of medium, and from 2.5% to 1.7% and 1.2% to 0.8% for a response of high), yet the significance of these results for a high response have actually increased, leading them both to be considered significant. The magnitude of the very high response has increased for both well-being measures (from 3.5% to 3.9% and from 3.3% to 3.5% for life satisfaction and worthwhileness of life respectively), with the significance for the worthwhileness of life coefficient being slightly lower than previously (but still significant at the 5% significance level).

3.4.3 Varying hours

The analysis on varying hours (Table 3.11) was the only analysis to find a significant impact upon an individual's anxiety. Both males and females are more likely to give a higher anxiety response if they are in a varying hours contract. Males are much less likely to give a response of very low (-3.5%) for

Table 3.9: Marginal effects of permanent employment on well-being (with selectivity)

Permanent employment (with selectivity)					
Female	**Very Low**	**Low**	**Medium**	**High**	**Very high**
Life satisfaction	-0.001 (0.002)	-0.001 (0.003)	-0.004 (0.011)	0.001 (0.004)	0.005 (0.012)
Happiness	-0.001 (0.004)	-0.002 (0.005)	-0.003 (0.010)	0.002 (0.005)	0.005 (0.014)
Worthwhileness of life	-0.001 (0.001)	-0.003 (0.002)	-0.015 (0.009)	-0.006 (0.004)	0.025 (0.016)
Anxiety	0.029 (0.020)	0.003 (0.002)	-0.008 (0.005)	-0.011 (0.007)	-0.013 (0.009)
Male	**Very low**	**Low**	**Medium**	**High**	**Very high**
Life satisfaction	-0.005*** (0.002)	-0.012*** (0.004)	-0.039*** (0.013)	0.017*** (0.006)	0.039*** (0.013)
Happiness	-0.003 (0.004)	-0.005 (0.006)	-0.011 (0.013)	0.007 (0.008)	0.013 (0.015)
Worthwhileness of life	-0.003** (0.002)	-0.008** (0.003)	-0.031** (0.013)	0.008** (0.004)	0.035** (0.015)
Anxiety	0.031 (0.023)	0.002 (0.002)	-0.010 (0.008)	-0.012 (0.009)	-0.010 (0.008)

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

anxiety, and are more likely to give a response of medium (1.2%), high (1.4%) or very high (1.1%). All other measures of well-being for males are insignificant when considering varying hours contracts. Similar to males, females are much less likely to give a response of very low (-2.8%) for anxiety, and much more likely to give a response of medium (0.8%), high (1%) or very high (1.3%). The magnitude of these coefficients would suggest that males are more likely to experience an increase in their anxiety, however, females are more likely to experience the extreme of very high anxiety.

The life satisfaction and happiness of females are also affected by varying hours contracts. The individual would be less likely to give a response of very high (-1.4% and -1.9%) or high (-0.3% and -0.7%) for both life satisfaction and happiness respectively. They would now most likely give a response of medium (1.3% and 1.4% respectively), also with an increased probability of giving a low (0.3% and 0.7%) or very low (0.2% and 0.5%) response. This lower life satisfaction and happiness supports the idea of increased anxiety.

Table 3.10: Marginal effects of varying hours on well-being

Varying hours					
Female	**Very Low**	**Low**	**Medium**	**High**	**Very high**
Life satisfaction	0.002**	0.003**	0.013**	-0.003**	-0.014**
	(0.001)	(0.001)	(0.006)	(0.002)	(0.006)
Happiness	0.005***	0.007***	0.014***	-0.007**	-0.019***
	(0.002)	(0.002)	(0.005)	(0.003)	(0.007)
Worthwhileness of life	0.000	0.000	0.002	0.001	-0.004
	(0.000)	(0.001)	(0.005)	(0.002)	(0.008)
Anxiety	-0.028***	-0.003**	0.008***	0.010***	0.013***
	(0.009)	(0.001)	(0.003)	(0.004)	(0.004)
Male	**Very low**	**Low**	**Medium**	**High**	**Very high**
Life satisfaction	0.000	-0.001	-0.004	0.001	0.004
	(0.001)	(0.001)	(0.006)	(0.002)	(0.006)
Happiness	0.002	0.003	0.006	-0.004	-0.006
	(0.002)	(0.003)	(0.006)	(0.004)	(0.006)
Worthwhileness of life	0.000	-0.001	-0.004	0.001	0.005
	(0.000)	(0.001)	(0.006)	(0.001)	(0.007)
Anxiety	-0.035***	-0.002**	0.012***	0.014***	0.011***
	(0.010)	(0.001)	(0.003)	(0.004)	(0.003)

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

There is very little difference to the results when taking into account selectivity (Table 3.12). The only change of interest is the low response for the anxiety of males. While the coefficient remains the same (-0.2%), it is now only significant at the 10% significance level. All other significances remain significant, with only very minor differences in some of the magnitudes of the coefficients.

3.4.4 Selectivity bias

The question of whether selectivity bias is an issue and needs to be taken into account can be answered by the ρ coefficient found in the Heckman ordered probit analysis. This coefficient determines whether there is correlation between the error terms for the well-being and selectivity equation. Due to how this analysis was performed, the results will only reveal whether selectivity bias exists depending upon the well-being measure used, rather than the employment contract. These coefficients can be found in Table 3.13.

Table 3.11: Marginal effects of varying hours on well-being (with selectivity)

Varying hours (with selectivity)					
Female	**Very Low**	**Low**	**Medium**	**High**	**Very high**
Life satisfaction	0.002**	0.003**	0.013**	-0.004**	-0.014**
	(0.001)	(0.001)	(0.005)	(0.002)	(0.006)
Happiness	0.005***	0.007***	0.013***	-0.007**	-0.019***
	(0.002)	(0.002)	(0.005)	(0.003)	(0.007)
Worthwhileness of life	0.000	0.000	0.002	0.001	-0.004
	(0.000)	(0.001)	(0.005)	(0.002)	(0.008)
Anxiety	-0.027***	-0.003**	0.007***	0.010***	0.012***
	(0.010)	(0.001)	(0.003)	(0.004)	(0.004)
Male	**Very low**	**Low**	**Medium**	**High**	**Very high**
Life satisfaction	-0.001	-0.001	-0.004	0.002	0.004
	(0.001)	(0.002)	(0.006)	(0.002)	(0.006)
Happiness	0.002	0.003	0.006	-0.004	-0.006
	(0.002)	(0.003)	(0.006)	(0.004)	(0.006)
Worthwhileness of life	0.000	-0.001	-0.004	0.001	0.005
	(0.001)	(0.001)	(0.006)	(0.001)	(0.006)
Anxiety	-0.035***	-0.002*	0.011***	0.014***	0.011***
	(0.010)	(0.001)	(0.003)	(0.004)	(0.003)

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

These results show that it is important to consider the issue of selectivity when the measure of well-being is life satisfaction or worthwhileness of life for males. However, when the measure of well-being is happiness, anxiety or worthwhileness of life for females, there would appear to be no issue of selectivity bias. This may go some way to explaining the differences found in the analysis on temporary employment contracts (where both the life satisfaction and worthwhileness of life for men were significant), yet it does not explain the consistency of the results in the other analyses where life satisfaction or worthwhileness of life were affected.

Table 3.12: Correlation of error terms from the well-being and selectivity equations

Well-being measure	Male	Female
Life satisfaction	6.04**	4.02**
Happiness	0.27	0.27
Worthwhileness of life	4.67**	0.00
Anxiety	1.16	0.05

3.5 Conclusion

The purpose of this study was to explore first how different employment contracts may affect well-being, and second to determine whether there is an issue of selectivity bias in research of this nature. This was done by considering three different contract types (full-time versus part-time, permanent versus temporary and varying hours versus regular hours employment) and how they affect four different measures of subjective well-being (life satisfaction, happiness, worthwhileness of life and anxiety). Unemployed individuals were then taken into account through the Heckman ordered probit, allowing for the identification of potential selectivity bias.

This study found that there are clear differences between the employment contracts explored. Similarly, gender differences were clearly identified in the effects of employment contract upon well-being. The difference between full-time and part-time employment tends to affect the well-being of females more than males, while the difference between permanent and temporary employment tends to affect the well-being of males more than females. While varying hours contracts affect the anxiety of both males and females, only females experience an effect upon the other well-being measures.

These results have implications for policy setters. With males and females affected differently by employment contract, policy setters should be able to more accurately target sources of negative well-being effects by encouraging particular employment contracts depending upon gender. Females benefit more from part-time, regular hours contracts, and males benefit more from permanent regular hours contracts. As such, firms could be encouraged through legislation or financial benefits to increase these employment options. Similarly, less desirable employment contracts may be subsidised to help offset the negative effects of the particular contract. Another possible policy would be to improve employees' rights through legislation. By improving employees' rights under certain employment contracts it may alleviate uncertainty and anxiety and therefore improve overall subjective well-being (or reduce the negative effect from the contract).

With females experiencing greater well-being through part-time, regular hours employment, the question must be asked of whether this is related to family commitments. With females still generally being the primary carers for children, the desire for part-time employment is understandable. However, if the government would want to encourage more females into full-time employment to help reduce the gender pay gap then there are policies that may be introduced to support this. One policy that could be implemented would be to encourage firms to increase childcare facilities. Similarly, there may be an option for increased child benefits for those in full-time employment to allow for external childcare. However, before these policies are undertaken, more research would be required into the viability of increased childcare, but also the demand for it (i.e. would more females choose full-time employment over part-time if they had more access to childcare?). As such, a future research question could look into the effects of employment contract on well-being subject to family commitments and subjective attitudes to work.

The inclusion of unemployed individuals in the analysis resulted in very similar results. While their inclusion was an important consideration to make, it would appear that the true interactions between employment contract and well-being are captured for happiness and anxiety when solely considering employed individuals. Similarly, the worthwhileness of life for females is unaffected by selectivity bias. However, when considering life satisfaction and the worthwhileness of life for males it is important to consider unemployed individuals in the analysis. Similarly, while the results are similar in this study, future studies could consider different selection equations to gain a more rounded understanding of the selection bias and to check for robustness. However, until validity tests become available for exactly identified models (if they ever do become available), these future studies may reveal little more.

There is much scope for future research in this area. With some of the well-being variables identifying the issue of selectivity bias it is important to ask what other measures of well-being may be affected by this bias? Similarly, other than employment contracts, which omits unemployed individuals, what other research may benefit from considering selectivity bias (e.g. marital satisfaction)? Other future research may also consider other employment contracts (e.g. zero-hours contracts), as well as interactions between employment contracts.

Appendices

Appendix 3.A

Table 3.14 shows the local authority unemployment rates.

Table 3.13: Local authority unemployment rates

UALA09	Region	Unemployment rate
460	Northern Ireland	3.4
11	Buckinghamshire	0.8
12	Cambridgeshire	0.7
16	Cumbria	1.6
17	Derbyshire	1.2
18	Devon	0.8
19	Dorset	0.7
21	East Sussex	1.4
22	Essex	1.3
23	Gloucestershire	1.1
24	Hampshire	0.7
26	Hertfordshire	1.1
29	Kent	1.4
30	Lancashire	1.9
31	Leicestershire	0.8
32	Lincolnshire	1.6
33	Norfolk	1.2
34	Northamptonshire	1.4
36	North Yorkshire	1.0
37	Nottinghamshire	1.5
38	Oxfordshire	0.6
40	Somerset	1.0
41	Staffordshire	0.8
42	Suffolk	1.2
43	Surrey	0.6
44	Warwickshire	1.0
45	West Sussex	0.9
47	Worcestershire	1.1
48	Eilean Siar, Orkney & Shetland	1.0
AB	Barking and Dagenham	2.5
AC	Barnet	1.5
AD	Bexley	1.3
AE	Brent	2.7
AF	Bromley	1.1
AG	Camden	1.6
AH	Croydon	1.9
AJ	Ealing	2.2

AK	Enfield	2.1
AL	Greenwich	2.2
AM	Hackney	2.5
AN	Hammersmith and Fulham	2.4
AP	Haringey	2.5
AQ	Harrow	1.3
AR	Havering	1.6
AS	Hillingdon	1.4
AT	Hounslow	1.7
AU	Islington	2.1
AW	Kensington and Chelsea	1.5
AX	Kingston upon Thames	1.0
AY	Lambeth	2.5
AZ	Lewisham	2.5
BA	Merton	1.5
BB	Newham	2.0
BC	Redbridge	1.5
BD	Richmond upon Thames	1.0
BE	Southwark	2.3
BF	Sutton	1.0
BG	Tower Hamlets	2.4
BH	Waltham Forest	2.4
BJ	Wandsworth	1.4
BK	Westminster	1.6
BL	Bolton	3.1
BM	Bury	2.4
BN	Manchester	2.9
BP	Oldham	3.1
BQ	Rochdale	2.9
BR	Salford	2.8
BS	Stockport	2.0
BT	Tameside	2.9
BU	Trafford	1.7
BW	Wigan	2.7
BX	Knowsley	3.7
BY	Liverpool	3.7
BZ	St. Helens	3.3
CA	Sefton	3.0
CB	Wirral	2.5
CC	Barnsley	2.4
CE	Doncaster	2.8
CF	Rotherham	2.7
CG	Sheffield	2.5
CH	Gateshead	2.6
CJ	Newcastle upon Tyne	2.5
CK	North Tyneside	2.2
CL	South Tyneside	4.1
CM	Sunderland	2.9
CN	Birmingham	4.1
CQ	Coventry	1.9

CR	Dudley	2.7
CS	Sandwell	3.2
CT	Solihull	1.5
CU	Walsall	2.5
CW	Wolverhampton	3.8
CX	Bradford	2.8
CY	Calderdale	2.0
CZ	Kirklees	2.1
DA	Leeds	2.3
DB	Wakefield	1.9
EB	Hartlepool	4.2
EC	Middlesbrough	4.3
EE	Redcar and Cleveland	3.8
EF	Stockton-on-Tees	2.9
EH	Darlington	2.8
EJ	County Durham	2.1
EM	Northumberland	2.2
EQ	Cheshire East	1.2
ET	Halton	2.9
EU	Warrington	2.1
EW	Cheshire West and Chester	1.5
EX	Blackburn with Darwen	2.9
EY	Blackpool	3.8
FA	Kingston Upon Hull, City of	3.9
FB	East Riding of Yorkshire	1.4
FC	North East Lincolnshire	3.6
FD	North Lincolnshire	2.2
FF	York	0.8
FK	Derby	1.5
FN	Leicester	2.2
FP	Rutland	0.6
FY	Nottingham	3.3
GA	Herefordshire, County of	0.8
GF	Telford and Wrekin	1.4
GG	Shropshire	1.0
GL	Stoke-on-Trent	1.8
HA	Bath and North East Somerset	1.0
HB	Bristol, City of	1.7
HC	North Somerset	1.0
HD	South Gloucestershire	0.9
HE	Cornwall	1.2
HG	Plymouth	1.9
HH	Torbay	1.9
HN	Bournemouth	1.3
HP	Poole	0.9
HX	Swindon	1.4
HY	Wiltshire	0.8
JA	Peterborough	1.6
KA	Luton	1.9
KB	Bedford	2.1

KC	Central Bedfordshire	0.8
KF	Southend-on-Sea	2.0
KG	Thurrock	1.9
LC	Medway	2.1
MA	Bracknell Forest	0.7
MB	West Berkshire	0.5
MC	Reading	1.3
MD	Slough	1.3
ME	Windsor and Maidenhead	0.7
MF	Wokingham	0.5
MG	Milton Keynes	1.5
ML	Brighton and Hove	1.4
MR	Portsmouth	1.5
MS	Southampton	1.4
MW	Isle of Wight	1.6
NA	Isle of Anglesey	3.0
NC	Gwynedd	1.9
NE	Conwy	2.1
NG	Denbighshire	2.2
NJ	Flintshire	1.7
NL	Wrexham	2.0
NN	Powys	1.1
NQ	Ceredigion	1.1
NS	Pembrokeshire	2.2
NU	Carmarthenshire	1.8
NX	Swansea	2.1
NZ	Neath Port Talbot	2.3
PB	Bridgend	2.1
PD	The Vale of Glamorgan	1.9
PF	Rhondda Cynon Taf	2.5
PH	Merthyr Tydfil	2.6
PK	Caerphilly	3.2
PL	Blaenau Gwent	3.9
PM	Torfaen	2.6
PP	Monmouthshire	1.1
PR	Newport	3.1
PT	Cardiff	2.4
QA	Aberdeen City	1.4
QB	Aberdeenshire	0.9
QC	Angus	1.6
QD	Argyll and Bute	1.5
QE	Scottish Borders	1.5
QF	Clackmannanshire	2.3
QG	West Dunbartonshire	3.7
QH	Dumfries and Galloway	1.7
QJ	Dundee City	3.0
QK	East Ayrshire	3.1
QL	East Dunbartonshire	1.1
QM	East Lothian	1.6
QN	East Renfrewshire	1.0

QP	City of Edinburgh	1.5
QQ	Falkirk	2.1
QR	Fife	2.2
QS	Glasgow City	3.2
QT	Highland	1.4
QU	Inverclyde	2.9
QW	Midlothian	1.6
QX	Moray	1.1
QY	North Ayrshire	4.0
QZ	North Lanarkshire	2.8
RB	Perth and Kinross	1.0
RC	Renfrewshire	2.4
RE	South Ayrshire	2.3
RF	South Lanarkshire	2.2
RG	Stirling	1.4
RH	West Lothian	1.6

Appendix 3.B

Tables 3.15 to 3.22 contain the main results of the ordered probits and Heckman ordered probits. The reference individual is a 16-25 year old, earning below minimum wage, with good health, a degree, single, never married, from Wales and working in agriculture.

Table 3.14: Results of the ordered probit on life satisfaction

Life satisfaction		Males		Females	
Employment contract	Full time	-0.003	(0.057)	-0.056*	(0.029)
	Permanent	0.237***	(0.078)	0.022	(0.064)
	Varying hours	0.024	(0.034)	-0.074**	(0.031)
Age	26-35	-0.167**	(0.073)	-0.151**	(0.059)
	36-45	-0.391***	(0.076)	-0.305***	(0.062)
	46-55	-0.438***	(0.077)	-0.380***	(0.063)
	56-65	-0.321***	(0.081)	-0.265***	(0.069)
	66 and over	0.031	(0.114)	0.053	(0.112)
Hourly wage	Below £10/hour	-0.065	(0.073)	-0.036	(0.047)
	Below £15/hour	0.067	(0.076)	0.059	(0.052)
	Below £20/hour	0.043	(0.082)	0.111*	(0.061)
	Below £25/hour	0.145	(0.090)	0.129*	(0.075)
	Below £30/hour	0.208**	(0.102)	0.198*	(0.108)
	£30/hour and over	0.254***	(0.095)	0.273***	(0.096)
Health	Health limits amount of work	-0.678***	(0.221)	-0.193	(0.122)
	Health limits kind of work	-0.047	(0.106)	-0.198**	(0.089)
	Health limits amount and kind of work	-0.552***	(0.070)	-0.582***	(0.054)
Education	Higher education	0.148**	(0.059)	0.122**	(0.049)
	GCE, A-level or equivalent	0.074	(0.047)	0.121***	(0.042)
	GCSE, A* - C or equivalent	0.097*	(0.053)	0.127***	(0.043)
	Other qualifications	0.148**	(0.068)	0.242***	(0.062)
	None or unknown	0.069	(0.081)	0.196***	(0.069)
Relationship status	Married, living with spouse	0.359***	(0.042)	0.265***	(0.036)
	Married, separated from spouse	-0.109	(0.094)	-0.277***	(0.070)
	Divorced	0.146**	(0.069)	-0.173***	(0.050)
	Widowed	-0.129	(0.150)	-0.135	(0.091)
	Civil Partnership	0.753***	(0.250)	-0.051	(0.302)
Region	North East	0.054	(0.081)	0.117*	(0.064)
	North West	-0.164**	(0.072)	-0.029	(0.061)
	Merseyside	-0.123	(0.118)	-0.053	(0.092)
	Yorkshire and Humberside	-0.082	(0.077)	-0.036	(0.062)
	East Midlands	-0.020	(0.090)	-0.064	(0.074)
	West Midlands	-0.023	(0.080)	-0.056	(0.066)
	Eastern	-0.050	(0.082)	-0.066	(0.067)

	London	-0.186**	(0.076)	-0.123*	(0.063)
	South East	-0.067	(0.070)	-0.021	(0.057)
	South West	-0.120	(0.075)	0.036	(0.065)
	Scotland	-0.140**	(0.070)	0.073	(0.056)
	Northern Ireland	0.179	(0.159)	0.152	(0.113)
Industry	B,D,E: Energy and water	-0.276	(0.217)	-0.000	(0.256)
	C: Manufacturing	-0.279	(0.204)	0.036	(0.217)
	F: Construction	-0.369*	(0.208)	0.029	(0.237)
	G,I: Dist., hotels and restaurants	-0.337*	(0.203)	0.056	(0.211)
	H,J: Transport and communication	-0.291	(0.205)	0.048	(0.219)
	K,L,M,N: Banking and finance	-0.328	(0.204)	-0.010	(0.212)
	O,P,Q: Public admin, edu. and health	-0.335*	(0.203)	0.035	(0.210)
	R,S,T,U: Other services	-0.261	(0.217)	0.027	(0.218)
Margins	Cut 1	-2.732***	(0.239)	-2.514***	(0.231)
	Cut 2	-2.134***	(0.234)	-2.045***	(0.228)
	Cut 3	-1.225***	(0.232)	-1.118***	(0.227)
	Cut 4	1.139***	(0.232)	1.115***	(0.227)

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Table 3.15: Results of the ordered probit on happiness

Happiness		**Males**		**Females**	
Employment contract	Full time	-0.070	(0.053)	-0.099***	(0.028)
	Permanent	0.064	(0.072)	0.019	(0.060)
	Varying hours	-0.032	(0.031)	-0.082***	(0.029)
Age	26-35	-0.081	(0.067)	-0.053	(0.055)
	36-45	-0.216***	(0.070)	-0.092	(0.057)
	46-55	-0.258***	(0.071)	-0.167***	(0.059)
	56-65	-0.219***	(0.075)	-0.080	(0.064)
	66 and over	0.090	(0.106)	0.299***	(0.106)
Hourly wage	Below £10/hour	-0.007	(0.068)	0.018	(0.044)
	Below £15/hour	0.022	(0.071)	0.054	(0.048)
	Below £20/hour	0.001	(0.076)	0.080	(0.057)
	Below £25/hour	0.017	(0.084)	0.105	(0.070)
	Below £30/hour	0.148	(0.094)	0.123	(0.100)
	£30/hour and over	0.081	(0.088)	0.070	(0.089)
Health	Health limits amount of work	-0.602***	(0.207)	-0.301***	(0.116)
	Health limits kind of work	-0.246**	(0.097)	-0.179**	(0.083)
	Health limits amount and kind of work	-0.305***	(0.066)	-0.512***	(0.051)
Education	Higher education	0.087	(0.054)	0.100**	(0.045)
	GCE, A-level or equivalent	0.007	(0.043)	0.037	(0.039)
	GCSE, A* - C or equivalent	0.011	(0.049)	0.081**	(0.040)
	Other qualifications	0.290***	(0.064)	0.173***	(0.059)
	None or unknown	0.170**	(0.077)	0.079	(0.065)
	Married, living with spouse	0.259***	(0.039)	0.138***	(0.034)

Relationship status	Married, separated from spouse	-0.092	(0.087)	-0.095	(0.066)
	Divorced	0.168***	(0.064)	-0.032	(0.047)
	Widowed	0.183	(0.142)	-0.043	(0.087)
	Civil Partnership	0.138	(0.237)	0.072	(0.284)
Region	North East	0.017	(0.075)	0.111*	(0.060)
	North West	-0.089	(0.067)	0.049	(0.057)
	Merseyside	-0.151	(0.109)	0.043	(0.086)
	Yorkshire and Humberside	0.012	(0.072)	0.011	(0.058)
	East Midlands	-0.016	(0.084)	0.047	(0.069)
	West Midlands	-0.076	(0.074)	-0.013	(0.062)
	Eastern	-0.100	(0.076)	0.043	(0.063)
	London	-0.062	(0.070)	0.047	(0.059)
	South East	-0.129**	(0.064)	0.013	(0.054)
	South West	-0.093	(0.069)	0.054	(0.060)
	Scotland	-0.165**	(0.064)	0.007	(0.052)
	Northern Ireland	-0.007	(0.146)	0.228**	(0.106)
Industry	B,D,E: Energy and water	-0.129	(0.204)	-0.282	(0.240)
	C: Manufacturing	-0.147	(0.192)	-0.025	(0.205)
	F: Construction	-0.185	(0.196)	-0.239	(0.223)
	G,I: Dist., hotels and restaurants	-0.129	(0.192)	0.010	(0.199)
	H,J: Transport and communication	-0.149	(0.193)	0.126	(0.207)
	K,L,M,N: Banking and finance	-0.164	(0.192)	-0.020	(0.200)
	O,P,Q: Public admin, edu. and health	-0.121	(0.191)	-0.006	(0.198)
	R,S,T,U: Other services	-0.031	(0.204)	0.037	(0.206)
Margins	Cut 1	-2.246***	(0.221)	-1.955***	(0.216)
	Cut 2	-1.684***	(0.219)	-1.449***	(0.214)
	Cut 3	-0.878***	(0.218)	-0.709***	(0.214)
	Cut 4	0.959***	(0.218)	1.029***	(0.214)

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Table 3.16: Results of the ordered probit on worthwhileness of life

Worthwhile		**Males**		**Females**	
Employment contract	Full time	-0.065	(0.057)	-0.106***	(0.030)
	Permanent	0.185**	(0.078)	0.099	(0.064)
	Varying hours	0.025	(0.034)	-0.016	(0.031)
Age	26-35	-0.120*	(0.072)	-0.018	(0.059)
	36-45	-0.301***	(0.075)	-0.121**	(0.062)
	46-55	-0.277***	(0.076)	-0.232***	(0.063)
	56-65	-0.184***	(0.080)	-0.082	(0.069)
	66 and over	0.126	(0.113)	0.249**	(0.112)
Hourly wage	Below £10/hour	-0.123*	(0.073)	-0.057	(0.047)
	Below £15/hour	0.010	(0.076)	0.043	(0.052)
	Below £20/hour	-0.043	(0.082)	0.045	(0.061)
	Below £25/hour	-0.009	(0.090)	0.128*	(0.075)

	Below £30/hour	0.128	(0.101)	0.089	(0.107)
	£30/hour and over	0.075	(0.094)	0.136	(0.096)
Health	Health limits amount of work	-0.356	(0.221)	0.043	(0.125)
	Health limits kind of work	-0.146	(0.105)	-0.302***	(0.089)
	Health limits amount and kind of work	-0.383***	(0.071)	-0.419***	(0.055)
Education	Higher education	0.039	(0.058)	0.122**	(0.049)
	GCE, A-level or equivalent	-0.003	(0.046)	0.067	(0.042)
	GCSE, A* - C or equivalent	0.040	(0.053)	0.109**	(0.043)
	Other qualifications	0.177***	(0.068)	0.077	(0.063)
	None or unknown	0.065	(0.082)	0.169**	(0.069)
Relationship status	Married, living with spouse	0.335***	(0.042)	0.209***	(0.036)
	Married, separated from spouse	-0.067	(0.094)	-0.003	(0.071)
	Divorced	0.203***	(0.068)	0.033	(0.050)
	Widowed	0.133	(0.153)	-0.046	(0.092)
	Civil Partnership	0.690***	(0.253)	0.269	(0.319)
Region	North East	-0.057	(0.081)	0.158**	(0.065)
	North West	-0.112	(0.072)	0.080	(0.061)
	Merseyside	-0.188	(0.117)	0.038	(0.092)
	Yorkshire and Humberside	-0.094	(0.077)	0.111*	(0.062)
	East Midlands	-0.165*	(0.089)	0.050	(0.075)
	West Midlands	-0.146*	(0.079)	0.034	(0.067)
	Eastern	-0.118	(0.082)	-0.014	(0.068)
	London	-0.154**	(0.075)	-0.000	(0.064)
	South East	-0.166**	(0.069)	0.017	(0.057)
	South West	-0.168**	(0.075)	0.013	(0.065)
	Scotland	-0.159**	(0.070)	0.084	(0.056)
	Northern Ireland	-0.041	(0.156)	0.245**	(0.113)
Industry	B,D,E: Energy and water	-0.298	(0.218)	-0.675***	(0.259)
	C: Manufacturing	-0.454**	(0.205)	-0.518**	(0.221)
	F: Construction	-0.508**	(0.210)	-0.439*	(0.241)
	G,I: Dist., hotels and restaurants	-0.505**	(0.204)	-0.476**	(0.215)
	H,J: Transport and communication	-0.516**	(0.206)	-0.375*	(0.223)
	K,L,M,N: Banking and finance	-0.518**	(0.205)	-0.493**	(0.217)
	O,P,Q: Public admin, edu. and health	-0.324	(0.204)	-0.336	(0.214)
	R,S,T,U: Other services	-0.378*	(0.218)	-0.414*	(0.223)
Margins	Cut 1	-3.050***	(0.241)	-2.996***	(0.239)
	Cut 2	-2.475***	(0.236)	-2.464***	(0.233)
	Cut 3	-1.548***	(0.234)	-1.518***	(0.231)
	Cut 4	0.739***	(0.233)	0.696***	(0.231)

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Table 3.17: Results of the ordered probit on anxiety

Anxiety		Males		Females	
Employment contract	Full time	0.034	(0.051)	-0.025	(0.027)
	Permanent	0.091	(0.069)	0.085	(0.057)
	Varying hours	-0.102***	(0.030)	-0.080***	(0.028)
Age	26-35	-0.084	(0.065)	-0.077	(0.053)
	36-45	-0.243***	(0.068)	-0.084	(0.056)
	46-55	-0.270***	(0.069)	-0.131**	(0.057)
	56-65	-0.249***	(0.073)	-0.138**	(0.063)
	66 and over	-0.020	(0.103)	0.189*	(0.103)
Hourly wage	Below £10/hour	0.156**	(0.066)	0.051	(0.043)
	Below £15/hour	0.121*	(0.068)	0.083*	(0.047)
	Below £20/hour	0.164**	(0.073)	0.098*	(0.055)
	Below £25/hour	0.148*	(0.080)	0.051	(0.067)
	Below £30/hour	0.096	(0.090)	-0.053	(0.094)
	£30/hour and over	0.184**	(0.084)	0.111	(0.085)
Health	Health limits amount of work	-0.704***	(0.198)	-0.256**	(0.113)
	Health limits kind of work	-0.095	(0.094)	-0.152*	(0.081)
	Health limits amount and kind of work	-0.298***	(0.064)	-0.319***	(0.050)
Education	Higher education	0.109**	(0.052)	0.170***	(0.044)
	GCE, A-level or equivalent	0.136***	(0.041)	0.088**	(0.038)
	GCSE, A* - C or equivalent	0.106**	(0.048)	0.162***	(0.039)
	Other qualifications	0.228***	(0.062)	0.147**	(0.057)
	None or unknown	0.271***	(0.075)	0.201***	(0.063)
Relationship status	Married, living with spouse	0.105***	(0.037)	-0.018	(0.032)
	Married, separated from spouse	-0.070	(0.084)	-0.158**	(0.064)
	Divorced	0.039	(0.062)	-0.081*	(0.046)
	Widowed	0.136	(0.137)	0.037	(0.085)
	Civil Partnership	0.153	(0.224)	0.058	(0.279)
Region	North East	-0.079	(0.072)	0.058	(0.059)
	North West	-0.051	(0.065)	-0.133**	(0.055)
	Merseyside	-0.173*	(0.105)	-0.067	(0.084)
	Yorkshire and Humberside	-0.030	(0.069)	0.002	(0.056)
	East Midlands	-0.037	(0.081)	-0.044	(0.067)
	West Midlands	0.139*	(0.071)	-0.029	(0.060)
	Eastern	-0.147**	(0.073)	-0.085	(0.061)
	London	-0.107	(0.067)	-0.232***	(0.057)
	South East	-0.077	(0.062)	-0.134***	(0.052)
	South West	0.054	(0.067)	-0.006	(0.059)
	Scotland	-0.101	(0.062)	-0.090*	(0.051)
	Northern Ireland	-0.138	(0.138)	-0.128	(0.101)
Industry	B,D,E: Energy and water	-0.157	(0.197)	-0.104	(0.233)
	C: Manufacturing	-0.090	(0.186)	-0.030	(0.200)
	F: Construction	-0.136	(0.190)	0.069	(0.218)
	G,I: Dist., hotels and restaurants	-0.074	(0.186)	0.061	(0.195)
	H,J: Transport and communication	-0.103	(0.187)	0.110	(0.202)

	K,L,M,N: Banking and finance	-0.165	(0.186)	-0.014	(0.196)
	O,P,Q: Public admin, edu. and health	-0.152	(0.185)	0.020	(0.194)
	R,S,T,U: Other services	0.029	(0.198)	0.083	(0.202)
Margins	Cut 1	-1.637***	(0.212)	-1.371***	(0.210)
	Cut 2	-1.002***	(0.211)	-0.822***	(0.209)
	Cut 3	-0.465**	(0.211)	-0.307	(0.209)
	Cut 4	0.524**	(0.211)	0.545***	(0.209)

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Table 3.18: Results of the Heckman ordered probit on life satisfaction

Life satisfcation		Males		Females	
Employment contract	Full time	0.008	(0.057)	-0.055*	(0.029)
	Permanent	0.235***	(0.077)	0.025	(0.063)
	Varying hours	0.024	(0.034)	-0.074**	(0.031)
Age	26-35	-0.088	(0.079)	-0.086	(0.067)
	36-45	-0.287***	(0.086)	-0.212***	(0.077)
	46-55	-0.338***	(0.087)	-0.291***	(0.077)
	56-65	-0.259***	(0.085)	-0.213***	(0.074)
	66 and over	-0.0511	(0.118)	-0.015	(0.117)
Hourly wage	Below £10/hour	-0.056	(0.073)	-0.031	(0.047)
	Below £15/hour	0.078	(0.076)	0.064	(0.052)
	Below £20/hour	0.054	(0.081)	0.116*	(0.061)
	Below £25/hour	0.155*	(0.090)	0.133*	(0.075)
	Below £30/hour	0.217**	(0.102)	0.199*	(0.107)
	£30/hour and over	0.262***	(0.094)	0.275***	(0.095)
Health	Health limits amount of work	-0.683***	(0.220)	-0.189	(0.121)
	Health limits kind of work	-0.054	(0.106)	-0.207**	(0.089)
	Health limits amount and kind of work	-0.682***	(0.086)	-0.670***	(0.068)
Education	Higher education	0.142**	(0.059)	0.108**	(0.049)
	GCE, A-level or equivalent	0.061	(0.047)	0.106**	(0.043)
	GCSE, A* - C or equivalent	0.076	(0.054)	0.099**	(0.045)
	Other qualifications	0.125*	(0.069)	0.184***	(0.068)
	None or unknown	-0.006	(0.085)	0.096	(0.084)
Relationship status	Married, living with spouse	0.377***	(0.042)	0.248***	(0.037)
	Married, separated from spouse	-0.091	(0.094)	-0.267***	(0.070)
	Divorced	0.161**	(0.069)	-0.158***	(0.050)
	Widowed	-0.122	(0.150)	-0.141	(0.091)
	Civil Partnership	0.780***	(0.247)	-0.049	(0.302)
Region	North East	0.050	(0.081)	0.112*	(0.064)
	North West	-0.162**	(0.072)	-0.032	(0.060)
	Merseyside	-0.134	(0.117)	-0.060	(0.092)
	Yorkshire and Humberside	-0.080	(0.077)	-0.037	(0.061)
	East Midlands	-0.014	(0.090)	-0.060	(0.074)

	West Midlands	-0.020	(0.080)	-0.056	(0.066)
	Eastern	-0.043	(0.082)	-0.063	(0.067)
	London	-0.181**	(0.076)	-0.121*	(0.063)
	South East	-0.060	(0.069)	-0.018	(0.057)
	South West	-0.113	(0.075)	0.039	(0.064)
	Scotland	-0.136*	(0.070)	0.073	(0.055)
	Northern Ireland	0.175	(0.158)	0.146	(0.112)
Industry	B,D,E: Energy and water	-0.270	(0.218)	-0.001	(0.256)
	C: Manufacturing	-0.272	(0.205)	0.035	(0.217)
	F: Construction	-0.365*	(0.208)	0.028	(0.235)
	G,I: Dist., hotels and restaurants	-0.331	(0.204)	0.051	(0.211)
	H,J: Transport and communication	-0.286	(0.207)	0.046	(0.219)
	K,L,M,N: Banking and finance	-0.322	(0.205)	-0.012	(0.213)
	O,P,Q: Public admin, edu. and health	-0.327	(0.204)	0.034	(0.210)
	R,S,T,U: Other services	-0.258	(0.217)	0.027	(0.219)
Employed					
Age	Age	0.337***	(0.007)	0.277***	(0.006)
	Age^2	-0.004***	(0.000)	-0.003***	(0.000)
Education	Higher education	-0.126*	(0.073)	-0.270***	(0.052)
	GCE, A-level or equivalent	-0.271***	(0.052)	-0.253***	(0.043)
	GCSE, A* - C or equivalent	-0.439***	(0.057)	-0.502***	(0.040)
	Other qualifications	-0.547***	(0.069)	-0.905***	(0.050)
	None or unknown	-1.071***	(0.064)	-1.330***	(0.047)
Relationship status	Married, living with spouse	0.377***	(0.051)	-0.342***	(0.038)
	Married, separated from spouse	0.310***	(0.110)	0.104	(0.079)
	Divorced	0.294***	(0.074)	0.200***	(0.055)
	Widowed	0.539***	(0.130)	0.052	(0.075)
	Civil Partnership	0.809**	(0.402)	-0.006	(0.375)
Health	Health limits amount of work	-0.144	(0.253)	0.123	(0.135)
	Health limits kind of work	-0.224*	(0.120)	-0.194**	(0.089)
	Health limits amount and kind of work	-1.718***	(0.050)	-1.208***	(0.038)
Employment	Local authority unemployment rate	-0.129***	(0.019)	-0.066***	(0.014)
Constant	Constant	-5.171***	(0.145)	-4.181***	(0.119)
Margins	Cut 1	-2.582***	(0.248)	-2.404***	(0.240)
	Cut 2	-1.986***	(0.242)	-1.937***	(0.237)
	Cut 3	-1.081***	(0.24)	-1.013***	(0.235)
	Cut 4	1.276***	(0.239)	1.211***	(0.233)
athrho	ρ	0.150**	(0.061)	0.136**	(0.068)

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Table 3.19: Results of the Heckman ordered probit on happiness

Happiness		**Males**		**Females**	
Employment contract	Full time	-0.068	(0.054)	-0.099***	(0.028)
	Permanent	0.064	(0.072)	0.020	(0.060)

	Varying hours	-0.032	(0.031)	-0.082***	(0.029)
Age	26-35	-0.065	(0.073)	-0.037	(0.063)
	36-45	-0.195**	(0.080)	-0.069	(0.073)
	46-55	-0.238***	(0.080)	-0.145**	(0.073)
	56-65	-0.207***	(0.079)	-0.067	(0.069)
	66 and over	0.074	(0.111)	0.281**	(0.111)
Hourly wage	Below £10/hour	-0.005	(0.068)	0.020	(0.044)
	Below £15/hour	0.024	(0.071)	0.055	(0.048)
	Below £20/hour	0.004	(0.076)	0.081	(0.057)
	Below £25/hour	0.019	(0.084)	0.107	(0.070)
	Below £30/hour	0.150	(0.094)	0.123	(0.100)
	£30/hour and over	0.083	(0.088)	0.071	(0.089)
Health	Health limits amount of work	-0.603***	(0.207)	-0.300***	(0.116)
	Health limits kind of work	-0.247**	(0.097)	-0.181**	(0.083)
	Health limits amount and kind of work	-0.331***	(0.083)	-0.535***	(0.067)
Education	Higher education	0.085	(0.054)	0.096**	(0.046)
	GCE, A-level or equivalent	0.005	(0.043)	0.034	(0.040)
	GCSE, A* - C or equivalent	0.007	(0.050)	0.074*	(0.043)
	Other qualifications	0.286***	(0.064)	0.159**	(0.065)
	None or unknown	0.154*	(0.082)	0.054	(0.081)
Relationship status	Married, living with spouse	0.263***	(0.039)	0.134***	(0.034)
	Married, separated from spouse	-0.088	(0.088)	-0.093	(0.067)
	Divorced	0.171***	(0.064)	-0.029	(0.047)
	Widowed	0.184	(0.142)	-0.045	(0.087)
	Civil Partnership	0.144	(0.237)	0.072	(0.284)
Region	North East	0.016	(0.075)	0.110*	(0.060)
	North West	-0.089	(0.067)	0.048	(0.057)
	Merseyside	-0.153	(0.109)	0.041	(0.086)
	Yorkshire and Humberside	0.012	(0.071)	0.011	(0.058)
	East Midlands	-0.015	(0.084)	0.048	(0.069)
	West Midlands	-0.075	(0.074)	-0.013	(0.062)
	Eastern	-0.099	(0.076)	0.044	(0.063)
	London	-0.062	(0.070)	0.048	(0.059)
	South East	-0.127**	(0.064)	0.014	(0.054)
	South West	-0.091	(0.069)	0.055	(0.060)
	Scotland	-0.165**	(0.065)	0.007	(0.052)
	Northern Ireland	-0.008	(0.146)	0.226**	(0.106)
Industry	B,D,E: Energy and water	-0.127	(0.203)	-0.283	(0.239)
	C: Manufacturing	-0.146	(0.192)	-0.026	(0.205)
	F: Construction	-0.184	(0.196)	-0.239	(0.223)
	G,I: Dist., hotels and restaurants	-0.128	(0.192)	0.009	(0.200)
	H,J: Transport and communication	-0.148	(0.193)	0.125	(0.207)
	K,L,M,N: Banking and finance	-0.163	(0.192)	-0.021	(0.201)
	O,P,Q: Public admin, edu. and health	-0.119	(0.191)	-0.006	(0.198)
	R,S,T,U: Other services	-0.031	(0.205)	0.036	(0.206)
Employed					

Age	Age	0.336***	(0.007)	0.277***	(0.006)
	Age^2	-0.004***	(0.000)	-0.003***	(0.000)
Education	Higher education	-0.126*	(0.073)	-0.271***	(0.052)
	GCE, A-level or equivalent	-0.270***	(0.053)	-0.253***	(0.043)
	GCSE, A* - C or equivalent	-0.439***	(0.057)	-0.503***	(0.040)
	Other qualifications	-0.544***	(0.069)	-0.907***	(0.050)
	None or unknown	-1.071***	(0.064)	-1.331***	(0.047)
Relationship status	Married, living with spouse	0.380***	(0.051)	-0.342***	(0.038)
	Married, separated from spouse	0.315***	(0.110)	0.104	(0.079)
	Divorced	0.292***	(0.074)	0.196***	(0.055)
	Widowed	0.543***	(0.130)	0.057	(0.075)
	Civil Partnership	0.775*	(0.400)	-0.003	(0.375)
Health	Health limits amount of work	-0.148	(0.253)	0.118	(0.135)
	Health limits kind of work	-0.225*	(0.120)	-0.192**	(0.088)
	Health limits amount and kind of work	-1.715***	(0.050)	-1.207***	(0.038)
Employment	Local authority unemployment rate	-0.131***	(0.019)	-0.067***	(0.014)
Constant	Constant	-5.155***	(0.145)	-4.172***	(0.119)
Margins	Cut 1	-2.217***	(0.228)	-1.929***	(0.221)
	Cut 2	-1.655***	(0.226)	-1.423***	(0.220)
	Cut 3	-0.850***	(0.225)	-0.684***	(0.219)
	Cut 4	0.987***	(0.225)	1.054***	(0.219)
athrho	ρ	0.030	(0.058)	0.034	(0.066)

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Table 3.20: Results of the Heckman ordered probit on worthwhileness of life

Worthwhile		**Males**		**Females**	
Employment contract	Full time	-0.055	(0.057)	-0.106***	(0.030)
	Permanent	0.183**	(0.077)	0.099	(0.064)
	Varying hours	0.024	(0.033)	-0.016	(0.031)
Age	26-35	-0.051	(0.078)	-0.020	(0.066)
	36-45	-0.210**	(0.086)	-0.123	(0.075)
	46-55	-0.190**	(0.086)	-0.235***	(0.076)
	56-65	-0.129	(0.084)	-0.083	(0.073)
	66 and over	0.056	(0.119)	0.250**	(0.117)
Hourly wage	Below £10/hour	-0.115	(0.073)	-0.057	(0.047)
	Below £15/hour	0.020	(0.076)	0.043	(0.052)
	Below £20/hour	-0.033	(0.081)	0.045	(0.061)
	Below £25/hour	-0.000	(0.090)	0.128*	(0.075)
	Below £30/hour	0.136	(0.101)	0.089	(0.107)
	£30/hour and over	0.082	(0.094)	0.136	(0.096)
Health	Health limits amount of work	-0.360	(0.222)	0.043	(0.125)
	Health limits kind of work	-0.152	(0.105)	-0.301***	(0.089)
	Health limits amount and kind of work	-0.498***	(0.088)	-0.417***	(0.069)
Education	Higher education	0.034	(0.058)	0.123**	(0.049)

	GCE, A-level or equivalent	-0.014	(0.046)	0.067	(0.043)
	GCSE, A* - C or equivalent	0.022	(0.053)	0.110**	(0.045)
	Other qualifications	0.156**	(0.068)	0.079	(0.068)
	None or unknown	-0.002	(0.086)	0.172**	(0.084)
Relationship status	Married, living with spouse	0.351***	(0.042)	0.209***	(0.037)
	Married, separated from spouse	-0.052	(0.094)	-0.003	(0.071)
	Divorced	0.216***	(0.068)	0.032	(0.051)
	Widowed	0.137	(0.152)	-0.046	(0.092)
	Civil Partnership	0.713***	(0.252)	0.269	(0.319)
Region	North East	-0.061	(0.081)	0.158**	(0.065)
	North West	-0.111	(0.071)	0.080	(0.061)
	Merseyside	-0.199*	(0.116)	0.038	(0.092)
	Yorkshire and Humberside	-0.093	(0.077)	0.111*	(0.062)
	East Midlands	-0.160*	(0.089)	0.050	(0.075)
	West Midlands	-0.143*	(0.079)	0.034	(0.067)
	Eastern	-0.113	(0.082)	-0.014	(0.068)
	London	-0.150**	(0.075)	-0.000	(0.064)
	South East	-0.160**	(0.069)	0.017	(0.057)
	South West	-0.162**	(0.074)	0.012	(0.065)
	Scotland	-0.156**	(0.070)	0.084	(0.056)
	Northern Ireland	-0.044	(0.156)	0.246**	(0.113)
Industry	B,D,E: Energy and water	-0.291	(0.221)	-0.675***	(0.259)
	C: Manufacturing	-0.447**	(0.206)	-0.518**	(0.221)
	F: Construction	-0.504**	(0.211)	-0.439*	(0.241)
	G,I: Dist., hotels and restaurants	-0.499**	(0.206)	-0.476**	(0.215)
	H,J: Transport and communication	-0.511**	(0.208)	-0.375*	(0.223)
	K,L,M,N: Banking and finance	-0.511**	(0.206)	-0.493**	(0.217)
	O,P,Q: Public admin, edu. and health	-0.316	(0.206)	-0.336	(0.214)
	R,S,T,U: Other services	-0.374*	(0.220)	-0.414*	(0.223)
Employed					
Age	Age	0.337***	(0.007)	0.277***	(0.006)
	Age^2	-0.004***	(0.000)	-0.003***	(0.000)
Education	Higher education	-0.125*	(0.073)	-0.272***	(0.052)
	GCE, A-level or equivalent	-0.270***	(0.053)	-0.254***	(0.043)
	GCSE, A* - C or equivalent	-0.441***	(0.057)	-0.504***	(0.040)
	Other qualifications	-0.555***	(0.069)	-0.909***	(0.050)
	None or unknown	-1.075***	(0.064)	-1.333***	(0.047)
Relationship status	Married, living with spouse	0.377***	(0.051)	-0.341***	(0.038)
	Married, separated from spouse	0.306***	(0.110)	0.103	(0.079)
	Divorced	0.290***	(0.074)	0.198***	(0.055)
	Widowed	0.541***	(0.130)	0.056	(0.075)
	Civil Partnership	0.789**	(0.402)	-0.002	(0.375)
Health	Health limits amount of work	-0.148	(0.253)	0.119	(0.135)
	Health limits kind of work	-0.227*	(0.120)	-0.191**	(0.089)
	Health limits amount and kind of work	-1.722***	(0.050)	-1.206***	(0.038)
Employment	Local authority unemployment rate	-0.130***	(0.019)	-0.067***	(0.014)

Constant	Constant	-5.163***	(0.145)	-4.173***	(0.119)
Margins	Cut 1	-2.917***	(0.253)	-2.998***	(0.243)
	Cut 2	-2.344***	(0.247)	-2.467***	(0.238)
	Cut 3	-1.420***	(0.245)	-1.520***	(0.236)
	Cut 4	0.862***	(0.243)	0.694***	(0.236)
athrho	ρ	0.132**	(0.061)	-0.004	(0.064)

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Table 3.21: Results of the Heckman ordered probit on anxiety

Anxiety		**Males**		**Females**	
Employment contract	Full time	0.039	(0.051)	-0.025	(0.027)
	Permanent	0.090	(0.069)	0.086	(0.057)
	Varying hours	-0.102***	(0.030)	-0.080***	(0.028)
Age	26-35	-0.049	(0.073)	-0.070	(0.062)
	36-45	-0.197**	(0.080)	-0.074	(0.072)
	46-55	-0.226***	(0.080)	-0.122*	(0.072)
	56-65	-0.221***	(0.077)	-0.132*	(0.067)
	66 and over	-0.055	(0.108)	0.181*	(0.109)
Hourly wage	Below £10/hour	0.160**	(0.066)	0.051	(0.043)
	Below £15/hour	0.126*	(0.068)	0.084*	(0.047)
	Below £20/hour	0.169**	(0.073)	0.099*	(0.055)
	Below £25/hour	0.152*	(0.080)	0.052	(0.067)
	Below £30/hour	0.100	(0.090)	-0.053	(0.094)
	£30/hour and over	0.188**	(0.084)	0.112	(0.085)
Health	Health limits amount of work	-0.706***	(0.198)	-0.256**	(0.113)
	Health limits kind of work	-0.098	(0.094)	-0.153*	(0.081)
	Health limits amount and kind of work	-0.356***	(0.083)	-0.329***	(0.067)
Education	Higher education	0.107**	(0.052)	0.169***	(0.044)
	GCE, A-level or equivalent	0.130***	(0.042)	0.086**	(0.039)
	GCSE, A* - C or equivalent	0.097**	(0.048)	0.159***	(0.042)
	Other qualifications	0.218***	(0.062)	0.141**	(0.064)
	None or unknown	0.237***	(0.081)	0.190**	(0.080)
Relationship status	Married, living with spouse	0.113***	(0.038)	-0.019	(0.033)
	Married, separated from spouse	-0.063	(0.085)	-0.157**	(0.065)
	Divorced	0.045	(0.062)	-0.080*	(0.046)
	Widowed	0.138	(0.137)	0.036	(0.085)
	Civil Partnership	0.166	(0.224)	0.058	(0.279)
Region	North East	-0.081	(0.072)	0.058	(0.059)
	North West	-0.050	(0.065)	-0.133**	(0.055)
	Merseyside	-0.179*	(0.105)	-0.068	(0.084)
	Yorkshire and Humberside	-0.029	(0.069)	0.002	(0.056)
	East Midlands	-0.035	(0.081)	-0.044	(0.068)
	West Midlands	0.140*	(0.072)	-0.029	(0.060)
	Eastern	-0.144**	(0.073)	-0.085	(0.061)
	London	-0.105	(0.067)	-0.231***	(0.057)

	South East	-0.073	(0.062)	-0.134***	(0.052)
	South West	0.057	(0.067)	-0.005	(0.059)
	Scotland	-0.100	(0.062)	-0.090*	(0.051)
	Northern Ireland	-0.139	(0.138)	-0.129	(0.101)
Industry	B,D,E: Energy and water	-0.154	(0.198)	-0.104	(0.233)
	C: Manufacturing	-0.088	(0.187)	-0.030	(0.200)
	F: Construction	-0.135	(0.191)	0.069	(0.218)
	G,I: Dist., hotels and restaurants	-0.072	(0.186)	0.061	(0.195)
	H,J: Transport and communication	-0.101	(0.188)	0.110	(0.202)
	K,L,M,N: Banking and finance	-0.162	(0.186)	-0.014	(0.196)
	O,P,Q: Public admin, edu. and health	-0.149	(0.186)	0.020	(0.194)
	R,S,T,U: Other services	0.030	(0.199)	0.083	(0.202)
Employed					
Age	Age	0.337***	(0.007)	0.278***	(0.006)
	Age^2	-0.004***	(0.000)	-0.003***	(0.000)
Education	Higher education	-0.123*	(0.073)	-0.272***	(0.052)
	GCE, A-level or equivalent	-0.269***	(0.053)	-0.253***	(0.043)
	GCSE, A* - C or equivalent	-0.438***	(0.057)	-0.504***	(0.040)
	Other qualifications	-0.545***	(0.069)	-0.909***	(0.050)
	None or unknown	-1.070***	(0.064)	-1.329***	(0.047)
Relationship status	Married, living with spouse	0.377***	(0.051)	-0.343***	(0.038)
	Married, separated from spouse	0.315***	(0.110)	0.097	(0.079)
	Divorced	0.291***	(0.074)	0.195***	(0.055)
	Widowed	0.544***	(0.130)	0.054	(0.075)
	Civil Partnership	0.774*	(0.399)	-0.005	(0.375)
Health	Health limits amount of work	-0.139	(0.254)	0.119	(0.135)
	Health limits kind of work	-0.224*	(0.120)	-0.195**	(0.089)
	Health limits amount and kind of work	-1.715***	(0.050)	-1.208***	(0.038)
Employment	Local authority unemployment rate	-0.131***	(0.019)	-0.067***	(0.014)
Constant	Constant	-5.160***	(0.145)	-4.178***	(0.119)
Margins	Cut 1	-1.573***	(0.223)	-1.360***	(0.216)
	Cut 2	-0.938***	(0.222)	-0.811***	(0.215)
	Cut 3	-0.401*	(0.221)	-0.296	(0.215)
	Cut 4	0.587***	(0.221)	0.556***	(0.215)
athrho	ρ	0.067	(0.062)	0.015	(0.068)

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Chapter 4

Adaptation and anticipation to life events

Brickman and Campbell (1971) looked at how changes in income affected well-being. They found that with an increase in income individuals would experience a momentary increase in their well-being, but would eventually return to their previous level of well-being. This phenomenon was known as the hedonic treadmill, which considers well-being to be like a treadmill, where one must continue to walk to remain in the same place. This adaptation to a change in income (which, at the time, was considered the greatest determinant of well-being) encouraged further research not only into adaptation, but also into the true determinants of well-being.

The analysis in this chapter will build upon this idea of the hedonic treadmill by exploring the adaptation and anticipation effects to 9 different life events: unemployment, marriage, divorce, birth of a child, birth of the first child, widowhood, illness, disability and retirement. In addition to this, unconditional quantile analysis will be employed to explore how well-being is affected at different points along the distribution. First will be an overview of the existing literature on the hedonic treadmill and quantile analysis, including a review of how each of the life events affect well-being. Next will be the methodology and data, followed by the conclusion.

4.1 Literature review

The idea of returning to a base level of well-being has been explored further by other researchers, in the form of adaptation. Suh, Diener and Fujita (1996) explore the subjective well-being of individuals who experienced positive and negative life effects, looking into whether there is any adaptation to these events. They find that the individuals experience a significant increase (decrease) to well-being following a positive (negative) life event for the 3 months following the event. However, finding no

significant change to well-being for any of the following periods, they suggest that there is complete adaptation to these life events after just 3 months.

While this gave a good initial look into adaptation using longitudinal analysis, the length of the study and the sample size were both small (only 115 individuals over 2 years). Other research has similarly been done into adaptation using short longitudinal data (e.g. Headey and Wearing, 1989), but Clark et al. (2008) were the first to use a large panel, enabling a range of life events to be found and the effects to be studied in depth. They look at 130,000 person-year observations over twenty years of the GSOEP, considering six different life events: unemployment, marriage, divorce, widowhood, birth of a child and layoff. The measure of well-being they consider is life satisfaction.

Clark et al. (2008) explore the possibility of adaptation by considering individuals that experience a key life event during the 20 years of the survey. With the large panel they are able to consider an individual's life satisfaction at the time of the event (within that year) and after the event, to see if any changes experienced at the time of the event continue or return back to the state they were in pre-event. This allows them to determine whether individuals going through significant life events experience a permanent increase/decrease in their life satisfaction or adapt to their new situation over time following the event. In addition to adaptation they explore anticipation effects. This is the idea that an individual's well-being will change prior to an event as they anticipate the change to their circumstances. They explore anticipation by considering the individual's well-being prior to the event, as well as at the time of the event, to see if there are positive or negative effects leading up to the event.

The findings of Clark et al. (2008) are that individuals experiencing marriage, divorce, widowhood, birth of a child and layoff all experience adaptation to their circumstances. However, males experiencing unemployment do not return to their base level of well-being (although females do). There is also evidence of anticipation effects to all life events, however the extent of this anticipation varies (with divorce and widowhood, for example, having long and large anticipation effects).

This analysis was then re-examined by Clark and Georgellis (2013). They consider whether these effects are unique to Germany or whether the UK experiences similar effects, and also test whether

multi-item well-being measures give a different perspective. For this they use the same methods as Clark et al. (2008), but use the BHPS data instead. They then repeat the test using the GHQ measure of well-being to enable analysis of a multi-item well-being measure. The findings of this paper confirm what was found previously in Germany – that there are anticipation effects across the board, with adaptation effects being seen in all key life events except unemployment in males. Performing a similar study in Russia, Bauer et al. (2015) find that although these findings may be generalised for the UK and Germany (and possibly other Western countries), they may not be generalised to other, culturally different countries like Russia. They look at unemployment, marriage, divorce and widowhood and find complete, long-run adaptation to widowhood for males alone, with all other life events finding no adaptation. This study highlights the importance of international comparison outside of similar countries.

Binder and Coad (2010) also consider adaptation to life events by using vector autoregression (VAR). They consider how correlated changes in well-being and life events are to changes in well-being and life events in other periods. They consider changes in health, income, marital status and employment status and find evidence for adaptation across the board. Interestingly, they also find that increases in well-being in previous periods lead to improvements in all other areas, suggesting that these adaptation effects may be uni-directional.

Picking up on a life event not considered by Clark and Georgellis (2013), Gupta et al. (2015) look at illness. There is a great deal of research suggesting that one of the greatest determinants of well-being is health, and so anticipation to and adaptation following an illness is an interesting consideration. The distribution of well-being is also considered by Gupta et al. through conditional quantile analysis. They find no evidence of anticipation to illness, but find that at different points on the well-being distribution there are varying degrees of adaptation. Those at the lower end of the distribution (especially at the 25^{th} percentile) experience little adaptation, yet those at the 75^{th} percentile experience complete adaptation by 3 years following the onset of the illness, with those at the 90^{th} percentile experiencing no negative effect from illness at all.

4.1.1 Quantile analysis

Most of the previous research into well-being has looked only at the average person, without considering how people at different points on the distribution may respond to changes in circumstances. While this is useful for an overview it limits the policy implications, as it is only the average person for whom any policies may be applied. By extending the analysis to consider different points on the distribution it is possible for policy to be targeted at particular groups of people, increasing the efficacy of any policy changes.

Research has found that the results of the analysis can change when considering the point on the distribution of well-being at which the analysis takes place (Binder and Coad, 2011; Fang, 2017; Lamu and Olsen, 2016). These studies tend to find that those at the upper end of the well-being distribution are less affected by circumstances (e.g. unemployment or changes in income), where those at the lower end of the distribution experience a greater impact. Conversely, while this seems to hold true for well-being as measured by life satisfaction, using a measure such as the GHQ for well-being tends to have more variable results, with some differences between the upper and lower end of the distribution being even more apparent, and with other differences being reversed (see education in Binder and Coad, 2011).

The previous research mentioned uses conditional quantile analysis, which explores how people with the same characteristics respond at different points on the distribution. Due to the fact that the unconditional quantile may not be equal to the same conditional quantile (i.e. that quantile dependant on other characteristics) the results for the conditional quantile analysis cannot be generalised to the population. To resolve this issue Firpo et al. (2009) came up with a method for unconditional quantile analysis. This method analyses individuals along the unconditional well-being distribution, and therefore allows for generalisation to the population. This is important for policy setting, as it allows the policy setter to more accurately target the points on the distribution where negative effects are most apparent.

Borah and Basu (2013) take this new unconditional quantile method to explore medication adherence. They compare the results of this unconditional quantile analysis to conditional quantile analysis by considering a hypothetical policy situation. They explore the situation where patient intervention

occurs when the Medication Possession Ratio (MPR)[12] was 70% or less. In this situation, under the conditional quantile analysis this intervention threshold falls within different quantiles conditional on different observed characteristics. However, there is no such issue with unconditional quantile analysis. As such, the results of the unconditional quantile analysis are more interpretable, and could be used more efficiently to target policies.

4.1.2 Employment status

One of the key papers looking at the relationship between employment status and well-being in the UK is by Clark and Oswald (1994). They look at the first sweep of the BHPS, which contains data for just over 6,000 individuals in 1991. By considering the GHQ section of the survey they were able to come up with an unhappiness level for each of these individuals whilst also being able to look at their employment status (although they only focus on employed, self-employed or unemployed). Looking at other variables included in the survey (such as health, education, marital status, etc.) they also find that employment/unemployment was the greatest influencer upon an individual's well-being.

Through their study, Clark and Oswald (1994) were looking to determine whether unemployment was generally voluntary or involuntary. They argued that if unemployed individuals showed equal or lower unhappiness than employed individuals then unemployment was generally voluntary, however if the converse were true then unemployment would generally be involuntary. What they found is that those individuals that were unemployed had a significantly greater unhappiness level than those in employment (whether self-employed or otherwise), suggesting that unemployment was indeed involuntary.

While a causality test was not performed by Clark and Oswald (1994), other studies have found that it is unemployment that causes a decline in well-being rather than the other way around. Jackson et al. (1983) performed a longitudinal study looking at a group of newly graduated students over a three-year period. They found that those in employment had lower distress levels than those that were unemployed. However, they also found that moving from unemployment into employment reduced

[12] The medication possession ratio is "the ratio of the number of days of medication supplied within the refill interval to the number of days in the refill interval, where refill interval refers to the first and last fill of the study medication." – Borah and Basu (2013)

the levels of distress experienced. This would suggest that the causality goes from employment to well-being. Warr (1987) collected various studies that look at the relationship between employment status and well-being. He collected both cross-sectional and longitudinal studies to evaluate not only the effects of differences in employment status, but also changes in employment status. Through the various studies Warr concluded that there is indeed greater well-being for the employed than for those in unemployment, and also that this relationship goes from employment status to well-being.

One study that also considers the effects of a change in employment status (from complete unemployment to regular employment or vice versa) is that by Winefield and Tiggemann (1990). In this study Winefield and Tiggemann perform longitudinal analyses on 4 different groups of people: those that were in employment for the whole duration of the study (between 1980 and 1983), those that were unemployed for the whole duration of the study, those that moved from unemployment into employment and those that moved from employment into unemployment. They measured four different variables for each respondent: self-esteem, depressive affect, locus of control and negative mood. They found that those moving from unemployment into employment had the greatest increase in positive effects, whilst those moving from employment into unemployment saw the greatest increase in negative effects. Surprisingly, those in consistent unemployment actually saw an increase in positive effects, suggesting that there may be some adaptation to unemployment.

The other important employment status that will be considered in this chapter is retirement. Lindeboom et al. (2002) look at individuals in Amsterdam, using the Longitudinal Aging Study Amsterdam (LASA), to explore how negative life events may affect the well-being of older individuals (aged 55 to 85). They consider disability, widowhood and death of a child/grandchild, but also consider retirement. They conclude that "declines in income and inflow into a Disability Insurance program significantly deteriorate emotional health… [which] may be taken as an argument in favour of income support for older individuals after retirement." This would suggest that, while retirement may not have significantly negative effects on well-being in itself, it may have negative effects on well-being through the loss of income.

Clark and Fawaz (2009) explore further the effects of retirement on well-being with the Survey of Health, Ageing and Retirement in Europe (SHARE), which follows over 40,000 people aged 50 and over, and the BHPS. They use the EURO-D score of psychological well-being in the SHARE and the GHQ in

the BHPS, which both measure psychological distress. From the European dataset they find that the effects of retirement on well-being differ between countries, with some individuals experiencing positive impacts from retirement and others experiencing negative impacts. From the BHPS they find that retirement has different effects on well-being depending upon various different factors, from number of hours worked per week when in employment to occupation to region. Most of these results are insignificant. However, the results that are significant tend to be negative, suggesting that generally retirement actually has detrimental effects on well-being for those in the UK.

This research on retirement has been extended further by Bonsang and Klein (2012), who use the GSOEP to investigate how voluntary versus involuntary retirement affects well-being in Germany. They find that those in voluntary retirement receive positive impacts to well-being due to the increase in free time, but experience negative well-being effects from the fall in household income. There is also found to be an increase in satisfaction with health that comes from retirement. However, the overall the well-being effects from voluntary retirement are negligible. It is also found that involuntary retirement overall has a negative effect on well-being. These findings are supported by Abolhassani and Alessie (2013).

4.1.3 Health

Health has been found in the literature to be a key determinant of well-being (Wilson, 1967). The difficulty with evaluating health is that, unlike with all of the other life events being considered here, health can be an unclear variable due to how different people perceive or react to illness. First, there is the choice of what health conditions to consider (e.g. specific illnesses, disability, general health satisfaction, etc.) followed by how those conditions are measured. The two methods found in the literature are a clinical measure and a subjective measure for health. The clinical measure considers doctor's notes, visits to doctor's surgery/hospital, medication usage, etc. where the subjective measure considers how the individual considers their health to be.

In order to consider the magnitude of the impact of poor health on well-being, Ferrer-i-Carbonell and van Praag (2002) calculate the income equivalence of health satisfaction changes. This is to say that they calculate the change in income that would be required to have the same impact as the change in health status, hence giving (negative) health a value as a percentage of income. To calculate this

change, they explore how the subjective health of the individual (measured through health satisfaction) changes their general satisfaction with life. They then calculate how much income would need to change to have the same effect on general satisfaction. They find that the initial income and employment status of the individual, as well as the severity of the health issue are all important factors in determining the value of illness. They find that East German workers tended to have the lowest value for illness, followed by West German workers, West German non-workers and East German non-workers respectively. This could suggest that East Germans value their income and employment status more than their health, relative to that of West Germans.

The severity of the illness has serious implications with regards to how great the effect is on general satisfaction. They find that the lowest impacts came from skin conditions and allergies (with East German workers valuing it as 7.5% of their income), with difficulties in seeing and hearing and sinusitis also being particularly low. The most severe illnesses are paralysis, stomach, liver and kidney issues and diabetes (where the latter is valued at 78.2% of the income of East German non-workers). This research is useful for showing not only how individuals react differently to illness (or, value health differently), but it is also useful in showing how the severity of the illness may affect the individual.

This research is built upon by Groot et al. (2004) who perform a similar analysis on individuals with cardiovascular disease (CVD). They use a leydon welfare function to evaluate the changes in income required to make someone with CVD as well off as an individual without. They use the Supplementary Provision Survey (SPS, Aanvullend Voorzieningengebruik Onderzoek 1995) of the Dutch Social and Cultural Planningbureau (SCP) to evaluate 6,382 individuals, of which 2.4% had CVD. They find that in order to alleviate the negative effects of CVD, 25 year old males need to be compensated €114,000 - €380,000 a year, depending upon the quality of the welfare. The lowest compensation necessary is for 75 year old males who need €57,000 - €137,000. As, at the time, the average cost for heart transplants in the Netherlands was €32,000, Groot et al. conclude that individuals value their health far greater than the cost necessary to remedy the condition. This not only shows that a value may be put on health, and that this value supports the idea that negative health has an impact on well-being, but it also shows how a clinical measure for health finds similar results to a subjective measure for health (as used by Ferrer-i-Carbonell and van Praag, 2002).

A different approach was taken by Graham et al. (2011) who evaluate how poor health affects an individual's life/activities, and then subsequently evaluate how these effects impact upon their well-being. They use the Gallup world poll data for 18 Latin American countries in 2007, looking at around 12,000 individuals. Using the Gallup world poll they are able to get a measure for subjective health through the EQ5D, which measures how individuals perceive their health to affect mobility, self-care and their usual activities, and also how they perceive their health in terms of pain/discomfort and anxiety/depression. Each of these 5 measures has 3 levels: no health issues, moderate problems and extreme problems. They find that health issues that lead to moderate and extreme difficulties in self-care are insignificant in determining well-being, whereas health issues that cause extreme pain are the most impactful to health satisfaction, and health issues that cause extreme anxiety are the most impactful to life satisfaction.

Another type of illness worth exploring is disability. One of the key papers on disability's impact upon well-being is Brickman et al. (1978) who look at how the well-being of lottery winners and accident victims changes over time. They ask the two groups of individuals, plus a control group, their overall happiness at the current time, their happiness before the event (or 6 months previously for the control group) and their predicted happiness 2 years hence. They find that those who won the lottery had significantly greater happiness after winning the lottery, with predicted happiness increasing still. Conversely, they find that accident victims had a significantly lower happiness after the accident, but predicted their future happiness to be similar to that of their pre-accident happiness. Brickman et al. conclude that there is complete adaptation to disability from this study, however they did recognise the issues with this being a cross-sectional analysis, which could only reveal predictions of future happiness, rather than an actual measure.

Using panel analysis, Lucas (2007) explores the adaptation to disability or illness through the GSOEP and the BHPS. He identifies individuals that experienced a disability since entry into the survey, evaluating well-being both pre- and post-disability. The question for well-being in the GSOEP asks about life satisfaction, where the BHPS uses a similar life satisfaction question, as well as the GHQ to evaluate psychological distress. His analysis shows that there are severe negative effects from disability for both life satisfaction and psychological distress, with little evidence of adaptation. The life satisfaction of individuals in the GSOEP is significantly, negatively affected by disability, which persists post-disability. This result is similar to that found for life satisfaction in the BHPS, where there

is no evidence of adaptation to the disability. The psychological distress in the BHPS finds that there is some evidence of adaptation, but this adaptation is incomplete. He finds that the level of psychological distress at the onset of disability is significantly positive, with the periods following disability finding a decline in this distress; however this recovery never declines to the levels of psychological distress found pre-disability.

Finding such different extremes in adaptation to disability is considered by Oswald and Powdthavee (2008), who recognise the pattern of "the traditional economist's model of 0% adaptation and the extreme 100% adaptation model advocated by some authors in the psychology literature." (Oswald and Powdthavee, 2008: 1072). They also explore adaptation to disability through the BHPS, using life satisfaction as their measure for well-being. They use a fixed effects regression to estimate the impact of disability, which differs to Lucas' (2007) multi-level method (which is more akin to random effects). Using this method they find that there is evidence for adaptation to disability, of the order 30% to 50%. They conclude their paper with the thought, "It may be that the two social science disciplines can converge in their thinking." (Oswald and Powdthavee, 2008: 1072).

4.1.4 Marital status

As explored by Myers (1999), close relationships have a huge impact on happiness. They recognise the psychology behind close relationships suggesting that there should be benefits to such relationships. As such, they examine the effects of marriage upon well-being. Looking at a survey following Americans during the 1970s and 1980s they find that those who are married are twice as likely to consider themselves very happy than those who have never been married. Separated and divorced individuals are respectively even less likely to consider themselves to be very happy. Myers goes on to review other research already performed into marriage's effects on well-being, finding similar results.

Prior to Myers, Haring-Hidore et al. (1985) did a meta-analysis of the research into the effects of marriage on life satisfaction. They pool all of the results from the previous research and end up with 111 results to compare. Using inferential analysis they find that there is only slight evidence for marital status determining subjective well-being, although this relationship is positive. Another interesting finding is that the studies where the age range was older tend to show weaker correlation between

marriage and well-being than those with a younger age range. These results (especially the small effect of marriage on well-being) were not posited by the researchers, and they suggest that more research would be necessary to better understand these results.

Frey and Stutzer (2000) take a slightly different stance in their analysis of relationships, where they explore the difference between being single or not. This research does not differentiate between marriage, partnerships or cohabiting and also does not differentiate between never married, divorced, widowed or separated, however, it still comes out with interesting (albeit not unexpected) results. They look at data on 6,000 Swiss individuals, looking at various different personal characteristics that may affect their life satisfaction (which is measured on a 10 point scale). They find that single women have significantly lower life satisfaction than couples, being between 25.8% and 37.3% less satisfied with life. Single males likewise have significantly lower life satisfaction, but to a lesser extent than single women (experiencing between 17.4% and 29.5% less satisfaction). They also find that couples with children do not have significantly different life satisfaction than those without children, but single parents have significantly lower life satisfaction (between 37.2% and 61.4%). As stated previously, this analysis, while revealing something of the relationship between couples and singles, is not able to identify the effects of marital status specifically.

A study that goes further to explore specifically the difference between married, living as married, never married, divorced, separated or widowed was that performed by Helliwell (2003). Helliwell uses three waves of the World Values Survey (WVS), using a 10 point scale to measure general satisfaction. He finds that married individuals have significantly higher general satisfaction than never married individuals, with a satisfaction score 0.429 higher on average. Individuals living as married couples also have a greater general satisfaction, at 0.238 points higher than those who were never married. Separation has significantly negative effects on satisfaction, at 0.355 points lower on average. No significant results are found for widowed or divorced individuals. With the difference between married and separated individuals being around 0.784 points, marriage compared to separation has a greater impact than health and unemployment, both of which have been found in the literature to be significant determinants of well-being. These results help to shed some light on how the different marital statuses affect well-being, but as there is no control for how long individuals have been in their current situation the results may be slightly misleading. For example, one would expect widowhood

to have a significant impact on well-being, which may not be picked up as those who are widowed may have adapted to their situation over time.

Blanchflower and Oswald (2004) perform a study on how sex affects happiness, with a focus on frequency of sexual activity and marital status. For this study they use a survey of around 16,000 Americans. They find that individuals who have sex 4 or more times per week have the greatest happiness, with happiness generally decreasing with frequency of sexual activity. They also find that individuals with a single sexual partner over the past year have the greatest happiness. Finding that married individuals have more sex than single, divorced, widowed or separated individuals they argue that marriage has the greatest benefits towards happiness. Never married individuals have the next highest happiness. Divorced and widowed individuals respectively have the next highest happiness, with separated individuals having the lowest happiness. The order of these effects supports the findings of Helliwell (2003).

Using panel analysis to take into account time factors, Lucas (2005) explores adaptation to divorce. Lucas uses 18 waves of the GSOEP, using the life satisfaction question as the measure for subjective well-being. He identifies individuals who experienced divorce since entry into the survey and analyses how their well-being changed leading up to the divorce and following it. He finds that divorce does have significantly negative effects on an individual's well-being, finding also that there is some adaptation to divorce, but this adaptation is incomplete. What he also finds is that, at the time of marriage, those who would eventually divorce have a lower life satisfaction than those who would stay married. This would suggest that there are selection effects, where people less satisfied with life are more likely to end up getting divorced.

Clark and Georgellis (2013) find that marriage has a positive impact upon well-being, but adaptation is quick to occur, with individuals returning to their base level of well-being just two years hence. This is supported by Frijters et al. (2011). Qari (2014) takes a similar approach to Clark and Georgellis, exploring anticipation and adaptation to marriage in Germany. He uses 23 waves of the GSOEP and finds that, contrary to Clark and Georgellis' findings, there is no long-run adaptation. He finds that married individuals experience a boost to their well-being at the time of marriage before a decline the following period. However, these individuals now have a new, higher base level of well-being than when they were single.

4.1.5 Birth of a child

Many studies that look into well-being consider how having children affects well-being (see, for example, DiTella et al., 2003; Frey and Stutzer, 2000; Haller and Hadler, 2006; Lelkes, 2006a). However, the research exploring how the birth of a child affects well-being is much more limited. Clark et al. (2008), when looking at anticipation and adaptation to life events in Germany, explore this effect. They find that life satisfaction for males increases the year prior to birth, with no significant well-being effects at the time of birth. Following this there are 4 years of negative effects from this childbirth, before complete adaptation is attained. Females experience the same increase in well-being the period prior to birth, but this positive effect persists for females to the year of birth. The negative effects from child birth then commence at 2 years following birth and persist until 3 years after birth, before complete adaptation is attained. This research shows that there is a clear effect of child birth upon well-being.

Clark and Georgellis (2013) take this same research and apply it to the UK through the BHPS. They find that males in the UK experience no significant effects from childbirth at any time, where females experience positive anticipation from 3 years prior to birth, persisting until the year of birth. Immediately following birth there is complete adaptation. The reason for this difference in the data may be due to the difference in country, however, it is more likely that this comes from the omitted variable that Clark et al. (2008) use for adaptation and anticipation. Their use a different omitted variable for the separate adaptation and anticipation analysis may distort the true effects. Clark and Georgellis then perform the same study again using the GHQ measure for psychological distress and find that females experience no significant impacts to psychological distress from childbirth, whereas males experience a negative effect at 1 year and 3 years following birth. This paper suggests that the effects of childbirth on life satisfaction are somewhat smaller than previously assumed.

Performing a similar study in Australia, Frijters et al. (2011) use quarterly data from the Household, Income and Labour Dynamics in Australia (HILDA) survey. They find that there are significant positive anticipation effects to childbirth, with the birth itself also having positive effects on life satisfaction. Following birth there are significant negative effects. When this analysis is split by gender it is found that the positive anticipation and momentary effects experienced by females are greater than that experienced by males, whereas the negative adaptation experienced by females is less than that of

males. This would suggest that males generally have a more negative experience from childbirth, with females having a more positive experience (relative to each other).

Building upon this research further, Myrskylä and Margolis (2014) use the GSOEP and BHPS to examine in depth how birth affects individuals in Germany and the UK respectively. Two key additions to arise from this paper are the distinction between whether the child born is the first child or a subsequent child and also whether age and marital status affects the way birth impacts upon well-being. Exploring the number of the child being born, they find that there are significantly positive anticipation effects leading up to the birth of the first child, with positive, but lower anticipation effects for the second child born. There are no significant anticipation effects for the third child born. Following birth there is immediate adaptation for all births, with no significant positive or negative effects found. This analysis is only performed using the GSOEP.

Considering just the birth of the first child, evaluating the effects of gender on the impact of birth on well-being, Myrskylä and Margolis (2014) find that there are significantly positive effects on well-being for both males and females the year prior to birth and at the time of birth. For both the GSOEP and the BHPS this effect is greater for females than males. Following birth there is complete adaptation for both males and females in both datasets. When evaluating age they find that 18-22 year olds experience no anticipation effects in either dataset but experience a slight negative impact to well-being following birth in the German data (no effect is found post-birth in the UK data). 23-34 year olds and 35-49 year olds both experience positive anticipation effects persisting until the year of birth, with 35-49 year olds experiencing the greater well-being effects. There is then complete adaptation for both age groups following birth for both datasets. They find that married individuals experience highly significant positive anticipation to childbirth, where unmarried individuals experience little to no positive anticipation. In the GSOEP there are positive well-being effects for both married and unmarried parents at the time of birth, with married individuals having only slightly greater well-being than unmarried. In the BHPS however, the positive well-being effects are only experienced by married individuals. Following birth there is complete adaptation for both married and unmarried parents, for both datasets. These results show that there are very few, if any, positive or negative effects following having a child, with positive well-being effects only being apparent before birth.

4.1.6 Conclusion

The literature here shows a clear relationship between each of these life events and well-being. Unemployment clearly has a negative effect upon well-being, with the adaptation literature suggesting that this negative effect may even persist in the long-run. Retirement can also be expected to have a negative impact upon well-being. Marriage can be expected to have a positive effect on well-being, although the persistence of that positive effect is uncertain. There is likely to be negative anticipation leading up to divorce (due to low marital satisfaction). With divorcees generally having lower well-being than those who are married it is likely that the overall well-being of divorcees after the event will be lower than that of married individuals. Widowhood is likely to have a strong negative impact upon well-being, but adaptation is expected. Illness and disability have both been found to cause a negative impact to well-being, yet they are also likely to adapt. Finally, birth of a child will likely see the weakest effects, yet the effects that are seen are likely to be negative.

There are some uncertainties in the literature, with some conflicting findings. For example, do individuals adapt to marriage as suggested by Clark and Georgellis (2013), or is Qari (2014) to be believed that the positive effects of marriage persist? However, the results of this study should help to bring some clarity to the true effects experienced.

4.2 Methodology

There is evidence to suggest that people at different points on the well-being distribution respond differently to changes in circumstances (Binder and Coad, 2011; Fang, 2017; Lamu and Olsen, 2016). To account for this, quantile regression analysis may be used. This form of analysis looks at different points along the distribution and evaluates how an individual at that point may respond to a change in circumstances. For this research the method that will be employed will be the unconditional fixed effects quantile analysis.

Most of the quantile analysis performed in the current literature on well-being uses conditional quantile analysis. This conditional analysis considers the conditional well-being distribution. This is to say that it looks at the well-being distribution conditional on various characteristics (generally those appearing in this research as control variables, such as health or employment status). This could show,

for example, how all those in employment respond at different points on the distribution, regardless of how those in unemployment respond. The issue with this is that an individual may be at the lower end of the well-being distribution, but be at the higher end of the well-being distribution conditional on their characteristics (i.e. be at the higher end of the well-being distribution compared to others with the same level of education, the same employment status, etc.). This method does give some insight into how an individual's well-being may change, however, it does not give a true representation of how "happy" individuals may respond differently to "unhappy" individuals.

Recognising this issue, Firpo et al. (2009) devise a method to look at the unconditional well-being distribution. By doing this, it is possible to identify how "happy" individuals would respond to changes in circumstances compared to how "unhappy" individuals would respond. This is important for policy implications, as it means that the policy maker could specifically target a particular group of individuals in order to alleviate/promote negative/positive effects due to particular life events.

The method devised by Fripo et al. (2009) considers the recentred influence function (RIF), which is where the influence function (the function that determines how the dependant variable will respond to a change in the distribution of the independent variable) is recentred by the quantile of interest (q_τ):

$$RIF(y; q_\tau) = q_\tau + IF(y; q_\tau)$$

With the RIF it is possible to calculate the unconditional quantile partial effect (UQPE) at quantile τ, $\alpha(\tau)$, by finding the expected partial effects of the expected RIF dependant on X:

$$\alpha(\tau) = E\left[\frac{dE[RIF(Y, q_\tau)|X]}{dx}\right]$$

This UQPE can then be interpreted as the effect of a change in the independent variable upon an individual at the τ^{th} quantile of the unconditional distribution of the dependant variable.

Using this methodology, the relationship of interest can be represented as so:

$$WB_{it}^{\tau} = \alpha_i^{\tau} + \beta^{\tau} X_{it} + \gamma_{-4}^{\tau} Z_{-4,it} + \gamma_{-3}^{\tau} Z_{-3,it} + \gamma_{-2}^{\tau} Z_{-2,it} + \gamma_{-1}^{\tau} Z_{-1,it} + \gamma_0^{\tau} Z_{0,it} + \gamma_1^{\tau} Z_{1,it} + \gamma_2^{\tau} Z_{2,it} + \gamma_3^{\tau} Z_{3,it} + \gamma_4^{\tau} Z_{4,it} + \gamma_5^{\tau} Z_{5,it} + \varepsilon_{it}^{\tau}$$

Where WB_{it} is the well-being measure of interest, α_i is the fixed effect, X_{it} is a matrix of the control variables and ε_{it} is the error term. Each of the Z_{it} variables represent the life events with their leads (-4 to -1), the event itself (0) and the lags (1 to 5). These can be used to show the anticipation effects and the adaptation effects to the event (creating these lead and lag variables will be explained in the data section). τ represents the quantile of interest (10, 25, 50, 75 and 90).

4.3 Data

The data used for this research are taken from the BHPS, an 18 wave survey following around 10,000 households across the whole UK. It started in 1991, following 5,500 households, with an extra 1,500 households being added in 1999 for both Scotland and Wales. A further 2,000 households were added to include Northern Ireland in the survey in 2001.

The survey asks about individual and household characteristics, building up a rough approximation of the demographic of the UK. As this survey follows the same households throughout (where possible), it is possible to follow particular households and individuals for several years, allowing exploration of how and when changes occur. The advantages of the BHPS (besides its long duration and large sample) is that it contains detailed information on many different groups (e.g. youth, single-parent families, etc.), allowing in-depth research into the characteristics of these groups.

4.3.1 Event variables

The life events of interest in this study are: unemployment, marriage, divorce, birth of a child, birth of the first child, widowhood, illness, disability and retirement. These events could not all be found directly in the BHPS data available, however, those that were not immediately available were calculated through the use of other variables. Once these variables were found, event histories were created to allow analysis leading up to the event of interest, at the time of the event, and following the event. The method for creating these event histories can be found in the event histories sub-section.

The employment changes (i.e. unemployment and retirement) were both found through the employment variable, which asked individuals about their current labour force status. Both unemployment and retirement were direct responses available for this question. This same variable was used to control for employment status[13]. Similarly, the relationship status changes were found using the marital status variable, which asks an individual their marital status. For this analysis, the responses of divorced and separated were combined into a single "divorced" response. The reason for this is the small number of observations for the "separated" response, as well as the fact that the nature of separation and divorce are fairly similar, and may be combined without serious issue. The other life events found from this variable were marriage and widowhood, each of which were also direct responses available.

There was no variable that asked if a child had been born in the period between surveys, so to evaluate the birth of a child or the birth of the first child it was necessary to consider the number of children at each wave of the survey and examine when a change occurred. While this is not a perfect method for determining birth of a child (as number of children may change for different reasons, such as adoption, death of a child, etc.), it can generally be accepted that an increase in the number of children between waves represents the birth of a child. To evaluate the birth of the first child, only those who entered the survey with zero children were considered.

The illness life event was found through the same method as Gupta et al. (2015), who used 15 questions about various different health problems, ranging from skin conditions to diabetes to cancer[14]. If the response for any of these questions was positive (i.e. a health condition existed), then that individual was said to have an illness. The reason for using this measure for illness is so that comparison may be made between the results of this study and the results found by Gupta et al. This variable differs to the variable for disability, which is found through a question which asks whether the respondent is registered disabled. This disability variable could be considered a subcategory of illness, as individuals that responded positively to this question (i.e. they were registered disabled)

[13] Explanation of the control variables can be found later in this section.

[14] The full list is health problems with: arms, legs, hands, etc.; sight; hearing; skin conditions/allergy; chest/breathing; heart/blood pressure; stomach or digestion; diabetes; anxiety, depression, etc.; alcohol or drugs; epilepsy; migraine; cancer; stroke; and other.

were also likely to have reported an illness[15]. Despite being a subcategory of illness, this variable is interesting as it would generally represent a more severe illness/condition.

4.3.2 Event histories

In order to analyse the anticipation and adaptation to life events, separate well-being dummy variables must be created for each of the periods leading up to the event, as well as for the periods following the event (including a dummy variable for the onset of the event). For this section only unemployment will be shown, however the same method was used for all other event variables.

The first step to create the well-being dummy variables was to find all individuals that experienced the onset of unemployment during the survey. Identification of these individuals was achieved by finding those who identified as being unemployed, but did not identify as being unemployed in the previous period. These individuals would have moved into unemployment (i.e. experienced the onset of unemployment) between the two waves of the survey at which they were identified. So as not to pick up multiple entries into unemployment, only the first time that an individual experienced the onset of unemployment was considered, with observations of those experiencing multiple entries into unemployment being dropped at the time of the second onset onwards.

Once the onset of unemployment has been found it is possible to create dummy variables leading up to and following the event. To find the anticipation variables (those leading up to the event), dummy variables were created for those who would experience the onset of well-being within the next year, between 1 and 2 years hence, between 2 and 3 years hence and between 3 and 4 years hence. While not formally identified, the omitted variable would be those who would experience unemployment between 4 and 5 years hence, such that all results would be relative to those experiencing unemployment between 4 and 5 years hence. The anticipation side of the analysis was not balanced, and so all individuals identified here could be included in the analysis.

[15] Out of 17,510 registered disabled individuals, 16,707 also responded positively to having an illness (just over 95%).

The adaptation variables (those following the event) were found by considering those who remained in unemployment for 1 to 2 years, 2 to 3 years, 3 to 4 years, 4 to 5 years and 5 or more years. If an individual dropped out of unemployment following the onset they remained in the sample so long as they did not experience a subsequent onset of unemployment. The adaptation side of the analysis was balanced, and so only those observed for 5 or more periods following the onset of unemployment remained in the sample (whether in unemployment or not during that period). The number of observations for each of the dummy variables created (including the dummy variables created for the other life events) can be found in Table 4.1.

Of note is the number of observations for unemployment and illness, which are low at 4 years following the event, which could possibly lead to spurious results when considering adaptation at 4 years or more after the event.

4.3.3 Well-being variables

There are several different measures for well-being in the BHPS. The measure that will be used for this research is the GHQ. The GHQ is a set of 12 questions on an individual's mental well-being. The responses of these questions range from 0 to 3, with 0 being the most positive response and 3 being the least[16]. The Likert measure, which will be used in this analysis, sums each of these scores leaving a scale from 0 to 36, with 0 being the highest mental well-being and 36 being the lowest. For this research the order of responses has been reversed. The distribution of these scores can be found in Figure 4.1.

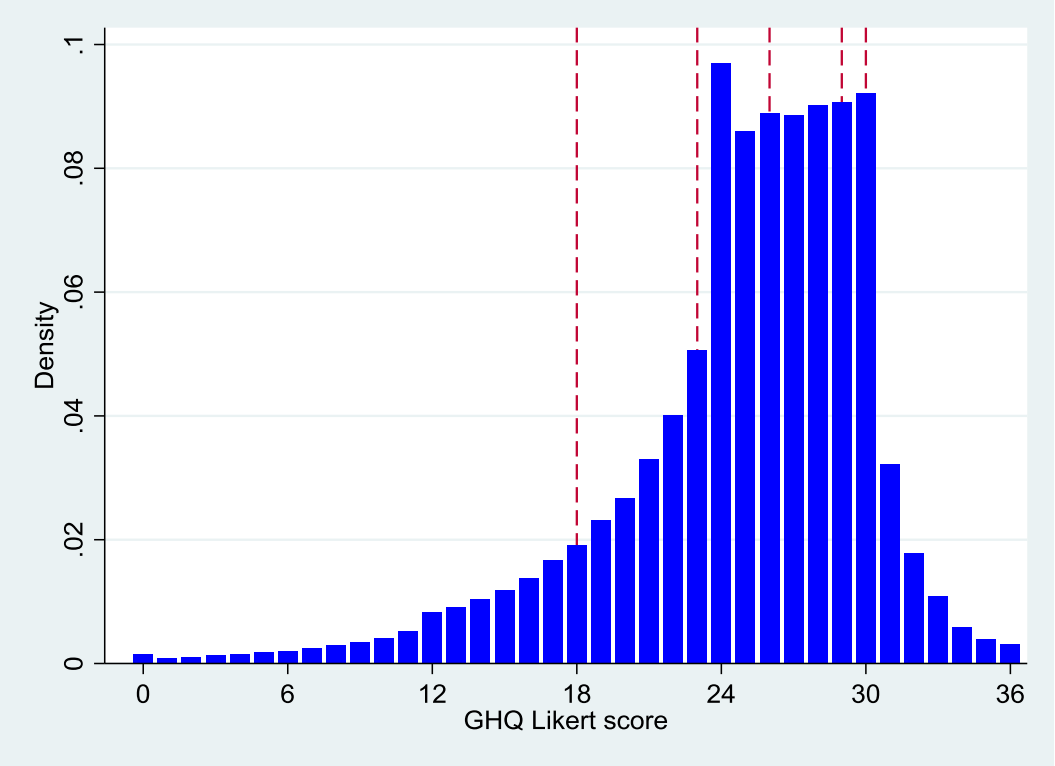
The mid-score for the GHQ-Likert is 18, however, the mean score is 24.812. This statistic, coupled with the GHQ-Likert histogram, shows that there is a positive skew in the well-being responses. This positive skew can be found in other well-being measures also, suggesting that the average individual has high well-being, but few have very high, low or very low well-being.

[16] The GHQ questions can be found in Appendix 4.A.

Table 4.1: The number of observations for lags and leads of life events

	Unemployment	Marriage	Divorce	Birth of child	Birth of first child	Widowhood	Illness	Disability	Retirement
Leads									
3-4 years hence	1,210	1,359	800	1,863	1,033	594	805	1,197	1,647
2-3 years hence	1,635	1,719	947	2,461	1,304	662	1,331	1,437	1,994
1-2 years hence	2,275	2,206	1,115	3,260	1,672	766	2,204	1,714	2,519
Within the next year	3,282	2,889	1,441	4,381	2,259	903	4,343	2,304	3,535
Lags									
0-1 years	1,498	1,625	779	2,639	1,428	465	1,686	981	1,681
1-2 years	308	1,340	551	2,143	1,157	340	592	201	1,150
2-3 years	106	1,105	440	1,542	804	273	264	123	862
3-4 years	44	925	331	1,043	498	215	38	71	682
4-5 years	22	776	267	773	330	176	10	53	545
5 or more years	28	2,760	731	1,754	604	510	1,835	132	1,788

Figure 4.1: Histogram of GHQ-Likert scores



Note: Dashed red lines, from left to right, show the 10th, 25th, 50th, 75th and 90th percentiles

4.3.4 Control variables

In order to accurately analyse the effects that each life event has on well-being, the other determinants of well-being must be accounted for. These variables are age, age-squared, log of household income, number of children, social capital, education, health, relationship status, region and employment status. Another control variable used was year, which allows the analysis to take into account time effects. The descriptive statistics for these variables can be found in Table 4.2.

Much of the previous research into well-being has considered genders individually. By evaluating the genders individually it splits the data roughly in half for each piece of analysis. Due to the nature of quantile analysis requiring large variation in the responses, it was important to maintain the largest sample possible (because the larger the sample, the more observations may be found at each point along the distribution and hence more accurate would be the variation). As such, the analysis performed here was done with the genders not divided. Also, due to it's time invariant nature, gender was not included as a control variable as the gender effects were picked up through the fixed effects.

The age variable simply asked the age of the respondent, with the number of children variable asking the number of children in the household at the time of the interview. The age of the individuals in this study ranges from 18 to 80, and the number of children ranges from 0 to 10, with means of 45.278 and 0.594 respectively. Age-squared was simply found by squaring the age variable. In order to calculate the log of household income the annual household income from 1st September of the previous year to 1st September of the current year was used. The reason that annual household income was used, rather than hourly (as is often used in well-being analysis) was due to the availability and the accuracy of annual household income being greater. The natural log of this variable was then found for this analysis and it ranges from -0.653 to 14.002, with a mean of 9.955.

There is no measure for social capital available directly from the BHPS, and as such one needed to be created. The social capital variable in this analysis was created through item response theory. Item response theory works by looking at how likely an individual is to respond positively to a certain "item" (in this case, something that would make up social capital, such as membership to a club), where someone with average social capital (0) will have a probability of 0.5 of responding positively. By doing this, many items may be combined to create a measure for a latent trait that is comprised of said items (in this case, social capital). This new variable will have an average of 0, with a positive value representing someone with greater social capital and a negative value representing an individual with lower social capital. The range of this social capital variable goes from -3.329 to 3.258.

The variables that were taken from the BHPS to evaluate social capital follow the definition given by Chan et al. (2006)[17]. This definition, while considering social cohesion, may be used also for social capital, which is the micro measure for social cohesion (Klein, 2013). By this definition, the variables that were used related to leisure activity, neighbourhood and residence, political support and behaviour, social and interest group activity, and values, opinions and attitudes[18]. Item response theory was then used on 36 items identified in the BHPS that fit this definition.

The variable that was used to control for health was the same variable that was used to identify those who had experienced an illness (see the event variables sub-section). This variable determines if an

[17] See section 2.4.4 of Chapter 2 for the full description.
[18] The full list of items included in this measure for social capital can be found in Appendix 4.B.

individual has experienced an illness in the past 12 months. This means that the response is binary (i.e. they were either ill within the last 12 months, or they were not). Another variable that could be used to control for health would be the subjective health status over the past 12 months (on a 5-point scale ranging from excellent to very poor). While this health variable is more desirable than a binary indication, there was one wave where this question was not asked. Due to the missing period this variable was less viable as an option, and therefore the binary option of illness has been used.

To control for education the variable was recoded into 3 categories: high education, medium education and no education. The reason for this recoding is due to the number of observations for each of the responses. There were few observations for the higher degree or teaching degree, hence combining them with first degree and recoding as high education will lead to a more accurate result. Similarly, the number of observations for CSE is low, hence combining with GCSE and A-level and recoding as medium education will lead to more accuracy.

Relationship status was found by using a variable which asks the individual their marital status. This was then recoded into 4 categories, married, divorced, widowed and never married. The divorced response is comprised of both divorced and separated individuals, as these responses are both equivalent in how they affect well-being. Employment status was found through recoding the employment variable into employed, self-employed, unemployed, retired and other. Due to the fact that some of the life events of interest include the relationship status or employment status of an individual, some of the analyses will omit completely the employment or relationship variable. Some of the other analyses will include these control variables, but will have different omitted variables.

In order to control for region a variable was created splitting the UK into 6 areas. These areas consist of London, the North, the Midlands, the East, the South West and the peripheries (i.e. Wales, Scotland and Northern Ireland). The reason for these regions being used rather than the usual 13 or 19 regions available in the BHPS is due to the small number of observations in some of the regions, leading to spurious results. The omitted response for this variable will be London.

Table 4.2: Descriptive statistics for control variables

Variable	Outcomes	Means	Min	Max
Age	Age	45.278	18	80
Number of children	Number of children	0.594	0	10
Log of household income	Ln(Household Income)	9.955	-0.653	14.002
Social capital	†	0.000	-3.329	3.258
Health	Was ill in last 12 months	0.589	0	1
Region	North	0.191	-	-
	Midlands	0.126	-	-
	East	0.168	-	-
	London	0.066	-	-
	South West	0.067	-	-
	Peripheries	0.382	-	-
Year	1991	0.043	-	-
	1992	0.041	-	-
	1993	0.040	-	-
	1994	0.040	-	-
	1995	0.039	-	-
	1996	0.040	-	-
	1997	0.047	-	-
	1998	0.046	-	-
	1999	0.065	-	-
	2000	0.065	-	-
	2001	0.079	-	-
	2002	0.069	-	-
	2003	0.068	-	-
	2004	0.066	-	-
	2005	0.065	-	-
	2006	0.064	-	-
	2007	0.062	-	-
	2008	0.060	-	-
Education	High	0.184	-	-
	Medium	0.488	-	-
	None	0.329	-	-
Relationship status	Married	0.567	-	-
	Divorced	0.098	-	-
	Widowed	0.079	-	-
	Never married	0.286	-	-
Employment status	Employed	0.502	-	-
	Self Employed	0.070	-	-
	Unemployed	0.038	-	-
	Retired	0.203	-	-
	Other	0.187	-	-

† The social capital variable was found through item response theory, which is explained earlier in this section

The final control variable will be a time variable, which will take into account year effects. However, due to the nature of how the event histories are created, there are no observations in the final wave, therefore, the analysis only goes from 1991 to 2007, with the 2008 variable dropped. The 1991 variable will also be omitted to avoid the dummy variable trap.

4.4 Results

In this section are the results of the fixed effects unconditional quantile regressions performed using the Likert GHQ measure for well-being for the 9 major life events: unemployment, marriage, divorce, birth of a child (**B1**), birth of the first child (**B2**), widowhood, illness, disability and retirement. The first set of results will be the control variables found when analysing unemployment, which can be found in Table 4.3. These control variables include social capital, age, age-squared, log of household income, number of children, employment, education, health, relationship status, region and year. These control variables will differ between analyses, with certain life events dropping certain controls to avoid autocorrelation (e.g. unemployment was not controlled for when analysing the anticipation and adaptation to unemployment). The significance and direction of these control variable coefficients are fairly consistent across all analyses in this chapter, and as such only those for unemployment will be displayed here. The results for the control variables of the other regressions can be found in Appendix 4.C in Tables 4.14 to 4.21.

The coefficients found here may be interpreted as change in the GHQ at the point along the well-being distribution if a certain event takes place. For example, the coefficient for the onset of unemployment at the 10^{th} percentile is -3.650. This means that at the onset of unemployment, on average (for those at that point along the distribution), their GHQ score will fall by 3.65 points. As the GHQ score for the 10^{th} percentile is 18 (see Figure 4.1), this would mean that those at the 10^{th} percentile experiencing an onset of unemployment would have, on average, a GHQ score of 14.35. Due to the long tail at the left hand side of the distribution, it can be expected that the changes in the GHQ scores will be larger at the 10^{th} percentile than at the higher percentiles (where the distribution is more concentrated).

4.4.1 Controls

The social capital variable is highly significant and positive at all percentiles, suggesting that social capital has a positive impact on an individual's well-being, regardless of where those individuals appear on the well-being distribution. Due to how this social capital variable was created, there are no studies that currently use the exact same measure for social capital. However, the research on other measures of social capital, or the components that make up this measure, tend to support this finding of a highly significant, positive relationship with SWB (Binder and Freytag, 2013; Lamu and Olsen, 2016; Yuan and Golpelwar, 2013).

There is strong evidence that age has a significant impact on well-being. While there is only sporadic evidence for the age variable having an impact on well-being, age-squared is highly significant across most of the regressions. Generally, when age is significant it is found to have a negative impact on well-being. Age-squared, however, is almost exclusively positive, suggesting that there is a u-shaped curve to age's effect on well-being. This is supported by the existing literature that has found age to have a negative impact on well-being in early life, before levelling out at around 45 years of age. Following this, well-being starts to increase once more.

Log of household income and number of children are both generally insignificant across the distribution for all life events. Where there are significant results they tend to be positive at the lower end of the distribution and negative at the upper end of the distribution. The lack of significance for income would support the current literature that suggests that income is not the main determinant of well-being (see Easterlin, 1974). However, where the results are significant it suggests that individuals at the lower end of the distribution actually may benefit from increases in income and having more children, whereas individuals at the upper end of the distribution would find an increase in income or number of children to be detrimental to their well-being.

Being employed or in self-employment is highly significant and positive at the 10^{th}, 25^{th} and 50^{th} percentiles, with very little evidence of impact at the upper end of the distribution. Generally, self-employment has a greater positive effect on well-being than regular employment at the 10^{th} and 50^{th} percentile, with regular employment having a greater impact than self-employment at the 25^{th} percentile. In contrast to employment, unemployment is highly significantly negative across the whole

distribution for all life events (except retirement). These results suggest that unemployment has an adverse effect on all individuals, but being in employment would only be beneficial for those at the lower end of the distribution.

Health is generally found in the literature to be the greatest determinant of well-being. It is no surprise, therefore, that health has highly significant effects on well-being in all analyses in this chapter. At all percentiles, individuals who experienced an illness within the last 12 months experienced a highly significant decline in their well-being. Previous research has found that the better is an individual's health, the greater is their well-being, supporting the findings here.

The significance of relationship status varies slightly across the different analyses, but there are some generalities that may be made. Where divorce is significant, those at the lower end of the distribution experience negative impacts to well-being, with those at the upper end of the distribution actually experiencing an increase in their well-being. Widowhood tends to be consistently negative, with a greater negative impact than divorce at all points on the distribution. There tend to be no significant effects for individuals who have never been married.

Education was also analysed, however it was found to be insignificant across almost all points of the distribution for all life events analysed. For the few exceptions where education was significant it had a negative impact on well-being, suggesting that those with a lower level of education actually experience greater well-being than do those with higher educational attainments. Region and year effects were both also taken into account; however, there were no consistent results across the analyses for either. At the median percentile there seems to be negative year effects that decrease in significance the further from 1991 the analysis takes place. The occasional significant results suggest that controlling for region and year effects were advisable, but no clear conclusions may be drawn to the region and year effects on well-being from these analyses.

The fixed effects variable picks up all individual characteristics that are constant over time (such as gender). These effects were found to be significant across the whole distribution for all life events (with few exceptions). Where most other results for control variables show decreasing magnitude of effects the higher on the distribution the analysis takes place, the fixed effects increase in both

Table 4.3: Fixed effects unconditional quantile results: control variables for unemployment analysis

	Percentile				
	10th	25th	50th	75th	90th
Social Capital	0.444*** (0.084)	0.270*** (0.041)	0.179*** (0.027)	0.115*** (0.024)	0.086*** (0.023)
Age	-0.450** (0.228)	-0.172 (0.111)	-0.132* (0.072)	-0.230*** (0.065)	-0.157*** (0.060)
Age^2	0.007*** (0.001)	0.003*** (0.000)	0.003*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
Ln(Income)	0.226* (0.117)	0.146** (0.058)	0.056 (0.036)	-0.012 (0.033)	-0.026 (0.031)
Number of children	0.162 (0.114)	0.107* (0.061)	0.031 (0.037)	-0.011 (0.033)	-0.034 (0.030)
Employment – Employed	1.530*** (0.242)	0.911*** (0.121)	0.340*** (0.073)	0.072 (0.066)	0.016 (0.063)
Employment – Self Employed	1.956*** (0.398)	0.914*** (0.208)	0.465*** (0.130)	0.236** (0.120)	0.133 (0.112)
Education – High	-0.175 (0.841)	-0.136 (0.462)	-0.302 (0.297)	0.141 (0.289)	0.109 (0.279)
Education – Medium	-0.336 (0.768)	0.121 (0.398)	-0.357 (0.254)	-0.038 (0.250)	-0.052 (0.238)
Health	-2.022*** (0.156)	-1.030*** (0.081)	-0.574*** (0.051)	-0.384*** (0.046)	-0.335*** (0.042)
Relationship status – Divorced	-1.355*** (0.486)	-0.594*** (0.210)	0.021 (0.124)	0.335*** (0.110)	0.358*** (0.103)
Relationship status – Widowed	-6.554*** (1.527)	-2.863*** (0.638)	-0.819** (0.341)	-0.385* (0.223)	-0.022 (0.184)
Relationship status – Never married	-0.112 (0.333)	-0.015 (0.182)	-0.001 (0.125)	-0.072 (0.120)	0.081 (0.112)
Region – North	1.036 (0.946)	0.558 (0.521)	0.079 (0.320)	-0.287 (0.310)	-0.573* (0.301)
Region – Midlands	1.858* (0.955)	0.381 (0.510)	0.110 (0.313)	0.047 (0.308)	-0.185 (0.289)
Region – East	-0.298 (0.765)	0.078 (0.387)	-0.143 (0.249)	-0.115 (0.247)	0.096 (0.238)
Region – South West	1.238 (1.201)	0.514 (0.605)	0.361 (0.376)	0.117 (0.366)	-0.234 (0.302)
Region – Peripheries	1.061 (1.024)	0.532 (0.551)	0.237 (0.349)	0.204 (0.366)	0.079 (0.331)
Year – 1992	-0.828** (0.319)	-0.593*** (0.167)	-0.478*** (0.108)	-0.203** (0.101)	-0.137 (0.092)
Year – 1993	-1.168** (0.489)	-0.657*** (0.247)	-0.562*** (0.160)	0.013 (0.146)	0.134 (0.135)
Year – 1994	-1.291* (0.688)	-0.795** (0.340)	-0.726*** (0.220)	-0.018 (0.201)	0.029 (0.186)
Year – 1995	-1.640* (0.898)	-1.047** (0.442)	-0.850*** (0.283)	0.003 (0.257)	0.052 (0.237)
Year – 1996	-1.857* (1.100)	-1.264** (0.539)	-1.050*** (0.345)	0.065 (0.312)	0.106 (0.289)

Year – 1997	-1.699 (1.302)	-1.141* (0.641)	-1.046** (0.411)	0.158 (0.372)	0.211 (0.344)
Year – 1998	-2.084 (1.514)	-1.344* (0.743)	-1.092** (0.476)	0.339 (0.429)	0.309 (0.398)
Year – 1999	-1.614 (1.719)	-1.101 (0.840)	-1.007* (0.539)	0.421 (0.485)	0.394 (0.450)
Year – 2000	-2.253 (1.923)	-1.583* (0.941)	-1.299** (0.604)	0.324 (0.542)	0.215 (0.503)
Year – 2001	-2.340 (2.159)	-1.678 (1.055)	-1.446** (0.677)	0.473 (0.608)	0.448 (0.564)
Year – 2002	-2.384 (2.374)	-1.655 (1.162)	-1.415* (0.744)	0.593 (0.669)	0.492 (0.620)
Year – 2003	-2.110 (2.600)	-1.515 (1.269)	-1.426* (0.814)	0.762 (0.732)	0.653 (0.679)
Year – 2004	-2.390 (2.817)	-1.666 (1.377)	-1.609* (0.882)	0.687 (0.793)	0.577 (0.736)
Year – 2005	-3.203 (3.164)	-1.734 (1.541)	-1.350 (0.981)	0.956 (0.884)	0.851 (0.822)
Year – 2006	-0.726 (3.391)	-1.505 (1.667)	-2.249** (1.063)	1.066 (0.964)	0.996 (0.900)
Year – 2007	-1.320 (3.747)	-1.194 (1.790)	-0.992 (1.153)	1.982* (1.070)	1.201 (0.992)
Constant	23.919*** (6.936)	23.463*** (3.386)	28.072*** (2.172)	34.743*** (1.958)	34.867*** (1.828)
Number of observations	90,025				

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

magnitude and significance the higher on the distribution. This may suggest that those at the upper end of the distribution are more "consistent" in how they react to changes in circumstances, with those at the lower end of the distribution being more variable.

4.4.2 Unemployment

There is significant evidence of anticipation for unemployment. There are increasing negative well-being effects the closer an individual gets to the event, with the year preceding the unemployment spell being particularly highly significant and negative, and the onset of unemployment leading to even greater loss in well-being across the whole distribution. There is then evidence of adaptation to unemployment at the lower ends of the distribution, with the upper end of the distribution showing evidence for no adaptation. All figures in this section are taken from Table 4.4 and the corresponding graphs are found in Figure 4.2.

At the median level, there are significant negative results found from 2 years prior to unemployment, almost doubling in magnitude the following year (from -0.295 to -0.580). This shows clear anticipation to unemployment at the median. At the onset of unemployment there is another decrease in well-being (from -0.580 to -1.063), supporting the evidence in the existing literature that unemployment has a strong negative impact on well-being. In the period following the onset of unemployment, there is a slight decline in the negative effect (from -1.063 to -0.892) showing slight but incomplete adaptation. This adaptation is then realised in the following two periods, with no significant impact from unemployment at 2 or 3 years of unemployment. At 4 years of unemployment there is another, significant, negative impact from unemployment. It is unclear why this negative impact happens at 4 years of unemployment, however, adaptation is resumed the following period, and so adaptation can be said to be complete for unemployment in the long-run. These results match those found by Clark and Georgellis (2013) in their GHQ analysis, which follows the same pattern for both males and females.

The 10^{th} and 25^{th} percentiles both follow the same pattern as the median, with anticipation effects commencing at 2 years prior to unemployment (at -1.313 and -0.626 respectively), and increasing in magnitude up until the onset of unemployment (at -3.650 and -1.920 respectively). The first year after unemployment onset sees slight adaptation (at -2.899 and -1.787 respectively), before full adaptation occurs. This adaptation continues until 4 years following unemployment onset, where there is a further negative impact from unemployment (at -8.405 and -1.513 respectively) before complete, long-run adaptation reoccurs. The impact upon well-being is less apparent at the 25^{th} percentile than at the 10^{th} percentile, and less apparent still at the median, suggesting that unemployment has a greater impact the lower an individual is on the well-being distribution.

While there is evidence of complete, long-run adaptation to unemployment at the lower end of the distribution, there is less evidence at the upper end of the distribution. Anticipation effects occur earlier for both the 75^{th} and 90^{th} percentile, commencing 4 years prior to the onset of unemployment (at -0.344 and -0.462 respectively). There are no anticipation effects the following period, before anticipation effects reoccur at 2 years prior to the onset of unemployment (at -0.372 and -0.363 respectively). These negative effects increase in magnitude until 1 year following the onset of unemployment (until -0.922 and -0.753 respectively). The fact that the negative effects are greater at 1 year of unemployment than at the onset suggests that adaptation to unemployment starts later at

the upper end of the distribution than at the lower end. At 2 years of unemployment there is short-run adaptation, which (at the 5% significance level) continues until 3 years of unemployment. Negative effects from unemployment recommence at 4 years of unemployment (at -1.767 and -2.084 respectively). However, unlike at the lower end of the distribution, these negative effects increase in magnitude at 5 or more years of unemployment (to -2.240 and -2.214 respectively). This suggests that there is no long-run adaptation to unemployment for those at the upper end of the distribution.

4.4.3 Marriage

There is evidence of anticipation and adaptation to marriage at the median and the 25th percentile, however, at other points of the distribution the effects are less apparent. Generally, where there are significant effects they are positive (with the exception of 3 years of marriage at the 90th percentile). The positive effects tend to increase up until the point of marriage, after which there is a decrease in the magnitude of the positive effects, which could potentially lay credence to the idea of the "honeymoon period". All figures in this section are taken from Table 4.5 and the corresponding graphs are found in Figure 4.3.

At the median the anticipation effects commence at 2 years prior to marriage (at 0.479). These anticipation effects increase in magnitude the following period (to 0.727) before reducing slightly at the time of marriage (to 0.688). This reduction in the positive effects from marriage continues to 1 year of marriage (to 0.632), before complete, long-run adaptation occurs (at the 5% significance level). At the 10% significance level adaptation takes 1 more year to occur (with 2 years of marriage being significantly positive with a magnitude of 0.432). Adaptation then occurs, before positive effects recommence at 4 years of marriage, continuing at 5 or more years of marriage (with a magnitude of 0.520 and 0.485 respectively). This would suggest that at the 10% significance level there is no long-run adaptation. These results for the median individual do not follow those results found by Clark and Georgellis (2013) when considering the GHQ for well-being. This may be the result of the genders being investigated together, rather than separately, as was done by Clark and Georgellis.

The 25th percentile follows a similar pattern to the median, with (at the 5% significance level) anticipation commencing at 2 years prior to marriage (at 0.764) and increasing up until the time of marriage (to 1.238). This positive effect then reduces in magnitude at 1 year of being married (to

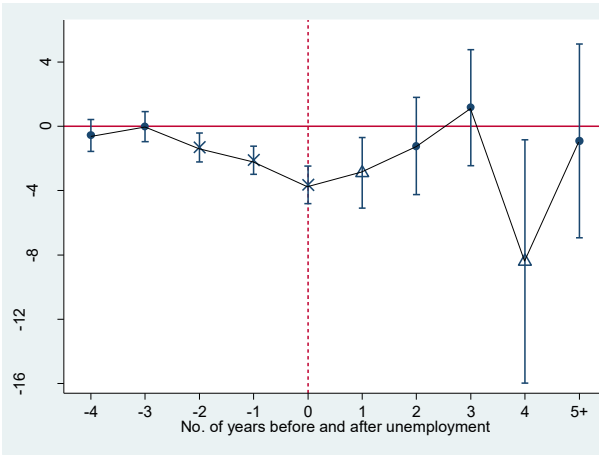
Table 4.4: Fixed effects unconditional quantile results: adaptation and anticipation to unemployment

	Percentile				
	10th	25th	50th	75th	90th
4 years until unemployment	-0.568 (0.505)	0.048 (0.243)	-0.047 (0.156)	-0.344** (0.148)	-0.462*** (0.131)
3 years until unemployment	-0.016 (0.477)	-0.346 (0.227)	-0.090 (0.146)	-0.210 (0.132)	-0.148 (0.127)
2 years until unemployment	-1.313*** (0.458)	-0.626*** (0.220)	-0.295** (0.139)	-0.372*** (0.130)	-0.363*** (0.120)
1 year until unemployment	-2.107*** (0.445)	-1.142*** (0.215)	-0.580*** (0.132)	-0.505*** (0.119)	-0.373*** (0.113)
Onset of unemployment	-3.650*** (0.596)	-1.920*** (0.272)	-1.063*** (0.161)	-0.729*** (0.141)	-0.690*** (0.132)
1 year being unemployed	-2.899** (1.119)	-1.787*** (0.518)	-0.892*** (0.316)	-0.922*** (0.283)	-0.753*** (0.272)
2 years being unemployed	-1.225 (1.539)	0.413 (0.748)	0.077 (0.435)	-0.404 (0.525)	-0.397 (0.469)
3 years being unemployed	1.162 (1.842)	-1.046 (1.108)	-0.191 (0.734)	-1.064* (0.642)	-0.490 (0.677)
4 years being unemployed	-8.405** (3.861)	-3.528* (1.858)	-2.337** (0.939)	-1.767** (0.773)	-2.084*** (0.756)
5+ years being unemployed	-0.910 (3.080)	-1.513 (1.381)	-0.656 (1.159)	-2.240*** (0.692)	-2.214*** (0.662)
Number of observations	90,025				

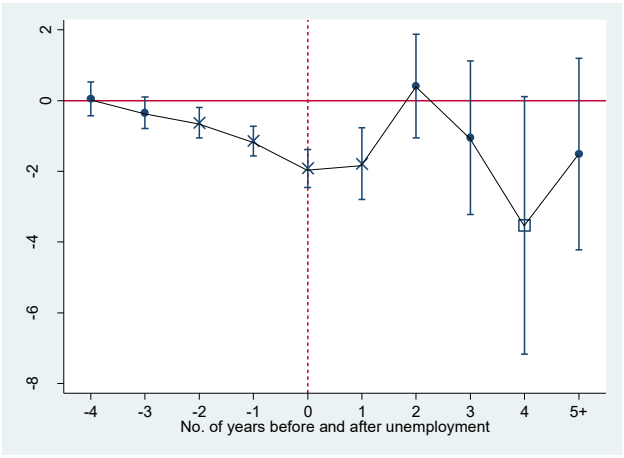
Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Figure 4.2: Fixed effects unconditional quantile results: adaptation and anticipation to unemployment at the 10th, 25th, 50th, 75th and 90th percentiles respectively

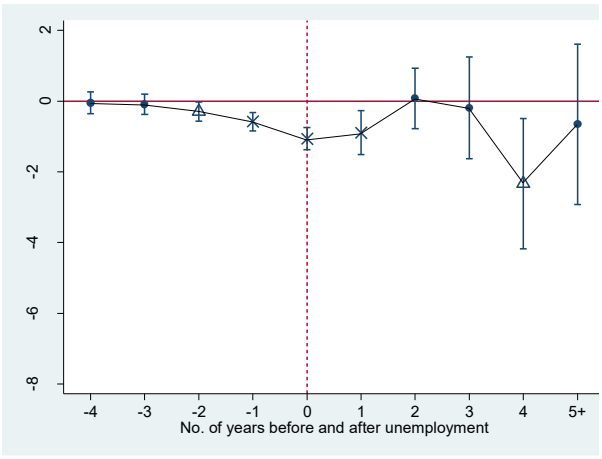
Panel A: 10th Percentile



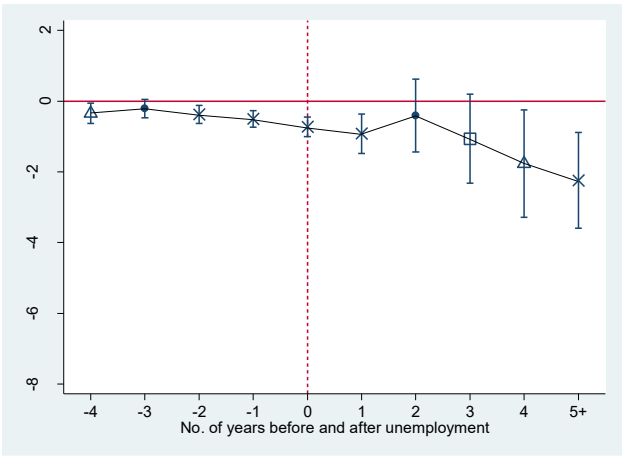
Panel B: 25th Percentile



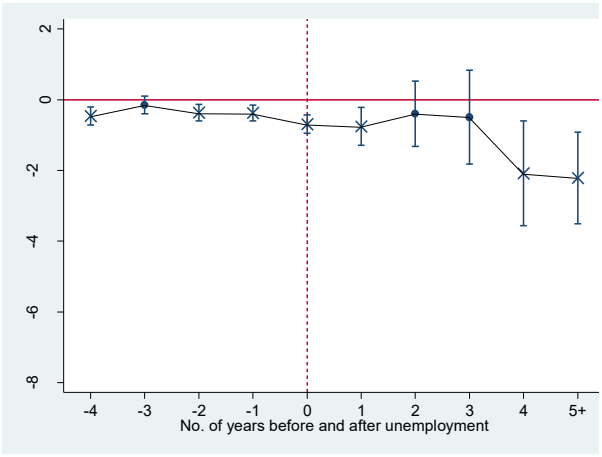
Panel C: 50th Percentile



Panel D: 75th Percentile



Panel E: 90th Percentile



Note: □, Δ and X denote significance at the 10%, 5% and 1% levels respectively. The bars represent the 95% confidence intervals

0.926) before complete adaptation occurs. Unlike at the median, the positive impact from marriage resumes at 5 or more years of marriage (at 0.900), suggesting that for those at the 25th percentile there is no long-run adaptation to marriage. At the 10% significance level anticipation begins earlier, at 4 years prior to marriage (with a magnitude of 0.447), with 3 years prior to marriage having no significant impact on well-being. Similarly, the initial stint of adaptation occurs later, with 2 years of marriage also being positively significant (at 0.655) before complete adaptation occurs.

The other percentiles (10th, 75th and 90th) show very few significant impacts from marriage. At the 10th percentile and the 75th percentile there is a positive effect at the time of marriage (with a magnitude of 1.359 and 0.484 respectively) before complete, long-run adaptation is attained. There is no evidence of anticipation at the 10th percentile, with only one period of positive anticipation at the 75th percentile (1 year prior to marriage, with a magnitude of 0.416). At the 5% significance level there is no evidence for marriage having any effect on individuals at the 90th percentile. These results would suggest that those at the high or extreme low end of the distribution experience very little changes to well-being from marriage. At the 10% significance level there is actually a negative impact from marriage at 3 years of marriage for those at the 90th percentile (with a magnitude of -0.492). This would suggest that for those at the extreme upper end of the distribution there may actually be detrimental effects to marriage.

4.4.4 Divorce

The nature of divorce is such that well-being would, understandably, be lower leading up to the event. Evidence of this lower well-being (or, negative anticipation) is found at all points of the distribution, however, the effects are much more pronounced at the lower end of the distribution, and only evident at the 90th percentile at the 10% significance level. Adaptation to divorce is apparent over the mid and lower end of the distribution, however, there is no evidence of adaptation at the upper end of the distribution, with positive effects enduring to 5 or more years. All figures in this section are taken from Table 4.6 and the corresponding graphs are found in Figure 4.4.

At the 5% significance level, for the median individual, anticipation effects commence at 3 years prior to divorce, with a negative effect of -0.395. These negative effects increase in magnitude until the year of divorce (to -1.318). From the year after divorce there is evidence of complete, long-run adaptation,

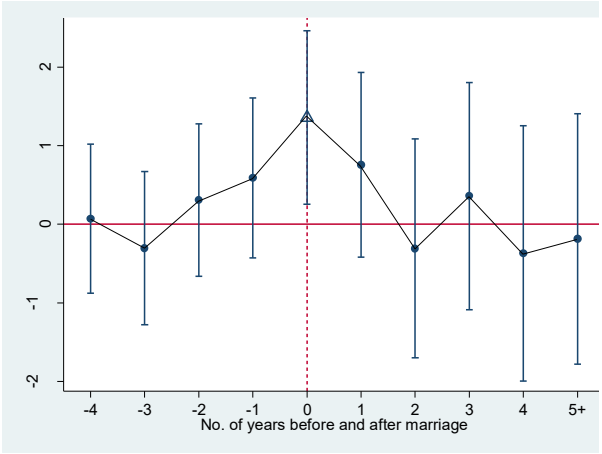
Table 4.5: Fixed effects unconditional quantile results: adaptation and anticipation to marriage

	Percentile				
	10th	25th	50th	75th	90th
4 years until marriage	0.071 (0.484)	0.447* (0.266)	0.272 (0.177)	0.106 (0.159)	-0.105 (0.225)
3 years until marriage	-0.303 (0.497)	0.340 (0.259)	0.264 (0.178)	0.031 (0.158)	-0.014 (0.233)
2 years until marriage	0.308 (0.495)	0.764*** (0.266)	0.479*** (0.177)	0.250 (0.158)	0.053 (0.225)
1 year until marriage	0.589 (0.519)	0.944*** (0.273)	0.727*** (0.183)	0.416*** (0.157)	0.330 (0.227)
Marriage	1.359** (0.563)	1.238*** (0.297)	0.688*** (0.205)	0.484*** (0.178)	0.409 (0.257)
1 year being married	0.758 (0.599)	0.926*** (0.316)	0.632*** (0.216)	0.250 (0.191)	-0.147 (0.264)
2 years being married	-0.306 (0.710)	0.655* (0.346)	0.432* (0.237)	0.171 (0.207)	-0.095 (0.289)
3 years being married	0.359 (0.737)	0.488 (0.381)	0.069 (0.256)	-0.045 (0.221)	-0.492* (0.297)
4 years being married	-0.370 (0.828)	0.483 (0.424)	0.520* (0.276)	0.275 (0.238)	-0.476 (0.314)
5+ years being married	-0.186 (0.814)	0.900** (0.398)	0.485* (0.264)	0.219 (0.220)	-0.461 (0.294)
Number of observations	45,373				

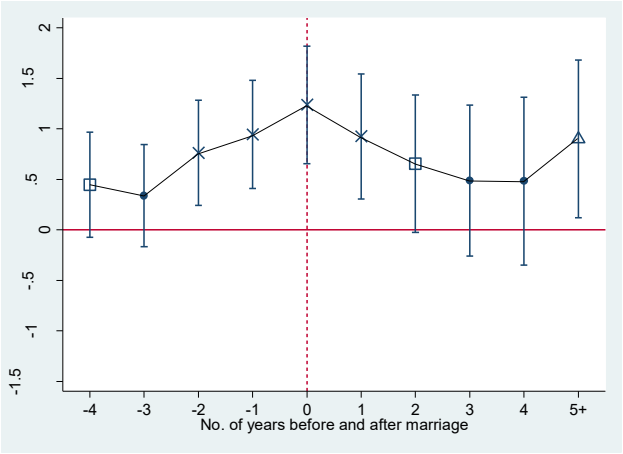
Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Figure 4.3: Fixed effects unconditional quantile results: adaptation and anticipation to marriage at the 10th, 25th, 50th, 75th and 90th percentile respectively

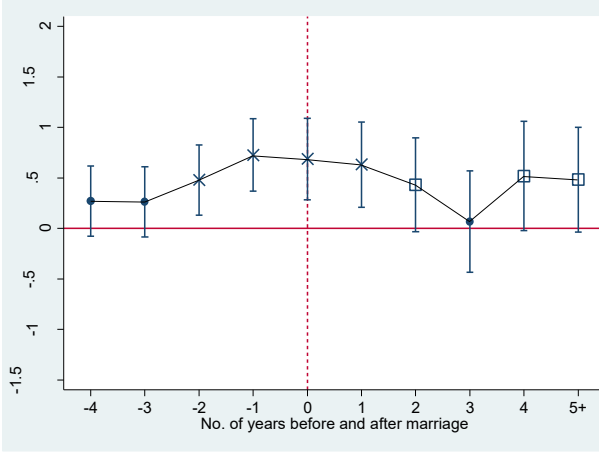
Panel A: 10th Percentile



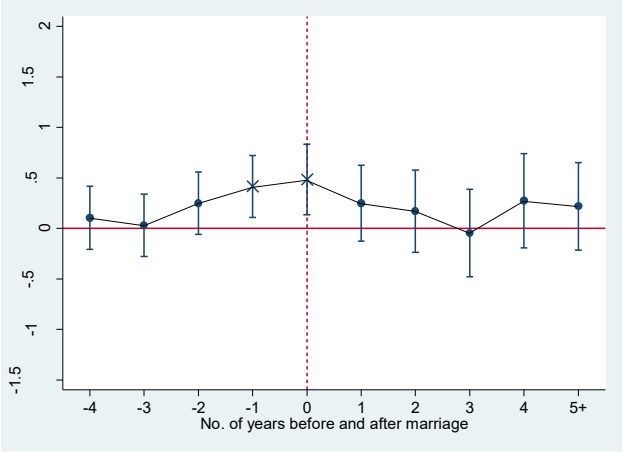
Panel B: 25th Percentile



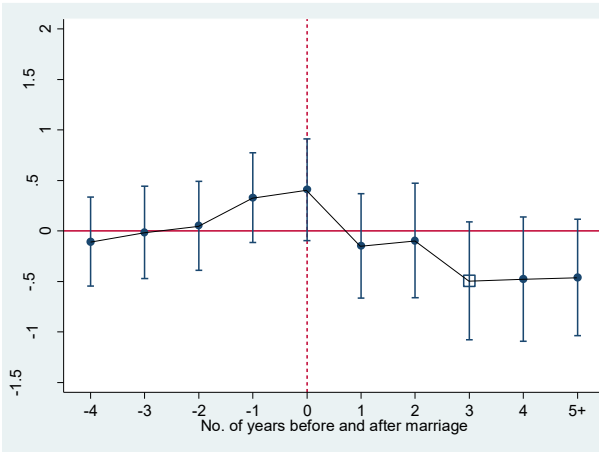
Panel C: 50th Percentile



Panel D: 75th Percentile



Panel E: 90th Percentile



Note: □, Δ and X denote significance at the 10%, 5% and 1% levels respectively. The bars represent the 95% confidence intervals

with no further significant effects. At the 10% significance level the anticipation effect occurs sooner, at 4 years prior to divorce, with an impact of -0.347. The anticipation effects found here are not dissimilar to those found by Clark and Georgellis (2013), where they found highly significant negative effects leading up to divorce for both males and females. However, while complete adaptation was found here, Clark and Georgellis found positive effects for males following divorce, and a negative effect for females at 5 or more years following divorce. The reason for complete adaptation found here but not in Clark and Georgellis' study may be due to the fact that the genders are combined in this analysis, neutralising the positive effects found for males and negative effects for females.

Those at the lower end of the distribution react to divorce in a similar manner to those at the median, experiencing the effects to a greater degree. Both at the 10^{th} and the 25^{th} percentile, anticipation commences at 4 years prior to divorce (at -2.819 and -0.782 respectively). There is then a slight decline in the negative effects (to -2.433 and -0.567 respectively) before the negative effects increase once more, up until the year of divorce (where it reaches -8.772 and -3.759 respectively). The first year following divorce sees a decline in the negative effects (to -4.156 and -1.311 respectively) before complete, long-run adaptation is attained. This would suggest that those at the lower end of the distribution experience "difficulties in marriage" to a greater extent than do those at the median, and do not fully experience the benefits of leaving this negative situation (by divorcing) as promptly.

Where the median and the lower end of the distribution saw both anticipation and adaptation to divorce, the upper end of the distribution experiences little anticipation and no apparent adaptation. Those at the 75^{th} percentile experience anticipation to divorce only 1 year before (at -0.436), with those at the 90^{th} percentile only experiencing the same anticipation effect at the 10% significance level (at -0.273). At the 5% significance level there is no impact in the year of divorce for either the 75^{th} or the 90^{th} percentile, before positive effects commence at 1 year of being divorced (at 0.549 and 0.508 respectively). These effects persist until peaking at 4 years of divorce (at 0.982 and 1.091 respectively), before reducing, while remaining significantly positive, at 5 or more years of divorce (at 0.591 and 0.479 respectively). These results would imply that those at the upper end of the distribution actually do not experience severe negative effects from a poor marriage, but do receive long-run benefits to divorce.

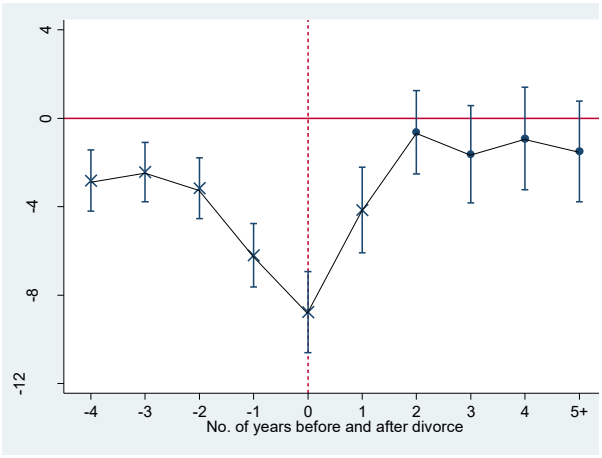
Table 4.6: Fixed effects unconditional quantile results: adaptation and anticipation to divorce

	Percentile				
	10th	25th	50th	75th	90th
4 years until divorce	-2.819***	-0.782**	-0.347*	0.039	0.066
	(0.708)	(0.323)	(0.194)	(0.170)	(0.166)
3 years until divorce	-2.433***	-0.567*	-0.395**	-0.020	-0.038
	(0.682)	(0.303)	(0.182)	(0.157)	(0.147)
2 years until divorce	-3.161***	-1.051***	-0.528***	-0.223	-0.116
	(0.703)	(0.321)	(0.185)	(0.151)	(0.144)
1 year until divorce	-6.199***	-2.238***	-1.130***	-0.436***	-0.273*
	(0.729)	(0.322)	(0.191)	(0.154)	(0.141)
Divorce	-8.772***	-3.759***	-1.318***	-0.342*	0.078
	(0.934)	(0.406)	(0.227)	(0.181)	(0.180)
1 year being divorced	-4.156***	-1.311***	-0.306	0.549**	0.508**
	(0.988)	(0.416)	(0.256)	(0.217)	(0.216)
2 years being divorced	-0.637	0.030	0.296	0.683***	0.474*
	(0.961)	(0.459)	(0.275)	(0.253)	(0.243)
3 years being divorced	-1.629	0.333	0.158	0.675**	0.561**
	(1.122)	(0.512)	(0.305)	(0.271)	(0.263)
4 years being divorced	-0.915	-0.020	0.592	0.982***	1.091***
	(1.182)	(0.559)	(0.345)	(0.313)	(0.315)
5+ years being divorced	-1.508	-0.085	0.334	0.591**	0.479**
	(1.162)	(0.517)	(0.330)	(0.229)	(0.227)
Number of observations	86,227				

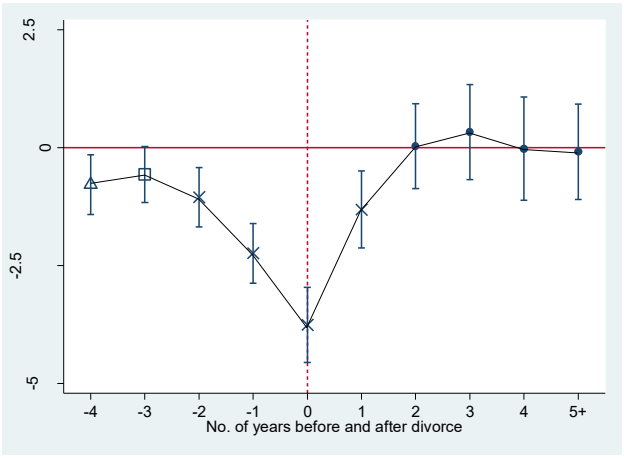
Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Figure 4.4: Fixed effects unconditional quantile results: adaptation and anticipation to divorce at the 10th, 25th, 50th, 75th and 90th percentile respectively

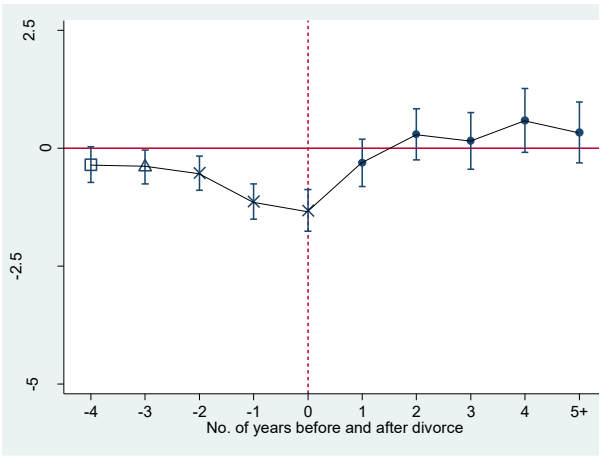
Panel A: 10th Percentile



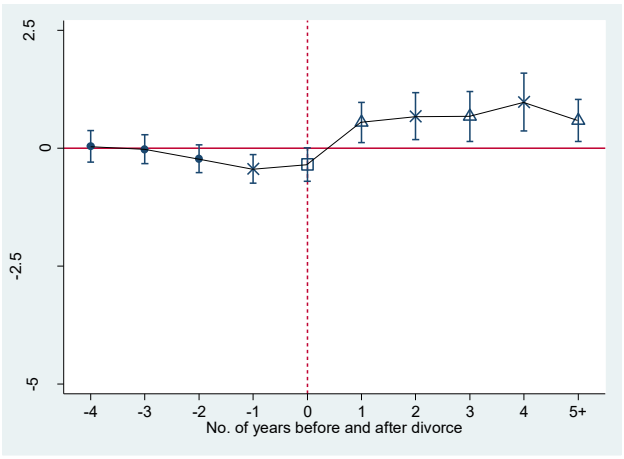
Panel B: 25th Percentile



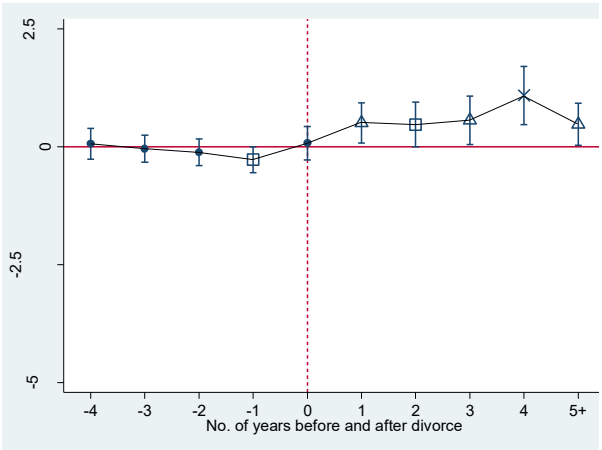
Panel C: 50th Percentile



Panel D: 75th Percentile



Panel E: 90th Percentile



Note: □, Δ and X denote significance at the 10%, 5% and 1% levels respectively. The bars represent the 95% confidence intervals

4.4.5 Birth of a child

The birth of a child analysis can be split into two categories: birth of a child (**B1**) and birth of the first child (**B2**). The difference between these two analyses is that **B1** includes all individuals who had a child since entry into the survey, whereas **B2** only includes those **B1** individuals who had zero children before entering the survey. The results of these analyses find very little impact at any point on the distribution, with (at the 5% significance level) no anticipation effects and only 2 significant effects following the birth of the child, for both **B1** and **B2**. All figures in this section for **B1** are taken from Table 4.7, with the corresponding graphs found in Figure 4.5 and for **B2** are taken from Table 4.8, with the corresponding graphs found in Figure 4.6.

For **B1**, there are no significant effects (at the 5% significance level) at any point of the distribution save for 2 years following the birth at the 50th percentile (with a value of -0.376), and 3 years following the birth at the 90th percentile (with a value of -0.341). The lack of significant results suggests that there is little impact to well-being from childbirth and that when there are effects there is immediate, long-run adaptation. At the 10% significance level there are a few more apparent effects. At the 10th percentile there is positive anticipation to childbirth at 3 years prior to birth (at 0.614), with no other effects until the time of birth (at 0.698). At the 25th percentile there is a positive impact to well-being 4 years following birth (at 0.681), before immediate, long-run adaptation is attained. Finally, at the 90th percentile, the negative effect occurs a period sooner, at 2 years following birth (at -0.231).

At the 5% significance level, the effects found for **B2** are the same as for **B1**, however, to a greater magnitude. At the 50th percentile, there is an impact at 2 years following birth of -0.453 (compared to **B1**'s -0.376), and at the 90th percentile there is an impact at 3 years following birth of -0.593 (compared to **B1**'s -0.341). At the 10% significance level there is one other significant effect. At the 75th percentile there is a negative impact at 3 years following childbirth (with a value of -0.452), before complete, long-run adaptation is attained.

With the analysis performed by Clark and Georgellis (2013) finding no significant effects for females, and only some evidence of negative effects for males, it is unsurprising that the results for this study tend to find little evidence of birth affecting well-being. Interestingly, the closeness of the results for **B1** and **B2** suggests that, contrary to previous findings in the literature (Myrskylä and Margolis, 2014),

the birth of a child has similar effects regardless of whether it is the first child or a subsequent child. However, due to the number of observations for **B1** and **B2** (55,875 and 45,750 respectively), it can be assumed that around 82% of the observations for **B1** are individuals experiencing the birth of their first child, which could explain the similarity between the two sets of results.

4.4.6 Widowhood

As widowhood occurs with the death of a partner, it is expected that there will be negative well-being effects associated with widowhood. While the death of a partner may occur unexpectedly, it is often the case that the death of the partner is foreseen, due to sickness or old age. As such, it may also be expected that there will be depressive effects to well-being before widowhood, as the individual deals with their partner's failing health. The results found in this section support this hypothesis.

Across the whole distribution there is evidence of negative anticipation effects for individuals about to experience widowhood. However, these anticipation effects vary in length and intensity depending upon where on the distribution the analysis is focused. Naturally, there are significant, negative well-being effects across the whole distribution at the time of widowhood, with varying degrees of adaptation following. Long-run adaptation tends to occur only for those at the lower end of the distribution. All figures in this section are taken from Table 4.9 and the corresponding graphs are found in Figure 4.7.

At the median there is strong evidence of anticipation to widowhood starting at 2 years before the death of the partner, increasing in intensity until the time of widowhood (from -0.887 to -3.119). The year following the death of the partner, the magnitude of the negative effect is halved (to -1.505), before short-run adaptation occurs (at the 5% significance level). The negative effects recommence at 3 years following the death of the partner (with an impact of -0.803), before adaptation reoccurs. There is a further negative impact at 5 or more years following the death of the partner (at -0.855). These results follow a similar pattern to those found by Clark and Georgellis (2013). However, the anticipation effects commenced sooner for both males and females, and adaptation to widowhood was instant for males, while persisting for females (with females never fully adapting).

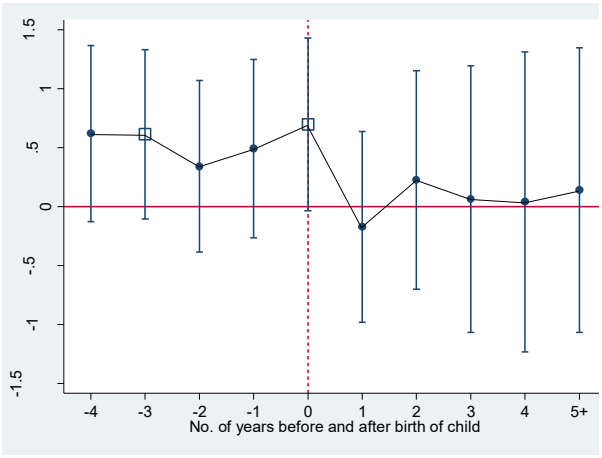
Table 4.7: Fixed effects unconditional quantile results: adaptation and anticipation to birth of a child

	Percentile				
	10th	25th	50th	75th	90th
4 years until birth of a child	0.620 (0.381)	0.183 (0.214)	0.063 (0.149)	-0.040 (0.141)	-0.155 (0.136)
3 years until birth of a child	0.614* (0.366)	0.313 (0.210)	0.184 (0.144)	0.082 (0.133)	-0.078 (0.130)
2 years until birth of a child	0.343 (0.371)	0.127 (0.211)	0.168 (0.143)	-0.005 (0.131)	-0.105 (0.124)
1 year until birth of a child	0.493 (0.386)	0.335 (0.219)	-0.018 (0.146)	0.033 (0.132)	-0.165 (0.123)
Birth of a child	0.698* (0.374)	0.092 (0.210)	0.074 (0.138)	0.101 (0.123)	0.071 (0.115)
1 year after birth of a child	-0.171 (0.413)	-0.185 (0.225)	-0.234 (0.147)	-0.067 (0.133)	-0.179 (0.124)
2 years after birth of a child	0.227 (0.473)	0.372 (0.257)	-0.376** (0.164)	-0.204 (0.145)	-0.231* (0.135)
3 years after birth of a child	0.064 (0.577)	0.134 (0.312)	-0.112 (0.201)	-0.254 (0.173)	-0.341** (0.160)
4 years after birth of a child	0.041 (0.649)	0.681* (0.349)	0.031 (0.232)	-0.097 (0.198)	-0.285 (0.179)
5+ years after birth of a child	0.140 (0.617)	0.301 (0.337)	0.008 (0.222)	-0.110 (0.182)	-0.120 (0.171)
Number of observations	55,875				

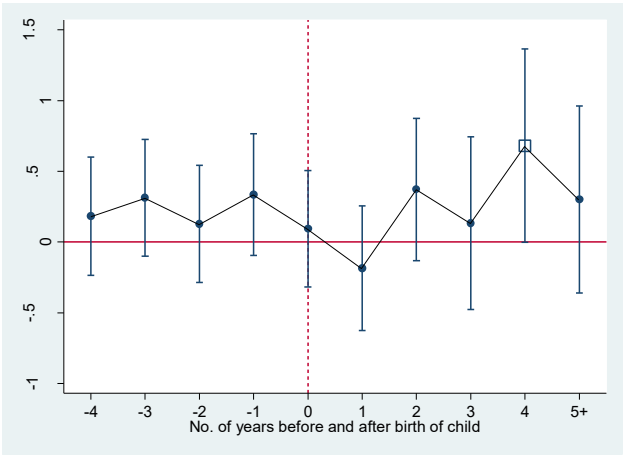
Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Figure 4.5: Fixed effects unconditional quantile results: adaptation and anticipation to birth of a child at the 10th, 25th, 50th, 75th and 90th percentile respectively

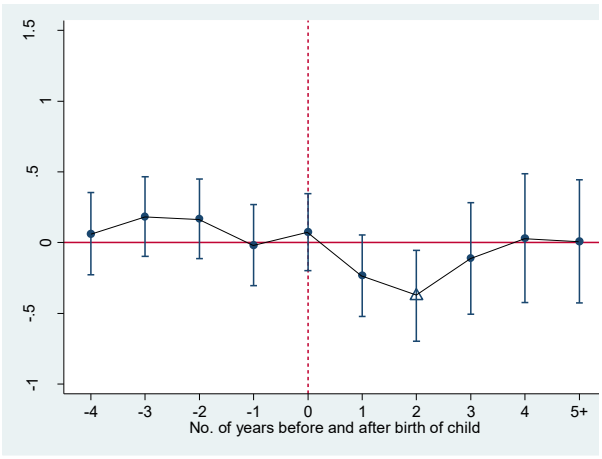
Panel A: 10th Percentile



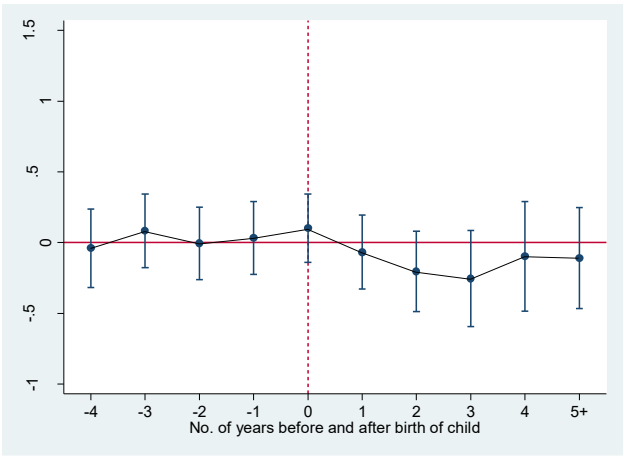
Panel B: 25th Percentile



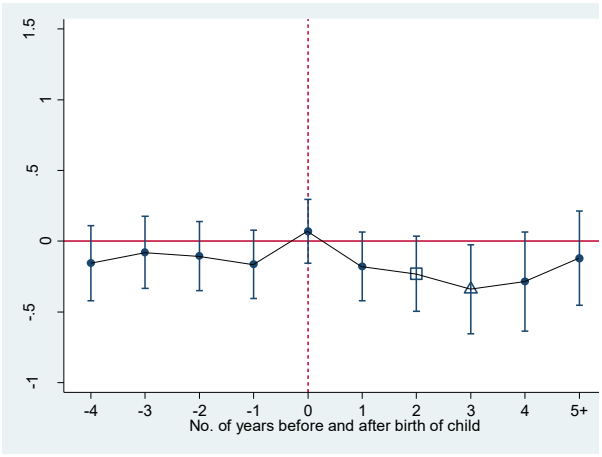
Panel C: 50th Percentile



Panel D: 75th Percentile



Panel E: 90th Percentile



Note: □, Δ and X denote significance at the 10%, 5% and 1% levels respectively. The bars represent the 95% confidence intervals

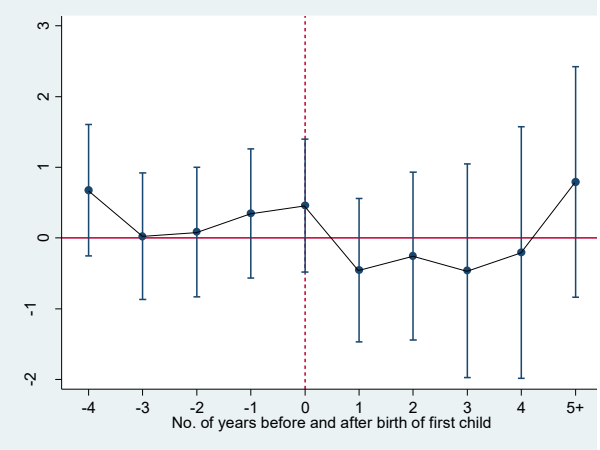
Table 4.8: Fixed effects unconditional quantile results: adaptation and anticipation to birth of first child

	Percentile				
	10th	25th	50th	75th	90th
4 years until birth of first child	0.674 (0.474)	0.332 (0.283)	0.072 (0.201)	0.029 (0.184)	-0.157 (0.183)
3 years until birth of first child	0.025 (0.457)	0.133 (0.274)	0.245 (0.190)	0.244 (0.174)	0.021 (0.173)
2 years until birth of first child	0.085 (0.468)	-0.176 (0.273)	-0.048 (0.190)	-0.092 (0.169)	-0.173 (0.163)
1 year until birth of first child	0.346 (0.466)	0.088 (0.271)	-0.095 (0.188)	0.044 (0.170)	-0.130 (0.164)
Birth of first child	0.460 (0.480)	-0.101 (0.264)	-0.022 (0.178)	-0.007 (0.158)	-0.099 (0.147)
1 year after birth of first child	-0.455 (0.519)	-0.305 (0.277)	-0.291 (0.190)	-0.108 (0.168)	-0.224 (0.160)
2 years after birth of first child	-0.256 (0.606)	0.175 (0.328)	-0.453** (0.217)	-0.261 (0.189)	-0.268 (0.178)
3 years after birth of first child	-0.462 (0.771)	-0.073 (0.428)	-0.069 (0.281)	-0.452* (0.230)	-0.593*** (0.212)
4 years after birth of first child	-0.206 (0.908)	0.142 (0.492)	-0.157 (0.341)	-0.274 (0.294)	-0.393 (0.265)
5+ years after birth of first child	0.792 (0.831)	0.248 (0.434)	-0.014 (0.339)	-0.120 (0.270)	-0.180 (0.260)
Number of observations	45,750				

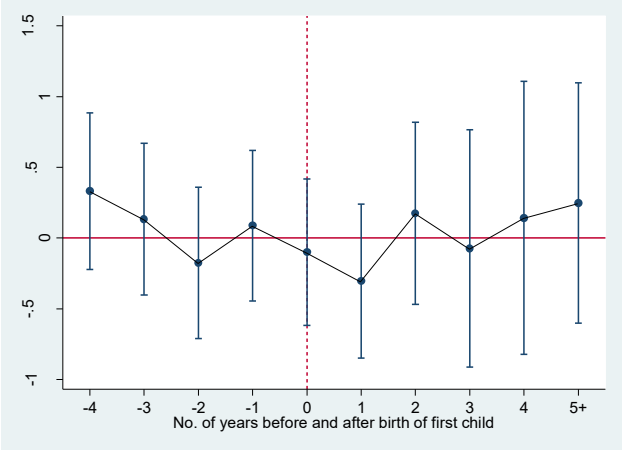
Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Figure 4.6: Fixed effects unconditional quantile results: adaptation and anticipation to birth of first child at the 10th, 25th, 50th, 75th and 90th percentile respectively

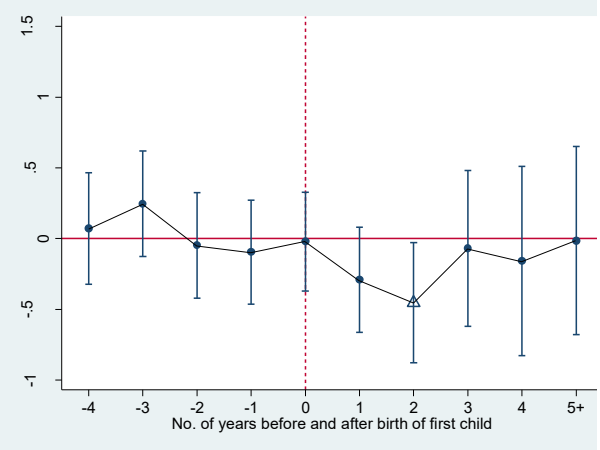
Panel A: 10th Percentile



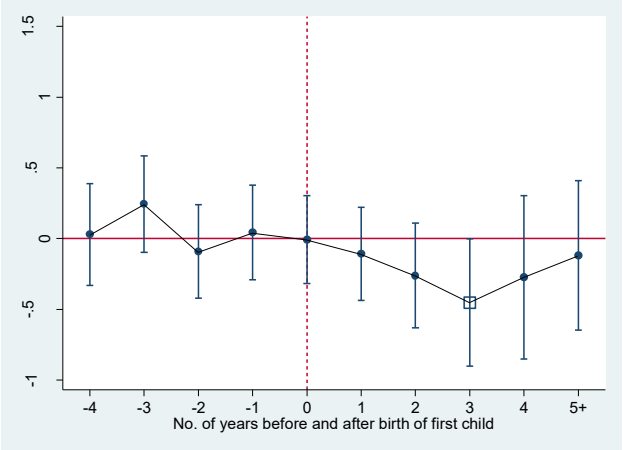
Panel B: 25th Percentile



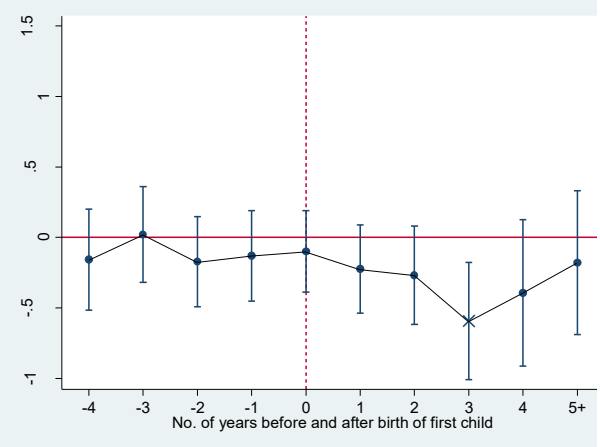
Panel C: 50th Percentile



Panel D: 75th Percentile



Panel E: 90th Percentile



Note: □, Δ and X denote significance at the 10%, 5% and 1% levels respectively. The bars represent the 95% confidence intervals

The results at the lower end of the distribution differ slightly to those found at the median, with anticipation commencing earlier and adaptation being more complete. At the 25th percentile, anticipation commences at 4 years prior to the death of the partner (at -0.698), increasing in magnitude every year until the death of the partner (at -6.869). At the 10th percentile the anticipation effect starts later, at 3 years prior to widowhood (at -1.689), before disappearing the following period. Anticipation then resumes the year prior to the death of the partner and increases at the time of death (from -2.372 to -12.983). Following the death of the partner, individuals at both the 10th and the 25th percentile see a reduction in the negative effects (to -3.501 and -2.550 respectively), before complete, long-run adaptation is attained (at the 5% significance level). This suggests that those at the lower end of the distribution experience greater impact from the death of their partner, but recover from this negative impact more rapidly.

The upper end of the distribution is more similar to the median, however, there are still some differences. Anticipation occurs earlier again, commencing at 4 years prior to widowhood at the 75th percentile (at -0.393) and at 3 years prior to widowhood at the 90th percentile (at -0.387). After a period of no anticipation for those at the 75th percentile (at 3 years prior to widowhood), there is an annual increase in the negative anticipation to widowhood up until the time of the death of the partner at both the 75th and the 90th percentiles (from -0.572 to -1.757 and -0.465 to -1.152 respectively). The year following the death of the partner sees a reduction in the negative effects (to -1.062 and -0.514 respectively), with a further decline the following year, leading to a lesser negative effect for those at the 75th percentile (at -0.591), and leading to complete adaptation for those at the 90th percentile. At the 5% significance level, those at both the 75th and 90th percentile have achieved adaptation by 3 years of widowhood, which continues until 5 or more years of widowhood. At this time there is a further negative effect from the death of the partner (at -0.613 and -0.486), suggesting that adaptation is only achieved in the short-run and that there is no long-run adaptation to the death of a partner for those at the upper end of the distribution.

4.4.7 Illness

There is little evidence found for anticipation to illness. This is not surprising, as illness tends to not be expected. However, there is clear evidence of negative well-being effects to illness at the onset, with some evidence of prolonged negative effects at the median and lower end of the distribution. At the upper end of the distribution there appears to be quicker, complete adaptation to illness. Of interest,

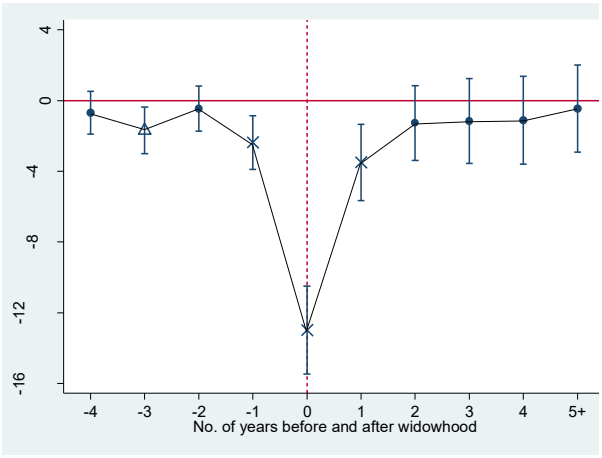
Table 4.9: Fixed effects unconditional quantile results: adaptation and anticipation to widowhood

	Percentile				
	10th	25th	50th	75th	90th
4 years until widowhood	-0.689 (0.619)	-0.698** (0.311)	-0.047 (0.199)	-0.393** (0.170)	-0.190 (0.154)
3 years until widowhood	-1.689** (0.669)	-0.876** (0.348)	-0.231 (0.203)	-0.256 (0.174)	-0.387** (0.154)
2 years until widowhood	-0.453 (0.650)	-1.103*** (0.381)	-0.887*** (0.213)	-0.572*** (0.170)	-0.465*** (0.154)
1 year until widowhood	-2.372*** (0.777)	-2.304*** (0.404)	-1.340*** (0.223)	-0.738*** (0.190)	-0.591*** (0.170)
Widowhood	-12.983*** (1.270)	-6.869*** (0.509)	-3.119*** (0.269)	-1.757*** (0.211)	-1.152*** (0.184)
1 year being widowed	-3.501*** (1.096)	-2.550*** (0.538)	-1.505*** (0.306)	-1.062*** (0.241)	-0.514** (0.217)
2 years being widowed	-1.270 (1.078)	-0.718 (0.577)	-0.580* (0.330)	-0.591** (0.280)	-0.272 (0.255)
3 years being widowed	-1.159 (1.223)	-0.496 (0.629)	-0.803** (0.355)	-0.544* (0.297)	-0.428* (0.237)
4 years being widowed	-1.109 (1.270)	-1.141* (0.673)	-0.526 (0.384)	0.091 (0.354)	0.186 (0.298)
5+ years being widowed	-0.448 (1.257)	-0.887 (0.601)	-0.855** (0.347)	-0.613** (0.263)	-0.486** (0.229)
Number of observations	113,298				

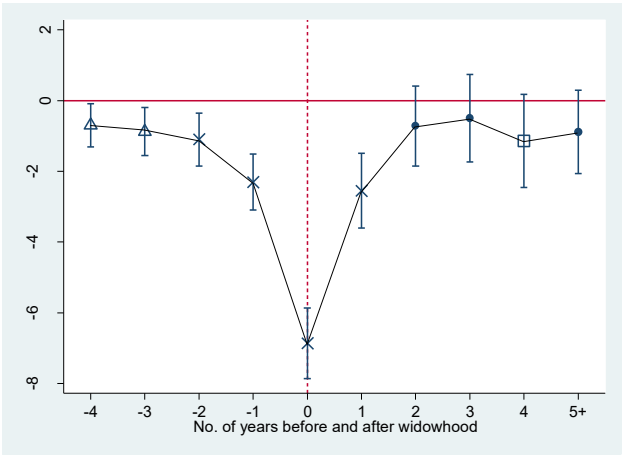
Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Figure 4.7: Fixed effects unconditional quantile results: adaptation and anticipation to widowhood at the 10th, 25th, 50th, 75th and 90th percentile respectively

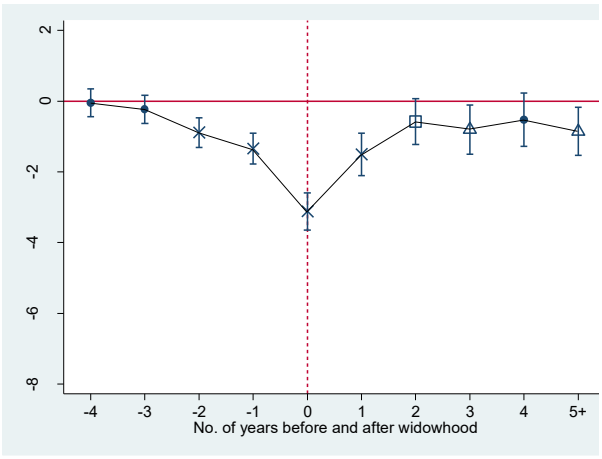
Panel A: 10th Percentile



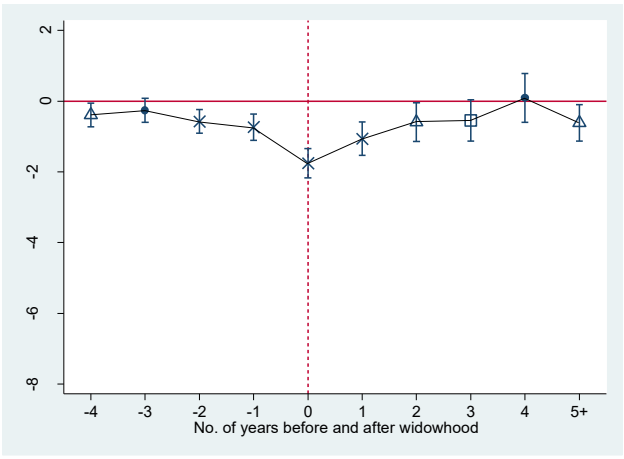
Panel B: 25th Percentile



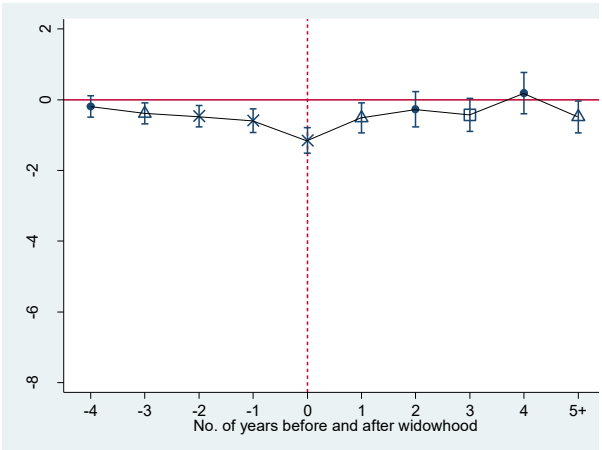
Panel C: 50th Percentile



Panel D: 75th Percentile



Panel E: 90th Percentile



Note: □, Δ and X denote significance at the 10%, 5% and 1% levels respectively. The bars represent the 95% confidence intervals

however, is that at 2 years following the onset of illness, for those at the median and upper end of the distribution, there is a greater negative effect than at the onset of illness itself, with the period in between being less severe. This could suggest that those experiencing an illness believe that it will not last for a long time, but after experiencing it for 2 years come to the realisation that it may be more long-term, thus the new situation must be adapted to (i.e. the idea of the illness being long-term and not short-term). All figures in this section are taken from Table 4.10 and the corresponding graphs are found in Figure 4.8.

Those at the median and the upper end of the distribution react similarly to an illness, with (at the 10% significance level) anticipation to illness commencing only one year prior to the onset (at -0.259, -0.144 and -0.131 for the 50^{th}, 75^{th} and 90^{th} percentile respectively). These effects then increase in magnitude at the onset (to -0.723, -0.401 and -0.328 respectively). Following this there is a slight recovery (at -0.461, -0.326 and -0.301 respectively) before the negative effect increases once more in magnitude (to -0.734, -0.446 and -0.384 respectively). As explained previously, this decrease in well-being may be due to the realisation that the illness is not short-term. After this, there is immediate long-run adaptation for those at the upper end of the distribution, with those at the median taking 2 periods more before complete, long-run adaptation is attained (at 5 or more years of illness).

These results differ to those found by Gupta et al. (2015), who found no evidence of anticipation at any period for any point on the distribution, and also found evidence of a continuous impact to well-being for those at the median. However, the reason for the difference in these results may be explained by the method used, because Gupta et al. used a conditional fixed effects quantile regression, which (as found by Borah and Basu, 2013) could lead to different results than when using an unconditional fixed effects quantile regression (as was used here). Also of note is the fact that the well-being measure used is the GHQ, which contains some questions that may be correlated with illness, such as the questions regarding worry-induced sleep loss, depression and feelings of being under strain (see Appendix 4.A for the full list of questions). However, as explained by Gupta et al. (page100, footnote 2), a fixed effects OLS estimator using life satisfaction gave similar results to their median quantile, suggesting that the correlation between illness and the GHQ measure of well-being will not greatly distort the results.

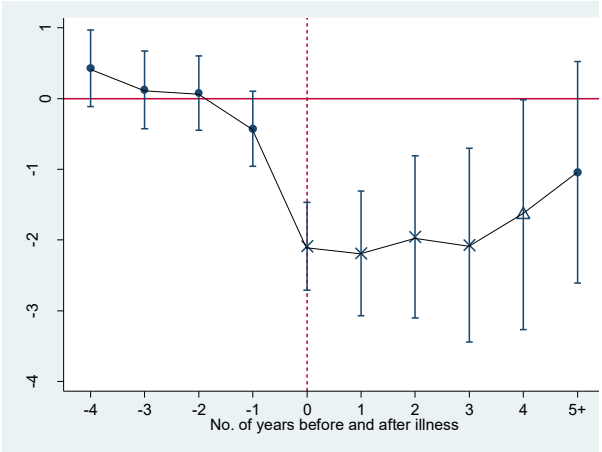
Table 4.10: Fixed effects unconditional quantile results: adaptation and anticipation to illness

	Percentile				
	10th	25th	50th	75th	90th
4 years until illness	0.429 (0.277)	0.094 (0.100)	0.033 (0.104)	0.042 (0.097)	0.025 (0.091)
3 years until illness	0.124 (0.280)	-0.068 (0.095)	-0.017 (0.102)	0.045 (0.090)	0.000 (0.083)
2 years until illness	0.078 (0.269)	-0.022 (0.091)	-0.076 (0.095)	-0.006 (0.085)	0.011 (0.080)
1 year until illness	-0.429 (0.271)	-0.252*** (0.092)	-0.259*** (0.096)	-0.144* (0.085)	-0.131* (0.078)
Onset of illness	-2.090*** (0.318)	-0.825*** (0.104)	-0.723*** (0.105)	-0.401*** (0.091)	-0.328*** (0.084)
1 year having illness	-2.189*** (0.449)	-0.606*** (0.141)	-0.461*** (0.138)	-0.326*** (0.121)	-0.301*** (0.108)
2 years having illness	-1.955*** (0.586)	-0.629*** (0.171)	-0.734*** (0.164)	-0.446*** (0.137)	-0.384*** (0.125)
3 years having illness	-2.071*** (0.699)	-0.628*** (0.212)	-0.423** (0.198)	-0.063 (0.170)	-0.217 (0.149)
4 years having illness	-1.642** (0.829)	-0.703*** (0.250)	-0.492** (0.231)	-0.222 (0.191)	-0.260 (0.163)
5+ years having illness	-1.042 (0.799)	-0.536** (0.249)	-0.372 (0.226)	-0.171 (0.177)	-0.188 (0.158)
Number of observations	46,381				

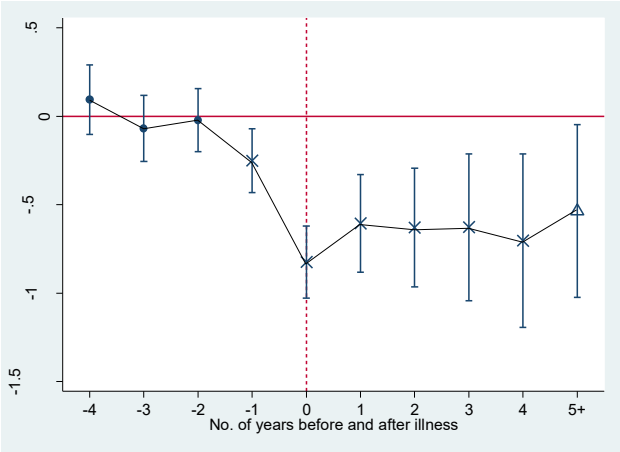
Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Figure 4.8: Fixed effects unconditional quantile results: adaptation and anticipation to illness at the 10th, 25th, 50th, 75th and 90th percentile respectively

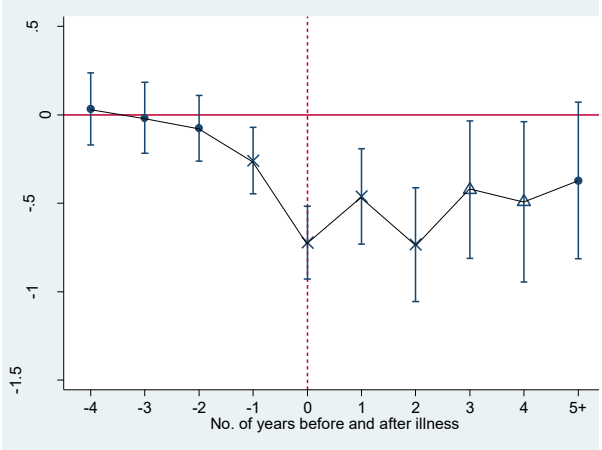
Panel A: 10th Percentile



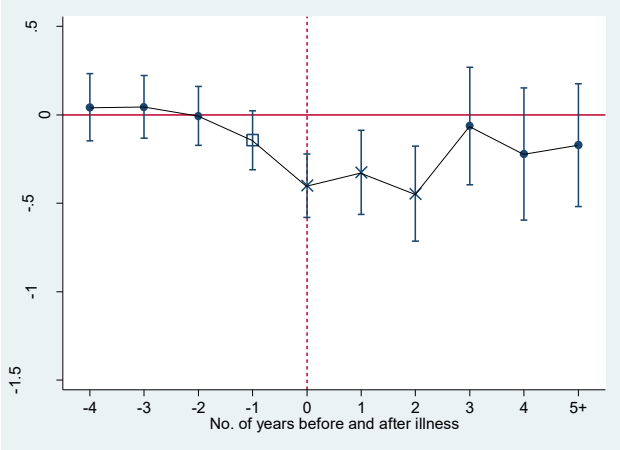
Panel B: 25th Percentile



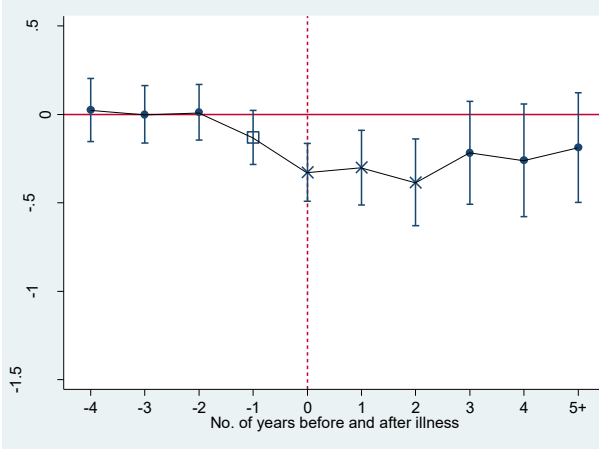
Panel C: 50th Percentile



Panel D: 75th Percentile



Panel E: 90th Percentile



Note: □, Δ and X denote significance at the 10%, 5% and 1% levels respectively. The bars represent the 95% confidence intervals

4.4.8 Disability

As explained in the data section, there are similarities between illness and disability, however, disability can be interpreted as a more severe sub-category of illness (with 95% of all registered disabled also having an illness, yet only around 12% of those with an illness also being registered disabled). This difference between illness and disability can shine some light on how different severity or expectation of illness may affect well-being. All figures in this section are taken from Table 4.11 and the corresponding graphs are found in Figure 4.9.

At the median, anticipation to disability does not occur until 1 year prior to becoming registered disabled (at -0.407), with a slight increase in the magnitude of the negative effect at the time of registering (to -0.468). In the period following this there is a further increase in the magnitude of the negative effect (to -0.867) before complete, long-run adaptation is attained. The anticipation leading up to disability at the median is similar to that of illness, however, adaptation to the situation is much more prompt for disability than for illness.

There are similar anticipation and adaptation effects to the median at the lower end of the distribution. The 25^{th} percentile (at the 5% significance level) sees anticipation commencing at 1 year prior to disability (at -1.214), with a subsequent negative effect at the onset (to -1.597). In the year following disability there is a slight decrease in the negative effect (to -1.463) before complete, long-run adaptation is attained. At the 10^{th} percentile the anticipation commences sooner, at 2 years prior to disability (at -1.217), increasing in magnitude up until the onset of disability (to -3.557). Following this there is immediate, long-run adaptation to disability.

At the upper end of the distribution the effects are much less apparent. At the 75^{th} percentile there is anticipation the year preceding disability (at -0.263), however, there are no other significant impacts to well-being. At the 90^{th} percentile there are no significant effects (at the 5% significance level), suggesting that those at the upper end of the distribution are scarcely affected by becoming registered disabled.

Where there was only small evidence for anticipation to illness, there is stronger evidence for anticipation to disability at the lower end of the distribution. There was also evidence of much faster adaptation to disability than to illness, with complete, long-run adaptation commencing by 2 years following the onset of disability at the latest. These results make intuitive sense, suggesting that becoming registered disabled is more predictable than having an illness, as illness would be recorded instantly, whereas becoming registered disabled may not happen immediately. Similarly, as disability would be expected to last longer than illness, it could explain the quick adaptation, as expectations of circumstances are steadier.

4.4.9 Retirement

There is no evidence of anticipation effects to retirement at any point on the distribution; however, those at the lower end of the distribution experience highly significant positive effects following retirement. Conversely, those at the median and upper end of the distribution experience little impact from retirement. These results suggest that those at the lower end of the distribution are more negatively affected by being in employment, and so experience greater benefits when retiring, while those at the upper end of the distribution, after experiencing a slight boost in well-being at the time of retirement, return quickly to their previous state, suggesting that they may have experienced more positive well-being during employment. All figures in this section are taken from Table 4.12 and the corresponding graphs are found in Figure 4.10.

At the median and the upper end of the distribution there is an initial positive impact at the time of retirement (at 0.559, 0.565 and 0.373 for the 50^{th}, 75^{th} and 90^{th} percentiles respectively), however, complete, long-run adaptation is quick to follow. At the 50^{th} percentile there is a slight reduction in the positive effect from retirement over the following to periods (to 0.525 and then on to 0.490) before complete adaptation is attained. At the 75^{th} percentile there is only one period of lower positive well-being effects (at 0.443) before complete long-run adaptation, and at the 90^{th} percentile the adaptation is immediate. This would suggest that the higher up on the distribution an individual is, the more likely they are to not benefit in the long-run (with regards to well-being) from retirement.

Contrary to this, those at the lower end of the distribution experience a positive impact at the time of retirement (at 2.569 and 1.190 for the 10^{th} and 25^{th} percentile respectively) but then see this positive

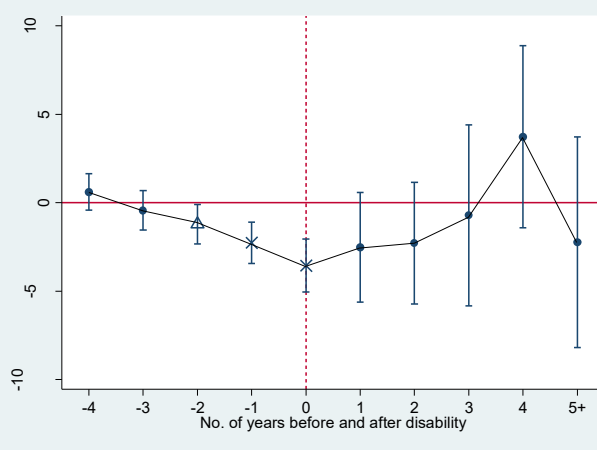
Table 4.11: Fixed effects unconditional quantile results: adaptation and anticipation to disability

	Percentile				
	10th	25th	50th	75th	90th
4 years until disability	0.607 (0.530)	0.217 (0.263)	0.156 (0.159)	-0.117 (0.132)	0.053 (0.125)
3 years until disability	-0.433 (0.565)	-0.442* (0.258)	-0.128 (0.150)	-0.119 (0.129)	-0.013 (0.118)
2 years until disability	-1.217** (0.568)	-0.505* (0.258)	-0.109 (0.152)	0.030 (0.128)	0.017 (0.118)
1 year until disability	-2.268*** (0.594)	-1.214*** (0.270)	-0.407*** (0.150)	-0.263** (0.128)	-0.068 (0.119)
Onset of disability	-3.557*** (0.761)	-1.597*** (0.330)	-0.468*** (0.178)	-0.241 (0.152)	-0.145 (0.130)
1 year having disability	-2.521 (1.582)	-1.463** (0.640)	-0.867*** (0.313)	-0.379 (0.265)	-0.422* (0.245)
2 years having disability	-2.288 (1.758)	-0.444 (0.777)	0.225 (0.465)	-0.368 (0.384)	-0.271 (0.333)
3 years having disability	-0.725 (2.612)	-0.770 (1.005)	-0.367 (0.552)	-0.302 (0.473)	-0.098 (0.388)
4 years having disability	3.726 (2.625)	-0.482 (1.227)	-0.568 (0.606)	-0.849 (0.561)	-0.038 (0.505)
5+ years having disability	-2.240 (3.037)	-1.316 (1.043)	-0.270 (0.535)	-0.509 (0.499)	-0.353 (0.451)
Number of observations	93,711				

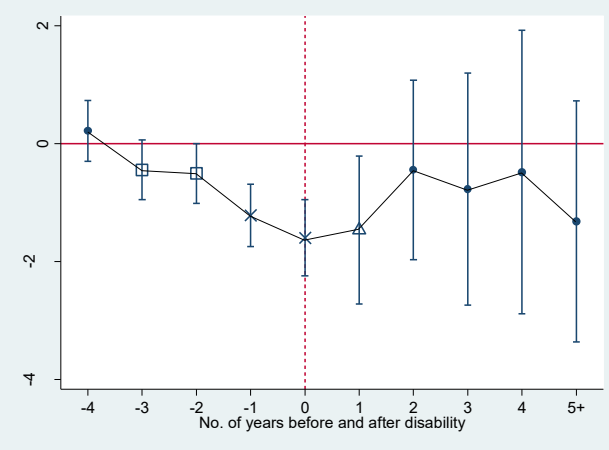
Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Figure 4.9: Fixed effects unconditional quantile results: adaptation and anticipation to disability at the 10th, 25th, 50th, 75th and 90th percentile respectively

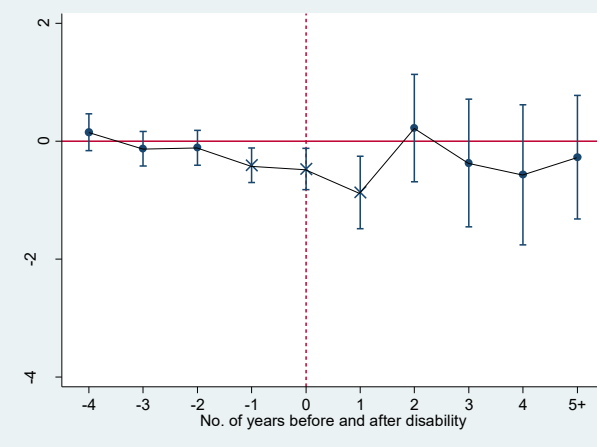
Panel A: 10th Percentile



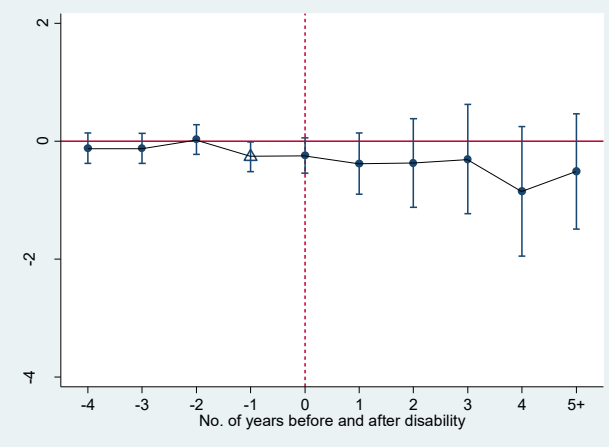
Panel B: 25th Percentile



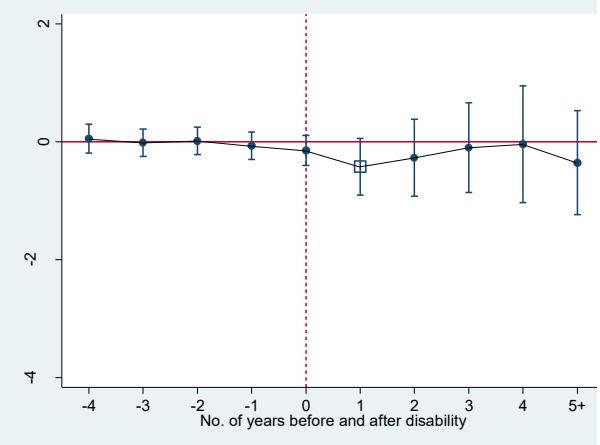
Panel C: 50th Percentile



Panel D: 75th Percentile



Panel E: 90th Percentile



Note: □, Δ and X denote significance at the 10%, 5% and 1% levels respectively. The bars represent the 95% confidence intervals

effect increase. Over the next two periods there is growth in the positive effects (to 3.690 and 1.507 respectively), before a slight decline in the positive effects at 3 years of retirement (at 3.299 and 1.307 respectively). At the 10th percentile there is then growth once more until 5 or more years of retirement (at 4.115), with those at the 25th percentile also experiencing growth in the positive effects at 4 years of retirement (at 1.542), before a slight decline at 5 or more years of retirement (at 1.466). There is no evidence at all of adaptation to retirement at the lower end of the distribution, which supports the assertion made about those at the upper end of the distribution (i.e. that the higher up on the distribution an individual is, the lower will be their long-run benefit from retirement).

4.5 Conclusion

This study has explored how individuals react to different life events, considering specifically the anticipation and adaptation to these events. The way that this study contributes to the existing literature is by also considering the effects at different points along the well-being distribution through the use of unconditional quantile analysis.

The results of this study have shown that the point along the distribution at which the analysis takes place is important for most life events. In all life events that were explored the magnitude of the impact to well-being was far greater at the lower end of the distribution than the impact at the upper end of the distribution. However, despite the magnitude of the effects being greater, the standard errors around the estimates are also greater, leading to some of the estimates with a greater magnitude at the lower end of the distribution being insignificant even when the estimate with a lower magnitude at the upper end of the distribution is significant. This was likely due to the well-being distribution being skewed such that there was more variation in well-being at the lower end of the distribution.

Another interesting finding here was the difference found between the results of unconditional and conditional quantile analysis (compare the results on illness found here, using unconditional quantile analysis, to the results found by Gupta et al. (2015) who used conditional quantile analysis). While these results are close, there are some clear differences, which suggest that it is extremely important to consider which method of quantile analysis is being employed. While the conditional quantile

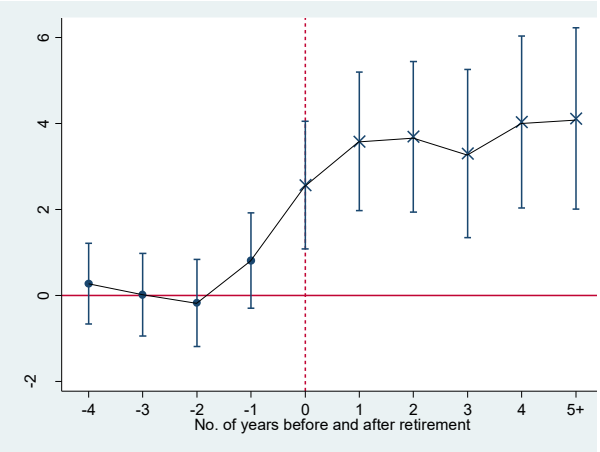
Table 4.12: Fixed effects unconditional quantile results: adaptation and anticipation to retirement

	Percentile				
	10th	25th	50th	75th	90th
4 years until retirement	0.272 (0.478)	-0.272 (0.212)	-0.052 (0.133)	-0.042 (0.126)	-0.132 (0.101)
3 years until retirement	0.018 (0.490)	-0.104 (0.213)	0.021 (0.134)	-0.039 (0.128)	-0.162 (0.099)
2 years until retirement	-0.177 (0.518)	-0.099 (0.222)	-0.081 (0.139)	-0.005 (0.141)	-0.171 (0.107)
1 year until retirement	0.810 (0.566)	0.020 (0.238)	0.006 (0.153)	0.013 (0.150)	-0.013 (0.118)
Retirement	2.569*** (0.758)	1.190*** (0.315)	0.559*** (0.190)	0.565*** (0.189)	0.373** (0.145)
1 year being retired	3.583*** (0.821)	1.313*** (0.350)	0.525** (0.219)	0.443** (0.222)	0.114 (0.166)
2 years being retired	3.690*** (0.892)	1.507*** (0.385)	0.490** (0.241)	0.151 (0.237)	-0.072 (0.180)
3 years being retired	3.299*** (0.996)	1.307*** (0.415)	0.260 (0.265)	-0.109 (0.265)	-0.067 (0.204)
4 years being retired	4.032*** (1.018)	1.542*** (0.453)	0.387 (0.279)	0.249 (0.296)	-0.019 (0.232)
5+ years being retired	4.115*** (1.075)	1.466*** (0.476)	0.209 (0.304)	-0.295 (0.324)	-0.101 (0.246)
Number of observations	30,467				

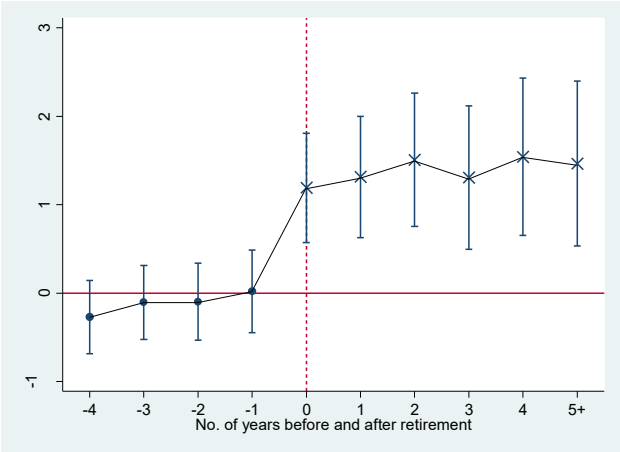
Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Figure 4.10: Fixed effects unconditional quantile results: adaptation and anticipation to retirement at the 10th, 25th, 50th, 75th and 90th percentile respectively

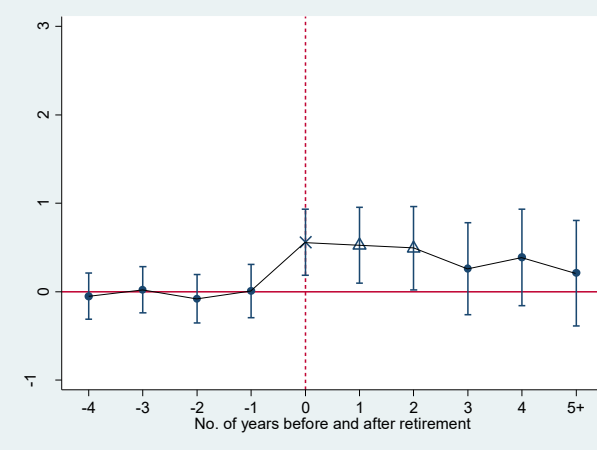
Panel A: 10th Percentile



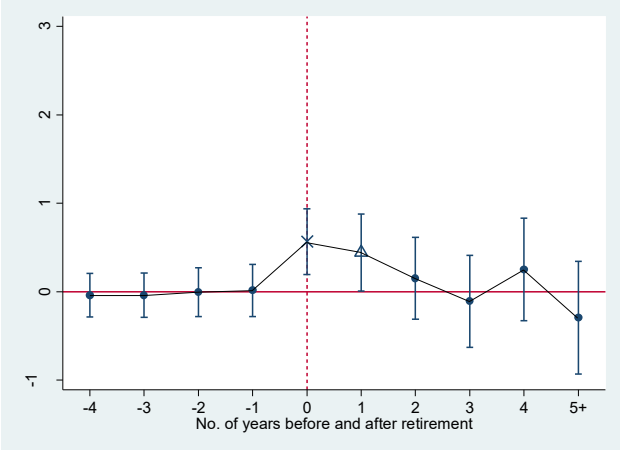
Panel B: 25th Percentile



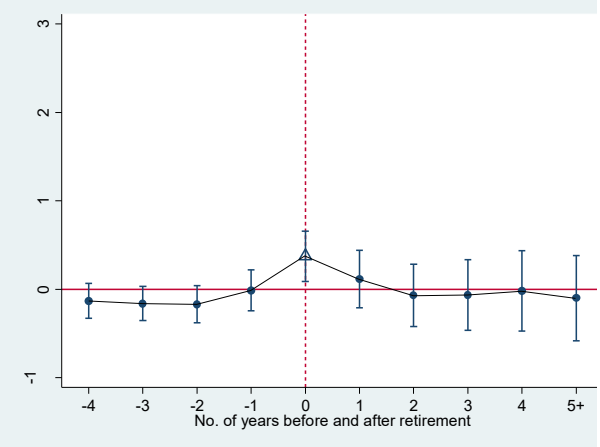
Panel C: 50th Percentile



Panel D: 75th Percentile



Panel E: 90th Percentile



Note: □, Δ and X denote significance at the 10%, 5% and 1% levels respectively. The bars represent the 95% confidence intervals

analysis gave an indication of how illness affected individuals at different points along the well-being distribution, it could not be generalised to the population, due to the nature of the results being conditional on other factors. As such, the unconditional results give a clearer picture of how illness affects individuals at different points along the well-being distribution. While these results may not be so important for policy setting in this situation (as it would be hard to target certain groups when the defining characteristic of the group is their well-being), the nature of unconditional quantile analysis would allow for more accurate policy setting in other analyses (where identification of certain groups would be more possible).

Nevertheless, there are several implications to policy that may be gleaned from this research. With unemployed individuals, regardless of where they are along the well-being distribution, experiencing a negative impact from unemployment that persists for at least a year, it is important to consider such schemes that could reduce the spell of unemployment, such as back-to-work schemes. However, while these schemes already exist, the efficacy of them is debateable, and more research would be required before settling on such schemes (Clayton et al., 2011; Osuna and García-Pérez, 2015).

The findings on widowhood may also inform policy, with all individuals experiencing a strong negative impact from widowhood that persists for at least 1 year (with no long-term adaptation being found for those at the mid to upper end of the distribution (50^{th}, 75^{th} and 90^{th} percentiles)). Due to the strong positive relationship between social capital and well-being, it may be suggested that schemes be set up to offer recent widows/widowers free counselling, or a scheme where volunteers visit those recently bereaved. This increase in social capital may offset the negative impact of widowhood. Similarly, an increase in health care for the recently bereaved may help offset the negative health effects associated with widowhood, which could also lead to a more rapid adaptation.

Finally, those experiencing a long-term illness suffer lower well-being for longer than those with a disability. The reason for this may be due to the support in terms of benefits and legislation that supports and protects those with a disability, but not those with a long-term illness. Greater legislation and more benefits towards those with long-term illnesses may therefore help alleviate this issue. This could also be extended to employment, where those with long term illnesses may suffer from poorer employability. Therefore, an increase in employability support may be another policy undertaken to

help alleviate these negative effects (although, as mentioned previously, the effectiveness of back-to-work schemes is open for debate (Clayton et al., 2011)).

While this study does indeed reveal something of the effects of these major life events on well-being, policy implications are limited also by the fact that this analysis is not split by gender. As seen by Clark and Georgellis (2013), there are some differences in how the genders experience these life events, sometimes to different magnitudes and sometimes even in a different direction (e.g. childbirth). Also, there is some correlation between these life events (such as long-term illness or disability and unemployment), that could be explored in more further. As such, future analysis may be conducted, when sufficient data is available, that also splits the analysis by gender and includes interaction terms. This will better allow policy setters to accurately target vulnerable individuals. However, due to the nature of quantile analysis needing great variation in the distribution, this may be something that could not be achieved without administrative data.

Appendices

Appendix 4.A

Below are the questions that are asked in the BHPS for the GHQ measure of well-being.

Here are some questions regarding the way you have been feeling over the last few weeks. For each question please ring the number next to the answer that best suits the way you have left.
Have you recently…

(a) Been able to concentrate on whatever you're doing?

With the responses:

Better than usual	0
Same as usual	1
Less than usual	2
Much less than usual	3

Then

(b) Lost much sleep over worry?
(e) Felt constantly under strain?
(f) Felt you couldn't overcome your difficulties?
(i) Been feeling unhappy or depressed?
(j) Been losing confidence in yourself?
(k) Been thinking of yourself as a worthless person?

With the responses:

Not at all	0
No more than usual	1
Rather more than usual	2
Much more than usual	3

Then

(c) Felt that you were playing a useful part in things?
(d) Felt capable of making decisions about things?
(g) Been able to enjoy your normal day-to-day activities?
(h) Been able to face up to problems?
(l) Been feeling reasonably happy, all things considered?

With the responses:

More so than usual	0
About the same as usual	1
Less than usual	2
Much less than usual	3

Appendix 4.B

Below are the items that were included in the creation of the social capital variable:

Table 4.13: Components of social capital

Category	Variable	Description
Leisure activity	wLACTA	Play sport/go walking/swimming
	wLACTB	Go to watch live sport
	wLACTC	Go to the cinema
	wLACTD	Go to concert/theatre/live performance
	wLACTE	Have a meal in a restaurant/café/pub
	wLACTF	Go for a drink at a pub/club
	wLACTL	Do unpaid voluntary work
	wXPLEIS	Amount spent on leisure per month
Neighbourhood and residence	wCRDARK	Feel safe walking home at night
	wLKNBRD	Likes present neighbourhood
	wOPNGBHA	Belong to neighbourhood
	wOPNGBHB	Local friends mean a lot
	wOPNGBHC	Advice obtainable locally
	wOPNGBHD	Can borrow things from neighbours
	wOPNGBHE	Willing to improve neighbourhood
	wOPNGBHF	Plan to stay in neighbourhood
	wOPNGBHG	Similar to others in neighbourhood
	wOPNGBHH	Talk regularly to neighbours
Political support and behaviour	wORGMA	Member of political party
	wVOTE1	Supports a particular political party
Social and interest group activity	wORGA	Active in any listed organisations
	wORGAA	Active in political party
	wORGAB	Active in trade union
	wORGAC	Active in environmental group
	wORGAD	Active in parents association
	wORGAE	Active in tenants group
	wORGAF	Active in religious group
	wORGAG	Active in voluntary group
	wORGAH	Active in other community group
	wORGAI	Active in social group
	wORGAJ	Active in sports club
	wORGAK	Active in women's institute
	wORGAL	Active in women's group
	wORGAM	Active in other organisation
Values, opinions and attitudes	wFISIT	Financial situation
	wOPCLS2	Subjective social class membership

Note: While there are other variables that could make up a social capital measure, they were omitted due to small number of observations or collinearity with other variables being used

Appendix 4.C

Table 4.14: Fixed effects unconditional quantile results: control variables for marriage analysis

	Percentile				
	10th	25th	50th	75th	90th
Social Capital	0.350*** (0.118)	0.250*** (0.063)	0.186*** (0.042)	0.148*** (0.037)	0.132** (0.053)
Age	-0.207 (0.324)	-0.001 (0.164)	-0.002 (0.111)	-0.164* (0.095)	0.043 (0.142)
Age^2	0.006*** (0.001)	0.004*** (0.001)	0.003*** (0.001)	0.002*** (0.000)	0.001** (0.001)
Ln(Income)	0.124 (0.135)	0.091 (0.073)	0.058 (0.049)	-0.003 (0.043)	-0.039 (0.064)
Number of children	0.169 (0.181)	0.072 (0.100)	0.097 (0.062)	0.022 (0.053)	-0.004 (0.077)
Employment – Employed	1.428*** (0.315)	0.763*** (0.166)	0.443*** (0.109)	0.085 (0.096)	0.081 (0.134)
Employment – Self Employed	1.900*** (0.561)	0.874*** (0.314)	0.565*** (0.212)	0.273 (0.189)	-0.104 (0.279)
Employment – Unemployed	-2.114*** (0.523)	-1.086*** (0.247)	-0.830*** (0.158)	-0.775*** (0.136)	-0.832*** (0.187)
Education – High	-0.291 (1.076)	-0.632 (0.633)	-0.848* (0.443)	-0.103 (0.404)	0.011 (0.578)
Education – Medium	-0.067 (0.946)	-0.174 (0.545)	-0.689* (0.387)	-0.255 (0.352)	-0.032 (0.504)
Poor health	-2.184*** (0.223)	-1.145*** (0.126)	-0.700*** (0.081)	-0.554*** (0.070)	-0.517*** (0.097)
Region – North	1.124 (1.093)	0.353 (0.623)	-0.329 (0.404)	-0.798** (0.370)	-0.530 (0.542)
Region – Midlands	1.565 (1.113)	-0.417 (0.625)	-0.527 (0.396)	-0.425 (0.366)	-0.212 (0.502)
Region – East	0.118 (0.828)	0.381 (0.428)	0.087 (0.299)	-0.073 (0.294)	-0.082 (0.426)
Region – South West	2.217 (1.418)	1.082 (0.758)	0.723 (0.523)	0.007 (0.486)	-0.455 (0.614)
Region – Peripheries	0.469 (1.173)	0.150 (0.697)	-0.087 (0.470)	-0.290 (0.501)	-0.124 (0.676)
Year – 1992	-0.672 (0.509)	-0.490* (0.279)	-0.450** (0.184)	-0.191 (0.168)	-0.227 (0.228)
Year – 1993	-1.448* (0.738)	-0.714* (0.393)	-0.559** (0.264)	-0.039 (0.229)	0.147 (0.332)
Year – 1994	-1.244 (1.014)	-0.823 (0.523)	-0.795** (0.352)	-0.030 (0.304)	-0.034 (0.452)
Year – 1995	-1.727 (1.302)	-1.381** (0.672)	-1.193*** (0.450)	-0.187 (0.385)	-0.333 (0.574)
Year – 1996	-2.335 (1.599)	-1.889** (0.823)	-1.721*** (0.545)	-0.255 (0.465)	-0.405 (0.697)
Year – 1997	-2.466 (1.886)	-1.840* (0.974)	-1.722*** (0.645)	-0.121 (0.552)	-0.224 (0.828)

Year – 1998	-2.768 (2.197)	-2.245** (1.129)	-1.961*** (0.749)	-0.060 (0.637)	-0.550 (0.961)
Year – 1999	-2.975 (2.500)	-2.353* (1.274)	-2.024** (0.847)	-0.061 (0.721)	-0.739 (1.090)
Year – 2000	-3.995 (2.798)	-3.042** (1.427)	-2.499*** (0.950)	-0.404 (0.805)	-1.220 (1.215)
Year – 2001	-3.542 (3.136)	-3.170** (1.596)	-2.700** (1.062)	-0.233 (0.900)	-1.132 (1.362)
Year – 2002	-4.044 (3.435)	-3.308* (1.756)	-2.957** (1.165)	-0.217 (0.990)	-1.293 (1.500)
Year – 2003	-4.010 (3.765)	-3.182* (1.915)	-3.019** (1.275)	-0.114 (1.081)	-1.286 (1.635)
Year – 2004	-4.674 (4.077)	-3.744* (2.078)	-3.486** (1.381)	-0.326 (1.170)	-1.848 (1.771)
Year – 2005	-5.730 (4.453)	-3.595 (2.274)	-3.501** (1.514)	-0.369 (1.284)	-2.169 (1.948)
Year – 2006	-4.927 (4.794)	-4.050 (2.469)	-3.386** (1.632)	-0.484 (1.396)	-2.198 (2.082)
Year – 2007	-3.320 (5.108)	-3.917 (2.661)	-3.386* (1.802)	-0.335 (1.543)	-3.447 (2.276)
Constant	18.380** (7.761)	20.448*** (3.956)	25.558*** (2.653)	33.014*** (2.261)	29.948*** (3.440)
Number of observations	45,373				

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Table 4.15: Fixed effects unconditional quantile results: control variables for divorce analysis

	Percentile				
	10^{th}	25^{th}	50^{th}	75^{th}	90^{th}
Social Capital	0.396*** (0.084)	0.275*** (0.042)	0.178*** (0.027)	0.120*** (0.024)	0.095*** (0.023)
Age	-0.554** (0.220)	-0.265** (0.112)	-0.184*** (0.071)	-0.257*** (0.064)	-0.177*** (0.060)
Age^2	0.006*** (0.001)	0.004*** (0.000)	0.003*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
Ln(Income)	0.129 (0.117)	0.133** (0.059)	0.027 (0.037)	-0.063* (0.034)	-0.063** (0.031)
Number of children	0.188* (0.112)	0.140** (0.060)	0.041 (0.038)	-0.015 (0.033)	-0.022 (0.031)
Employment – Employed	1.612*** (0.241)	0.926*** (0.123)	0.373*** (0.075)	0.096 (0.065)	-0.003 (0.064)
Employment – Self Employed	1.947*** (0.396)	0.872*** (0.210)	0.469*** (0.132)	0.175 (0.119)	0.024 (0.112)
Employment – Unemployed	-2.376*** (0.431)	-1.205*** (0.202)	-0.768*** (0.119)	-0.601*** (0.105)	-0.620*** (0.099)
Education – High	-0.327 (0.897)	-0.123 (0.475)	-0.286 (0.309)	0.093 (0.290)	-0.009 (0.297)
Education – Medium	-0.376 (0.815)	0.139 (0.417)	-0.345 (0.270)	-0.096 (0.254)	-0.229 (0.259)

Poor health	-1.921*** (0.157)	-0.976*** (0.082)	-0.543*** (0.052)	-0.380*** (0.046)	-0.339*** (0.043)
Relationship status – Widowed	-6.658*** (1.530)	-2.752*** (0.670)	-0.806** (0.370)	-0.515** (0.234)	-0.139 (0.182)
Relationship status – Never married	-0.482 (0.330)	-0.234 (0.179)	-0.124 (0.123)	-0.095 (0.116)	0.062 (0.110)
Region – North	0.616 (0.944)	0.411 (0.520)	-0.057 (0.325)	-0.326 (0.303)	-0.446 (0.291)
Region – Midlands	1.319 (0.940)	0.255 (0.504)	0.119 (0.316)	0.019 (0.301)	-0.107 (0.280)
Region – East	0.030 (0.736)	0.131 (0.379)	-0.032 (0.250)	0.066 (0.238)	0.320 (0.225)
Region – South West	0.856 (1.171)	0.320 (0.597)	0.374 (0.385)	0.163 (0.357)	-0.229 (0.295)
Region – Peripheries	0.641 (1.043)	0.597 (0.559)	0.235 (0.352)	0.264 (0.360)	0.179 (0.329)
Year – 1992	-0.553* (0.319)	-0.476*** (0.172)	-0.442*** (0.109)	-0.171* (0.102)	-0.100 (0.095)
Year – 1993	-0.842* (0.476)	-0.434* (0.252)	-0.522*** (0.160)	-0.023 (0.146)	0.099 (0.137)
Year – 1994	-0.835 (0.669)	-0.446 (0.345)	-0.627*** (0.218)	0.002 (0.200)	0.035 (0.188)
Year – 1995	-1.144 (0.869)	-0.660 (0.448)	-0.734*** (0.280)	0.038 (0.257)	0.064 (0.240)
Year – 1996	-1.168 (1.058)	-0.749 (0.546)	-0.876** (0.341)	0.116 (0.312)	0.129 (0.292)
Year – 1997	-0.954 (1.250)	-0.586 (0.650)	-0.852** (0.406)	0.195 (0.371)	0.234 (0.347)
Year – 1998	-1.088 (1.454)	-0.617 (0.752)	-0.860* (0.470)	0.395 (0.429)	0.313 (0.402)
Year – 1999	-0.692 (1.650)	-0.350 (0.851)	-0.712 (0.532)	0.544 (0.485)	0.446 (0.455)
Year – 2000	-1.140 (1.844)	-0.766 (0.952)	-1.021* (0.596)	0.396 (0.543)	0.265 (0.508)
Year – 2001	-1.037 (2.070)	-0.739 (1.067)	-1.092 (0.667)	0.564 (0.607)	0.481 (0.570)
Year – 2002	-1.092 (2.279)	-0.673 (1.175)	-1.017 (0.733)	0.728 (0.669)	0.552 (0.626)
Year – 2003	-0.530 (2.497)	-0.403 (1.286)	-0.953 (0.803)	0.928 (0.730)	0.749 (0.685)
Year – 2004	-0.734 (2.703)	-0.489 (1.392)	-1.131 (0.869)	0.816 (0.792)	0.664 (0.743)
Year – 2005	1.368 (3.233)	-0.074 (1.656)	-0.944 (1.001)	0.754 (0.906)	0.216 (0.854)
Year – 2006	3.630 (3.565)	-0.953 (1.805)	-1.067 (1.108)	0.890 (0.979)	0.742 (0.923)
Year – 2007	0.942 (4.333)	-2.054 (2.178)	-1.697 (1.290)	0.374 (1.133)	0.233 (1.100)
Constant	28.622*** (6.588)	26.442*** (3.377)	29.881*** (2.110)	35.905*** (1.918)	35.747*** (1.806)

Number of observations	86,227

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Table 4.16: Fixed effects unconditional quantile results: control variables for birth of a child (B1) analysis

	Percentile				
	10th	25th	50th	75th	90th
Social Capital	0.429*** (0.110)	0.308*** (0.058)	0.183*** (0.038)	0.115*** (0.034)	0.108*** (0.032)
Age	-0.002 (0.302)	0.020 (0.161)	-0.179* (0.108)	-0.295*** (0.095)	-0.186** (0.091)
Age^2	0.005** (0.002)	0.003** (0.001)	0.004*** (0.001)	0.003*** (0.001)	0.002** (0.001)
Ln(Income)	0.197 (0.135)	0.146** (0.073)	0.062 (0.048)	-0.039 (0.042)	-0.054 (0.040)
Number of children	0.224 (0.178)	0.139 (0.098)	0.002 (0.062)	-0.014 (0.052)	-0.072 (0.050)
Employment – Employed	1.305*** (0.277)	0.909*** (0.147)	0.454*** (0.095)	0.169** (0.082)	0.079 (0.079)
Employment – Self Employed	1.620*** (0.516)	0.887*** (0.295)	0.565*** (0.191)	0.015 (0.170)	-0.066 (0.159)
Employment – Unemployed	-2.364*** (0.523)	-1.299*** (0.250)	-0.832*** (0.152)	-0.661*** (0.130)	-0.698*** (0.121)
Education – High	-0.162 (1.115)	-0.396 (0.584)	-0.595 (0.381)	-0.240 (0.349)	-0.242 (0.345)
Education – Medium	-0.224 (1.012)	0.054 (0.512)	-0.588* (0.333)	-0.423 (0.301)	-0.444 (0.299)
Poor health	-2.047*** (0.201)	-1.036*** (0.112)	-0.622*** (0.072)	-0.433*** (0.063)	-0.434*** (0.058)
Relationship status - Divorced	-2.364*** (0.604)	-0.969*** (0.292)	-0.224 (0.172)	0.104 (0.146)	0.129 (0.144)
Relationship status – Widowed	-8.043** (3.798)	-3.098*** (1.120)	-0.690 (0.684)	-0.399 (0.656)	0.463 (0.552)
Relationship status – Never married	-0.085 (0.345)	0.041 (0.195)	-0.078 (0.137)	-0.107 (0.124)	0.023 (0.117)
Region – North	1.349 (1.003)	0.690 (0.583)	-0.002 (0.355)	-0.449 (0.336)	-0.784** 0.340)
Region – Midlands	1.922* (1.046)	0.177 (0.577)	0.046 (0.355)	-0.236 (0.339)	-0.340 (0.332)
Region – East	-0.265 (0.814)	0.180 (0.430)	-0.033 (0.286)	0.062 (0.271)	0.208 (0.268)
Region – South West	2.170 (1.338)	0.924 (0.683)	0.793* (0.461)	0.298 (0.438)	-0.113 (0.378)
Region – Peripheries	1.117 (1.076)	0.726 (0.639)	0.202 (0.408)	0.198 (0.428)	0.018 (0.401)
Year – 1992	-1.111*** (0.411)	-0.576** (0.229)	-0.417*** (0.149)	-0.098 (0.137)	-0.154 (0.127)
Year – 1993	-1.606*** (0.607)	-0.785** (0.336)	-0.484** (0.221)	0.046 (0.199)	0.122 (0.188)

Year – 1994	-1.931**	-0.912**	-0.510*	0.156	0.041
	(0.861)	(0.460)	(0.301)	(0.271)	(0.258)
Year – 1995	-2.734**	-1.519**	-0.805**	0.147	0.099
	(1.122)	(0.600)	(0.390)	(0.350)	(0.331)
Year – 1996	-3.686***	-2.049***	-1.051**	0.117	0.127
	(1.369)	(0.731)	(0.472)	(0.423)	(0.401)
Year – 1997	-3.728**	-2.042**	-1.040*	0.274	0.407
	(1.612)	(0.865)	(0.559)	(0.503)	(0.477)
Year – 1998	-4.199**	-2.426**	-1.165*	0.422	0.427
	(1.878)	(1.003)	(0.651)	(0.581)	(0.552)
Year – 1999	-4.253**	-2.340**	-1.142	0.428	0.420
	(2.136)	(1.133)	(0.738)	(0.660)	(0.627)
Year – 2000	-5.474**	-3.067**	-1.548*	0.245	0.234
	(2.386)	(1.270)	(0.829)	(0.736)	(0.698)
Year – 2001	-5.331**	-3.200**	-1.537*	0.483	0.481
	(2.672)	(1.419)	(0.926)	(0.823)	(0.785)
Year – 2002	-5.908**	-3.431**	-1.581	0.593	0.582
	(2.941)	(1.565)	(1.017)	(0.905)	(0.861)
Year – 2003	-5.701*	-3.234*	-1.517	0.789	0.823
	(3.220)	(1.710)	(1.113)	(0.991)	(0.943)
Year – 2004	-6.405*	-3.824**	-1.840	0.667	0.670
	(3.487)	(1.853)	(1.207)	(1.073)	(1.021)
Year – 2005	-6.374*	-3.686*	-1.607	0.698	0.657
	(3.826)	(2.033)	(1.329)	(1.183)	(1.134)
Year – 2006	-7.312*	-4.262*	-2.003	0.475	0.436
	(4.151)	(2.205)	(1.434)	(1.278)	(1.216)
Year – 2007	-7.684*	-3.914	-1.543	0.937	1.288
	(4.423)	(2.382)	(1.556)	(1.400)	(1.336)
Constant	15.301**	19.856***	29.283***	35.601***	35.898***
	(6.526)	(3.441)	(2.279)	(2.001)	(1.920)
Number of observations	55,875				

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Table 4.17: Fixed effects unconditional quantile results: control variables for birth of first child (B2) analysis

	Percentile				
	10^{th}	25^{th}	50^{th}	75^{th}	90^{th}
Social Capital	0.428***	0.311***	0.186***	0.112***	0.108***
	(0.126)	(0.065)	(0.043)	(0.037)	(0.036)
Age	0.064	0.023	-0.203	-0.274**	-0.141
	(0.350)	(0.182)	(0.124)	(0.107)	(0.104)
Age^2	0.005*	0.004**	0.004***	0.003***	0.001*
	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)
Ln(Income)	0.152	0.139*	0.069	-0.046	-0.057
	(0.148)	(0.081)	(0.054)	(0.047)	(0.045)
Number of children	0.243	0.058	-0.024	-0.007	-0.066
	(0.212)	(0.117)	(0.073)	(0.060)	(0.059)
Employment – Employed	1.365***	0.758***	0.385***	0.098	-0.000
	(0.321)	(0.170)	(0.111)	(0.093)	(0.093)

Employment – Self Employed	1.980*** (0.578)	0.946*** (0.339)	0.478** (0.217)	-0.022 (0.185)	-0.111 (0.179)
Employment – Unemployed	-2.371*** (0.610)	-1.319*** (0.287)	-0.927*** (0.179)	-0.770*** (0.147)	-0.776*** (0.140)
Education – High	0.516 (1.283)	0.050 (0.665)	-0.772* (0.421)	-0.289 (0.385)	-0.360 (0.396)
Education – Medium	0.433 (1.160)	0.423 (0.587)	-0.851** (0.367)	-0.502 (0.339)	-0.593* (0.351)
Poor health	-1.986*** (0.228)	-1.059*** (0.126)	-0.674*** (0.082)	-0.473*** (0.069)	-0.456*** (0.065)
Relationship status - Divorced	-2.705*** (0.716)	-0.935*** (0.334)	-0.134 (0.203)	0.124 (0.170)	0.154 (0.180)
Relationship status – Widowed	-7.993* (4.476)	-3.008** (1.262)	-0.616 (0.554)	-0.708 (0.732)	0.247 (0.620)
Relationship status – Never married	-0.252 (0.387)	-0.042 (0.219)	-0.102 (0.157)	-0.052 (0.141)	0.079 (0.133)
Region – North	1.513 (1.119)	0.680 (0.644)	0.015 (0.386)	-0.658* (0.359)	-0.936** (0.366)
Region – Midlands	1.017 (1.171)	-0.090 (0.646)	-0.221 (0.382)	-0.401 (0.364)	-0.438 (0.360)
Region – East	-0.707 (0.891)	0.128 (0.453)	0.019 (0.305)	-0.049 (0.281)	0.179 (0.278)
Region – South West	1.992 (1.556)	1.094 (0.771)	0.986* (0.520)	0.271 (0.481)	-0.146 (0.415)
Region – Peripheries	0.979 (1.211)	0.636 (0.706)	0.034 (0.458)	-0.145 (0.447)	-0.180 (0.428)
Year – 1992	-1.647*** (0.465)	-0.672*** (0.255)	-0.430** (0.168)	-0.163 (0.151)	-0.238* (0.142)
Year – 1993	-2.317*** (0.696)	-0.984*** (0.379)	-0.546** (0.250)	-0.017 (0.222)	0.024 (0.213)
Year – 1994	-2.591** (1.002)	-1.092** (0.521)	-0.557 (0.344)	0.115 (0.305)	-0.069 (0.294)
Year – 1995	-3.295** (1.310)	-1.690** (0.682)	-0.850* (0.446)	-0.004 (0.393)	-0.101 (0.378)
Year – 1996	-4.101** (1.602)	-2.140** (0.834)	-1.009* (0.542)	0.090 (0.476)	-0.051 (0.459)
Year – 1997	-4.326** (1.887)	-2.190** (0.988)	-1.018 (0.643)	0.146 (0.567)	0.183 (0.546)
Year – 1998	-4.709** (2.198)	-2.611** (1.146)	-1.127 (0.746)	0.337 (0.655)	0.186 (0.632)
Year – 1999	-4.943** (2.505)	-2.603** (1.296)	-1.139 (0.847)	0.327 (0.743)	0.152 (0.718)
Year – 2000	-6.377** (2.795)	-3.429** (1.449)	-1.590* (0.950)	0.126 (0.828)	-0.056 (0.798)
Year – 2001	-6.409** (3.136)	-3.606** (1.623)	-1.569 (1.064)	0.344 (0.928)	0.121 (0.897)
Year – 2002	-7.062** (3.449)	-3.813** (1.788)	-1.625 (1.168)	0.418 (1.019)	0.195 (0.985)
Year – 2003	-6.689* (3.779)	-3.577* (1.957)	-1.463 (1.279)	0.675 (1.116)	0.423 (1.078)

Year – 2004	-7.505* (4.087)	-4.269** (2.118)	-1.783 (1.385)	0.555 (1.207)	0.233 (1.168)
Year – 2005	-6.699 (4.493)	-3.514 (2.341)	-1.053 (1.539)	0.791 (1.354)	0.348 (1.312)
Year – 2006	-8.741* (4.879)	-3.630 (2.542)	-1.730 (1.674)	0.752 (1.473)	0.186 (1.405)
Year – 2007	-8.426 (5.224)	-3.952 (2.800)	-1.868 (1.843)	0.328 (1.621)	0.414 (1.573)
Constant	14.431* (7.647)	19.804*** (3.914)	30.063*** (2.625)	35.637*** (2.256)	35.341*** (2.201)
Number of observations	45,750				

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Table 4.18: Fixed effects unconditional quantile results: control variables for widowhood analysis

	Percentile				
	10^{th}	25^{th}	50^{th}	75^{th}	90^{th}
Social Capital	0.417*** (0.069)	0.270*** (0.035)	0.154*** (0.022)	0.102*** (0.019)	0.083*** (0.018)
Age	-0.243 (0.186)	0.032 (0.094)	-0.069 (0.060)	-0.137*** (0.052)	-0.076 (0.046)
Age^2	0.003*** (0.001)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)	0.001*** (0.000)
Ln(Income)	0.186* (0.102)	0.109** (0.051)	0.046 (0.032)	-0.019 (0.028)	-0.008 (0.025)
Number of children	0.096 (0.106)	0.068 (0.057)	-0.018 (0.035)	-0.055* (0.029)	-0.052** (0.026)
Employment – Employed	1.255*** (0.202)	0.714*** (0.105)	0.263*** (0.063)	-0.014 (0.055)	-0.045 (0.050)
Employment – Self Employed	1.369*** (0.333)	0.611*** (0.182)	0.282** (0.113)	0.031 (0.102)	0.003 (0.090)
Employment – Unemployed	-2.449*** (0.380)	-1.262*** (0.179)	-0.770*** (0.105)	-0.576*** (0.090)	-0.532*** (0.079)
Education – High	-0.212 (0.830)	-0.304 (0.443)	-0.413 (0.287)	-0.007 (0.260)	-0.073 (0.245)
Education – Medium	-0.136 (0.748)	0.064 (0.382)	-0.382 (0.245)	-0.140 (0.224)	-0.204 (0.209)
Poor health	-1.841*** (0.134)	-0.963*** (0.071)	-0.572*** (0.045)	-0.376*** (0.039)	-0.320*** (0.035)
Relationship status - Divorced	-1.296*** (0.433)	-0.692*** (0.195)	-0.026 (0.114)	0.260*** (0.097)	0.287*** (0.088)
Relationship status – Never married	0.102 (0.320)	0.084 (0.175)	0.052 (0.118)	-0.013 (0.107)	0.103 (0.096)
Region – North	0.886 (0.878)	0.328 (0.479)	-0.128 (0.294)	-0.478* (0.270)	-0.603** (0.252)
Region – Midlands	1.668* (0.864)	0.404 (0.473)	0.126 (0.289)	0.061 (0.270)	-0.049 (0.243)
Region – East	-0.218 (0.674)	0.150 (0.353)	-0.074 (0.222)	-0.054 (0.211)	0.168 (0.193)

Region – South West	1.497 (1.045)	0.481 (0.532)	0.500 (0.331)	0.256 (0.312)	0.001 (0.255)
Region – Peripheries	0.984 (0.920)	0.666 (0.498)	0.321 (0.315)	0.242 (0.322)	0.194 (0.283)
Year – 1992	-0.673** (0.274)	-0.509*** (0.146)	-0.394*** (0.093)	-0.151* (0.084)	-0.103 (0.074)
Year – 1993	-0.964** (0.411)	-0.610*** (0.214)	-0.444*** (0.138)	-0.044 (0.120)	0.051 (0.107)
Year – 1994	-0.895 (0.574)	-0.771*** (0.294)	-0.566*** (0.188)	-0.068 (0.164)	-0.029 (0.147)
Year – 1995	-1.332* (0.751)	-1.010*** (0.381)	-0.628** (0.242)	-0.023 (0.211)	-0.036 (0.187)
Year – 1996	-1.431 (0.918)	-1.214*** (0.464)	-0.735** (0.295)	0.048 (0.256)	0.008 (0.228)
Year – 1997	-1.393 (1.084)	-1.208** (0.553)	-0.785** (0.350)	0.107 (0.304)	0.095 (0.271)
Year – 1998	-1.629 (1.261)	-1.365** (0.638)	-0.777* (0.406)	0.245 (0.352)	0.175 (0.314)
Year – 1999	-1.342 (1.432)	-1.244* (0.722)	-0.636 (0.460)	0.328 (0.398)	0.218 (0.355)
Year – 2000	-1.681 (1.599)	-1.674** (0.808)	-0.909* (0.514)	0.214 (0.445)	0.070 (0.397)
Year – 2001	-1.740 (1.797)	-1.782* (0.907)	-0.996* (0.577)	0.331 (0.499)	0.229 (0.446)
Year – 2002	-1.732 (1.977)	-1.771* (0.999)	-0.921 (0.634)	0.466 (0.549)	0.272 (0.490)
Year – 2003	-1.460 (2.164)	-1.676 (1.091)	-0.922 (0.694)	0.578 (0.600)	0.374 (0.535)
Year – 2004	-1.732 (2.345)	-1.926 (1.183)	-0.997 (0.751)	0.545 (0.650)	0.316 (0.580)
Year – 2005	-1.833 (2.839)	-2.305 (1.437)	-0.862 (0.895)	0.401 (0.771)	0.547 (0.699)
Year – 2006	-3.351 (3.286)	-1.373 (1.585)	-0.928 (1.026)	0.875 (0.868)	0.886 (0.776)
Year – 2007	-3.144 (4.350)	-1.295 (1.899)	-0.290 (1.162)	1.063 (1.033)	0.731 (0.902)
Constant	21.148*** (6.655)	19.524*** (3.349)	27.523*** (2.131)	33.453*** (1.845)	33.190*** (1.651)
Number of observations	113,298				

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Table 4.19: Fixed effects unconditional quantile results: control variables for illness analysis

	Percentile				
	10^{th}	25^{th}	50^{th}	75^{th}	90^{th}
Social Capital	0.427*** (0.102)	0.152*** (0.033)	0.157*** (0.034)	0.068** (0.030)	0.045 (0.028)
Age	-0.336 (0.246)	-0.105 (0.085)	-0.107 (0.090)	-0.167** (0.078)	-0.108 (0.072)

Age^2	0.004*** (0.001)	0.002*** (0.000)	0.002*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
Ln(Income)	0.126 (0.152)	0.007 (0.045)	-0.027 (0.046)	-0.015 (0.040)	-0.016 (0.037)
Number of children	0.102 (0.139)	-0.026 (0.045)	0.028 (0.048)	0.003 (0.042)	-0.017 (0.038)
Employment – Employed	1.674*** (0.311)	0.517*** (0.098)	0.327*** (0.095)	0.096 (0.087)	0.047 (0.080)
Employment – Self Employed	1.816*** (0.506)	0.464*** (0.167)	0.563*** (0.168)	0.033 (0.152)	-0.032 (0.135)
Employment – Unemployed	-2.093*** (0.554)	-0.897*** (0.166)	-0.616*** (0.157)	-0.516*** (0.133)	-0.505*** (0.119)
Education – High	-1.401 (0.984)	-0.633* (0.339)	-0.994** (0.392)	0.019 (0.364)	0.226 (0.335)
Education – Medium	-0.957 (0.825)	-0.375 (0.277)	-0.939*** (0.333)	-0.081 (0.307)	0.010 (0.284)
Relationship status - Divorced	-0.503 (0.537)	-0.208 (0.165)	0.150 (0.160)	0.358** (0.139)	0.311** (0.132)
Relationship status – Widowed	-4.787** (1.931)	-0.616 (0.473)	-0.606 (0.415)	-0.351 (0.419)	-0.081 (0.351)
Relationship status – Never married	-0.295 (0.408)	-0.067 (0.141)	-0.081 (0.155)	0.027 (0.137)	0.044 (0.125)
Region – North	0.613 (1.190)	0.345 (0.398)	-0.285 (0.384)	-0.612* (0.351)	-0.709** (0.343)
Region – Midlands	-0.453 (1.122)	-0.350 (0.355)	-0.427 (0.376)	-0.501 (0.350)	-0.439 (0.321)
Region – East	-1.265 (0.908)	-0.410 (0.313)	-0.381 (0.333)	-0.518* (0.309)	-0.218 (0.297)
Region – South West	0.407 (1.421)	-0.079 (0.492)	-0.155 (0.454)	-0.438 (0.391)	-0.302 (0.333)
Region – Peripheries	0.209 (1.249)	-0.008 (0.476)	-0.246 (0.492)	-0.071 (0.447)	-0.090 (0.396)
Year – 1992	-0.475 (0.373)	-0.089 (0.127)	-0.375*** (0.135)	-0.298** (0.122)	-0.141 (0.112)
Year – 1993	-0.308 (0.544)	-0.145 (0.190)	-0.396** (0.198)	-0.183 (0.175)	0.035 (0.163)
Year – 1994	-0.927 (0.752)	-0.157 (0.259)	-0.658** (0.274)	-0.207 (0.241)	-0.106 (0.224)
Year – 1995	-1.136 (0.977)	-0.265 (0.336)	-0.819** (0.351)	-0.274 (0.309)	-0.142 (0.288)
Year – 1996	-1.294 (1.185)	-0.382 (0.408)	-0.915** (0.428)	-0.209 (0.376)	-0.070 (0.350)
Year – 1997	-1.022 (1.399)	-0.180 (0.484)	-0.866* (0.511)	-0.245 (0.449)	-0.083 (0.416)
Year – 1998	-1.030 (1.626)	-0.185 (0.560)	-0.833 (0.589)	-0.090 (0.518)	0.023 (0.482)
Year – 1999	-0.681 (1.844)	-0.020 (0.634)	-0.804 (0.668)	0.011 (0.585)	0.101 (0.546)
Year – 2000	-0.990 (2.075)	-0.309 (0.709)	-1.221 (0.748)	-0.192 (0.654)	-0.122 (0.610)

Year – 2001	-1.054 (2.330)	-0.298 (0.798)	-1.242 (0.839)	-0.103 (0.735)	0.044 (0.686)
Year – 2002	-1.066 (2.558)	-0.299 (0.878)	-1.194 (0.923)	0.021 (0.809)	0.111 (0.756)
Year – 2003	-0.725 (2.800)	-0.149 (0.960)	-1.194 (1.009)	0.068 (0.887)	0.230 (0.828)
Year – 2004	-0.768 (3.036)	-0.162 (1.040)	-1.481 (1.094)	-0.102 (0.960)	0.067 (0.898)
Year – 2005	-1.557 (3.290)	-0.367 (1.125)	-1.730 (1.186)	-0.299 (1.038)	0.038 (0.968)
Year – 2006	-0.772 (3.526)	-0.494 (1.212)	-1.497 (1.272)	0.043 (1.118)	0.206 (1.044)
Year – 2007	-1.391 (3.818)	-0.066 (1.304)	-1.424 (1.379)	-0.006 (1.222)	0.216 (1.128)
Constant	25.804*** (7.029)	26.303*** (2.400)	30.101*** (2.516)	33.447*** (2.195)	33.590*** (2.039)
Number of observations	46,381				

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Table 4.20: Fixed effects unconditional quantile results: control variables for disability analysis

	Percentile				
	10^{th}	25^{th}	50^{th}	75^{th}	90^{th}
Social Capital	0.443*** (0.080)	0.292*** (0.040)	0.181*** (0.026)	0.117*** (0.023)	0.103*** (0.022)
Age	-0.549*** (0.206)	-0.228** (0.108)	-0.153** (0.067)	-0.262*** (0.062)	-0.179*** (0.057)
Age^2	0.007*** (0.001)	0.004*** (0.000)	0.003*** (0.000)	0.002*** (0.000)	0.001*** (0.000)
Ln(Income)	0.205* (0.111)	0.149*** (0.056)	0.040 (0.035)	-0.025 (0.032)	-0.034 (0.030)
Number of children	0.166 (0.109)	0.117** (0.059)	0.025 (0.036)	-0.018 (0.032)	-0.025 (0.030)
Employment – Employed	1.663*** (0.232)	0.914*** (0.117)	0.370*** (0.071)	0.056 (0.063)	0.001 (0.061)
Employment – Self Employed	1.903*** (0.373)	0.851*** (0.198)	0.489*** (0.123)	0.187* (0.113)	0.093 (0.106)
Employment – Unemployed	-2.436*** (0.403)	-1.277*** (0.188)	-0.711*** (0.110)	-0.563*** (0.099)	-0.560*** (0.092)
Education – High	-0.130 (0.869)	-0.197 (0.465)	-0.309 (0.297)	0.071 (0.279)	-0.040 (0.279)
Education – Medium	-0.195 (0.785)	0.095 (0.401)	-0.385 (0.255)	-0.143 (0.241)	-0.250 (0.240)
Poor health	-2.045*** (0.149)	-1.047*** (0.079)	-0.566*** (0.050)	-0.393*** (0.044)	-0.350*** (0.040)
Relationship status - Divorced	-1.374*** (0.448)	-0.550*** (0.205)	0.014 (0.121)	0.312*** (0.106)	0.345*** (0.100)
Relationship status – Widowed	-6.578*** (1.419)	-2.754*** (0.606)	-0.752** (0.334)	-0.187 (0.237)	0.079 (0.190)

Relationship status – Never married	-0.060 (0.325)	-0.098 (0.178)	-0.046 (0.121)	-0.057 (0.114)	0.073 (0.107)
Region – North	1.013 (0.937)	0.381 (0.511)	-0.111 (0.312)	-0.425 (0.297)	-0.615** (0.287)
Region – Midlands	2.014** (0.952)	0.348 (0.495)	0.108 (0.306)	0.052 (0.293)	-0.105 (0.276)
Region – East	0.067 (0.757)	0.134 (0.384)	-0.040 (0.244)	-0.002 (0.237)	0.196 (0.226)
Region – South West	1.440 (1.146)	0.496 (0.581)	0.399 (0.362)	0.155 (0.346)	-0.135 (0.292)
Region – Peripheries	1.025 (1.036)	0.561 (0.547)	0.230 (0.341)	0.155 (0.357)	0.062 (0.328)
Year – 1992	-0.641** (0.304)	-0.511*** (0.165)	-0.425*** (0.104)	-0.130 (0.098)	-0.081 (0.090)
Year – 1993	-0.837* (0.450)	-0.485** (0.242)	-0.486*** (0.152)	0.083 (0.141)	0.170 (0.131)
Year – 1994	-0.830 (0.631)	-0.555* (0.333)	-0.607*** (0.206)	0.103 (0.192)	0.097 (0.178)
Year – 1995	-1.182 (0.818)	-0.828* (0.431)	-0.772*** (0.265)	0.160 (0.246)	0.138 (0.227)
Year – 1996	-1.335 (0.998)	-0.992* (0.526)	-0.927*** (0.323)	0.261 (0.299)	0.199 (0.276)
Year – 1997	-1.244 (1.176)	-0.793 (0.625)	-0.923** (0.383)	0.370 (0.356)	0.349 (0.329)
Year – 1998	-1.332 (1.369)	-0.880 (0.723)	-0.929** (0.444)	0.607 (0.411)	0.464 (0.380)
Year – 1999	-0.863 (1.554)	-0.652 (0.818)	-0.788 (0.503)	0.739 (0.464)	0.546 (0.431)
Year – 2000	-1.452 (1.735)	-1.112 (0.916)	-1.118** (0.563)	0.619 (0.519)	0.376 (0.481)
Year – 2001	-1.254 (1.949)	-1.080 (1.027)	-1.200* (0.631)	0.817 (0.581)	0.618 (0.539)
Year – 2002	-1.250 (2.143)	-1.041 (1.130)	-1.184* (0.694)	0.972 (0.640)	0.692 (0.593)
Year – 2003	-0.945 (2.346)	-0.836 (1.235)	-1.127 (0.759)	1.186* (0.699)	0.882 (0.649)
Year – 2004	-1.102 (2.540)	-0.963 (1.339)	-1.295 (0.821)	1.130 (0.758)	0.828 (0.704)
Year – 2005	-1.736 (2.918)	-0.915 (1.508)	-1.623* (0.922)	0.937 (0.845)	0.371 (0.775)
Year – 2006	-0.946 (3.165)	-1.612 (1.648)	-1.531 (1.003)	1.318 (0.918)	0.694 (0.851)
Year – 2007	-3.274 (3.701)	-1.196 (1.841)	-1.653 (1.136)	1.365 (1.035)	0.999 (0.959)
Constant	26.469*** (6.268)	25.076*** (3.288)	28.858*** (2.025)	35.896*** (1.864)	35.638*** (1.737)
Number of observations	93,711				

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Table 4.21: Fixed effects unconditional quantile results: control variables for retirement analysis

	Percentile				
	10th	25th	50th	75th	90th
Social Capital	0.393**	0.129*	0.096**	0.222***	0.130***
	(0.159)	(0.071)	(0.043)	(0.042)	(0.033)
Age	0.266	0.332	0.323*	-0.307*	-0.105
	(0.609)	(0.272)	(0.167)	(0.169)	(0.128)
Age^2	-0.007**	-0.004**	-0.002*	0.002*	0.001
	(0.004)	(0.002)	(0.001)	(0.001)	(0.001)
Ln(Income)	0.317	0.023	0.042	0.042	0.102**
	(0.273)	(0.111)	(0.066)	(0.065)	(0.052)
Number of children	0.696	0.330	0.002	-0.126	-0.103
	(0.489)	(0.239)	(0.145)	(0.141)	(0.103)
Employment – Employed	3.685***	1.600***	0.463***	0.091	-0.086
	(0.642)	(0.268)	(0.152)	(0.146)	(0.103)
Employment – Self Employed	3.656***	1.454***	0.402*	0.277	0.094
	(0.849)	(0.371)	(0.219)	(0.218)	(0.169)
Employment – Unemployed	-1.040	-0.538	-0.313	-0.349*	-0.197
	(0.928)	(0.382)	(0.218)	(0.203)	(0.164)
Education – High	-0.932	1.594	-0.071	-0.824	-0.334
	(3.135)	(1.916)	(0.997)	(0.903)	(1.041)
Education – Medium	0.496	-1.585	-1.037	-1.505***	-0.898
	(1.903)	(1.030)	(0.679)	(0.498)	(0.652)
Poor health	-1.737***	-0.895***	-0.588***	-0.430***	-0.214***
	(0.296)	(0.130)	(0.089)	(0.088)	(0.074)
Relationship status - Divorced	-0.233	-0.236	0.329	0.163	0.231
	(1.166)	(0.453)	(0.276)	(0.322)	(0.236)
Relationship status – Widowed	-5.764***	-2.015***	-0.931***	-0.892***	-0.414**
	(1.147)	(0.535)	(0.302)	(0.290)	(0.182)
Relationship status – Never married	2.248	-0.937	0.682	1.023	-0.281
	(1.975)	(0.843)	(0.695)	(0.689)	(0.532)
Region – North	3.853	2.908*	2.221**	1.847	1.137
	(3.546)	(1.746)	(1.098)	(1.139)	(0.931)
Region – Midlands	1.622	2.045	1.373	1.292	1.477*
	(3.238)	(1.614)	(0.939)	(1.164)	(0.845)
Region – East	1.200	1.090	0.424	0.807	1.130**
	(1.520)	(1.085)	(0.568)	(0.739)	(0.553)
Region – South West	3.195	1.764	1.688**	1.862**	2.039***
	(2.682)	(1.307)	(0.765)	(0.923)	(0.684)
Region – Peripheries	1.135	1.560	1.597*	1.456	0.748
	(2.536)	(1.435)	(0.896)	(1.072)	(0.827)
Year – 1992	0.881	-0.166	-0.538***	-0.319*	-0.109
	(0.694)	(0.310)	(0.197)	(0.189)	(0.157)
Year – 1993	0.721	0.146	-0.568**	-0.103	-0.151
	(1.041)	(0.459)	(0.285)	(0.269)	(0.215)
Year – 1994	1.246	-0.140	-0.790**	-0.103	-0.022
	(1.459)	(0.641)	(0.381)	(0.366)	(0.296)
Year – 1995	2.208	0.256	-0.678	0.116	-0.067
	(1.889)	(0.827)	(0.492)	(0.467)	(0.376)
Year – 1996	2.675	0.320	-0.994*	0.221	-0.056

	(2.308)	(1.002)	(0.601)	(0.570)	(0.458)
Year – 1997	2.921 (2.738)	0.633 (1.190)	-1.032 (0.711)	0.304 (0.675)	-0.025 (0.547)
Year – 1998	3.959 (3.173)	1.067 (1.376)	-0.929 (0.823)	0.582 (0.783)	0.059 (0.632)
Year – 1999	5.129 (3.603)	1.389 (1.558)	-0.799 (0.933)	0.862 (0.882)	0.299 (0.715)
Year – 2000	5.634 (4.007)	1.419 (1.741)	-0.987 (1.043)	0.814 (0.989)	0.194 (0.803)
Year – 2001	6.092 (4.511)	1.574 (1.954)	-1.269 (1.167)	0.952 (1.108)	0.305 (0.896)
Year – 2002	7.054 (4.954)	2.080 (2.149)	-1.134 (1.281)	1.290 (1.218)	0.394 (0.986)
Year – 2003	8.352 (5.414)	2.459 (2.351)	-1.183 (1.402)	1.452 (1.331)	0.397 (1.074)
Year – 2004	8.465 (5.869)	2.574 (2.545)	-1.214 (1.514)	1.557 (1.437)	0.471 (1.160)
Year – 2005	8.315 (6.330)	2.818 (2.753)	-1.600 (1.646)	1.163 (1.558)	0.326 (1.263)
Year – 2006	10.457 (6.917)	3.262 (2.969)	-1.454 (1.765)	1.643 (1.669)	0.517 (1.347)
Year – 2007	10.367 (7.344)	3.330 (3.167)	-1.481 (1.887)	2.006 (1.792)	0.412 (1.450)
Constant	16.520 (25.559)	14.958 (11.320)	13.362* (6.865)	38.956*** (6.769)	32.353*** (5.255)
Number of observations	30,467				

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively. The brackets show the standard errors**

Chapter 5

An exploration of the direct and indirect influences of religiosity upon well-being

In the well-being literature religion has regularly been used as a control variable, almost universally finding a positive relationship. The literature that has focussed specifically on religion is somewhat scarcer, however, being a niche area of interest for several decades. For a comprehensive review of the literature see Koenig et al. (2001, 2012) and, more recently, Rizvi and Hossain (2017). These studies have also generally found a positive relationship between religion and well-being. However, there are many other significant determinants of well-being (see Chapter 2 for some examples), which are also affected by religion. There is a question, therefore, of whether these effects may lead to religion not only directly, but also indirectly, affecting well-being.

On top of the question of direct and indirect effects there are many other questions that this chapter will shed light on. First, with various measures of both religiosity and well-being used in the literature, it is important to ask the question: how is religiosity/well-being measured, and do different measures yield similar results? There is also the question of how males and females may differ both in their religiosity and also in how that religiosity affects their well-being. It is also important, when looking at religiosity, to consider how individuals of different religions/denominations are affected by their religiosity. Finally, with most studies considering the main religion of the country in which the study takes place, there is little evidence on how individuals of minority religions are affected by their religiosity (and those studies that do take this into account tend to look only at one particular religion and fail to compare to the majority religion, e.g. Diwan et al., 2004; Jamal and Badawi, 1993; Tarakeshwar, 2003a and 2003b). This study should therefore give some insight into how individuals of minority religions are affected by their religiosity.

Following is an expansion of some of the research on religiosity, picking up on the highest quality articles[19] that introduce something new to the research. The next section will look at the data being used in this study, followed by the methodology. The results will then be shown, with the conclusion to the study following the results.

5.1 Literature Review

The literature reviewed here will first look at the different religions/denominations on well-being (with the first section – Christianity and well-being – being the literature where the predominant focus is on Christianity, although other religions/denominations may be mentioned). Next will be the literature considering the relationship between religion and mediating variables[20]. For the literature on the relationship between the mediating variables and well-being see Chapter 2 and the literature reviews in Chapter 3 and Chapter 4.

5.1.1 Christianity and well-being

One early study specifically looking at religion's effects upon well-being is that by Hadaway and Roof (1978). They use Campbell et al.'s (1976) Quality of American Life survey, which interviewed 2,164 individuals in the United States (excluding Alaska and Hawaii). They explore religion as a source of meaning and belonging, evaluating the effects that these have on worthwhileness of life (on a 7 point scale). For meaning, the interviewees are asked how important their faith is to them, ranging from not at all important to extremely important. Belonging is measured by frequency of attendance at a religious service and whether the individual belongs to a church or synagogue. They find a significant correlation between all measures used for religion and worthwhileness of life, with the importance of faith being highly correlated (as the largest predictor of life satisfaction when in a model including number of friends, marital status, age, education, health, income and race). They also find that the correlation between the religious variables and worthwhileness of life is increasingly significant for Protestants, Catholics and other Christians respectively; however, those who identify as Jewish see no significant correlation between religion and worthwhileness of life.

[19] The quality is judged by Koenig et al. (2001, 2012), who use a 10-point scale based on data and methodology. By only considering the high quality articles it limits the amount of erroneous evidence. All articles included here that are not reviewed by Koenig et al. are of un-rated quality.
[20] The mediating variables will be explained in greater detail in the methodology section.

Hadaway and Roof (1978), while performing a relevant and revealing study, do identify some limitations. They recognise that the variables consistently found to be of importance in the well-being literature (education, health, income and race) only weakly influence well-being, suggesting that there may be an issue with some of the measures. While religion at the time was not important to everyone, it was of importance to vast areas of American society. Of the 2,129 individuals in this study, only 108 (around 5.1%) consider themselves to be neither Christian nor Jewish. Since there has been a significant decline in the number of Americans who consider themselves to be Christian over the past couple of decades, this research may be less relevant when commenting upon the findings in today's society[21].

Building upon this measure for religious meaning, Pollner (1989) uses a pooled dataset from the 1983 and 1984 General Social Survey to explore individuals' perception of the divine. To do this a new measure for religiosity – divine relationships – is introduced. This new measure asks how individuals relate to the divine (how close they feel to God, how often they pray and how often they feel as though they are close to a powerful, spiritual force that seems to lift them out of themselves). In the study Pollner also includes church attendance, although due to the high correlation between divine relationships and church attendance, the regressions are run twice, once including church attendance and once omitting it. The measure that is used for well-being is life satisfaction (on a scale of 1 to 7) and global happiness, life excitement and marital happiness (each on a scale of 1 to 3). The controls used are age, sex, race, education, income and marital status.

Pollner (1989) finds that divine relationship is a highly significant determinant of well-being. Divine relationships is the most important determinant for all well-being measures, except for life excitement, where it is the second most important after education. When also controlling for church attendance, divine relationships are still highly significant, remaining the most important determinant for life satisfaction and marital happiness. It also remains the second most important determinant for life excitement and becomes the second most important determinant for global happiness after marital status. Church attendance itself is significant only for global happiness and marital happiness.

[21] This last argument may be made for much of the earlier literature reviewed here, due to the increase in atheism/secularism/agnosticism globally within the past few decades.

Another aspect of divine perception that Pollner (1989) explores is image of God. In the General Social Survey the individuals are asked "When you think about God, how likely are each of these images to come to your mind?" on a 4 point scale, with 12 images provided: judge, redeemer, lover, master, mother, creator, father, spouse, friend, king, liberator and healer. These are then divided into three categories, God as ruler (king, judge and master), God as someone to relate to (lover, mother, father, spouse and friend) and God as a source of remedy (healer, liberator, redeemer and creator). There is no significant impact on well-being with God as someone to relate to, however, God as ruler is significantly negative for global happiness and God as a source of remedy is significantly positive for life satisfaction. Including the interaction terms it is found that divine relationships are much more significantly positive on global happiness when God is viewed as ruler, with divine relationships similarly being much more positive on life satisfaction when God is viewed as a source of remedy. This research suggests that the way an individual views God could impact upon how religion affects their well-being.

Ellison et al. (1989) consider the previous literature and conclude that religiosity is comprised of three components: "(1) individual belief and/or personal religious experience; (2) level of participation in organized religious activities; and (3) type and strength of personal identification with a religious community." (Ellison et al., 1989: 103). These components are then explored by Ellison et al., focussing on the effects on general life satisfaction of religiosity as participatory, affiliative and devotional. While employing the controls generally found in this literature (gender, health, marital status, income, education, race, urban/rural and prestige) they also include a control for non-religious sociability in the form of affiliation (member of secular voluntary organisation/association) and intensity (time spent in social situations). In their final model, which contains all control variables along with all variables of interest, it is found that devotional intensity is the greatest religious determinant of life satisfaction, being the third greatest determinant overall (following marital status and income). Frequency of attendance is also significantly, positively related to life satisfaction, however, not as significant as in a previous model where devotional intensity was excluded. Strength of affiliation in this model is found to be insignificant, as is denomination (with the exception of the Baptist churches). Of note is that both of the sociability variables are found to be significantly, positively related to life satisfaction, with intensity being the greater determinant. With two of the religiosity variables (especially frequency of attendance) remaining significant alongside the sociability variables it suggests that enhanced social networks in religious circles are not the sole cause for religion having a positive impact upon life satisfaction.

Recognising the issue with only including a single measure (or very few measures) for religion when exploring well-being, Poloma and Pendleton (1990) draw upon the 1985 Akron Area Survey to look deeper into this relationship. For well-being they use multi-item measures for life satisfaction, negative affect and existential well-being, along with a single-item measure for happiness. For religion they use four indices: religious satisfaction, religious experiences in prayer, satisfaction with church activity and orthodoxy. They also use four single-item measures: closeness to God, "born-again" status, frequency of prayer and church attendance. With this vast selection of religious and well-being variables they are able to explore the importance of using multi-dimensional measures for both religion and well-being. They find that religious satisfaction is the greatest determinant of existential well-being, although it is only marginally significant for life satisfaction and not significant at all for negative affect and happiness. They also find that closeness to God is an important determinant of existential well-being, with prayer frequency being important in determining life satisfaction and happiness. Religious experiences in prayer contributes only to improved happiness. Other measures, such as church attendance, are found to be less significant than has been found previously in the literature. They conclude saying, "A major finding suggests that traditional measures of activity and belief that have been employed in [quality of life] research may not be the best consistent indicators of religiosity". (Poloma and Pendleton, 1990: 271). This research suggests that there is a call for multi-item measures for both well-being and religiosity, with a greater variation in the measures used for the latter.

Looking at religion from a slightly more experiential point of view, Krause and Ellison (2003) explore whether perceived forgiveness by God contributes to an increase in life satisfaction. They use data on a group of older whites and African Americans in the United States (excluding Alaska and Hawaii). The variable used for forgiveness has the statement "I believe God has forgiven me for the things I've done wrong", asking whether the individual strongly disagrees, disagrees, is unsure, agrees or strongly agrees with the statement. For the life satisfaction variable they use a three question measure comprised of past satisfaction, regret (or desire to change the past) and current overall satisfaction with life. Along with forgiveness they also explore church attendance and frequency of private prayer. Another variable that they consider is forgiveness of others. They find that all three measures of religiosity (forgiveness by God, church attendance and private prayer) are significantly related to life satisfaction, however, forgiveness of others is the most significant determinant. This may mean that, assuming "forgiveness" can be removed from being a religious concept, there are indeed other factors determining why religion has positive effects on well-being. Having said that, as the other religiosity

variables are still significant, it suggests that religiosity is still an important variable to consider when exploring well-being.

Using the same data, Krause (2003) explores whether the individual finding "meaning in religion" affects life satisfaction. Krause no longer considers the question of forgiveness but includes a 6 question variable for "religious meaning", determining whether the individual feels that: "God put me in this life for a purpose", "God has a specific plan for my life", "God has a reason for everything that happens to me", "My faith gives me a sense of direction in my life", "My faith helps me better understand myself" and "My faith helps me better understand other people". Using the same measure for life satisfaction as Krause and Ellison (2003), and also including church attendance and private prayer, how religious meaning affects well-being specifically by race is explored. He finds that when not including religious meaning, both private prayer and church attendance are positively associated with well-being, however, once religious meaning is included both become insignificant, with religious meaning taking its place as the greatest determinant of life satisfaction. The result for the interaction term between race and religious meaning is highly significant and suggests that religious meaning has a greater influence on African Americans than on whites when determining life satisfaction.

While religiosity has generally been found to have a positive effect on well-being, Lelkes (2006b) explores whether religiosity could not only enhance positive well-being but also protect against economic shocks. To explore this Lelkes considers Hungary just after the fall of the iron curtain and the collapse of communism – a time of much economic and social change. She collects data from 1992 and 1998 on 5,365 and 3,802 individuals respectively. For the religiosity variable she uses a dummy variable for participation in a religious service at least once a month, with the happiness variable being life satisfaction. She finds that religiosity significantly influences the utility of an individual, with religious individuals having a higher level of utility than non-religious individuals. She also finds that religious individuals receive less utility from money and are therefore less affected by economic change. Conversely, she does find that religiosity does not contribute to increasing well-being, with religious and non-religious people seeing the same changes in well-being over time after the increase in religious freedom that came from the collapse of communism. This suggests that religiosity could protect individuals from economic shocks, but may be less adept at protecting them from other (e.g. political) shocks.

Also exploring how religiosity can protect against shocks, Greeley and Hout (2006) consider the events of 9/11 and investigate how the well-being of religious versus non-religious individuals is affected. They compare the happiness of individuals in 2000, which is before the attack, to the happiness of individuals in 2002, several months following the attack. The measure they use for happiness is a 3-point scale, rating individuals as "very happy", "pretty happy" or "not too happy". They find, naturally, that there is a decrease between 2000 and 2002 in the percentage of individuals who respond as "very happy", with an increase in the percentage of those responding "not too happy". When split by religiosity they find that the increase in those responding "not too happy" is much greater for the non-religious than for the religious (from 10% to 18% versus from 11% to 12% respectively). They argue that this is evidence of religiosity protecting against negative shocks like terrorist attacks. While this may be true, there are several issues with this study, such as an overly simplified dichotomy between religious and non-religious individuals and no controls for other important well-being determinants. These results may therefore be taken as what they are – interesting, but further research would be required before attempting to draw robust conclusions in this area.

Where most of the previous research is cross-sectional, Koenig and Vaillant (2009) perform a cohort study to identify how past religious experiences affect "present" well-being. They use the cohort of 456 men followed by Glueck and Glueck (1950), exploring how attributes at age 47 (or health at the age of 45) affect objective health, subjective health and subjective well-being at age 70. By the age of 70 there are 249 fewer individuals remaining in the cohort (through attrition or inactivity), so the sample used by Koenig and Vaillant is 207. For the subjective well-being measure they use a scale ranging from 0 to 40 created from satisfaction with various aspects of life (work, children, friends and marriage) and the highest satisfaction with either community service, a hobby or a sport. They find that church attendance at 47 has a highly significant positive effect on subjective well-being at age 70. They also find that social class and years of education at 47 are significant, with mood at 47 being highly significant. As church attendance is still significant despite controlling for social class and mood it would again suggest that religiosity is important in its own right, rather than just being a proxy for social capital and personality.

One final study of interest is that by Schweitzer et al. (2007) who interview 13 Sudanese Christian refugees living in Australia. In this qualitative study they ask the refugees what the key factors are in them being able to cope with pre-migration, transition and post-migration stressors. The interviewers

identify 4 key factors aiding in the coping process: family and community support, personal attitudes and beliefs, comparison with others less fortunate and religion. The respondents feel that their belief in God allowed them to regain control and meaning. Similarly, through prayer they feel emotional support, helping them to better deal with unhappiness and loneliness. Finally, their religion allows them to expand their social connections. While there is no quantification in this study, it is of interest in identifying how religion may act as a coping mechanism and may inform future research.

All of the studies reviewed here find a positive relationship between the religious variable and well-being. The reason for this is that of all the literature reviewed by Koenig et al. (2001, 2012) over 78% found a positive relationship. Less than 5% of the studies found mixed results, with less than 16% finding no association between religion and well-being, and less than 1% finding a negative association. On top of this, those finding no association or negative association are, on average, of a lower quality than those finding positive association. Due to the overwhelming evidence to suggest that there is a positive relationship between religion and well-being the studies finding no or negative association have been omitted here.

5.1.2 Other religions

As recognised by Rizvi and Hossain (2017: 1565), the literature specifically considering Christianity and well-being has become somewhat less of interest, being replaced instead by an increased interest in other religions' relationship to well-being. While still not as researched as Christianity, there are some studies of interest that will be reviewed here.

5.1.3 Judaism and well-being

Much of the research considering the effects of Jewish religiosity upon well-being explores Israeli Jews. This research is of general interest. However, due to cultural differences between Israel and the UK, as well as differences in religious demographics, these studies may be lacking in importance to this research. There is one study of note (Cohen, 2002) that looks at the effects of Judaism on well-being in the US, which is culturally more similar to the UK. He includes religiosity variables considering congregational support, religious belief and spirituality, and explores how it affects the happiness of Catholics, Protestants and Jews. He finds that Jews are unaffected by any of the religiosity variables. Due to the small number of Jewish respondents in this study (50), plus the single-item measure for

well-being, he performs further analysis which includes almost double the number of Jewish respondents (95) and considers two other well-being measures: the satisfaction with life scale and the delighted-terrible scale. In this second study he also controls for neuroticism, trait optimism and trait pessimism, to remove personality traits. He finds that Jews receive no boost to satisfaction with life, and only receive a slightly higher "delight" due to support from their religion and their spirituality. However, the spirituality effect is much smaller than that for both Catholics and Protestants, with the support effect also being smaller than that for Catholics (although only slightly greater than that for Protestants). Overall it may be argued that religiosity for Jews in the US has very little, if any effect on well-being, especially when compared to their Catholic or Protestant counterparts.

The research that considers Judaism in Israel tends to find that there is a positive relationship between religiosity and well-being for students (see Francis and Katz, 2002; Francis et al., 2004; Vilchinsky and Kravetz, 2005), while for the elderly the results are less clear (compare Shkolnik et al., 2001, who finds a positive effect to Iecovich, 2002, who finds no effect). Little other research has been performed specifically considering Judaism and well-being.

5.1.4 Islam and well-being

While the research on Islam and well-being is more global than the Judaism research (which focusses almost solely on Israel), the nations where the research takes place are predominantly middle-eastern. This being the case, there are again few studies that shed much light on Islam in the UK, which has a different culture and religious demographic. However, one study that is useful for this is that by Jamal and Badawi (1993) who consider the well-being of Muslim immigrants in North America. They explore whether religiosity counteracts the effects of job stress on well-being. Religiosity in this study is a self-reported measure, asking the individual to rate their religiousness on a scale of 1-10 (with 1 being low and 10 being high). They run multiple regressions looking at job stress on well-being, religiosity on well-being and the interaction between job stress and religiosity on well-being, finding that job stress significantly impacts on all 6 measures of well-being, but when interacting with religiosity these effects are smaller (with only 4 being significant, and those having a smaller magnitude). While this supports the hypotheses of Jamal and Badawi it is interesting to note that religiosity is not found to be a significant determinant of any of the well-being measures by itself.

Of the other studies that look at Islam and well-being there is almost universal evidence suggesting positive correlation. In three separate studies looking at Kuwaiti undergraduates, adolescents and personnel[22] respectively, Abdel-Khalek (2006, 2007, 2008) finds a positive relationship between religiosity and well-being. Similar results are found in Pakistan (Gull and Dawood, 2013; Hafeez and Rafique, 2013; Suhail and Chaudhry, 2004), Algeria (Tiliouine et al., 2008), Malaysia (Noor, 2008) and Iran (Jesarati et al., 2013; Sahraian et al., 2013). Overall it can be suggested that being a religious Muslim in a Muslim country is beneficial to overall well-being. However, as this research will consider the UK, which is not a Muslim country, these results may not hold. The relationship between Islam and well-being in the UK could therefore be an interesting area for future research.

5.1.5 Hinduism and well-being

In order to study how Hinduism affects well-being Tarakeshwar et al. (2003a) create the Hindu Religious Coping Scale, assessing what aspects of the Hindu religion enhance coping mechanisms. This scale is split into three sub-categories: God-focused coping mechanisms, spirituality-focused coping mechanisms and religious guilt, anger and passivity coping mechanisms. They then use this scale to explore how well-being differs between those with different degrees of religious coping. Looking at 164 Hindus living in the US they evaluate religious coping on life satisfaction, depressed mood and marital satisfaction (the last of which only includes 87 participants). They find that God-focused coping has a highly positive effect on life satisfaction, but not on the other well-being measures. Spirituality-focused coping is not found to be significant for any measure of well-being. Finally, coping in the form of religious guilt, anger and passivity has a strong negative impact upon life satisfaction and marital satisfaction, with a strong positive impact upon depressed mood. This would suggest that there are both positive and negative influences of Hinduism on well-being, with the God-focused aspect leading to positive well-being and the more emotional aspects leading to negative well-being. The authors do recognise the limitations of this study, noting that this is one of the first to be performed on Hindus in the US and using a completely new scale.

Along with this study, Tarakeshwar et al. (2003b) also explore religious practices of Hindus in the US, testing whether these religious practices affect well-being. Following 182 US Hindus they tested the effects of devotion, ethical action[23], knowledge and yoga on four measures of well-being: life

[22] Personnel of government ministries, institutions or the private sector.
[23] How ethical principles influence organisation of life, work, role as a son or daughter and personal daily habits.

satisfaction, depressed mood, physical health and marital satisfaction. They find that devotion has a positive effect on depressed mood and a negative effect on marital satisfaction, suggesting that the more devout the Hindu the worse off. Ethical action conversely leads to a lower depressed mood and improves both life and marital satisfaction, suggesting that ethical action has a positive effect on overall well-being. Knowledge has no effect on any of the well-being measures. Finally, yoga is found to have a positive impact on physical health but a negative impact on marital satisfaction. This study therefore finds that there are mixed results to how Hinduism affects well-being depending on the prevalence of different religious practices (or "pathways") adopted by the individual.

A study by Diwan et al. (2004) investigates how Indian immigrants to the US (79% of whom are Hindu) experience positive and negative affect. Using a 5-item measure for religiosity, composed of meditation, prayer, reading holy books, participation in spiritual discourse and attendance of religious functions, they find that religiosity has no impact on positive affect, and a weak but negative impact on negative affect. This would suggest that the higher the religiosity of a Hindu, the less likely they are to suffer negative affect, however, they will not receive a boost to positive affect.

The other studies looking at the effects of Hinduism on well-being focus on India, finding unanimous evidence of a positive relationship. There is a positive effect of Hinduism on well-being through religious practice (Bijlani et al., 2005; Maheshwari and Singh, 2009), as well as spirituality (Gupta and Chadha, 2014). There is also a positive impact upon mental and physical health (Bijlani et al., 2005; Rammohan et al., 2002). However, considering how the consistency of these results differs from the mixed results among US Hindus it once again may not translate to Hindus living in a non-Hindu country, especially the UK, which would be similar in culture and religious demographic to the US.

5.1.6 Buddhism and well-being

There are very few studies that consider Buddhism in and of itself when considering religiosity. Several of the studies reviewed here recognise the inclusion of Buddhists in the sample but neglect to perform research on just Buddhists or to control for religion/denomination. One study that clearly differentiates between religions is that by Tsai et al. (2007). They look at Christian and Buddhist students in the US, roughly half of which (of both religions) are oriented to American culture, with the other half being oriented to both American and East Asian culture. They explore positive and negative

affect, examining how the religions differ in their beliefs on affect, as well as examining how current practitioners of each religion experienced the affect. They find that Buddhists and Christians experience positive affect to a similar degree, however, individuals of both religions experienced greater positive affect than those of no religion, suggesting that having a religion of some form (whether Christian or Buddhist) would lead to positive affect.

Studies in Singapore (Ibrahim and Chung, 2003; Sim and Loh, 2003) and Taiwan (Liu et al., 2012) suggest that there are no effects from Buddhism on well-being[24], although these studies are missing clarity on the exact influence of Buddhism, as opposed to religiosity in general. There are either no effects (Jung, 2014), or possibly negative effects (Kim, 2003) for South Korea. Yamaoka (2008) considers several nations/areas of East Asia, finding once more that there is no significant impact of religion upon well-being. These results together would suggest that Buddhism has little impact on well-being in Buddhist heavy nations.

5.1.7 Religion and well-being conclusion

One of the most commonly used religious variables in the existing literature is the frequency of attendance at a religious service[25]. In studies where this is the sole religiosity variable there consistently appears to be a significant, positive relationship between religion and well-being. However, once other religiosity or sociability variables are controlled for, the significance of this variable is lessened, sometimes to the point of insignificance. Due to the accessibility and common employment of this variable it is still advisable to include as a measure of religiosity in future studies. The other variables that appear to be of importance are: importance of faith (including closeness to God), frequency of private prayer, religious experience and perception of the divine. Religion/denomination varies in significance, with most results finding it to not have a great effect upon well-being (when other religiosity variables are accounted for). Similarly, whether an individual actually belongs to a religion or not is generally picked up in the other religiosity variables.

[24] Swinyard et al. (2001) compare religiosity's effects on well-being in the US to Singapore, finding similar effects. They argue that as Singapore is a predominantly Buddhist/Hindu nation this supports that religiosity in Buddhism has a positive impact on well-being

[25] This variable is used in most of the articles explored here. It is also used by Helliwell and Putnam (2004), Ortega et al. (1983), Spreitzer and Snyder (1974) and Uppal (2006), to name but a few.

5.1.8 Religion and other variables

When considering the direct and indirect effects of religion on well-being it is important to consider not only religion's effects on well-being, but also religion's effects on the other determinants of well-being. The well-being determinants that will be considered here are social capital, income, employment status, health, marital status and education. The reason for including these variables is due to the significant relationship found between each of these variables and both well-being (see Chapter 2 and the literature reviews in Chapter 3 and Chapter 4) and religion (as will be shown here).

5.1.9 Religion and social capital

One of the greatest uncertainties in the religion/well-being literature is whether religion directly impacts upon well-being, or if that relationship simply captures increased social networks. As some of the studies in the literature have social relationships as controls, with religiosity variables remaining significant, it would suggest that there is some direct influence. What the relationship is between religion and social capital should therefore be a consideration. By identifying this relationship it would shed some light on the direct and indirect effects of religion on well-being.

There is little research performed so far specifically evaluating the effect that religiosity has on social capital. One of the first studies is that by Lam (2006), who looks at membership in voluntary associations by religion. She looks at both the country and individual level to explore how different denominations determine the probability of membership. At the country level (which includes 29 of the 43 countries from the World Values Survey) she finds that members of Catholic countries are significantly less likely to be involved in a voluntary association than in a Protestant country, with members of countries of other religions being even less likely to be involved. She also finds that the proportion of Protestants in the country significantly positively affects membership in voluntary associations. At the individual level she finds that Catholics are significantly less likely to be members of voluntary associations than Protestants, however the strength of this relationship is not as significant as at the country level. People of other religions or no religion do not significantly differ from Protestants in their likelihood of being a member of a voluntary association.

To explore civic engagement and political participation, Hoffman and Appiah (2008) look at voting patterns and engagement in community activities among Americans. They find that the probability of

both voting and civic engagement is increased through church involvement. They find that church involvement significantly positively affects probability of voting, even when interacting church involvement with race, where being black is significantly negatively related to voting. Civic engagement is also positively related to church involvement and is found to be especially strong in black churches. This research is limited in its scope, as it only considers one vote (the 1996 presidential election), however, it does give some insight into church involvement and social capital.

Picking up on a different aspect of social capital, Berggren and Bjørnskov (2011) explore how religiosity affects trust. They perform both cross-country analysis over 109 countries and cross-state analysis over 43 US states. They measure religiosity as whether religion is important in daily life and trust as belief that most people can be trusted. They find that increases in religiosity is significantly negatively related to trust, finding consistent results for both the cross-country and cross-state analysis. The authors argue that this result may be due to the divisive nature of religion, where religious individuals may distrust those of other religions and non-religious individuals may distrust highly religious individuals. They also find that the countries that are not well-predicted by the model are Buddhist countries, suggesting that there may be a split by religion, where individuals who consider their Buddhist religion to be important in daily life actually experience higher levels of trust.

Hastings (2016) goes further by looking at both religiosity and spirituality and how they affect social connectedness. He finds that religious non-attenders, spiritual but not religious individuals and neither spiritual nor religious individuals all have a significantly lower social interaction frequency than religious attenders. Neither spiritual nor religious individuals have the greatest negative effect, with spiritual but not religious individuals having the smallest (while still significantly negative). He also finds that religious non-attenders and neither spiritual nor religious individuals are significantly less likely to have close ties, with spiritual but not religious not being significantly different from religious attenders. These results suggest that it is not just religion that is an important determinant of social capital, but that spirituality may also have an impact, as well as the degree of religiosity (i.e. religious service attender versus non-attender).

Due to there being many dimensions to social capital the measure for social capital in the literature reviewed here varies from the measure that will be used in this research. Some of the measures explored here consider just one aspect of social capital, with others creating a measure comprising

various components of social capital. However, due to the inconsistency of the findings in this literature it will be important to consider which aspects of social capital are used/included in the research here.

5.1.10 Religion and income

There is very little research that has been performed exploring empirically the effects of religiosity on income[26]. One study by Brown (2000) looks at South Asian communities in the UK, exploring how economic activity varies by religion. He finds that there are many more Muslims in the lower income bands than Sikhs, Hindus and other religions. Within religious groups there are further differences, where Bangladeshi Muslims are worse off than other Muslims. However, Indian Muslims are over-represented in the top income band, with over a third of all Indian Muslims being in the top income band. Hindus and "other" religions are also highly represented in the top income band. This study shows that there is indeed a difference in earnings for members of a minority religion in the UK. However, there is still some uncertainty due to missing variables such as human capital, which could explain these differences. There is also no control for the main religion of the UK – Christianity.

By using regression analysis and including UK ethnic and religious majorities (white British and Christians), Lindley (2002) builds upon this research. Using non-religious, white people as her reference group she finds that only males of "other religions" have a positive earnings coefficient. However, due to the nature of this group it is difficult to say which "other" religions are better off. Interestingly, the only females to be affected by their religion are Christians, who have a significantly negative impact upon their earnings. Male Hindus of African Asian ethnicity are negatively affected by their religion, although overall Hindus find no significant negative impact upon their earnings. All male Muslims and Sikhs are negatively impacted by their religion, regardless of ethnicity. While this study does shed more light on the effects of religion upon income, it still lacks clarity on true religiosity (as it simply uses self-reported religion).

[26] Much research has been done indirectly, by looking at religion's effects on social capital, education, work ethic, etc. with other research looking at how each of these variables affects earnings/income. However, the research considering directly the impact of religiosity upon earnings/income is sparse.

Dilmaghani (2011) considers how religiosity affects the earnings of Canadians. She uses 3 unique measures for religiosity: importance of religion, individual religious practices and group religious practices, as well as an index comprising these three components. She finds that overall there is a significantly negative relationship between religiosity and earnings. There is a significantly negative effect for the religiosity index on the natural log of hourly wages, which could be explained by all three of the components also finding a significantly negative effect. When all three components are included in the model (without the index), only group religious practices is found to not be significantly negative, which may be due to the social aspect of the group practices and the positive relationship between social capital and earnings.

When considering whether religion/denomination is important, Dilmaghani (2011) finds that Catholics, Muslims and "Other religions" (including Buddhism, Hinduism, Sikhism, etc.) suffer most severely for their religiosity. However, when religion/denomination is interacted with religiosity it is found that a greater degree of religiosity does not affect Muslims, but does affect those in the Catholic, Jewish and "Other religions" negatively. Protestants find no significant premium or penalty, even when taking into account the intensity of religiosity. This suggests that the variance of religiosity may affect some denominations or religions more, where others (such as Islam) are less sensitive. From this study it can therefore be argued that religiosity will not have a positive effect on earnings, and may in fact lead to a pay penalty.

Dilmaghani (2015) follows up on this research by considering how gender affects these results. With the literature suggesting that females receive a pay penalty and are also more prone to religiosity, Dilmaghani explores whether the gender effects explain away the previous findings on religiosity and earnings. She finds that even when accounting for gender there is a significant penalty for overall religiosity. Importance of religion and individual religious practices are significantly negative again, with group religious practices being significantly positive. Interestingly, when gender is interacted with the three religiosity components, gender only makes a difference for individual religious practices, where females who engage more in individual religious practices actually find a significant pay premium.

5.1.11 Religion and employment status

Previously there was much research into the effects of ethnicity upon economic activity, with little focus on religion. However, Brown (2000) argues that the variation in economic activity within ethnicity would suggest that another factor is of importance. He goes on, therefore, to explore differences in economic activity in South Asian communities in the UK taking into account religion. He concludes that the ethnic group variables available are indeed lacking in their power to wholly explain differences in economic activity. He finds that, compared to Hindus, Sikhs are less economically active, with less representation in "top status jobs" and with lower earnings. Indian Muslims are more advantaged than other South Asian Muslims, being more likely to be economically active and receiving higher earnings. While this research is useful in identifying the existence of religious effects, it is unable to identify causality. There is also some uncertainty, due to the data available at the time, as to whether this is the whole story, with the author himself suggesting that other variables may explain away these differences (such as human capital).

Following on from this research Lindley (2002) also looks into how religion affects economic activity, using probit analysis. With non-religious, white individuals as the reference category she finds that Hindus and other non-religious individuals experience no significant difference in economic activity. White, Christian males are significantly more likely to be in employment than their non-religious counterparts, although females are unaffected by religion. Pakistani Muslims of both genders are the most negatively affected by their religion, with female Bangladeshi Muslims also having less likelihood of being in employment. Both males and females of "other" religions are also less likely to be in employment. This research supports the findings of Brown (2000) while also identifying positive discrimination towards white Christian males.

Heath and Martin (2013) improve upon previous research by more accurately identifying religion and ethnicity effects. To do this they analyse only the ethnic groups that contain religious diversity (e.g. white British), or vice versa (e.g. Christian), in the UK before comparing these results with those including the ethnic groups with no religious diversity (e.g. Pakistani Muslims), or vice versa (e.g. Sikh). Through this they are able to identify more clearly which effects are truly from religion and which are from ethnicity. They find that Muslim's suffer the greatest negative impact compared to other religions of the same ethnic groups, with females having the most severe effects. Interestingly, the

magnitudes of the negative effects are similar for Muslims regardless of ethnicity, suggesting that religion could have a greater discriminatory effect than ethnicity.

This analysis is taken further still by Khattab and Modood (2015), who similarly attempt to identify the true discriminatory traits, separating ethnicity into two components: visibility (skin colour) and cultural differences (religion). Where previous studies used self-reported ethnic background as their ethnicity variable, by using skin colour it puts more focus on visual discrimination and will therefore pick out different religious effects. They perform logit regressions to identify how 13 different ethno-religious groups compare to the reference of Christian white-British in terms of employment. While finding discrimination by ethnicity, they also find that white Muslims and non-religious white-British both experience an employability penalty, supporting the suggestion that religion indeed has an impact on employability.

5.1.12 Religion and health

There is much research done on the relationship between religion and health. For a comprehensive review of the literature on religion and health see Koenig et al. (2001, 2012). The general finding of this research is that there is a positive correlation between religiosity and health, although the focus here will be specifically on those studies that consider subjective health as this measure has been found to be a significant determinant of well-being and is also readily available in the data used for this research.

One of the earliest studies specifically investigating the relationship between religion and health is by St George and McNamara (1984). They consider how both church attendance and religious strength affect subjective health among black and white people in the United States. They find that white males and females are both positively affected by the strength of their religion but unaffected by church attendance. Conversely, both male and female black people find a negative effect to their health from church attendance. However, only black males experience a boost to health from the strength of their religion. These findings would suggest that the strength of religious beliefs could have a positive impact on subjective health, although race and gender do determine how effective this impact may be.

Taking into account generational differences, Levin and Markides (1985) look at the health and religiosity of three generations of Mexican Americans. Looking at the Pearson correlation coefficients it is found that frequency of attendance at religious services has a positive effect upon the self-rated health of the eldest generation, but has no effect on the younger generations. The positive effect is greater for males than females. Self-rated religiosity has no effect upon self-rated health. Delving deeper, Levin and Markides (1986) perform regression analysis to investigate whether their previous results hold up, controlling for physical capacity[27]. They find that religious attendance has almost no effect on the health of males for any generation. Conversely, females of the oldest and youngest generations experience a significant boost to subjective health from religious attendance, with the older generation experiencing the greater effect. However, when physical capacity is controlled for religious attendance is no longer a significant determinant of subjective health. Due to the correlation between subjective health and physical capacity and the correlation between religious attendance and physical capacity, Levin and Markides suggest that the previously found results were really picking up the effects of physical capacity. These results are challenged by Broyles and Drenovsky (1992) who suggest that there is still a relationship between religiosity and subjective health even when controlling for physical capacity, although the strength of this relationship is small.

A more in-depth analysis by Musick (1996) looks at the difference between religion's effects on health for black and white individuals living in North Carolina, a highly religious state. He uses three measures for religiosity: church attendance, religious devotion and conservativeness of religiosity. These are then regressed against subjective health, with various demographic and control variables included sequentially to give insight into the true effects of the religiosity variables. He finds that both black and white individuals experience positive subjective health effects from increased church attendance, however the effect is lessened when control variables are introduced. Once the type of health problem is introduced into the model church attendance no longer becomes a determining factor of subjective health, however, religious devotion becomes a significant, positive determinant. The conservativeness of religiosity has a significant negative impact upon the subjective health for whites only when no other variables are included in the model. This would suggest that religious devotion would be the most important determinant of subjective health, even though it is insignificant when other control or demographic variables are not considered.

[27] Physical capacity is measured as activity limitations due to health problems.

Including more measures for religiosity, Krause (2002) explores how church attendance, congregational cohesiveness, spiritual support, emotional support and connectedness with God affect subjective health in old age. He finds that church attendance is a highly significant positive determinant of subjective health, with congregational cohesiveness also having a significant positive effect but to a lesser extent. None of the other religiosity variables have a significant effect upon subjective health, including connectedness with God. This would suggest that the social aspect (attendance and cohesiveness) are the important religious factors that lead to greater health, whereas the more spiritual aspects have no effect. These results are supported by Krause (2006a, 2006b), Krause and Cairney (2009).

Interestingly, Krause (2009) found that the opposite was the case, finding that private prayer was significant in determining subjective health where church attendance was not. While not controlling for attendance, Ross et al. (2008), who consider the subjective health of cancer survivors, also find that private prayer is a significant, positive determinant of subjective health. This inconsistency in the results, whether it is the attendance at church or the spirituality that leads to greater subjective health, would suggest that further research is required in this area before the relationship between religiosity and subjective health is fully understood.

5.1.13 Religion and marital status

For meta-analyses on how religion influences marital status see Mahoney et al. (2001) and, more recently, Mahoney (2010). They find that the chance of divorce among religious individuals, especially when the religion of the partner is the same, is significantly lower than for non-religious individuals. This finding is consistent across most of the studies in the meta-analyses, with no findings suggesting that religious individuals would be more likely to divorce. The studies also show that there is a negative relationship between frequency of attendance at religious services and divorce. As well as divorce, the studies explored in the meta-analyses also find that there is a positive relationship between religiousness and commitment to marriage, as well as some evidence towards a positive relationship between religiousness and investment in marriage.

Attitudes towards both divorce and religion have changed over time, however, a more recent study by Tuttle and Davis (2015) uses structural equation modelling to explore the direct and indirect effects

of religion on marital stability. They find that marital infidelity is reduced by religiosity, and that likelihood of divorce is decreased indirectly through an increase in marital happiness. While the latter result is of importance in suggesting that divorce is still less likely among religious people, it is also of importance and significance for the research performed here, as it would suggest that religiosity affects marital status indirectly through well-being, rather than just religiosity affecting well-being through marital status.

Considering the age of marriage in the US, Uecker and Stokes (2008) find that religion and religiosity has a significant influence on the age of marriage in the US. They find that conservative Protestants and people of "other religions" are more likely to get married at an early age than mainline Protestants, with Mormons being much more likely than both to be married at an earlier age. Catholics are much less likely to get married at an early age. Interestingly, there is no difference between mainline Protestants and people of no religion. The frequency of attendance at religious services makes no difference, but the importance of religion has significance, with early marriage being more likely among those who report their religion to be important to them. This research supports the findings of Xu et al. (2005), with the exception of Catholics who, interestingly, are found to have a lower age at first marriage than those of no religion (which contrasts Uecker and Stokes' findings).

To summarise the research performed so far, it has been found that religiosity decreases the probability of divorce and increases the probability of early marriage. With the well-being literature finding a positive correlation between religiosity and marital satisfaction (e.g. Goddard et al., 2012; Olson et al., 2016) it should be expected that there will be a positive indirect effect for religiosity on well-being through marriage.

5.1.14 Religion and education

The relationship between education and religion is an interesting one, as there are different findings in the literature between years of schooling and intelligence. Much of the research, going back as far as Howells (1928) and Sinclair (1928) finds that the greater the level of religiosity (measured primarily as belief in God and/or the afterlife) the lower will be the intelligence. This research has been supported in the more recent literature (see Bell, 2002, for a meta-analysis, which finds that there is a negative relationship between IQ and religiosity in 39 out of the 43 studies). However, the research

also shows that the greater the level of religiosity, the greater will be the years of schooling (see, among others, Boppart et al., 2014; Darnell and Sherkat, 1997; Sander, 1992). As a measure for intelligence is not easily available in the data, years of education will be used in this analysis.

When looking at the effects of education on subjective well-being earlier research finds a significant effect but later research is a little more sceptical about the relationship. A meta-analysis performed by Witter et al. (1984) finds a median effect of education on well-being of 0.13. However, once a control is included for employment this value is less than half (0.06), which would immediately suggest that the effects of education may be lessened when the correct controls are used. As can be seen in Isaacowitz and Smith's (2003) study, once general intelligence is controlled for the effects of education on well-being become insignificant. Once again Kanazawa (2014) supports this by finding education to be an insignificant control variable. D'Agostino et al. (2018) explore the determinants of subjective well-being in Europe and find the significance of education varies greatly, with some countries finding a significantly positive effect, some finding a significantly negative effect, and others (including the UK) finding no significance. It is safe to say that the effects of education on well-being vary, however, within the UK it can be assumed that the effects of education may get picked up through other control variables such as income, employment and intelligence.

5.2 Methodology

In order to determine the direct and indirect effects of religiosity on well-being, and therefore identify a more comprehensive relationship, it is important to consider how the effects are calculated. One methodology that identifies both direct and indirect effects is structural equation modelling, as devised by Baron and Kenny (1986) and built upon by Hayes (2009). This method considers first how religiosity will affect well-being directly. It then goes on to explore how religiosity affects each of the mediating variables (the indirect effects), and how each of these mediating variables affect well-being. It is argued that the product of the coefficients for religiosity on the mediating variable and the mediating variable on well-being will be an approximation of the indirect effect through that particular mediator. Algebraically the model will take the form:

$$WB_i = \alpha_0 + \beta_\theta \sum_{\theta=1}^{9} X'_{\theta i} + \gamma_0 R_i + \lambda_0 P_i + Z_i + \varepsilon_0$$

$$X_{1i} = \alpha_1 + \gamma_1 R_i + \lambda_1 P_i + Z_i + \varepsilon_1$$

$$\vdots$$

$$X_{9i} = \alpha_9 + \gamma_9 R_i + \lambda_9 P_i + Z_i + \varepsilon_9$$

where WB_i is the well-being of individual i; $X_{\theta i}$ are the indirect pathways between religiosity and well-being; R_i is the religiosity of the individual; P_i are the personality traits; and Z_i is a matrix of exogenous control variables. The control variables used for this research will be year, age and its square, number of children, race, region, gender and religion/denomination[28]. The error terms (ε_θ) are assumed to be randomly distributed and are able to be correlated across all equations. As this analysis uses a pooled cross-section, to account for individual effects the standard errors are clustered around the individual. All outcome variables have been standardised, with a mean of 0 and a standard deviation of 1, to allow for clear interpretation of the coefficients. The reference individual will be a British male from London with no religion, in employment and married.

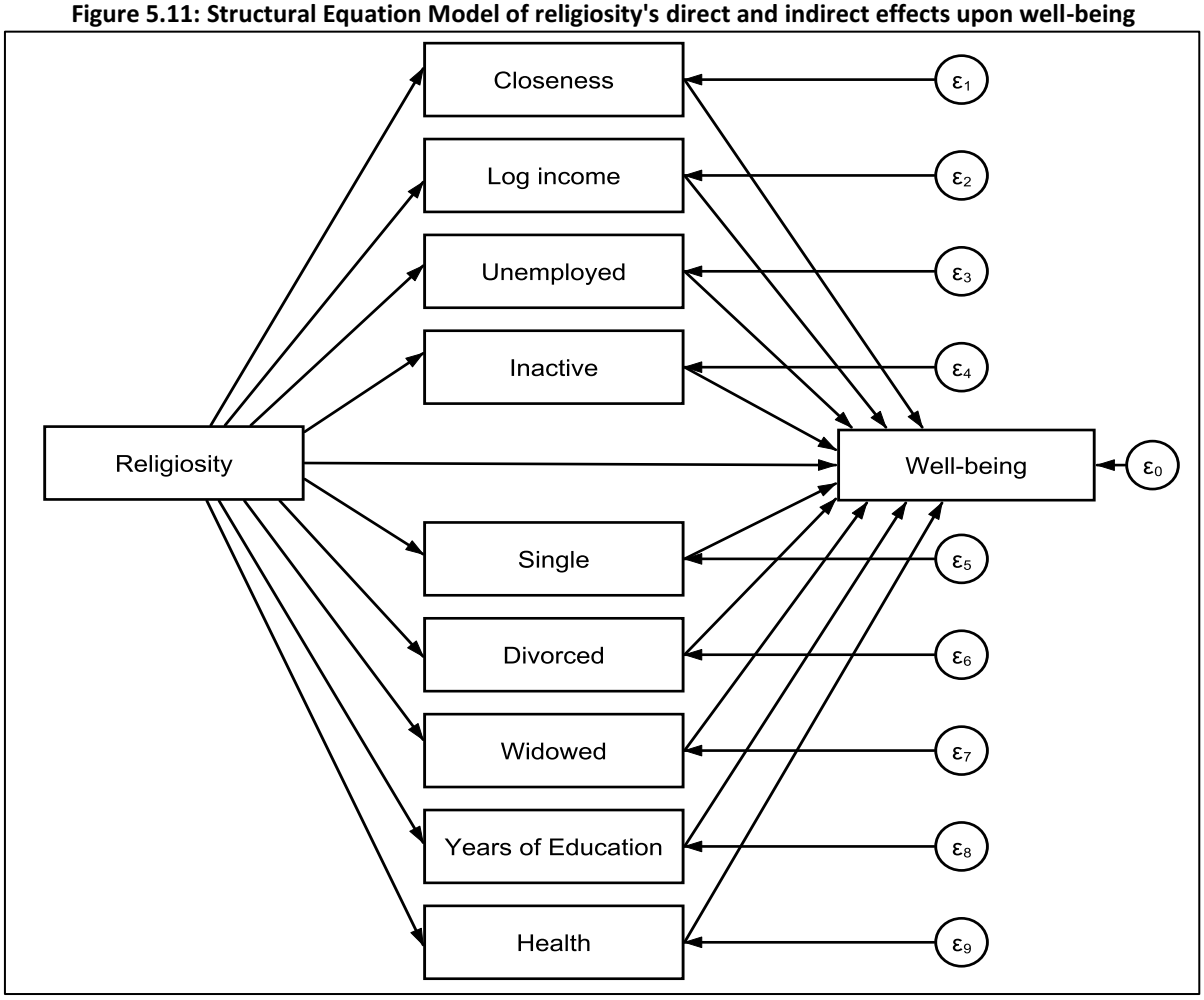
The direct effect of religiosity on well-being for this methodology is determined by the coefficient γ_0, with the indirect effects being calculated as $\beta_\theta \times \gamma_\theta$ for each θ. These give all of the individual indirect effects, with the total indirect effect being $\sum_{\theta=1}^{9} \beta_\theta \times \gamma_\theta$ and the combined effect being the total indirect effect plus the direct effect. This model may be more clearly represented graphically through Figure 5.1. In this diagram the direct effect is identified by the arrow going from religiosity to well-being, with each of the individual indirect effects being identified by the pair of arrows going from religiosity to the mediating variables, and then from the mediating variables to well-being. While the control variables and personality traits are not shown in the diagram, each of the arrows representing a regression include all of the control variables and personality traits.

The reason for including personality traits is to proxy for fixed effects. In their seminal study, Ferrer-i-Carbonell and Frijters (2004) identified the importance of including fixed effects when looking at well-being. They found that the difference between treating the well-being variable as ordinal or cardinal

[28] Gender and religion/denomination will be omitted as control variables when analysis is split by gender and religion/denomination respectively.

was negligible, however, the difference between analysis with no fixed effects and analysis including fixed effects was highly significant. One method identified to take into account the fixed effects is to include personality traits, which are assumed to be fixed over time (these traits will be described in greater detail in the data section).

Figure 5.11: Structural Equation Model of religiosity's direct and indirect effects upon well-being



A limitation of this study is the same as that identified by Powdthavee and Wooden (2015: 124), who performed a similar study on sexual orientation and well-being. They recognise that the simple, uni-directional relationships between the variables are unrealistic. Similarly, in this study, it would be foolish to believe that the causal relationship between religiosity and health, for example, only goes in one direction. However, clearly identifying and testing these relationships is no simple task. It is also difficult to find an instrumental variable for religiosity that is wholly uncorrelated to the dependant variable. A possible solution to this could be to find an instrumental variable similar to that as used by Becker and Wößmann (2009). They use distance from Martin Luther's city, Wittenberg, to measure

the spread of Protestantism, which they argue is exogenous from literacy in Germany (the variable of interest to them), due to how far back Luther's theses and the spread of Protestantism occurred. However, finding a similar instrumental variable for this research is unlikely. As such, this study has limited the analysis to its simplest form, in the interest of opening the door for future research where these bi-directional relationships may be further explored.

5.3 Data

The data for this research are taken from Understanding Society, a longitudinal survey that follows around 40,000 households across the UK. There are currently 7 waves of data (2009-2016), which follow on from the 18 waves of the BHPS[29]. The survey contains various sections, building up data on both household and individual characteristics and attitudes. This allows for a loose approximation of the demography of the UK, as well as giving insight into the culture within the UK (of both natives and immigrants)[30].

The variables that will be necessary for this analysis will be variables for religiosity, well-being, social capital, income, employment, marital status, education and health, as well as personality traits and control variables for year, age, gender, race and number of children. These variables will be described in greater detail in this section. This data will be used as a pooled cross-section. The variables for religiosity, well-being, income, education and health have all been standardised for easier interpretation of the coefficients[31].

5.3.1 Religiosity variables

As has been seen in the existing literature, there are many different variables that may be used to proxy religiosity. There are three variables readily available in Understanding Society: attendance at religious services, whether religion makes a difference to the individual and the frequency of private

[29] See the data section of Chapter 4 for more information on the BHPS.
[30] For a more in-depth overview of Understanding Society see Buck and McFall (2012) and the Understanding Society user guide (Knies, 2017).
[31] All descriptive statistics shown here are before standardisation, as such, the mean and standard deviation when analysis occurs will differ.

prayer (outside of a religious service). To explore the importance of which variable is used when considering religiosity these variables will be explored individually.

The variable for attendance at religious services (hereafter, attendance) asks the question, "How often, if at all, do you attend religious services or meetings?" The responses to this question range from 1 to 5, with 5 being once a week or more, 4 being less often but at least once a month, 3 being less often but at least once a year, 2 being never or practically never and 1 being only at weddings, funerals, etc. The variable for whether religion makes a difference (hereafter, difference) asks, "How much difference would you say religious beliefs make to your life?" The responses range from 1 to 4, with 1 being no difference, 2 being little difference, 3 being some difference and 4 being great difference. Finally, the variable for prayer frequency (hereafter, prayer) asks, "Apart from when you are at religious services, how often, if at all, do you pray?" The responses range from 1 to 7, with 7 being every day, 6 being more than once a week, 5 being at least once a week, 4 being at least once a month, 3 being only on special holy days, 2 being less often and 1 being never. The descriptive statistics for the religiosity variables can be found in Table 5.1.

Table 5.1: Descriptive statistics for religiosity variables

Category	Outcome	Whole Sample	Male	Female
Attendance	Once a week or more	0.164	0.156	0.170
	Less often but at least once a month	0.062	0.052	0.070
	Less often but at least once a year	0.142	0.115	0.162
	Never or practically never	0.168	0.182	0.158
	Only at weddings, funerals, etc.	0.464	0.495	0.440
Difference	Great difference	0.209	0.175	0.233
	Some difference	0.171	0.153	0.184
	Little difference	0.146	0.143	0.148
	No difference	0.475	0.529	0.434
Prayer	Every day	0.437	0.355	0.500
	More than once a week	0.090	0.091	0.089
	At least once a week	0.058	0.067	0.051
	At least once a month	0.044	0.037	0.049
	Only on special holy days	0.031	0.033	0.030
	Less often	0.075	0.082	0.070
	Never	0.265	0.336	0.212

Note: These descriptive statistics come from the regressions where life satisfaction is used as the measure for well-being. The means differ slightly when using GHQ, but this difference is negligible

5.3.2 Well-being variables

The measures for well-being used in this analysis will be the single-item life satisfaction and the multi-item GHQ. The life satisfaction question asks how the individual rates their satisfaction on a 7-point scale, ranging from completely dissatisfied (1) to completely satisfied (7). The GHQ asks 12 questions on an individual's mental well-being, with the responses for each ranging from 0 to 3[32]. The Likert measure, which will be used in this analysis, sums each of these scores leaving a scale from 0 to 36, with 0 being the highest mental well-being and 36 being the lowest. For this analysis the responses of the GHQ have been reversed, meaning that a higher GHQ response would represent a higher level of well-being. As with religiosity, both of the well-being variables will be treated as cardinal variables, rather than ordinal (Ferrer-i-Carbonell and Frijters, 2004; van Praag and Ferrer-i-Carbonell, 2004). The distribution of these scores can be found in Figures 5.2 and 5.3, with the descriptive statistics found in Table 5.2.

As can be seen from Figures 5.2 and 5.3, there is a positive skew in both well-being measures, with few observations at the lower end and the median score being towards the upper end (6 out of 7 for life satisfaction and 26 out of 36 for the GHQ). This distribution is similar to other well-being distributions found for the UK, which suggests that the average individual has high well-being, but few have very high, low or very low well-being.

Table 5.2: Descriptive statistics for well-being variables

Category	Variable	Mean	Min	Max
Well-being	Life satisfaction	5.199	1	7
	GHQ	25.090	0	36

Note: The descriptive statistics for well-being come from the regressions where attendance is used as the measure for religiosity. The means differ slightly when using difference or prayer frequency, but this difference is negligible

5.3.3 Mediating variables

The mediating variables used in this analysis are social capital, income, employment, marital status, education and health. These variables were chosen due to a significant relationship being found between these variables and both religiosity and well-being (as can be seen in the literature reviews in this chapter, Chapter2, Chapter 3 and Chapter 4). These significant relationships suggest that an

[32] The GHQ questions can be found in Appendix 4.A.

indirect effect may be found between the religiosity variable and well-being variable, through these mediating variables. The descriptive statistics for these variables, as well as for the control variables, can be found in Tables 5.3 and 5.4[33].

There is no direct measure for social capital in Understanding Society, so the measure that will be used to proxy social capital is closeness. This variable is created through item response theory. For a brief explanation of item response theory see the data section of Chapter 4, specifically the control variable section considering social capital. While the methodology for creating this variable is the same as in Chapter 4, the variables available in Understanding Society are different to those available in the British Household Panel Survey, and as such a new measure must be created. The variables used with item response theory in this analysis can be found in Appendix 5.B. The reason for using closeness as the proxy for social capital is because data was available in all 7 waves of Understanding Society to create this variable, allowing for an approximation of social capital that does not limit the time range for this analysis. The closeness variable that is created for this analysis has a mean of just less than 0, with a range from -1.303 to 0.992. With this variable, a positive value suggests positive feelings of closeness to others, with a negative value suggesting the opposite.

For income, the measure used was the natural log of total household net income. With a mean value of approximately 7.8, but a minimum value below 0 and a maximum value of just under 10, it is clear that income is positively skewed. Education is determined through years of education. This measure is calculated through determining the highest qualification achieved and then converting that to years in education (e.g. a response of GCSE or equivalent would suggest 12 years of education). While this measure is not exact it does give a good approximation of the years spent in education. For a breakdown of the conversion from highest qualification achieved to years of education see Appendix 5.C. The variable used for health is a subjective measure that asks, “In general, would you say your health is…” giving 5 possible responses ranging from poor (5) to excellent (1). For this analysis these results have been reversed leading to a higher score suggesting better health.

[33] Table 5.3 shows the descriptive statistics for the analysis of attendance on life satisfaction. The descriptive statistics for the analysis of difference on life satisfaction or GHQ, or attendance on GHQ, are all very similar, and so only one set of statistics is shown here. Table 5.4 shows the descriptive statistics for the analysis of prayer on life satisfaction, as these statistics vary somewhat to those in Table 5.3. The descriptive statistics for prayer on GHQ varies little to those in Table 5.4, and so are not shown here. The other descriptive statistics can be found in Tables 5.19 to 5.22 in Appendix 5.A.

Figure 5.12: Histogram of life satisfaction scores

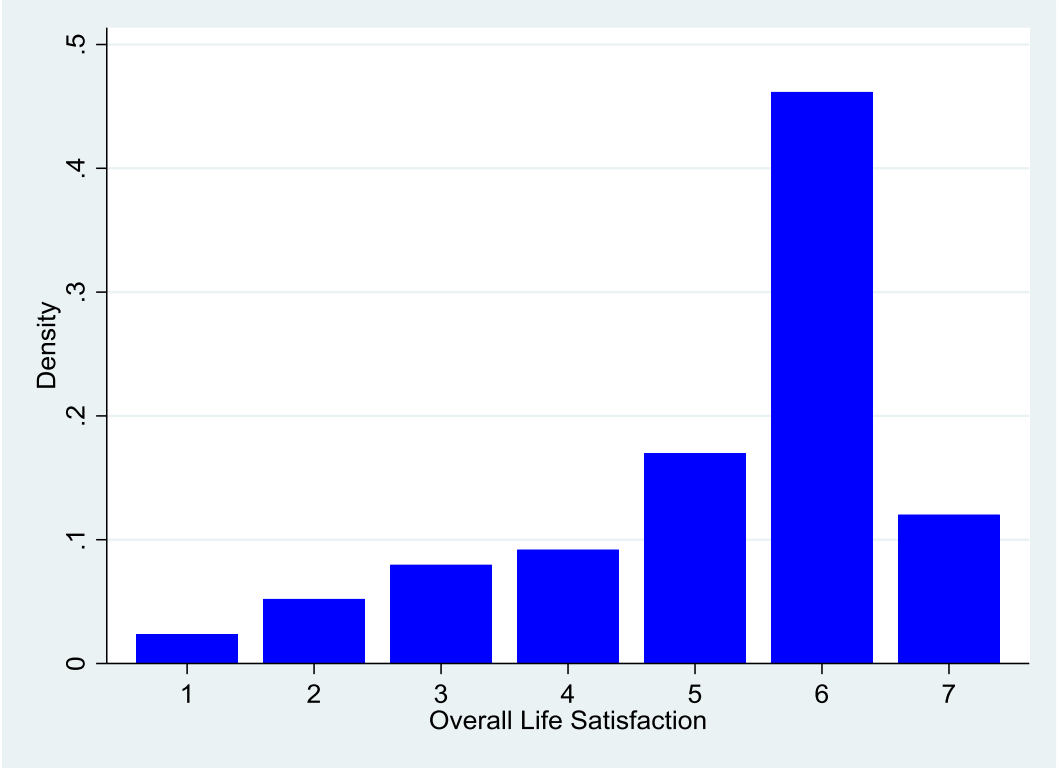
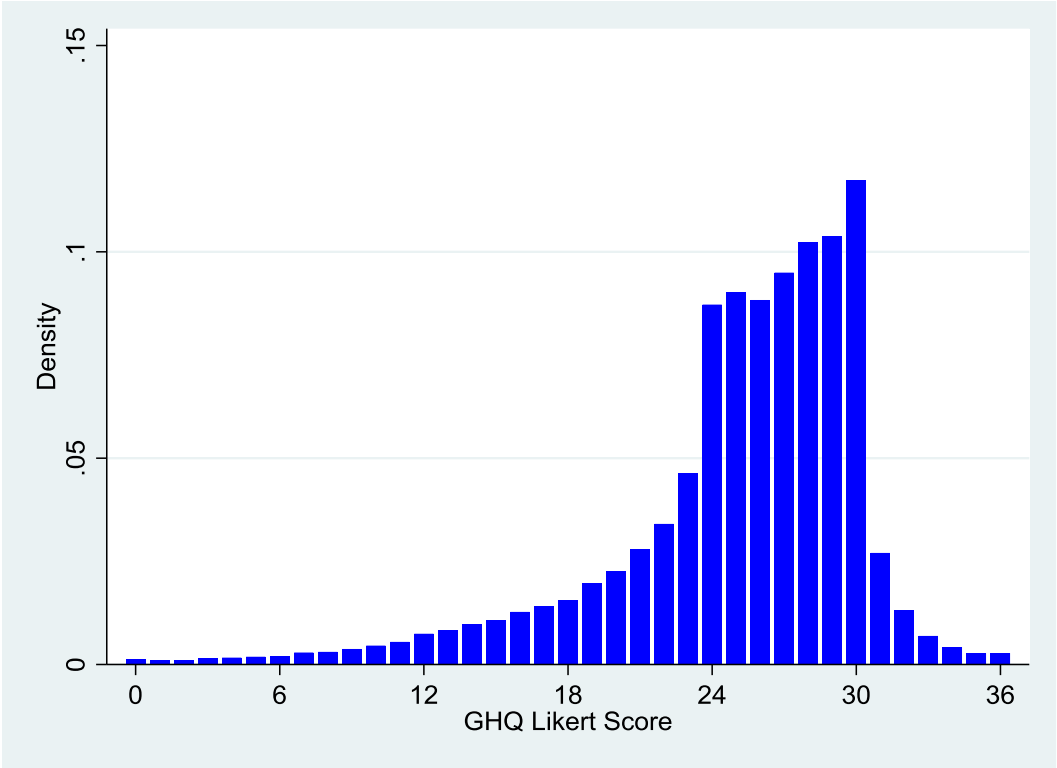


Figure 5.13: Histogram of GHQ-Likert scores



Employment is split into 3 dummy variables: in employment, unemployed and inactive. In employment includes both employed and self-employed, with inactive making up all observations not in employment or unemployed. In this analysis, in employment is the omitted variable. Marital status is split into 4 dummy variables: married, single, divorced and widowed. Married includes those who are in a civil partnership. Single encompasses only those individuals who have never been married or in a civil partnership. Divorced includes those who responded as being either divorced or separated. In this analysis, married is the omitted variable.

5.3.4 Fixed effects

As found by Ferrer-i-Carbonell and Frijters (2004), it is important to consider fixed effects when looking at well-being. One method for taking into account fixed effects is to use a persistent, unobserved measure that strongly influences well-being. The big 5 personality traits (agreeableness, conscientiousness, extraversion, neuroticism and openness) satisfy this condition (John and Srivastava, 1999). These traits are believed to be persistent over time and are strong predictors of well-being, and can therefore be included in this model to account for fixed effects.

In Understanding Society, the big 5 personality traits each comprise of 3 variables (see Appendix 5.D). The responses to these variables are recoded such that all responses go in the same direction (e.g. the agreeableness variables are recoded such that a higher score suggests a higher level of agreeableness). Principle component analysis was then used to come up with an individual measure for each of the big 5 personality traits. To allow for easier interpretation of the results of the principle component analysis these results were rotated using the varimax rotation. The descriptive statistics for these personality traits can be found in Tables 5.3 and 5.4 (see also footnote 28).

5.3.5 Control variables

The control variables used in this analysis are gender, age and its square, number of children, religion/denomination, race, region and time. These variables are commonly used as controls in the well-being and religiosity literature. The descriptive statistics for these variables can be found in Tables 5.3 and 5.4 (see also footnote 28).

The variable used for gender is a dummy variable for females. Due to there being clear differences between the well-being and religiosity of males and females the analysis is performed split by gender. Gender is also included as a control variable when the analysis is split by religion/denomination. The variable used for age and its square comes from the age of the respondent at the time of the interview. In the literature it is common to limit the age variable to working age. However, due to age having a significant impact on religiosity (see Koenig and Vaillant, 2009), the age variable has not been limited in this analysis. Number of children was found by asking how many children (under the age of 16) are living in the household. Time is determined through the wave of the survey.

The religion/denomination variable asks the respondent what religion/denomination they are a member of for England/Scotland/Wales and Northern Ireland individually. These regional answers have been combined into one religion/denomination variable. For this analysis these religions have been grouped into non-religious, church of England/Scotland/Ireland (hereafter, Anglican), Catholic, other Christian and non-Christian religions. The reason for limiting these religions/denominations to these groups is due to the number of observations for each group. To fully explore religiosity's effects on well-being, the analysis is also split by religion/denomination.

Race is a subjective measure, in that the individual was asked to identify their own ethnic group. This variable was recoded into 6 groups, including British, other white, Asian, African, mixed race and other race. These groupings were chosen due to frequency of responses for each race category. Also included is region, which is recoded into 3 groups: London, England and the peripheries. The reason for these groupings was due to inconsistent results when using the 12 groups.

5.4 Results

The first set of results will be the effects of religiosity on life satisfaction split by gender, with the second set of results considering the GHQ. This will then be repeated for the analysis split by religion/denomination. In each of the results tables, the first section (γ_θ) shows the effect that religiosity has on each of the mediating variables, with the second section (β_θ) showing the effect that each of the mediating variables has on well-being. The third section ($\gamma_\theta \times \beta_\theta$) shows the individual indirect effects, which is the multiplication of the two direct effects. The direct effect is the effect of

Table 5.3: Descriptive statistics for the analysis of attendance on life satisfaction

Category	Variable	Whole Sample	Male	Female	Min	Max
Gender	Female	0.572	-	-	-	-
Social Capital	Closeness	-0.003	-0.048	0.032	-2.249	1.930
Income	Log income	7.808	7.840	7.785	-2.485	9.903
Employment	In employment	0.570	0.613	0.538	-	-
	Unemployed	0.044	0.053	0.037	-	-
	Inactive	0.386	0.335	0.424	-	-
Marital status	Married	0.547	0.586	0.518	-	-
	Single	0.273	0.283	0.266	-	-
	Divorced	0.124	0.101	0.142	-	-
	Widowed	0.056	0.031	0.075	-	-
Education	Years of education	13.098	13.063	13.123	8	19
Health	Subjective health	2.433	2.426	2.439	0	4
Personality (Fixed effects)	Agreeableness	0.025	-0.160	0.162	-3.709	1.087
	Conscientiousness	0.035	-0.069	0.112	-2.665	0.997
	Extraversion	0.001	-0.047	0.037	-2.382	1.281
	Neuroticism	0.019	0.171	-0.094	-2.186	1.568
	Openness	0.001	0.110	-0.080	-2.509	1.332
Religion	No religion	0.418	0.474	0.376	-	-
	C of E/S/I	0.284	0.253	0.308	-	-
	Catholic	0.098	0.082	0.110	-	-
	Other Christian	0.117	0.100	0.130	-	-
	Non-Christian religion	0.084	0.091	0.078	-	-
Age	Age	49.568	50.194	49.099	16	102
Children	Number of children	0.564	0.510	0.604	0	9
Race	British	0.832	0.830	0.835	-	-
	Other white	0.036	0.033	0.038	-	-
	Asian	0.068	0.079	0.059	-	-
	African	0.035	0.031	0.039	-	-
	Mixed race	0.015	0.014	0.016	-	-
	Other race	0.013	0.013	0.013	-	-
Region	London	0.112	0.115	0.111	-	-
	England	0.725	0.730	0.722	-	-
	Peripheries	0.162	0.155	0.167	-	-
Wave	1	0.212	0.210	0.213	-	-
	2	0.124	0.124	0.124	-	-
	3	0.154	0.157	0.152	-	-
	4	0.214	0.213	0.215	-	-
	5	0.104	0.104	0.104	-	-
	6	0.099	0.099	0.098	-	-
	7	0.093	0.093	0.093	-	-

Note: All values in the Whole sample, Male and Female columns are the means

Table 5.4: Descriptive statistics for the analysis of prayer on life satisfaction

Category	Variable	Whole Sample	Male	Female	Min	Max
Gender	Female	0.569	-	-	-	-
Social Capital	Closeness	-0.096	-0.111	-0.084	-2.249	1.930
Income	Log income	7.863	7.882	7.848	-0.257	9.903
Employment	In employment	0.601	0.682	0.539	-	-
	Unemployed	0.069	0.073	0.067	-	-
	Inactive	0.330	0.244	0.395	-	-
Marital status	Married	0.529	0.569	0.499	-	-
	Single	0.350	0.358	0.345	-	-
	Divorced	0.094	0.062	0.119	-	-
	Widowed	0.027	0.011	0.038	-	-
Education	Years of education	14.048	14.173	13.953	8	19
Health	Subjective health	2.434	2.490	2.392	0	4
Personality (Fixed effects)	Agreeableness	0.057	-0.101	0.177	-3.709	1.087
	Conscientiousness	-0.064	-0.149	0.001	-2.665	0.997
	Extraversion	-0.025	-0.062	0.003	-2.382	1.281
	Neuroticism	0.088	0.178	0.020	-2.186	1.568
	Openness	0.024	0.084	-0.022	-2.509	1.332
Religion	No religion	0.257	0.303	0.222	-	-
	C of E/S/I	0.122	0.110	0.132	-	-
	Catholic	0.088	0.081	0.094	-	-
	Other Christian	0.139	0.102	0.167	-	-
	Non-Christian religion	0.394	0.405	0.385	-	-
Age	Age	42.279	42.794	41.890	16	94
Children	Number of children	0.911	0.822	0.978	0	8
Race	British	0.234	0.250	0.221	-	-
	Other white	0.035	0.035	0.036	-	-
	Asian	0.392	0.416	0.373	-	-
	African	0.196	0.157	0.208	-	-
	Mixed race	0.082	0.073	0.089	-	-
	Other race	0.071	0.068	0.073	-	-
Region	London	0.404	0.402	0.406	-	-
	England	0.535	0.538	0.533	-	-
	Peripheries	0.061	0.060	0.061	-	-
Wave	1	0.129	0.127	0.130	-	-
	2	0.123	0.122	0.124	-	-
	3	0.189	0.194	0.186	-	-
	4	0.172	0.174	0.170	-	-
	5	0.138	0.136	0.139	-	-
	6	0.130	0.127	0.132	-	-
	7	0.120	0.121	0.120	-	-

Note: All values in the Whole sample, Male and Female columns are the means

religiosity on well-being, the total indirect effect is the sum of the individual indirect effects and the combined effects is the sum of the direct and indirect effect. For reference, the results for the whole sample can be found in Appendix 5.E.

5.4.1 Split by gender

To get a more in-depth look at how religiosity influences life satisfaction the analysis is split by gender (see Tables 5.5 and 5.6). Splitting by gender reveals that there are some similarities and some differences in how each gender's well-being is affected by their religiosity. For attendance, females have a slightly larger direct effect, receiving a 1.7% increase in life satisfaction per standard deviation increase in attendance, versus males' 1.6% increase. However, the indirect effect for females leads to a 4.7% increase in life satisfaction, where males only experience a 4.2% increase. This leads to a combined effect for females of a 6.4% increase in life satisfaction, with males experiencing a 5.8% increase. So, while both genders experience a significant, positive, direct and indirect effect from attendance, females seem to receive greater benefit from increased attendance. Neither gender experiences direct effects from difference. However, both genders experience a positive indirect effect (3.6% and 3.7% increase in life satisfaction for females and males respectively). Despite males having a slightly greater indirect effect than females, the combined effects show that females, again, receive the greatest benefit when their religion makes a difference in their life (with a 4.5% increase in life satisfaction, versus males' 4.3% increase). Prayer makes little difference to either gender, yet females do experience a slightly significant positive direct effect, with a 3.3% increase in life satisfaction per 1 standard deviation increase in prayer frequency.

When examining the individual indirect effects there is little variation between attendance and difference, regardless of gender (with the exception of being single for females, which leads to an increase in life satisfaction of 0.2% per standard deviation increase in attendance, with no effect being found for difference). Health has a stronger indirect effect for attendance (a 2.2% increase for both genders) than for difference (a 1.5% increase for females and a 1.7% increase for males), yet it remains the strongest indirect effect regardless of measure of religiosity used. Being inactive seems to have no indirect effect, as well as widowhood for females. There are only 2 significant indirect effects for prayer frequency. Both genders experience a negative indirect effect from income (with a 0.4% decrease in life satisfaction for females and a 0.5% decrease for males), with females experiencing a slight increase from being single (a 0.3% increase) and males experiencing a slight increase from being

widowed (a 0.4% increase). Overall, an increase in prayer frequency has very little indirect effect upon overall life satisfaction.

The previous analysis is then repeated for religiosity's effects on the GHQ (see tables 5.7 and 5.8). Comparing Table 5.7 to Table 5.8 it can be seen that males have an insignificant direct effect from attendance on GHQ, whereas females find a significant, positive effect (with an increase in well-being of 1.4% per standard deviation increase in attendance). The results otherwise show the same story as life satisfaction to a greater degree, with females benefiting more from attendance at religious services than males (compare the indirect effects of a 4.2% increase in well-being for females and a 3.2% increase for males and the combined effect of a 5.5% increase for females with a 3.1% increase for males). Where difference had no direct effect for either gender when considering life satisfaction, the GHQ actually finds a significantly negative direct effect for both females and males (a 1.9% and a 2.5% decrease in well-being respectively). The indirect effects are positive for both females and males (a 3.1% and a 2.6% increase in well-being respectively), leading to insignificant combined effects. There are no direct effects from prayer frequency for either gender, however, females experience a slight negative indirect effect (with a 1.7% decrease in well-being). The combined effects are insignificant for both genders.

The individual indirect effects for the GHQ are similar to that of life satisfaction for both attendance and difference, with the exception of years of education. Where there was a significantly positive indirect effect for both males and females for life satisfaction, the analysis with the GHQ reveals no indirect effect for females for years of education and a significantly negative indirect effect for males (with a 0.5% decrease in well-being per standard deviation increase for both attendance and difference). While most indirect effects for prayer remain insignificant, there are a few minor differences between life satisfaction and the GHQ. For females, income is no longer significant, yet being inactive leads to a significantly negative indirect effect (with a 0.7% decrease in well-being). Similarly, for males, being widowed is no longer significant whereas being inactive has a negative effect (with a 0.3% decrease in well-being). Income also has a slightly less negative effect (compare a 0.2% decrease for the GHQ to a 0.5% decrease in life satisfaction).

From the analysis split by gender it would appear that females are generally more positively affected by religiosity than males. When using the GHQ measure for well-being, the only result that suggests a

Table 5.5: The effects of religiosity on life satisfaction for females

	Female	Attendance	Difference	Prayer
Religiosity on… (γ_θ)	Closeness	0.047***	0.041***	-0.011
	Log Income	0.072***	0.059***	-0.059***
	Employment Status			
	Unemployed	-0.005***	-0.004***	0.006
	Inactive	-0.004	-0.000	0.050***
	Marital Status			
	Single	-0.013***	-0.004	-0.023**
	Divorced	-0.020***	-0.017***	-0.008
	Widowed	0.004	-0.003	-0.003
	Years of Education	0.198***	0.188***	-0.041
	Health	0.091***	0.058***	-0.025
…on Life Satisfaction (β_θ)	Closeness	0.193***	0.187***	0.182***
	Log Income	0.045***	0.046***	0.060***
	Employment Status			
	Unemployed	-0.215***	-0.208***	-0.262***
	Inactive	0.035***	0.030**	0.013
	Marital Status			
	Single	-0.142***	-0.135***	-0.145***
	Divorced	-0.205***	-0.202***	-0.199***
	Widowed	-0.135***	-0.089***	-0.109
	Years of education	0.027***	0.030***	0.023
	Health	0.248***	0.250***	0.259***
Indirect Effects ($\gamma_\theta \times \beta_\theta$)	Closeness	0.009***	0.008***	-0.002
	Log Income	0.003***	0.003***	-0.004**
	Employment Status			
	Unemployed	0.001***	0.001***	-0.002
	Inactive	-0.000	-0.000	0.001
	Marital Status			
	Single	0.002***	0.001	0.003*
	Divorced	0.004***	0.003***	0.002
	Widowed	-0.001	0.000	0.000
	Years of Education	0.005***	0.006***	-0.001
	Health	0.022***	0.015***	-0.006
Direct Effect		**0.017*** **	**0.009**	**0.033***
Total Indirect		**0.047*** **	**0.036*** **	**-0.009**
Combined Effects		**0.064*** **	**0.045*** **	**0.025**
N		63,882	66,813	11,186

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively**

Table 5.6: The effects of religiosity on life satisfaction for males

Male		Attendance	Difference	Prayer
Religiosity on… (γ_θ)	Closeness	0.043***	0.048***	0.016
	Log Income	0.079***	0.066***	-0.064***
	Employment Status			
	Unemployed	-0.004**	-0.007***	0.004
	Inactive	-0.008**	-0.004	0.017**
	Marital Status			
	Single	-0.012***	-0.008*	-0.023*
	Divorced	-0.019***	-0.015***	-0.007
	Widowed	-0.006***	-0.009***	-0.010**
	Years of Education	0.200***	0.213***	-0.015
	Health	0.094***	0.069***	0.002
…on Life Satisfaction (β_θ)	Closeness	0.146***	0.149***	0.125***
	Log Income	0.049***	0.047***	0.071***
	Employment Status			
	Unemployed	-0.308***	-0.309***	-0.245***
	Inactive	0.021	0.019	0.013
	Marital Status			
	Single	-0.111***	-0.105***	-0.085*
	Divorced	-0.130***	-0.112***	-0.074
	Widowed	-0.166***	-0.137***	-0.405***
	Years of education	0.016**	0.016**	0.029*
	Health	0.238***	0.244***	0.231***
Indirect Effects ($\gamma_\theta \times \beta_\theta$)	Closeness	0.006***	0.007***	0.002
	Log Income	0.004***	0.003***	-0.005**
	Employment Status			
	Unemployed	0.001**	0.002***	-0.001
	Inactive	-0.000	-0.000	0.000
	Marital Status			
	Single	0.001**	0.001*	0.002
	Divorced	0.002***	0.002***	0.000
	Widowed	0.001**	0.001**	0.004*
	Years of Education	0.003**	0.003***	-0.000
	Health	0.022***	0.017***	0.000
Direct Effect		**0.016****	**0.006**	**-0.016**
Total Indirect		**0.042*****	**0.037*****	**0.003**
Combined Effects		**0.058*****	**0.043*****	**-0.012**
N		47,854	49,488	8,458

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively**

Table 5.7: The effects of religiosity on GHQ for females

Female		Attendance	Difference	Prayer
Religiosity on… (γ_θ)	Closeness	0.047***	0.041***	-0.009
	Log Income	0.072***	0.058***	-0.059***
	Employment Status			
	Unemployed	-0.005***	-0.004***	0.006
	Inactive	-0.004	0.000	0.050***
	Marital Status			
	Single	-0.013***	-0.004	-0.024**
	Divorced	-0.020***	-0.017***	-0.007
	Widowed	0.004	-0.002	-0.003
	Years of Education	0.197***	0.187***	-0.040
	Health	0.092***	0.059***	-0.023
…on GHQ (β_θ)	Closeness	0.200***	0.196***	0.195***
	Log Income	0.014**	0.015***	0.022
	Employment Status			
	Unemployed	-0.314***	-0.317***	-0.292***
	Inactive	-0.087***	-0.095***	-0.137***
	Marital Status			
	Single	-0.071***	-0.061***	-0.120***
	Divorced	-0.126***	-0.130***	-0.140***
	Widowed	-0.098***	-0.054**	0.004
	Years of education	-0.000	0.005	0.044***
	Health	0.292***	0.291***	0.303***
Indirect Effects ($\gamma_\theta \times \beta_\theta$)	Closeness	0.009***	0.008***	-0.002
	Log Income	0.001**	0.001**	-0.001
	Employment Status			
	Unemployed	0.002***	0.001***	-0.002
	Inactive	0.000	-0.000	-0.007***
	Marital Status			
	Single	0.001***	0.000	0.003*
	Divorced	0.003***	0.002***	0.001
	Widowed	-0.000	0.000	-0.000
	Years of Education	-0.000	0.001	-0.002
	Health	0.027***	0.017***	-0.007
Direct Effect		**0.014****	**-0.019*****	**0.023**
Total Indirect		**0.042*****	**0.031*****	**-0.017***
Combined Effects		**0.055*****	**0.012**	**0.006**
N		63,723	66,657	11,151

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively**

Table 5.8: The effects of religiosity on GHQ for males

Male		Attendance	Difference	Prayer
Religiosity on… (γ_θ)	Closeness	0.043***	0.047***	0.017
	Log Income	0.078***	0.067***	-0.066***
	Employment Status			
	Unemployed	-0.004**	-0.007***	0.004
	Inactive	-0.008**	-0.004	0.018**
	Marital Status			
	Single	-0.012***	-0.008*	-0.023*
	Divorced	-0.019***	-0.015***	-0.007
	Widowed	-0.007***	-0.009***	-0.010**
	Years of Education	0.199***	0.213***	-0.016
	Health	0.095***	0.070***	0.004
…on GHQ (β_θ)	Closeness	0.138***	0.141***	0.136***
	Log Income	0.026***	0.024***	0.033**
	Employment Status			
	Unemployed	-0.330***	-0.324***	-0.361***
	Inactive	-0.122***	-0.126***	-0.198***
	Marital Status			
	Single	-0.027	-0.032*	-0.013
	Divorced	-0.052**	-0.038*	-0.048
	Widowed	-0.082**	-0.062*	0.096
	Years of education	-0.023***	-0.022***	-0.005
	Health	0.260***	0.261***	0.276***
Indirect Effects ($\gamma_\theta \times \beta_\theta$)	Closeness	0.006***	0.007***	0.002
	Log Income	0.002***	0.002***	-0.002*
	Employment Status			
	Unemployed	0.001**	0.002***	-0.001
	Inactive	0.001*	0.000	-0.003*
	Marital Status			
	Single	0.000	0.000	0.000
	Divorced	0.001**	0.001*	0.000
	Widowed	0.001*	0.001	-0.001
	Years of Education	-0.005***	-0.005***	0.000
	Health	0.025***	0.018***	0.001
Direct Effect		**-0.001**	**-0.025*** **	**-0.022**
Total Indirect		**0.032*** **	**0.026*** **	**-0.004**
Combined Effects		**0.031*** **	**0.000**	**-0.025**
N		47,751	49,386	8,431

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively**

more negative effect for females than for males is the indirect effect from prayer frequency. All other results are either more positive or less negative than the equivalent male result. Similarly, with life satisfaction the only result that suggests males receive greater benefit than females is the indirect effect from attendance and difference. Once again, all other results are more positive for females than males. This would support the literature, which suggests that females are not only more prone to religiosity (see Thompson, 1991) but also tend to have a more variable well-being (see Diener et al., 1999; Fujita et al., 1991; Parker and Brotchie, 2010).

5.4.2 Split by religion/denomination

An important consideration to make when looking at religiosity is the religion/denomination of the individual. As such, the following results are split by religion/denomination, with the relationship between religiosity and life satisfaction first, followed by the relationship between religiosity and the GHQ. The analysis was split into 5 groups[34]: no religion (40.7%/25.6%), Anglican (27.7%/12.2%), Catholic (9.5%/8.8%), other Christian (11.3%/13.8%) and non-Christian religions (10.8%/39.6%). Due to the number of observations for each category it was not possible to split these groups into smaller categories. As such, some of these results (especially the "other Christian" and "non-Christian religion" categories) may only reveal so much about how religiosity affects well-being for these groups.

Splitting by religion/denomination shows marked differences for each of the religiosity variables used. Using attendance to measure religiosity finds individuals of no religion experiencing a significantly negative direct effect (with a 2% decrease in life satisfaction per standard deviation increase in attendance). All Christian denominations experience a significantly positive direct effect from attendance at religious services, but to varying degrees, with Anglicans experiencing the smallest effect (a 1.8% increase), followed by Catholics (a 3.5% increase) and other Christians experiencing the greatest direct effect (a 5.1% increase). Interestingly, individuals of a non-Christian religion experience no direct effect from attendance at religious services.

With the exception of those with no religion, all of the indirect effects from attendance at religious services are significantly positive, regardless of religion/denomination. These indirect effects are lowest for individuals of a non-Christian religion (with a 1.4% increase in life satisfaction per standard

[34] The first percentage in brackets shows the distribution for the analysis using attendance and difference as the measure of religiosity, with the second percentage being the distribution for the analysis using prayer frequency as the measure of religiosity

deviation increase in attendance). Both Anglicans and Catholics experience the highest indirect effect from attendance at religious services (with a 5.9% increase in life satisfaction), with other Christians having an indirect effect somewhere in between (a 4.1% increase in life satisfaction). These indirect effects lead to the combined effects for those of no religious affiliation and those of a non-Christian religion to be insignificant, suggesting that for these two groups there is no true effect of attendance at religious services on life satisfaction. All of the Christian denominations have a high, significantly positive combined effect, with Catholics benefiting the most from attendance (a 9.4% increase in life satisfaction), followed by other Christians (a 9.2% increase in life satisfaction) and finally Anglicans (a 7.7% increase in life satisfaction).

Where attendance and difference were fairly similar when split by gender (with a smaller direct effect for difference, but similar results otherwise), when splitting by religion/denomination there are more differences that may be identified between the religiosity variables. The direct effects of difference on life satisfaction are insignificant for all religions/denominations apart from other Christians, who experience a significantly positive direct effect (with a 5% increase in life satisfaction per standard deviation increase in difference). This may explain the lower direct effects/significances for difference for the gender split, although it may be attributable to a smaller sample size. The indirect effects for the Christian denominations are similar to those from when attendance is used as the measure of religiosity, although they are slightly smaller (with increases of 5.1% for Anglicans, 4.7% for Catholics and 3.4% for other Christians). The indirect effect of difference on life satisfaction for individuals with no religious affiliation, unlike with attendance, is strongly positive (with a 2.9% increase in life satisfaction). Those of a non-Christian religion actually see a significantly negative indirect effect from difference (a 1% decrease in life satisfaction), which is the reverse of attendance (a 1.4% increase).

When the direct and indirect effects are combined those of a non-Christian religion receive no significant effect upon life satisfaction. All other religions/denominations (including no religion) have a significantly positive combined effect, with those with no religion having the lowest (a 2.2% increase in life satisfaction), followed by Catholics (a 4.9% increase) and Anglicans (a 5.9% increase). Other Christians experienced the greatest effect (an 8.4% increase in life satisfaction), which is unsurprising due to the large direct effect of difference on life satisfaction for other Christians.

Where prayer frequency was found to be mostly insignificant when splitting by gender, when splitting by religion/denomination some of the results become significant, which shows the importance of splitting by religion/denomination in this sort of analysis. There is an insignificant direct effect for those with no religious affiliation, Anglicans and Catholics. However, other Christians and those of a non-Christian religions both experience a significantly positive direct effect (with a 7.8% and a 4% increase in life satisfaction per standard deviation increase in prayer frequency respectively). Despite having this significantly positive direct effect, neither other Christians nor those of a non-Christian religion experience a significant indirect effect from prayer frequency. Catholics also experience no significant indirect effect. Individuals with no religious affiliation experience a strong negative indirect effect from prayer frequency (with a 3.8% decrease in life satisfaction) while Anglicans experience a significantly positive indirect effect (a 2.7% increase in life satisfaction). These indirect effects lead to Catholics and Anglicans having no significant combined effect from prayer frequency. Other Christians experience a significantly positive combined effect (a 7.8% increase in life satisfaction), with those of a non-Christian religion also experiencing a significantly positive effect, albeit slightly lower (a 4.2% increase). Those with no religious affiliation experience a significantly negative combined effect from prayer frequency (a 5.5% decrease in life satisfaction).

The individual indirect effects clearly differ between religion/denomination. Closeness is a significantly positive indirect effect for both attendance and difference for all Christian denominations (ranging from a 0.7% increase in well-being for difference for other Christians, to a 1% increase for Catholics (for both attendance and difference)). While those of no religion experience a similar indirect effect for difference (with a 0.7% increase in well-being), there is no indirect effect through attendance. Conversely, those of a non-Christian religion experience a positive indirect effect through attendance (a 0.5% increase), but no effect through difference. This lower indirect effect through closeness for both those of no religion and those of a non-Christian religion result from the direct effect of religiosity upon closeness. Those of a non-Christian religion experience a positive direct effect upon closeness from attendance, however it is the lowest of all religious groups (with a 2.8% increase in closeness per standard deviation increase in attendance, versus the second lowest of a 4.9% increase for Catholics). Those of no religion experience no direct effect upon their level of closeness from increased attendance at religious services. Similarly, those of no religion experience the lowest increase in closeness from an increase in attendance (with a 4% increase in closeness per standard deviation increase in difference), with those of a non-Christian religion experiencing no direct effect. These results follow the literature (Heath and Li, 2015) that suggests those of a minority religion (specifically,

Muslims, Sikhs and Hindus) and those of no religion engage less in civic participation, which would likely lead to lower levels of social capital (or, in this case, closeness). There is no indirect effect through closeness from increased frequency of prayer for any religion/denomination. However, as this measure for prayer frequency is prayer outside of religious services (or, generally speaking, private prayer), an increase in closeness would not necessarily be expected from this measure of religiosity.

Income has a strong, positive indirect effect for Catholics and Anglicans for both difference and attendance (ranging from a 0.3% increase in well-being per standard deviation increase in difference for Anglicans to a 0.6% increase in well-being per standard deviation increase in attendance for Catholics). Interestingly, other Christians experience a slightly positive indirect effect through income for attendance (with a 0.1% increase in well-being), but no significant increase for difference. Conversely, those of no religion experience a positive indirect effect for difference (with a 0.3% increase in well-being), but not for attendance. Those of a non-Christian religion experience a negative indirect effect for both attendance and difference (with a 0.2% and a 0.3% decrease in well-being respectively). Due to the nature of the non-Christian religious category being made up of all minority religions in the UK, it is hard to identify exactly which religious groups are the main drivers of this finding. However, as Islam is the largest minority religion in the UK, and Muslims have been found to have a lower level of income than those of other religious groups (Dilmaghani, 2011, 2015), it is possible that Muslims are the main driver of the negative indirect effect experienced by those of non-Christian religions. There is no indirect effect for prayer frequency through income for any of the religions, with those of no religion experiencing a significantly negative indirect effect (with a 0.6% decrease in well-being).

There are no indirect effects through inactivity for any religion/denomination for any measure of religiosity, with the exception of a slightly positive indirect effect of prayer frequency for those of a non-Christian religion (with a 0.3% increase in well-being per standard deviation increase in prayer). However, unemployment has a positive indirect effect for all Christian denominations for both attendance and prayer (ranging from a 0.1 increase in well-being per standard deviation increase in difference for Anglicans to a 0.3% increase in well-being per standard deviation increase in attendance for Catholics). Those of no religion experience a positive indirect effect for difference (with a 0.2% increase in well-being), but a negative indirect effect for attendance (with a 0.2% decrease in well-being), while those of a non-Christian religion experience no indirect effect through income. Those of

no religion are the only ones to experience an indirect effect for prayer, receiving a 0.6% decrease in well-being per standard deviation increase in prayer. These results support the findings of Khattab and Modood (2015), who find that white Christians are the least likely to be unemployed, with those of no religion and Muslims being more likely to be unemployed.

There is little evidence of indirect effects through marital status for those of no religion, regardless of the measure of religiosity (with the exception of a slightly negative indirect effect through divorce, leading to a 0.2% decrease in well-being per standard deviation increase in attendance). For all other religions, no measure of religiosity has a significant impact upon well-being through widowhood (with the exception of a 0.1% increase in well-being per standard deviation increase in difference for Anglicans). However, divorce has a significantly positive indirect effect for both attendance and difference for all Christian denominations (ranging from a 0.3% increase in well-being for other Christians to a 0.7% increase in well-being per standard deviation increase in attendance for Catholics). This is due to Christians being less likely to be divorced (Tuttle and Davis, 2015), leading to an overall positive indirect effect. Those of a non-Christian religion also experience a positive indirect effect for attendance (with a 0.3% increase in well-being), but find no indirect effect for difference. Being more likely to marry at an early age, other Christians and those of a non-Christian religion find a negative relationship between religiosity and being single (Uecker and Stokes, 2008). This leads to a significantly positive indirect effect through being single for attendance and difference for both of these religious groups (with a 0.2% increase in well-being for those of a non-Christian religion and a 0.3% increase in well-being for other Christians). Catholics and Anglicans, who are less likely to be married, do see a positive indirect effect for attendance (with a 0.3% and a 0.1% increase in well-being respectively), but experience no increase for difference. Prayer has no indirect effect through marital status for any of the Christian denominations, but has a slightly positive indirect effect for those of a non-Christian religion through being single (with a 0.5% increase in well-being) and being divorced (with a 0.3% increase in well-being).

Another key difference in individual indirect effects can be found through years of education. For both attendance and difference, those of no religion and Anglicans there is a significant indirect effect from education (from a 0.4% increase in well-being per standard deviation increase in attendance for those of no religion, to a 0.7% increase in well-being per standard deviation increase in difference for Anglicans). Other Christians also experience a slight indirect effect through education (a 0.3% and a

0.4% increase in well-being for attendance and difference respectively). However, Catholics and those of a non-Christian religion experience no indirect effect through education. This is again supported by the literature (Heath and Li, 2015), which finds ethnic and religious minorities to be lacking in education. Supporting this further, prayer has a negative indirect effect upon well-being through education for those of a non-Christian religion (with a 0.4% decrease in well-being), while having no indirect effect for any other religion/denomination.

Health is also significantly and highly positive for all Christian denominations for both difference and attendance (ranging from a 1.5% increase in well-being per standard deviation increase in difference for other Christians, to a 3.3% increase in well-being per standard deviation increase in attendance for Anglicans). Those of no religion experience a much lower indirect effect from health (a 1.1% increase for difference and a 0.7% increase for attendance), with those of a non-Christian religion experiencing no indirect effect from attendance, and a negative indirect effect from difference (with a 1.1% decrease in well-being). This can be attributed to health being better for Christians than for those of no religion and non-Christian religions. However, as the measure used for health is a subjective measure, it may be that Christians feel they should have their life more "together" and would therefore report a higher subjective health than reality. This could warrant future research. Prayer frequency has no effect upon health for Catholics, other Christians or those of a non-Christian religion, yet it does have a positive effect for Anglicans (with a 7.6% increase in subjective health per standard deviation increase in prayer), leading to a significant indirect effect upon well-being (with a 2% increase in well-being). Conversely, those of no religion experience negative health from increased prayer frequency (with a 6.9% decrease in subjective health per standard deviation increase in prayer). However, as this is a pooled cross-section and therefore does not take into account causality, it is safe to assume that those of no religion who turn to prayer are already experiencing negative effects in their lives, such as poor health, and therefore the causality may go from health to prayer frequency, rather than the other way around.

When considering the GHQ as the measure for well-being, the indirect effects remain consistent with the analysis performed using life satisfaction. However, with the exception of other Christians (who remain consistent regardless of the well-being measure used) there are many differences when looking at the direct effects of religiosity upon well-being, leading also to differences in the combined effects.

Those of no religion experience no direct effect upon the GHQ through attendance, but do experience a strong negative direct effect through difference (with a 0.5% decrease in well-being per standard deviation in difference). This leads to a significantly negative combined effect of a 2.8 decrease in well-being (compared to the 2.2% increase in life satisfaction). While the results for prayer frequency are similar for life satisfaction and the GHQ, this vast contrast for difference highlights the importance of the measure used for well-being.

Anglicans experienced a positive direct impact upon life satisfaction through attendance, yet no such effect is found when considering the GHQ. With the indirect effects remaining consistent, this leads to a combined effect being much smaller when using the GHQ than when using life satisfaction (compare a 5% increase in well-being per standard deviation increase in attendance to a 7.7% increase in life satisfaction). Conversely, difference had no significant direct effect upon life satisfaction, but there is a strong negative effect when using the GHQ (with a 2.7% decrease in well-being). This, again, leads to a much smaller combined effect when considering the GHQ (with a 1.7% increase in well-being, significant only at the 10% level) than when considering life satisfaction (with a 5.9% increase in life satisfaction, significant at the 1% level). Prayer has a similar impact upon the GHQ as it does upon life satisfaction, with the exception of the indirect effects being insignificant for the GHQ (where it was only slightly significant (at the 10% level) for life satisfaction).

Similar to Anglicans, Catholics experience no direct effect upon the GHQ through attendance. With the indirect effects remaining consistent this leads to a much lower combined effect (with a 7.7% increase in well-being per standard deviation increase in attendance compared to a 9.4% increase in life satisfaction). While difference has no significant direct effect upon neither life satisfaction nor the GHQ, the coefficient for the GHQ is much smaller, leading to an insignificant combined effect upon the GHQ (compared to a highly significant positive effect for life satisfaction). As with Anglicans, prayer frequency remains consistent regardless of the well-being measure used.

For those of a non-Christian religion, attendance has the same effect upon the GHQ as it does upon life satisfaction. However, the direct effect upon the GHQ through difference, despite remaining insignificant, is much more negative than for life satisfaction. This leads to a significantly negative combined effect upon the GHQ through difference (with a 3.2% decrease in well-being per standard deviation increase in difference). Where prayer was found to have a slightly significant positive direct

effect upon life satisfaction, the GHQ is unaffected by increases in prayer frequency, leading to an insignificant combined effect.

Splitting the analysis by religion/denomination found that Christianity tended to have the strongest effects upon well-being. Attendance and difference consistently found the three Christian groups to have the greatest direct, indirect and combined effects (with the one exception of difference on the GHQ for Catholics, which was insignificant). However, it is interesting to note the difference between the results when using life satisfaction as the well-being measure and the GHQ. Attendance for Christians has a positive effect on both measures of well-being, supporting the existing literature (e.g. Ellison et al., 1989; Hadaway and Roof, 1978; Krause and Ellison, 2003). With a significant social capital variable also included, this significance from attendance would suggest that there is an important religious component to attendance that causes the positive effects on well-being. Difference had a positive effect when considering life satisfaction, but a much smaller effect (if any at all) when considering the GHQ (with the exception of other Christians). While no other studies found by this researcher have used this measure, the similar measures in the literature (such as importance of religion (Hadaway and Roof, 1978) or religious meaning (Krause, 2003)) have found a positive correlation to well-being, suggesting that difference should go in the same direction. As such, the life satisfaction results support the literature, but the results found when using the GHQ as the measure for well-being are unusual. The reason for this outcome may stem from what the GHQ actually measures (i.e. mental distress). There may be a correlation between the feeling that religion makes a difference and some of the components of the GHQ (such as, for example, whether the respondent felt they could not overcome their difficulties, or have been thinking of themselves as a worthless person).

In the existing literature, prayer frequency is found to have a positive impact upon well-being (see Krause and Ellison, 2003; Poloma and Pendleton, 1990) but such findings are less clear in this study. Those with no religious affiliation experience a negative impact from prayer frequency. This may not be surprising, as prayer is often considered a “last resort” for those who do not believe in a particular religion, suggesting that those who are praying may be experiencing negative effects from other aspects of their lives and would therefore have a lower level of well-being. Going against the findings of the literature, Christianity finds very little effect from prayer frequency. Other Christians are the only Christian group that actually receive a positive direct effect from prayer frequency (with both life

Table 5.9: The effects of religiosity on life satisfaction for individuals with no religious affiliation

	No Religion	Attendance	Difference	Prayer
Religiosity on… (γ_θ)	Closeness	0.008	0.040***	-0.023
	Log Income	0.019	0.055***	-0.091***
	Employment Status			
	Unemployed	0.009***	-0.007***	0.020**
	Inactive	0.003	-0.004	0.031**
	Marital Status			
	Single	0.000	0.003	0.003
	Divorced	0.012*	-0.005	0.003
	Widowed	0.000	-0.004	-0.002
	Years of Education	0.121***	0.174***	-0.119***
	Health	0.028*	0.043***	-0.069*
…on Life Satisfaction (β_θ)	Closeness	0.168***	0.166***	0.146***
	Log Income	0.058***	0.058***	0.069***
	Employment Status			
	Unemployed	-0.257***	-0.262***	-0.280***
	Inactive	0.015	-0.003	-0.014
	Marital Status			
	Single	-0.120***	-0.110***	-0.097*
	Divorced	-0.171***	-0.163***	-0.161**
	Widowed	-0.167***	-0.082**	-0.267*
	Years of education	0.034***	0.035***	0.045**
	Health	0.250***	0.252***	0.234***
Indirect Effects ($\gamma_\theta \times \beta_\theta$)	Closeness	0.001	0.007***	-0.003
	Log Income	0.001	0.003***	-0.006**
	Employment Status			
	Unemployed	-0.002***	0.002***	-0.006*
	Inactive	0.000	0.000	-0.000
	Marital Status			
	Single	-0.000	-0.000	-0.000
	Divorced	-0.002*	0.001	-0.001
	Widowed	-0.000	0.000	0.001
	Years of Education	0.004***	0.006***	-0.005
	Health	0.007*	0.011***	-0.016*
Direct Effect		**-0.020***	**-0.008**	**-0.017**
Total Indirect		**0.009**	**0.029*****	**-0.038*****
Combined Effects		**-0.011**	**0.022***	**-0.055***
N		46,677	50,772	5,047

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively**

Table 5.10: The effects of religiosity on life satisfaction for Anglicans

Anglican		Attendance	Difference	Prayer
Religiosity on… (γ_θ)	Closeness	0.059***	0.060***	0.031
	Log Income	0.127***	0.101***	-0.041
	Employment Status			
	Unemployed	-0.006***	-0.006***	-0.001
	Inactive	-0.008*	-0.002	0.035**
	Marital Status			
	Single	-0.007*	-0.003	-0.007
	Divorced	-0.021***	-0.020***	-0.004
	Widowed	-0.001	-0.008**	-0.013
	Years of Education	0.306***	0.285***	0.196***
	Health	0.137***	0.103***	0.076*
…on Life Satisfaction (β_θ)	Closeness	0.163***	0.167***	0.159***
	Log Income	0.028***	0.029***	0.034
	Employment Status			
	Unemployed	-0.271***	-0.234***	-0.246**
	Inactive	0.062***	0.072***	-0.058
	Marital Status			
	Single	-0.134***	-0.117***	-0.170**
	Divorced	-0.188***	-0.183***	-0.134*
	Widowed	-0.135***	-0.086***	0.002
	Years of education	0.020**	0.024***	0.017
	Health	0.241***	0.248***	0.267***
Indirect Effects ($\gamma_\theta \times \beta_\theta$)	Closeness	0.010***	0.010***	0.005
	Log Income	0.004***	0.003***	-0.001
	Employment Status			
	Unemployed	0.002***	0.001***	0.000
	Inactive	-0.000	-0.000	-0.002
	Marital Status			
	Single	0.001*	0.000	0.001
	Divorced	0.004***	0.004***	0.001
	Widowed	0.000	0.001*	-0.000
	Years of Education	0.006**	0.007***	0.003
	Health	0.033***	0.026***	0.020*
Direct Effect		**0.018****	**0.008**	**-0.035**
Total Indirect		**0.059*****	**0.051*****	**0.027***
Combined Effects		**0.077*****	**0.059*****	**-0.007**
N		31,754	31,166	2,403

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively**

Table 5.11: The effects of religiosity on life satisfaction for Catholics

Catholic		Attendance	Difference	Prayer
Religiosity on… (γ_θ)	Closeness	0.049***	0.046***	-0.014
	Log Income	0.118***	0.080***	-0.053
	Employment Status			
	Unemployed	-0.012***	-0.009***	-0.010
	Inactive	-0.019***	-0.009	0.042**
	Marital Status			
	Single	-0.014*	-0.006	-0.029
	Divorced	-0.044***	-0.030***	0.002
	Widowed	0.002	-0.002	-0.003
	Years of Education	0.189***	0.196***	0.001
	Health	0.129***	0.101***	-0.041
…on Life Satisfaction (β_θ)	Closeness	0.186***	0.191***	0.151***
	Log Income	0.055***	0.063***	0.032
	Employment Status			
	Unemployed	-0.279***	-0.249***	-0.472***
	Inactive	-0.039	-0.031	-0.069
	Marital Status			
	Single	-0.184***	-0.205***	-0.113
	Divorced	-0.162***	-0.144***	-0.174
	Widowed	-0.043	-0.060	-0.290*
	Years of education	-0.002	0.003	0.018
	Health	0.234***	0.239***	0.205***
Indirect Effects ($\gamma_\theta \times \beta_\theta$)	Closeness	0.009***	0.009***	-0.002
	Log Income	0.006***	0.005***	-0.002
	Employment Status			
	Unemployed	0.003***	0.002**	0.005
	Inactive	0.001	0.000	-0.003
	Marital Status			
	Single	0.003*	0.001	0.003
	Divorced	0.007***	0.004**	-0.000
	Widowed	-0.000	0.000	0.001
	Years of Education	-0.000	0.001	0.000
	Health	0.030***	0.024***	-0.008
Direct Effect		**0.035*** **	**0.003**	**-0.041**
Total Indirect		**0.059*** **	**0.047*** **	**-0.007**
Combined Effects		**0.094*** **	**0.049*** **	**-0.048**
N		10,928	10,843	1,737

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively**

Table 5.12: The effects of religiosity on life satisfaction for other Christians

	Other Christian	Attendance	Difference	Prayer
Religiosity on… (γ_θ)	Closeness	0.055***	0.044***	-0.019
	Log Income	0.036**	0.037**	-0.065
	Employment Status			
	Unemployed	-0.007***	-0.005**	-0.009
	Inactive	0.001	-0.007	0.008
	Marital Status			
	Single	-0.030***	-0.019***	-0.031
	Divorced	-0.023***	-0.025***	-0.026
	Widowed	0.002	0.003	-0.004
	Years of Education	0.157***	0.190***	0.063
	Health	0.085***	0.064***	-0.002
…on Life Satisfaction (β_θ)	Closeness	0.162***	0.159***	0.144***
	Log Income	0.036***	0.025**	0.089***
	Employment Status			
	Unemployed	-0.271***	-0.321***	-0.326***
	Inactive	0.056**	0.059**	-0.028
	Marital Status			
	Single	-0.104***	-0.145***	-0.141**
	Divorced	-0.125***	-0.120***	-0.064
	Widowed	-0.157***	-0.151***	0.008
	Years of education	0.022*	0.021*	0.021
	Health	0.228***	0.231***	0.279***
Indirect Effects ($\gamma_\theta \times \beta_\theta$)	Closeness	0.009***	0.007***	-0.003
	Log Income	0.001**	0.001	-0.006
	Employment Status			
	Unemployed	0.002**	0.002**	0.003
	Inactive	0.000	-0.000	-0.000
	Marital Status			
	Single	0.003**	0.003**	0.004
	Divorced	0.003**	0.003**	0.002
	Widowed	-0.000	-0.000	-0.000
	Years of Education	0.003*	0.004*	0.001
	Health	0.019***	0.015***	-0.000
Direct Effect		**0.051*** **	**0.050*** **	**0.078** **
Total Indirect		**0.041*** **	**0.034*** **	**0.001**
Combined Effects		**0.092*** **	**0.084*** **	**0.078** **
N		13,019	13,100	2,728

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively**

Table 5.13: The effects of religiosity on life satisfaction for members of non-Christian religions

Non-Christian Religion		Attendance	Difference	Prayer
Religiosity on… (γ_θ)	Closeness	0.028***	0.009	0.021
	Log Income	-0.041***	-0.066***	-0.043
	Employment Status			
	Unemployed	-0.006*	-0.001	0.004
	Inactive	0.013**	0.029***	0.041***
	Marital Status			
	Single	-0.021***	-0.022***	-0.046***
	Divorced	-0.015***	0.000	-0.019**
	Widowed	0.002	0.002	-0.001
	Years of Education	0.019	-0.001	-0.105***
	Health	0.018	-0.044**	-0.025
…on Life Satisfaction (β_θ)	Closeness	0.196***	0.178***	0.159***
	Log Income	0.048***	0.040***	0.064***
	Employment Status			
	Unemployed	-0.249***	-0.251***	-0.165***
	Inactive	-0.021	-0.011	0.073*
	Marital Status			
	Single	-0.119***	-0.094***	-0.111**
	Divorced	-0.215***	-0.202***	-0.184**
	Widowed	-0.116*	-0.134*	-0.253**
	Years of education	-0.004	-0.001	0.034**
	Health	0.244***	0.243***	0.242***
Indirect Effects ($\gamma_\theta \times \beta_\theta$)	Closeness	0.005***	0.002	0.003
	Log Income	-0.002**	-0.003***	-0.003
	Employment Status			
	Unemployed	0.001	0.000	-0.001
	Inactive	-0.000	-0.000	0.003*
	Marital Status			
	Single	0.002**	0.002**	0.005*
	Divorced	0.003**	-0.000	0.003*
	Widowed	-0.000	-0.000	0.000
	Years of Education	-0.000	0.000	-0.004*
	Health	0.004	-0.011**	-0.006
Direct Effect		**-0.002**	**-0.007**	**0.040***
Total Indirect		**0.014*****	**-0.010***	**0.002**
Combined Effects		**0.012**	**-0.017**	**0.042***
N		12,339	13,401	7,804

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively**

Table 5.14: The effects of religiosity on GHQ for individuals with no religious affiliation

	No Religion	Attendance	Difference	Prayer
Religiosity on… (γ_θ)	Closeness	0.008	0.040***	-0.023
	Log Income	0.018	0.054***	-0.090***
	Employment Status			
	Unemployed	0.009***	-0.007***	0.021**
	Inactive	0.003	-0.004	0.032**
	Marital Status			
	Single	0.000	0.003	0.003
	Divorced	0.012*	-0.004	0.004
	Widowed	0.000	-0.004	-0.002
	Years of Education	0.121***	0.174***	-0.115***
	Health	0.030*	0.043***	-0.068*
…on GHQ (β_θ)	Closeness	0.172***	0.166***	0.140***
	Log Income	0.032***	0.026***	0.041*
	Employment Status			
	Unemployed	-0.296***	-0.309***	-0.310***
	Inactive	-0.123***	-0.133***	-0.123**
	Marital Status			
	Single	-0.028	-0.028	0.067
	Divorced	-0.076***	-0.072***	-0.023
	Widowed	-0.082**	-0.028	-0.010
	Years of education	-0.010	-0.010	0.010
	Health	0.277***	0.274***	0.298***
Indirect Effects ($\gamma_\theta \times \beta_\theta$)	Closeness	0.001	0.007***	-0.003
	Log Income	0.001	0.001***	-0.004
	Employment Status			
	Unemployed	-0.003***	0.002***	-0.006*
	Inactive	-0.000	0.000	-0.004
	Marital Status			
	Single	-0.000	-0.000	0.000
	Divorced	-0.001	0.000	-0.000
	Widowed	-0.000	0.000	0.000
	Years of Education	-0.001	-0.002	-0.001
	Health	0.008*	0.012***	-0.020*
Direct Effect		**-0.011**	**-0.050*** **	**-0.030**
Total Indirect		**0.005**	**0.021*** **	**-0.039** **
Combined Effects		**-0.006**	**-0.028** **	**-0.069***
N		46,566	50,670	5,025

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively**

Table 5.15: The effects of religiosity on GHQ for Anglicans

Anglican		Attendance	Difference	Prayer
Religiosity on… (γ_θ)	Closeness	0.059***	0.059***	0.034
	Log Income	0.127***	0.101***	-0.042
	Employment Status			
	Unemployed	-0.006***	-0.006***	-0.001
	Inactive	-0.008*	-0.002	0.035**
	Marital Status			
	Single	-0.007*	-0.003	-0.007
	Divorced	-0.021***	-0.020***	-0.004
	Widowed	-0.001	-0.008**	-0.013
	Years of Education	0.306***	0.285***	0.197***
	Health	0.138***	0.103***	0.075*
…on GHQ (β_θ)	Closeness	0.161***	0.160***	0.113***
	Log Income	0.003	0.015**	0.027
	Employment Status			
	Unemployed	-0.388***	-0.368***	-0.463***
	Inactive	-0.070***	-0.068***	-0.275***
	Marital Status			
	Single	-0.047*	-0.023	-0.053
	Divorced	-0.129***	-0.114***	-0.114
	Widowed	-0.077***	-0.031	0.109
	Years of education	-0.012	-0.002	0.006
	Health	0.266***	0.270***	0.277***
Indirect Effects ($\gamma_\theta \times \beta_\theta$)	Closeness	0.009***	0.009***	0.004
	Log Income	0.000	0.002*	-0.001
	Employment Status			
	Unemployed	0.002***	0.002***	0.001
	Inactive	0.001	0.000	-0.010*
	Marital Status			
	Single	0.000	0.000	0.000
	Divorced	0.003***	0.002***	0.000
	Widowed	0.000	0.000	-0.001
	Years of Education	-0.004	-0.001	0.001
	Health	0.037***	0.028***	0.021*
Direct Effect		**0.001**	**-0.027*** **	**-0.034**
Total Indirect		**0.049*** **	**0.043*** **	**0.015**
Combined Effects		**0.050*** **	**0.017***	**-0.019**
N		31,685	31,102	2,401

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively**

Table 5.16: The effects of religiosity on GHQ for Catholics

Catholic		Attendance	Difference	Prayer
Religiosity on… (γ_θ)	Closeness	0.049***	0.045***	-0.008
	Log Income	0.118***	0.080***	-0.055
	Employment Status			
	Unemployed	-0.012***	-0.009***	-0.010
	Inactive	-0.019***	-0.009	0.044***
	Marital Status			
	Single	-0.014*	-0.006	-0.028
	Divorced	-0.044***	-0.029***	0.001
	Widowed	0.002	-0.002	-0.004
	Years of Education	0.189***	0.195***	0.000
	Health	0.129***	0.101***	-0.035
…on GHQ (β_θ)	Closeness	0.170***	0.185***	0.193***
	Log Income	0.015	0.017	0.003
	Employment Status			
	Unemployed	-0.357***	-0.342***	-0.540***
	Inactive	-0.173***	-0.167***	-0.256***
	Marital Status			
	Single	-0.058	-0.077**	-0.054
	Divorced	-0.101**	-0.106**	-0.096
	Widowed	-0.061	-0.008	0.264
	Years of education	-0.024*	-0.022	0.015
	Health	0.308***	0.305***	0.259***
Indirect Effects ($\gamma_\theta \times \beta_\theta$)	Closeness	0.008***	0.008***	-0.002
	Log Income	0.002	0.001	-0.000
	Employment Status			
	Unemployed	0.004***	0.003**	0.005
	Inactive	0.003**	0.002	-0.011*
	Marital Status			
	Single	0.001	0.000	0.001
	Divorced	0.004**	0.003**	-0.000
	Widowed	-0.000	0.000	-0.001
	Years of Education	-0.004*	-0.004	0.000
	Health	0.040***	0.031***	-0.009
Direct Effect		**0.019**	**-0.019**	**-0.054**
Total Indirect		**0.058*** **	**0.044*** **	**-0.016**
Combined Effects		**0.077*** **	**0.026**	**-0.070**
N		10,903	10,819	1,733

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively**

Table 5.17: The effects of religiosity on GHQ for other Christians

	Other Christian	Attendance	Difference	Prayer
Religiosity on… (γ_θ)	Closeness	0.054***	0.043***	-0.020
	Log Income	0.037***	0.039**	-0.066
	Employment Status			
	Unemployed	-0.006***	-0.005**	-0.009
	Inactive	0.001	-0.007	0.008
	Marital Status			
	Single	-0.030***	-0.019***	-0.030
	Divorced	-0.023***	-0.026***	-0.026
	Widowed	0.002	0.003	-0.004
	Years of Education	0.157***	0.191***	0.059
	Health	0.085***	0.063***	-0.006
…on GHQ (β_θ)	Closeness	0.153***	0.161***	0.160***
	Log Income	0.019*	0.014	0.036
	Employment Status			
	Unemployed	-0.292***	-0.319***	-0.388***
	Inactive	-0.041	-0.052*	-0.142**
	Marital Status			
	Single	-0.056	-0.052	-0.146*
	Divorced	-0.047	-0.065*	-0.037
	Widowed	-0.080	-0.068	0.219
	Years of education	0.001	-0.001	0.077**
	Health	0.271***	0.285***	0.268***
Indirect Effects ($\gamma_\theta \times \beta_\theta$)	Closeness	0.008***	0.007***	-0.003
	Log Income	0.001	0.001	-0.002
	Employment Status			
	Unemployed	0.002**	0.002*	0.003
	Inactive	-0.000	0.000	-0.001
	Marital Status			
	Single	0.002	0.001	0.004
	Divorced	0.001	0.002	0.001
	Widowed	-0.000	-0.000	-0.001
	Years of Education	0.000	-0.000	0.005
	Health	0.023***	0.018***	-0.002
Direct Effect		**0.042*** **	**0.031** **	**0.079** **
Total Indirect		**0.037*** **	**0.030*** **	**0.004**
Combined Effects		**0.079*** **	**0.060*** **	**0.083** **
N		12,989	13,057	2,722

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively**

Table 5.18: The effects of religiosity on GHQ for members of non-Christian religions

Non-Christian Religion		Attendance	Difference	Prayer
Religiosity on… (γ_θ)	Closeness	0.027***	0.007	0.023*
	Log Income	-0.043***	-0.066***	-0.044
	Employment Status			
	Unemployed	-0.005	-0.000	0.004
	Inactive	0.012*	0.029***	0.041***
	Marital Status			
	Single	-0.021***	-0.022***	-0.046***
	Divorced	-0.014***	0.001	-0.018**
	Widowed	0.002	0.002	-0.001
	Years of Education	0.020	-0.001	-0.105***
	Health	0.021	-0.041**	-0.021
…on GHQ (β_θ)	Closeness	0.215***	0.212***	0.201***
	Log Income	0.015	0.008	0.025
	Employment Status			
	Unemployed	-0.308***	-0.306***	-0.225***
	Inactive	-0.122***	-0.128***	-0.105**
	Marital Status			
	Single	-0.106***	-0.099**	-0.147***
	Divorced	-0.122**	-0.159***	-0.159*
	Widowed	-0.088	-0.120	-0.069
	Years of education	-0.013	-0.009	0.008
	Health	0.288***	0.280***	0.300***
Indirect Effects ($\gamma_\theta \times \beta_\theta$)	Closeness	0.006***	0.002	0.005*
	Log Income	-0.001	-0.001	-0.001
	Employment Status			
	Unemployed	0.002	0.000	-0.001
	Inactive	-0.001*	-0.004***	-0.004**
	Marital Status			
	Single	0.002**	0.002**	0.007**
	Divorced	0.002*	-0.000	0.003
	Widowed	-0.000	-0.000	0.000
	Years of Education	-0.000	0.000	-0.001
	Health	0.006	-0.012**	-0.006
Direct Effect		**-0.008**	**-0.020**	**0.015**
Total Indirect		**0.015****	**-0.012***	**0.001**
Combined Effects		**0.007**	**-0.032****	**0.016**
N		12,307	13,372	7,776

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively**

satisfaction and GHQ). Prayer frequency for those of a non-Christian religion has significantly positive direct and combined effects upon life satisfaction. Due to there being a strong focus on prayer outside of religious services for many of the non-Christian religions this is not a surprising response. However, when considering the GHQ these effects disappear. This may again be due to a correlation between some components of the GHQ and frequency of prayer.

5.5 Conclusion

This study investigated the direct and indirect relationships between religiosity and well-being. To investigate these relationships Structural Equation Modelling was used, with three different measures of religiosity (attendance at religious services, whether religion makes a difference to oneself and the frequency of prayer outside of religious services), two measures of well-being (life satisfaction and the general health questionnaire) and six different mediators (social capital, income, employment, marital status, years of education and health). Using this model there were many interesting conclusions that may be drawn.

First, the evidence would suggest that it is important to consider both the direct and indirect effects when performing research in this area. There were several findings that suggested the indirect effects of religiosity changed, enhanced or diminished the direct effect that religiosity had on well-being. The significance of these changes could suggest that previous research into religiosity's effects upon well-being may be missing an important component. The consideration of indirect effects may also be extended to other research on well-being, which has a complex relationship with many of its determinants. For example, examining how unemployment will affect well-being, with the knowledge that it would also affect income, health and social capital (which all also affect well-being).

Another important finding from this study is, when considering religiosity and well-being, it is important to ask what measures are being employed. Both religiosity and well-being are arguably very subjective and personal concepts and, as such, are extremely difficult to actually measure. With three different religiosity measures and two different well-being measures there were six sets of results for the whole sample. Seeing the difference between these results shows that a great deal of consideration must be made when choosing these measures, and that any conclusions drawn must be

clarified (e.g. religion does not have a direct positive effect upon well-being for Catholics, rather attendance at religious services has a positive direct effect upon life satisfaction for Catholics).

The evidence from this study would also suggest that females are, as the existing literature alludes to, more sensitive to religiosity. While they are more prone to be religious (see Thompson, 1991), they are also affected more strongly by this religion. Similarly, Christians are most positively affected by their religiosity when compared to those with no religious affiliation and those of a non-Christian religion. This finding is unsurprising, as Christianity is the majority religion in the UK. However, it does help to shed some light on how those of a minority religion are affected relative to those of the majority. There is definitely scope for more research into the effect of religiosity for minority religions relative to majority religions.

With these findings, there are considerations to be made with regards to policy, along with questions that must be asked. The indirect effects from religiosity point to some important mediators, but is enough being done to maximise upon these mediators in order to promote positive well-being? Should something be done to allow those of no religion to be able to experience the same benefits to well-being that is appreciated by those of a religion, such as improving social capital or promoting good health among non-religious individuals? Both social capital and health lead to strong positive indirect effects for all Christian denominations. Although it would be difficult to target social capital at a particular group (especially when the defining characteristic of that group is that they have no religion), it would be a possibility to increase the number of social clubs or areas specifically aimed at improving social capital (e.g. recreation centres). An increase in these opportunities may help to encourage social capital among groups that are more isolated. Health seems to have the smallest effect upon those of a minority religion, which predominantly comprises ethnic minorities. Policy could be implemented that specifically targets ethnic minorities, such as encouraging health checks and improving education on health in areas with a high density of such groups.

Also, with those of minority religions experiencing much smaller positive benefits from their religiosity (if not finding it detrimental to their well-being), is there an issue with the religion not promoting positive well-being, or is there an issue of religious discrimination, disintegration or disinterest that should be targeted by policy? Is enough being done for those of a minority religion to bring them to a place where the only differences found in well-being between them and those of a majority religion

are purely the religious differences, rather than cultural or racial? As mentioned earlier, those of a minority religion are predominantly of an ethnic minority. Both religious and racial discrimination has been found to exist in the literature. However, separating these discriminatory factors out further will help to better protect those who are victims of said discrimination. This study has laid some foundations to help answer these questions on the true relationship between religion and well-being.

Appendices

Appendix 5.A

Table 5.19: Descriptive statistics for the analysis of difference on life satisfaction

Category	Variable	Whole Sample	Male	Female	Min	Max
Gender	Female	0.575	-	-	-	-
Social Capital	Closeness	-0.009	-0.051	0.022	-2.249	1.930
Income	Log income	7.812	7.845	7.788	-2.485	9.903
Employment	In employment	0.575	0.621	0.542	-	-
	Unemployed	0.046	0.055	0.039	-	-
	Inactive	0.379	0.325	0.419	-	-
Marital status	Married	0.539	0.575	0.512	-	-
	Single	0.280	0.292	0.271	-	-
	Divorced	0.127	0.102	0.146	-	-
	Widowed	0.054	0.031	0.071	-	-
Education	Years of education	13.142	13.089	13.181	8	19
Health	Subjective health	2.433	2.434	2.432	0	4
Personality (Fixed effects)	Agreeableness	0.013	-0.170	0.149	-3.709	1.087
	Conscientiousness	0.027	-0.069	0.098	-2.665	0.997
	Extraversion	-0.004	-0.056	0.034	-2.382	1.281
	Neuroticism	0.011	0.166	-0.103	-2.186	1.568
	Openness	-0.005	0.100	-0.083	-2.509	1.332
Religion	No religion	0.437	0.495	0.393	-	-
	C of E/S/I	0.268	0.237	0.291	-	-
	Catholic	0.093	0.079	0.104	-	-
	Other Christian	0.113	0.099	0.123	-	-
	Non-Christian religion	0.090	0.090	0.090	-	-
Age	Age	48.993	49.690	48.477	16	102
Children	Number of children	0.593	0.526	0.643	0	9
Race	British	0.828	0.832	0.824	-	-
	Other white	0.036	0.033	0.038	-	-
	Asian	0.071	0.077	0.067	-	-
	African	0.036	0.030	0.040	-	-
	Mixed race	0.016	0.014	0.017	-	-
	Other race	0.014	0.014	0.013	-	-
Region	London	0.114	0.116	0.113	-	-
	England	0.725	0.728	0.722	-	-
	Peripheries	0.161	0.156	0.165	-	-
Wave	1	0.204	0.203	0.204	-	-
	2	0.126	0.126	0.126	-	-
	3	0.158	0.160	0.157	-	-
	4	0.206	0.206	0.205	-	-
	5	0.108	0.106	0.109	-	-
	6	0.102	0.102	0.102	-	-
	7	0.097	0.097	0.097	-	-

Note: All values in the Whole sample, Male and Female columns are the means

Table 5.20: Descriptive statistics for the analysis of attendance on GHQ

Category	Variable	Whole Sample	Male	Female	Min	Max
Gender	Female	0.572	-	-	-	-
Social Capital	Closeness	-0.002	-0.048	0.032	-2.249	1.930
Income	Log income	7.809	7.840	7.785	-2.485	9.903
Employment	In employment	0.571	0.613	0.539	-	-
	Unemployed	0.044	0.053	0.037	-	-
	Inactive	0.385	0.334	0.424	-	-
Marital status	Married	0.547	0.586	0.518	-	-
	Single	0.273	0.283	0.266	-	-
	Divorced	0.124	0.101	0.142	-	-
	Widowed	0.056	0.031	0.074	-	-
Education	Years of education	13.098	13.066	13.122	8	19
Health	Subjective health	2.434	2.427	2.439	0	4
Personality (Fixed effects)	Agreeableness	0.023	-0.161	0.161	-3.709	1.087
	Conscientiousness	0.034	-0.069	0.112	-2.665	0.997
	Extraversion	0.001	-0.047	0.037	-2.382	1.281
	Neuroticism	0.020	0.171	-0.094	-2.186	1.568
	Openness	0.002	0.110	-0.080	-2.509	1.332
Religion	No religion	0.418	0.474	0.376	-	-
	C of E/S/I	0.284	0.253	0.308	-	-
	Catholic	0.098	0.082	0.110	-	-
	Other Christian	0.117	0.100	0.129	-	-
	Non-Christian religion	0.084	0.091	0.078	-	-
Age	Age	49.564	50.190	49.095	16	102
Children	Number of children	0.563	0.510	0.604	0	9
Race	British	0.832	0.830	0.835	-	-
	Other white	0.036	0.033	0.038	-	-
	Asian	0.068	0.079	0.059	-	-
	African	0.035	0.031	0.039	-	-
	Mixed race	0.015	0.014	0.016	-	-
	Other race	0.013	0.013	0.013	-	-
Region	London	0.112	0.115	0.110	-	-
	England	0.725	0.730	0.722	-	-
	Peripheries	0.162	0.155	0.168	-	-
Wave	1	0.211	0.210	0.212	-	-
	2	0.124	0.124	0.124	-	-
	3	0.155	0.157	0.153	-	-
	4	0.214	0.213	0.215	-	-
	5	0.104	0.104	0.104	-	-
	6	0.098	0.099	0.098	-	-
	7	0.093	0.093	0.093	-	-

Note: All values in the Whole sample, Male and Female columns are the means

Table 5.21: Descriptive statistics for the analysis of difference on GHQ

Category	Variable	Whole Sample	Male	Female	Min	Max
Gender	Female	0.574	-	-	-	-
Social Capital	Closeness	-0.009	-0.051	0.022	-2.249	1.930
Income	Log income	7.812	7.845	7.788	-2.485	9.903
Employment	In employment	0.576	0.621	0.542	-	-
	Unemployed	0.046	0.054	0.039	-	-
	Inactive	0.379	0.325	0.419	-	-
Marital status	Married	0.539	0.575	0.512	-	-
	Single	0.280	0.292	0.271	-	-
	Divorced	0.127	0.102	0.146	-	-
	Widowed	0.054	0.030	0.071	-	-
Education	Years of education	13.142	13.091	13.180	8	19
Health	Subjective health	2.433	2.434	2.432	0	4
Personality (Fixed effects)	Agreeableness	0.013	-0.170	0.149	-3.709	1.087
	Conscientiousness	0.026	-0.069	0.098	-2.665	0.997
	Extraversion	-0.004	-0.056	0.034	-2.382	1.281
	Neuroticism	0.012	0.166	-0.103	-2.186	1.568
	Openness	-0.005	0.101	-0.083	-2.509	1.332
Religion	No religion	0.437	0.495	0.393	-	-
	C of E/S/I	0.268	0.237	0.291	-	-
	Catholic	0.093	0.079	0.104	-	-
	Other Christian	0.113	0.099	0.123	-	-
	Non-Christian religion	0.090	0.090	0.090	-	-
Age	Age	48.992	49.689	48.476	16	102
Children	Number of children	0.593	0.526	0.643	0	9
Race	British	0.828	0.832	0.824	-	-
	Other white	0.036	0.033	0.038	-	-
	Asian	0.071	0.077	0.067	-	-
	African	0.036	0.030	0.040	-	-
	Mixed race	0.016	0.014	0.017	-	-
	Other race	0.014	0.014	0.014	-	-
Region	London	0.114	0.116	0.112	-	-
	England	0.725	0.728	0.722	-	-
	Peripheries	0.161	0.156	0.165	-	-
Wave	1	0.203	0.203	0.203	-	-
	2	0.126	0.126	0.127	-	-
	3	0.158	0.160	0.157	-	-
	4	0.206	0.206	0.206	-	-
	5	0.108	0.106	0.109	-	-
	6	0.102	0.102	0.102	-	-
	7	0.097	0.096	0.097	-	-

Note: All values in the Whole sample, Male and Female columns are the means

Table 5.22: Descriptive statistics for the analysis of prayer on GHQ

Category	Variable	Whole Sample	Male	Female	Min	Max
Gender	Female	0.570	-	-	-	-
Social Capital	Closeness	-0.096	-0.112	-0.084	-2.249	1.930
Income	Log income	7.864	7.885	7.848	-0.257	9.903
Employment	In employment	0.602	0.684	0.539	-	-
	Unemployed	0.069	0.073	0.066	-	-
	Inactive	0.329	0.243	0.395	-	-
Marital status	Married	0.529	0.570	0.498	-	-
	Single	0.350	0.358	0.344	-	-
	Divorced	0.094	0.062	0.119	-	-
	Widowed	0.027	0.011	0.038	-	-
Education	Years of education	14.052	14.181	13.954	8	19
Health	Subjective health	2.434	2.490	2.392	0	4
Personality (Fixed effects)	Agreeableness	0.057	-0.101	0.177	-3.709	1.087
	Conscientiousness	-0.064	-0.150	0.001	-2.665	0.997
	Extraversion	-0.024	-0.061	0.004	-2.382	1.281
	Neuroticism	0.088	0.179	0.020	-2.186	1.568
	Openness	0.025	0.086	-0.021	-2.509	1.332
Religion	No religion	0.257	0.302	0.222	-	-
	C of E/S/I	0.123	0.110	0.132	-	-
	Catholic	0.089	0.080	0.095	-	-
	Other Christian	0.139	0.103	0.166	-	-
	Non-Christian religion	0.393	0.405	0.385	-	-
Age	Age	42.288	42.777	41.918	16	94
Children	Number of children	0.911	0.824	0.976	0	8
Race	British	0.234	0.250	0.221	-	-
	Other white	0.035	0.034	0.036	-	-
	Asian	0.391	0.416	0.373	-	-
	African	0.186	0.157	0.208	-	-
	Mixed race	0.082	0.073	0.089	-	-
	Other race	0.071	0.069	0.073	-	-
Region	London	0.404	0.402	0.406	-	-
	England	0.535	0.538	0.533	-	-
	Peripheries	0.061	0.060	0.061	-	-
Wave	1	0.129	0.128	0.130	-	-
	2	0.122	0.121	0.123	-	-
	3	0.189	0.194	0.186	-	-
	4	0.172	0.174	0.171	-	-
	5	0.138	0.137	0.139	-	-
	6	0.129	0.126	0.131	-	-
	7	0.120	0.120	0.120	-	-

Note: All values in the Whole sample, Male and Female columns are the means

Appendix 5.B

These variables were used in item response theory to come up with a measure for closeness (a proxy for social capital).

Table 5.23: Variables used with item response theory for closeness variable

Variable	Description
w_famsup	Do you feel supported by your family – that is those that live with you?
w_remit2	Support for family members or friends.
w_remit3	Support for a local community.
w_scwemwbf	I've been feeling close to other people.
w_scopngbha	Belong to neighbourhood.
w_scopngbhb	Local friends mean a lot.
w_scrrely	Family – how much can you rely on them if you have a serious problem?

Appendix 5.C

In order to get a measure for years of education the highest qualification achieved was converted to years of education. Table 5.24 shows how this conversion was determined. As this variable was being treated as cardinal rather than ordinal the maximum and minimum years of education were fixed at 19 and 8 respectively, so as to prevent extreme values skewing the results.

Table 5.24: Highest qualification achieved in Understanding Society with corresponding years of education

Code	Understanding Society Definition	Recode (years of edu)
1	University higher degree (e.g. MSc, PhD)	19
2	1st degree level inc found'n deg, grad memb prof inst, PGCE	17
3	Diploma in higher education	
4	Teaching qualification (excluding PGCE)	
5	Nursing or other medical qualification not yet mentioned	
6	A level	14
7	Welsh baccalaureate	
8	International baccalaureate	
9	AS level	
10	Higher grade/advanced higher (Scotland)	
11	Certificate of sixth year studies	
12	GCSE/O level	12
13	CSE	10
14	Standard/ordinary (o) grade/lower (Scotland)	
15	Other school (inc. school leaving exam cert or matriculation)	
96	None of the above	8

Appendix 5.D

In Understanding Society the big 5 personality traits (agreeableness, conscientiousness, extraversion, neuroticism and openness) are determined through 3 different questions for each:

Table 5.25: Big 5 variables in Understanding Society

Personality trait	Variable	Description	Statement
Agreeableness	c_scptrt5a1	Rude	I see myself as someone who is sometimes rude to others.
	c_scptrt5a2	Forgiving nature	I see myself as someone who has a forgiving nature.
	c_scptrt5a3	Kind	I see myself as someone who is considerate and kind to almost everyone.
Conscientiousness	c_scptrt5c1	Thorough job	I see myself as someone who does a thorough job.
	c_scptrt5c2	Lazy	I see myself as someone who tends to be lazy.
	c_scptrt5c3	Efficient	I see myself as someone who does things efficiently
Extraversion	c_scptrt5e1	Talkative	I see myself as someone who is talkative.
	c_scptrt5e2	Sociable	I see myself as someone who is outgoing, sociable.
	c_scptrt5e3	Reserved	I see myself as someone who is reserved.
Neuroticism	c_scptrt5n1	Worries a lot	I see myself as someone who worries a lot.
	c_scptrt5n2	Nervous	I see myself as someone who gets nervous easily.
	c_scptrt5n3	Relaxed	I see myself as someone who is relaxed, handles stress well.
Openness	c_scptrt5o1	Original	I see myself as someone who is original, comes up with new ideas.
	c_scptrt5o2	Artistic	I see myself as someone who values artistic, aesthetic experiences.
	c_scptrt5o3	Active imagination	I see myself as someone who has an active imagination.

Appendix 5.E

The two tables found here are the results for the analysis run upon the whole sample.

Table 5.26: The effects of religiosity on life satisfaction for the whole sample

	Whole Sample	Attendance	Difference	Prayer
Religiosity on… (γ_θ)	Closeness	0.046***	0.046***	0.004
	Log Income	0.070***	0.056***	-0.062***
	Employment Status			
	Unemployed	-0.005***	-0.006***	0.004
	Inactive	-0.008***	0.002	0.046***
	Marital Status			
	Single	-0.011***	-0.006**	-0.024***
	Divorced	-0.019***	-0.014***	-0.002
	Widowed	0.003	-0.001	-0.003
	Years of Education	0.198***	0.197***	-0.032
	Health	0.094***	0.064***	-0.021
…on Life Satisfaction (β_θ)	Closeness	0.172***	0.170***	0.156***
	Log Income	0.047***	0.047***	0.066***
	Employment Status			
	Unemployed	-0.262***	-0.258***	-0.254***
	Inactive	0.033***	0.030***	0.029
	Marital Status			
	Single	-0.129***	-0.123***	-0.121***
	Divorced	-0.176***	-0.169***	-0.148***
	Widowed	-0.133***	-0.094***	-0.129**
	Years of education	0.023***	0.024***	0.028***
	Health	0.244***	0.248***	0.246***
Indirect Effects ($\gamma_\theta \times \beta_\theta$)	Closeness	0.008***	0.008***	0.001
	Log Income	0.003***	0.003***	-0.004***
	Employment Status			
	Unemployed	0.001***	0.002***	-0.001
	Inactive	-0.000**	0.000	0.001
	Marital Status			
	Single	0.001***	0.001**	0.003**
	Divorced	0.003***	0.002***	0.000
	Widowed	-0.000	0.000	0.000
	Years of Education	0.004***	0.005***	-0.001

	Health	0.023***	0.016***	-0.005
Direct Effect		**0.016*** **	**0.009***	**0.017**
Total Indirect		**0.044*** **	**0.036*** **	**-0.006**
Combined Effects		**0.061*** **	**0.045*** **	**0.011**
N		111,736	116,301	19,644

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively**

Table 5.27: The effects of religiosity on GHQ for the whole sample

Whole Sample		**Attendance**	**Difference**	**Prayer**
Religiosity on… (γ_θ)	Closeness	0.046***	0.046***	0.006
	Log Income	0.070***	0.056***	-0.063***
	Employment Status			
	Unemployed	-0.005***	-0.006***	0.004
	Inactive	-0.008***	0.002	0.046***
	Marital Status			
	Single	-0.011***	-0.006**	-0.024***
	Divorced	-0.019***	-0.014***	-0.002
	Widowed	0.003	-0.001	-0.003
	Years of Education	0.197***	0.197***	-0.032
	Health	0.095***	0.064***	-0.020
…on GHQ (β_θ)	Closeness	0.168***	0.168***	0.168***
	Log Income	0.020***	0.020***	0.027**
	Employment Status			
	Unemployed	-0.315***	-0.314***	-0.326***
	Inactive	-0.118***	-0.124***	-0.166***
	Marital Status			
	Single	-0.049***	-0.044***	-0.080**
	Divorced	-0.111***	-0.112***	-0.118***
	Widowed	-0.115***	-0.080***	0.015
	Years of education	-0.013***	-0.010**	0.022*
	Health	0.277***	0.277***	0.293***
Indirect Effects ($\gamma_\theta \times \beta_\theta$)	Closeness	0.008***	0.008***	0.001
	Log Income	0.001***	0.001***	-0.002**
	Employment Status			
	Unemployed	0.001***	0.002***	-0.001
	Inactive	0.001***	-0.000	-0.008***
	Marital Status			
	Single	0.001***	0.000*	0.002*
	Divorced	0.002***	0.002***	0.000

	Widowed	-0.000	0.000	-0.000
	Years of Education	-0.003***	-0.002**	-0.001
	Health	0.026***	0.018***	-0.006
Direct Effect		**0.007**	**-0.026*** **	**-0.003**
Total Indirect		**0.038*** **	**0.028*** **	**-0.014** **
Combined Effects		**0.044*** **	**0.002**	**-0.018**
N		111,474	116,043	19,582

Note: *, ** and * represent significance at the 10%, 5% and 1% levels respectively**

Chapter 6

Conclusion

Three empirical studies have been performed in this thesis, considering the relationship between subjective well-being and its determinants. The first study looked at the relationship between employment contracts and well-being, accounting for possible selectivity bias. The second study considered adaptation and anticipation to life events, looking at different points along the well-being distribution. Finally, the third empirical study looked at the relationship between religiosity and well-being with a focus on the direct and indirect effects. While there are limitations to all three of these studies, each of them has found something previously unconsidered by the existing literature.

The first empirical study finds that an individual's employment contract is indeed important to an individual's subjective well-being, and that selectivity bias may indeed be an important consideration to make when looking at well-being. The findings show that females are more affected than males by the difference between full-time and part-time contracts, with females benefiting more from being employed part-time. Conversely, males are affected more than females by the difference between permanent and temporary employment, with males benefiting most from a permanent contract. Finally, varying hours contracts increase the anxiety of both males and females, although males are unaffected through the other subjective well-being measures. Females suffer with lower happiness and life satisfaction from varying hours employment. Due to the recent rise in zero-hours contract, which is not dissimilar, this has strong implications for the subjective well-being of females.

Concerning selectivity bias, the study finds that there is selectivity bias when using life satisfaction as the measure for subjective well-being and worthwhileness of life for males, with all other measures of subjective well-being finding no significant differences when including unemployed individuals in the analysis. These results would suggest not only that selectivity bias is an important consideration to make when looking at employment contracts, but also that the subjective well-being measure being considered is extremely important and may be affected differently to other well-being measures.

There are some policy implications that may be drawn from these findings. First, with the different employment contracts affecting males and females differently one policy implication could be to encourage certain individuals into certain employment contracts. With part-time contracts having a positive impact upon female subjective well-being, yet varying hours contracts having a negative effect (and the permanency of employment not having any effect), one policy could be to encourage firms (financially or legislatively) to create more regular hours, part-time employment options for females. Conversely, with males suffering negative subjective well-being from temporary employment and increasing anxiety from varying hours employment (and full-time versus part-time employment having no impact), firms could be encouraged (again, financially or legislatively) to create more permanent, regular hours contracts for males. Alternatively, if these full-time, varying hours contracts for females and temporary, varying hours contracts for males are essential, the negative impact may be offset through other means. By incentivising these employment contracts through subsidies or greater benefits (e.g. extra holiday days), it may have a positive enough impact upon subjective well-being to offset the negatives.

Ultimately, it is important to consider employees' rights and the legislation behind the various employment contracts. By protecting employees under certain types of employment contract it could aid to reduce, or even remove, some of the negative effects experienced as a result of the contract. It would also be of great interest to compare how the relationship between employment contract and well-being varies across countries. With countries like France having much stronger employment laws protecting their employees, and countries like the US having much weaker laws, an international comparison may work to highlight the true cause of any negative effects experienced because of the employment contract.

While this research has been informative, it can be expanded further. This research considered only cross-sectional analysis, which only gives a snapshot of the relationship between employment contracts and well-being at a particular point in time. An expansion of this research could consider longitudinal data (or a cohort study) to explore how well-being changes with changes in employment contract. Similarly, through using different surveys it is possible to pick up on different employment contracts and different measures for well-being. A paper by Bryson and MacKerron (2016) uses a smart phone app called Mappiness to track how individuals' happiness changes depending upon what activity they are doing. They find that working is the second most negative activity that the participants

took part in (after being sick in bed). While the questions asked on this app do not allow for analysis on different types of employment contract (with anyone in employment being classed as "employed or self-employed"), similar research may be done to determine why work gives such a negative response and whether the type of employment contract contributes.

The second empirical study was able to corroborate the findings of previous research (Clark et al., 2008; Clark and Georgellis, 2013; Gupta et al., 2015) while also improving upon the previous research through including more life events and considering the unconditional distribution of well-being. The findings of this study were varied, as it explored 8 different life events, however, there were some interesting findings, with implications to policy.

Unemployment was found to cause a negative impact on subjective well-being, with individuals at all points along the well-being distribution suffering negative anticipation leading up to the event. While adaptation to unemployment was achieved for those at the lower end of the distribution, the negative impact persisted for those at the upper end (75^{th} and 90^{th} percentiles). This would suggest that those with a naturally higher well-being suffer longer from being made unemployed. While policy may not be able to target those individuals specifically, the fact that all individuals suffer for at least a year from being made unemployed may highlight the importance of back-to-work schemes, suggesting that they may need to be made more readily available to all individuals.

Widowhood was found to cause the greatest negative shock to well-being at the time of the event, yet adaptation was reasonably fast at the lower end of the distribution (10^{th} and 25^{th} percentile). However, negative effects persisted at the mid and upper end of the distribution (50^{th}, 75^{th} and 90^{th} percentile). With marriage having a positive influence upon subjective well-being it is unsurprising that negative effects were found to persist. With social capital being a greater determinant of well-being than marriage, policy may be aimed to give more support to those who suffer widowhood in order to offset the negative impact from the death of a partner. The form of this support could be free counselling for those who suffer the loss, or a scheme could be set up where volunteers visit recent sufferers of widowhood, enhancing their social capital. While these schemes are not necessarily the realm of government, the importance of supporting the vulnerable who suffer the loss of a loved one is an issue that should be taken seriously by the government.

Those who suffer from a disability tend to adapt very quickly to the disability, yet those who suffer a long-term illness tend to suffer negative well-being effects for longer (with those at the 25th percentile having a persistent negative effect). While there is a lot of support for those who suffer with a disability (with specific benefits and laws that help and protect this vulnerable group), those who suffer long-term illnesses have less support. This is something that could be tackled by the government, by enhancing the benefits and protecting the rights of those who suffer with a long-term illness.

Other findings from this study (with fewer policy implications) are that those at the lower to mid end of the distribution (25th and 50th percentile) tend to enjoy the positive well-being effects from marriage persistently, however, at the upper end (90th percentile) there is actually some negative impact from being married (although only at three years of marriage). Divorce seems to have strong negative anticipation effects at the lower and mid end of the distribution (10th, 25th and 50th percentile), although they do adapt quickly to divorce. Conversely, those at the upper end of the distribution (75th and 90th percentile) enjoy a positive well-being effect immediately after divorce, which seems to be persistent. Interestingly, birth of a child (whether the first or subsequent child) seems to have very little impact upon well-being either positively or negatively (although, this finding may be due to the analysis performed here considering the genders together, rather than separately). Finally, retirement seems to be enjoyed greatly by those at the lower end of the distribution (10th and 25th percentile), with persistent positive effects. However, those at the upper end of the distribution adapt quickly to retirement.

There is also scope to build upon this research through larger datasets. The analysis performed here was limited to certain measures of time (annual) and not split by gender due to the number of observations. If the data becomes available, a smaller time step for the adaptation and anticipation effects (e.g. monthly rather than annually), as well as splitting the analysis by gender, would reveal more on the true effects experienced prior to and following major life events, also aiding in targeting particular groups more effectively with policy. Similarly, an exploration of other major life events (finishing school, moving to a new city, buying a house, etc.) would help to highlight other areas where protection of well-being should be considered.

The final empirical study explored the complex relationship between religiosity and subjective well-being through the direct and indirect effects. The findings of this study reveal the importance of

considering the indirect effects in well-being analysis, as many of the direct relationships found between religiosity and well-being were diminished, bolstered or reversed when including the indirect effects, with few relationships remaining unchanged. However, this does bring up some important issues. First, what relationships in the well-being literature are believed to be positive/negative, where the true relationship, through mediators, actually reveals a different story? Similarly, what variables generally considered to be unrelated to well-being may in actual fact have an indirect relationship? These questions alone are enough to warrant further research, yet more considerations that must be made are identified through this study.

By using three different measures of religiosity and two measures of subjective well-being there were six different possible analyses (before splitting by gender or religion/denomination). The results of these analyses differed among both religiosity measures and well-being measures used. This highlights the importance not only of what variables should be used when measuring religiosity or well-being, but also how these relationships are defined. To say that Catholics experience a positive impact upon well-being from their religion could be true if the measure for religiosity is attendance at religious services and the measure for well-being is the GHQ, however, both other measures of religiosity (with the GHQ as the well-being measure) would actually suggest a negative relationship between Catholicism and well-being. Despite this, there are some generalisations that may be drawn from this analysis.

When splitting the analysis by gender there was a consistent finding that females had greater positive or smaller negative direct and combined effects on both measures of well-being from all three measures of religiosity. While the data confirms the findings that females are more prone to religiosity, the findings of the analysis suggest that the benefits of religiosity are greater for females than males, even when taking into account the indirect relationships. While differences between the genders have been explored to a great extent in the economics, psychology and sociology literatures, these findings once again confirm that differences exist between males and females with regards to religion/religiosity, and may help to inform future research in the area.

Another finding of this study is that Christians are generally the most positively affected by religiosity, with those of no religion or a non-Christian religion receiving fewer benefits to their well-being from their belief. However, comparing the results of this study to other studies that look at religiosity in

other countries, with a different majority religion, it could be argued that the positive well-being received by Christians is because they are in the majority religion, with those of a non-Christian religion suffering through being a minority. While this is not confirmable through this study alone, future research considering majority and minority religions in various other countries may reveal some interesting findings.

The implications of these results are extremely important. If those of a minority religion are suffering negative well-being, or lower well-being than those of the majority religions, what is causing this negative effect? It is possible that discrimination is one of the causes of this issue, and with those of a minority religion also predominantly being of a minority race, it would suggest that race/religious discrimination is still an issue. A similar possible cause for these findings is disintegration between those of a majority religion and those of a minority religion. Again, with those of minority religions also being predominantly of a minority race there comes the issue of cultural or language barriers that act to isolate communities of those of minority religions. The lower well-being from religiosity may be a reflection not of the religion itself but of the isolation that hampers social capital (a strong determinant of well-being). These are extremely important considerations that must be made and explored further.

Another consideration to be made as a result of this research is whether the mediators found to be significant are being maximised. For example, health was consistently found to have a strong indirect effect between religiosity and well-being. As such, it must be asked whether this is encouraged (through religious ministries being available in doctor's surgeries or hospitals), which could aid not only the healing process (through the positive relationship found between religiosity and health), but also lead to greater increases in well-being. Through use of the Mappiness app, Dolton and MacKerron (2018) maps individuals going to watch the football and measures their well-being at this time. A similar study could be performed that maps individuals as they go to church/temple/synagogue/mosque/etc. and explore changes in the well-being of these individuals. While this may highlight changes in well-being due to social capital, rather than religion, this could help to explore further the indirect effects from increased religiosity.

The three studies performed here greatly enhance the well-being literature, bringing several new findings that not only expand the current literature, but also open up avenues for future research.

Similarly, the policy implications of this research are vast, with several vulnerable groups identified and possible solutions to lower well-being in these groups being proposed. With the increase in data becoming available by nationally and worldwide there is scope for future research in international comparisons, suggesting that one, if not more, of these studies may be a starting point for new strains of research into the relationship between well-being and its determinants.

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