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**Essay on the Use of Subjective Well-Being  
Data in Economic Analysis: An Empirical Study  
Using Developed and Developing Countries Data**

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A thesis submitted in partial fulfilment of the requirements for the  
degree of Doctor of Philosophy in Economics

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Finally, I would like to dedicate this thesis to my late grandmother who recently passed away at the end of last year.

*Kid Terng Khun Ya Krub.*



## **Declaration**

I declare the following:

The material contained in this thesis is my own work.

Some materials of Chapter 4 have recently been accepted for a publication in *Economica*, which is forthcoming at the time of the completion of this thesis.

The thesis has not been submitted for a degree at any another university.

## Abstract

This thesis studies the determinants of subjective well-being, with the main focus on the data relating to developing countries. Chapters 2, 3, and 4 use new South African integrated household data to study the determinants of perceived quality of life at the cross-section. The fifth chapter compares the cross-sectional and over time structures of subjective economic well-being for Indonesia, whilst the sixth chapter uses reported well-being data from the British household panel survey to test an 'old' economic hypothesis in a new way.

Chapter 2 tests whether the determinants of subjective well-being are the same when comparing poor and rich nations. Using South Africa as a case study, we find from the full sample analysis that in most comparable cases, the coefficient signs of the usual socio-economic factors in the life satisfaction regression equations for South Africa in 1993 are typically similar to that which would have been expected from data in the more-developed countries. However, our subpopulation regressions reveal very distinct life satisfaction patterns by race and region prior to the end of apartheid in South Africa.

Chapter 3 analyses the labour market phenomenon in South Africa. We test whether unemployment hurts less in terms of life satisfaction when there is more of it around. After controlling for the relevant socio-economic factors, we find the unemployed's well-being to be significantly and positively correlated with the levels of others' unemployment in the region.

Using the South African data set of 1997, the fourth chapter explores the contemporaneous relationship between measures of criminal victimization and reported well-being. We find crime victims to report significantly lower well-being than the non-victims, *ceteris paribus*. Reported life satisfaction is lower for nonvictimized respondents currently living in higher crime areas. However, we find some evidence that criminal victimization hurts less in areas of higher crime rates.

Chapter 5 examines the cross-sectional and longitudinal relationships between objective and subjective economic ladder for Indonesia. It finds that individuals' perceptions of economic rank in the economy are more dependent on his or her socio-economic characteristics (i.e. health, education, marital status), as well as attitudes towards future economic ladder, than the current spending behaviour would normally reveal. The correlation between objective and subjective economic ladder is also weakened considerably when an individual's inborn predispositions are controlled for in the regression.

Chapter 6 tests whether one's partner's happiness increases one's own happiness in a marriage. After using "residual" self-rated health to provide an instrument for the partner's life satisfaction and allowing controls on individual fixed-effects, we find strong evidence of an interdependent relationship in the reported life satisfaction between married partners, which is not present for those whom are merely cohabiting.

# **Chapter One**

## **Introduction**

This thesis explores the subjective notion of utility. The conventional view of utility in standard microeconomic textbooks is that it employs an *objectivist* position, based on observable choices made by individuals<sup>1</sup>. In this analysis, utility only depends on tangible goods and services and leisure. An individual is then observed to prefer one bundle of goods to another. Given that all the choices made between alternatives satisfy a certain criteria of reasonableness, a utility function that will explain an individual's preferences between different bundles of goods can be inferred from behaviour. Utility has thus become merely a number that denotes preferences without any further substantive meaning whatsoever.

This *modern* concept of “decision” utility has been influenced by the rise of positivism and behaviorism in the early 20<sup>th</sup> century. The Utilitarians' view of measurable cardinal utility (i.e. the idea that utility scales can be measured and, in particular, are comparable between individuals)<sup>2</sup> is rejected as being *unscientific*, because it is not objectively observable. The basic difficulty seems to be that there is no obvious way of comparing utility scales between individuals and, in particular, no way of showing that two individuals with similar income levels will get the same level of additional satisfaction from a given increase in income (Robbins, 1938). Most importantly, the ordinal concepts of utility (or revealed preference) have been demonstrated by numerous neoclassical economists - such as Hicks (1934) and Allen (1934) - to be sufficient for all the ordinary purposes of demand theory and could be used to derive welfare theory independent of cardinal utility assumptions. It has become evident that the analysis of consumer demand can be undertaken using only statements

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<sup>1</sup>See Pindyck and Rubinfeld (1997), Frank (2002), and Varian (2002), among others.

<sup>2</sup>See Bentham (1789) and Mill (1863).

about preferences. For all these reasons, modern economic theory has completely given up the substantive and empirically measurable idea of utility in terms of satisfaction and pleasure in order to explain individual choices in favor of the preference index of ordinal utility.

Over the last few decades, however, there has been a movement within economics that claims that utility should be considered in terms of happiness, and that it can, and should, be measured. This development is fueled by the growing concerns over accumulated evidence - both from real life observation and inference from laboratory experiments - that individuals may not always act rationally when making decisions about consumption. It is often the case that people are not as well informed about their choices as is axiomatically assumed in revealed preference theory, or that they discount the future in an excessive, inconsistent manner.

Economists have also come to the agreement that people are not always able to choose the greatest amount of utility for themselves. It has been demonstrated by numerous scholars that contextual influences, such as the comparison of one's own income to that of friends or colleagues, can affect individuals' utility of outcomes in a great way (e.g. Duesenberry, 1948; Hirsch, 1976; Clark and Oswald, 1998). An example comes from Robert Frank (1985)'s illustration of two miners choosing whether to work in a clean or dusty mine. In order to compensate the miners working in relatively worse conditions, wages in the dusty mine at \$250 a week are higher than those in the clean mine by \$50. However, the adverse effect of working in the dusty mine is that life expectancy is shortened by fifteen years. See Figure

1-1. In the absence of concerns about the relative standing of income hierarchy, each miner would find it worthwhile to sacrifice \$50 a week in order to escape from working in the dusty mine. But neither is willing to make that same exchange if relative standing of income hierarchy actually matters. The two miners are then left with a standard case of Prisoner's dilemma, whereby the dominant strategy for each is to choose the dusty mine. Yet, by doing so, an outcome results in each working in a distasteful environment in comparison with the alternative of both working in the clean mine.

The nonsubstantive concept of utility has also been challenged from different angles by various enterprising economists. There are countless examples of non-objectivist theoretical analyses in economics. They incorporate, for instance, an individual's emotional state (e.g. Hermalin and Isen, 1999), mastery and meaning (e.g. Loewenstein, 1999), self-confidence (e.g. Benabou and Tirole, 1999), altruism (e.g. Altonji *et al*, 1997), and fairness (e.g. Rabin, 1997). The exclusive reliance on an objective approach by the standard economic theory is thus open to doubt, both theoretically and empirically. It seems that human happiness cannot be understood without, in part, listening to what human beings have to say.

The subjective approach to utility offers economists a fruitful complementary path to study an individual's well-being. This is because subjective well-being is a much broader concept than decision utility. It also includes "experienced" utility, which is based on an individual's experiences of consumption or life events in the past, as well as "procedural" utility or the utility derived from the mere act of engaging in an activity preferred by the individual. It is also considered by many as the ultimate goal of human life. We do not

want other things that we may want, such as money, job security, and status, simply for themselves, but rather to give us the possibility of making us happier. Finally, the concept of subjective well-being allows us to gain a better insight into human well-being. This creates a basis for explicitly testing fundamental assumptions and propositions in economic theory.

The general perception, as postulated in psychology, is that there is a reported well-being function for each individual in question. Each respondent, when asked to rate his or her own personal happiness or subjective well-being onto a numerical scale is thought to base his or her answer on a whole extensive set of personal and household characteristics, as well as social circumstances and background. Hence, the happiness measures based on surveys do not claim to be objective, but rather, attempt to make a global assessment of the whole sphere of life.

As subjective well-being data are based on individuals' judgement, they may be prone to sampling and nonsampling biases. For instance, subjective survey responses may be distorted by the order and the wording of the question. People may also misrepresent their happiness levels in order to maintain the social desirability to be happy, or their own personal self-esteem. However, extensive studies in psychology have shown that while the measures of subjective well-being are subject to some distortions and measurement errors, they seem to contain substantial amounts of valid variance and a high degree of consistency over time (for an overview see Diener, 1984).

Recognizing the limitations of such subjective scale, research in the economics of happi-

ness over the recent years has established a systematic relationship between economic factors and reported well-being data. Macroeconomic conditions such as unemployment and inflation have been found to negatively affect reported happiness and life satisfaction scores across different countries and time periods (Di Tella *et al*, 2001). At the micro-level, personal unemployment seems to contribute to individuals' unhappiness, even when incomes are controlled for in the microeconomic regression (Clark and Oswald, 1994; Winkelmann and Winkelmann, 1998).

Many happiness research findings have added new knowledge to the standard view in economics, whilst other results have challenged it. For example, while being unemployed depresses people's well-being markedly, personal unemployment does not seem to hurt as much when there is more of it around in the area (see Clark, 2003). In contrast, several scholars have found, for many of the studied advanced industrialised nations, that higher income does not simply translate into higher happiness over time, despite the fact that wealthier persons have consistently reported higher well-being levels than poorer persons in the same country at the cross-section (Easterlin, 1995).

One general drawback from the existing literature on happiness is that much of the research work only focuses on the subjective outcomes in wealthy nations, simply because adequate data are more readily available from these countries. Most conclusions from economic papers are drawn from econometric inferences, using either the US or the European data, and, are therefore unlikely to be globally representative. Given that other societies may have different sets of values, people in them are likely to be different in judging how



satisfied they are with the life that they lead. In one community, equality may be most important, for example, whereas in another location more weight may be placed on economic prosperity. People of subpopulations in poorer countries, or in an extremely diversified culture, may indeed possess a completely opposite view of how one's life should be judged. The implication of cultural influences on happiness thus points to the need for internal standards when judging societies: are people able to accomplish their own values and goals, and therefore judge their own lives to be successful, as based on their own standards?

The recent introduction of happiness surveys carried out in less developed countries, however, allows economists to investigate some of the previously explored issues in a different context. Are the rich in poorer nations significantly more satisfied with life when compared to the poor? Is personal unemployment still associated with lower overall levels of well-being in locations of high unemployment rates? Do we accept or reject the hypothesis that the usual socio-economic determinants of happiness are the same in poor and rich countries? In addition to these intrinsic interests, surveys from poorer countries also provide an opportunity to study other determinants of subjective well-being that have not been examined before, by using data from advanced industrialised economies.

This thesis is an attempt to show that research on happiness should not only be limited to the studies carried out on wealthy nations. The thesis uses various measures of subjective well-being from a combination of data sets taken mainly from less developed countries. It analyses a number of previously explored issues of interests. It also uses these data sets to provide new tests of economic hypotheses. This thesis blends cross-section and panel

results. Our approach to the empirical analysis of subjective well-being data is divided into the following five chapters.

Chapter 2 discusses in greater depth the concept of happiness, how people's subjective well-being is empirically measured, and the validity and reliability of these subjective scales. It then conducts an empirical analysis of the cross-sectional relationship between socio-economic factors and the reported life satisfaction at the household level for South Africa in 1993. The results obtained from the full sample regression suggest that in most comparable cases, the coefficient signs of the usual socio-economic factors in the microeconomic life satisfaction function are typically similar in South Africa to those of more-developed countries. Expenditure and home ownership, for example, are found to be positively correlated with self-rated welfare at the household level. Higher proportions of unemployed members in the household are associated with one of the lowest well-being scores, all other things being equal.

However, the presence of strong sub-cultural values in South Africa results in the implication that people may judge their perceived quality of life differently across subpopulations. Our sub-sample regressions reveal a clear difference in the determinants of life satisfaction by race (Blacks versus Non-Blacks) and region (Rural versus Urban). For instance, while the correlation between household unemployment and individual assessments of household life satisfaction is negative and statistically significant for those living in the urban area, the same robust relationship cannot be obtained for the rural population, controlling for race in the regression. We also find some evidence of substantial disparities in the estimated coeffi-

cient size across subpopulations. The marginal welfare impact of household expenditure on reported well-being, for example, is estimated to be around nine-times larger for non-black households than for black households. Chapter 2's evidence thus supports the notion that human well-being in the less developed countries should be analysed at the sub-cultural level, as well as at the aggregated level.

Using the same South African data, the third chapter tests for a positive relationship between the unemployed's well-being and the regional unemployment rate, previously found by Clark (2003) for the British population. This fundamental idea, inspired by Akerlof (1980)'s seminal work on a theory of social custom, is that in an area of high unemployment, the going-norm for the citizen in that area changes from being employed to being unemployed. Hence, it follows that the negative effect of unemployment on subjective well-being will be inversely related to the number of unemployed people in the environment.

In consonance with Clark's results, we find from our full sample analysis that household unemployment significantly depresses the perception of well-being at the household level, whilst the regional unemployment rate is observed to be negatively correlated with the reported well-being for those with no unemployed members in the household. Like Clark for Britain, we also find the reported well-being of unemployed households in South Africa to be associated positively and significantly with higher proportions of unemployed others in the same region. In other words, it is easier to be unemployed if there is more of it around in the area. This provides supporting psychological evidence that would appear consistent with the idea of unemployment hysteresis in areas of high unemployment rate. Results

remain robust only for the urban black sample, however, when sub-sample analysis is taken into consideration.

One of the more serious welfare-related issues concerning the general population in South Africa is the effect of crime on people's welfare. Using a different South African data set for the year 1997, Chapter 4 seeks to examine the relatively unexplored relationship between subjective well-being and crime. Consistent with the idea that crime affects people's well-being in a negative way, we find that respondents from victimized households report a substantially lower subjective well-being score, on average, compared to those from non-victimized households. For the full sample, the non-pecuniary 'unhappiness' cost of crime is estimated, at the mean, to be worth approximately \$21,142 per month, for an average household spending \$240 per month. Regressions on subpopulations also reveal that crime affects the subjective well-being of the rural population more than those living in urban areas.

We also find the main effect of the regional victimization rate at both the magistrial district level and the provincial level to be negative and well-defined in our microeconomic life satisfaction regression equations for South Africa. Nevertheless, an interesting finding emerges when we interact the regional victimization rate at the magistrial district level with the crime victim dummy. It appears that, while experiences of crime are negatively related with an individual's perceptions of household well-being, the negative correlation is attenuated - at least at the magistrial district level - as crime on others rises. In other words, it is easier to be a victim when many others are also victims. This provides new evidence

in favor of interdependence in utility among crime victims living in the same geographical unit in South Africa.

There are, of course, limitations to cross-sectional data. One issue that has not been dealt with in detail in this dissertation is the identification problem involved in the modelling of happiness regression equations. For instance, are people more satisfied with their life because of their economic conditions, or do happy people assess their economic conditions more favorably? The problem of reversed causality may also exist at the individual level in the relationship between marriage and happiness: does marriage make people happy, or are intrinsically happier people more likely to find a partner and get married? In addition, with respect to the influence of average characteristics of relevant others in the community, there may be a Manski-type reflection issue if, say, others' unemployment or crime affect the reported life satisfaction at the household level directly, rather than indirectly as we have portrayed them throughout our analysis (Manski, 1993). More importantly, cross-sectional studies on happiness may be unreliable if individuals' subjective responses are dominated by personal latent psychological differences (i.e. inborn genetic predispositions). The idea is that cross-section equations will be biased whenever unobserved personality traits (such as neuroticism or self-esteem) are correlated with observable socio-economic factors (unemployment or education) and subjective well-being responses.

In many cases in this dissertation, it will not be possible to find suitable instruments to deal with all of the identification problems involved in the estimation of happiness equations. This dissertation, then, reports on simple equations that are to be thought of as a beginning.

We are, however, able to deal with the issues of personality and simultaneity bias in Chapters 5 and 6. In these two chapters, longitudinal data set are introduced for the first time in this dissertation, to allow person-specific effects to be differenced out.

Chapter 5 attempts to address some of the above difficulties by introducing a panel data set to help with the study of subjective well-being. It follows the analysis carried out by Ravallion and Lockshin (2001, 2002) on the Russian data and begins with an empirical analysis of the determinants of individuals' subjective economic ladder for Indonesia three years after the financial crisis in 1997. The cross-sectional relationship between the objective economic indicator (e.g. *per capita* level of expenditure) and self-rated economic welfare, albeit positively related, is not particularly strong. Rather, it appears that individual perceptions of economic rank in Indonesia are more dependent on a number of socio-economic characteristics, as well as attitudes towards future economic welfare, than current spending behaviour would normally reveal.

We then implement an approach that is likely to be more robust than the one used in the cross-sectional analysis. The fact that the survey is longitudinal (re-surveying the same individual over time) in nature allows us to control for individual differences in personality traits that influence subjective economic welfare, and are also likely to be correlated with expenditures, employment status, and other personal and household characteristics at the same time. Controlling for the individual fixed effects, the resulting estimates imply a weaker, though still statistically significant impact of the expenditure variable on subjective economic welfare compared to the one obtained earlier at the cross-section. In contrast

to the finding of a largely insignificant, cross-sectional relationship between personal unemployment status and individual assessments of economic rank in the economy, a change from employment in period  $t$  to unemployment in period  $t + 1$  is seen to be associated with a sharp drop in the reported economic ladder in our panel model.

Chapter 6 devises a test of what is probably one of the central tenets in the field of the economics of marriage, that a married person becomes happier when his wife (or her husband) becomes happier (Becker, 1974). It argues, in essence, that spouses have some knowledge of each other's subjective well-being. A key identification issue in estimation, however, is the simultaneity bias in the couple's reports of life satisfaction. Using an individual-level data set from the British Household Panel Survey, we instrument the spouse's life satisfaction by his or her person-specific, 'unexplained' subjective health status. This time-varying variable is assumed to reflect pervasive individual differences in negative emotionality and self-concept (Watson and Clark, 1984). Allowing controls for individuals' unobserved heterogeneity in the regressions, we find a positive, significant relationship between one's life satisfaction and his or her partner's life satisfaction. The welfare impact of the partner's life satisfaction on one's life satisfaction is also sizeable, as well as statistically significant. An increase in the spouse's life satisfaction from one standard deviation point below the mean to one standard deviation above the mean is enough to offset around 20% of the non-pecuniary cost of unemployment on one's life satisfaction. The same significant result cannot be obtained, however, for those couples in a cohabiting union.

Chapter 7 summarises the conclusions from the research undertaken in the present thesis.

**Figure 1-1: Mine Safety Choices When Relative Standing Matters**

	<b>B</b>	
<b>A</b>	<b>Clean Mine</b>	<b>Dusty Mine</b>
<b>Clean Mine</b>	Second best for A Second best for B	Worst for A Best for B
<b>Dusty Mine</b>	Best for A Worst for B	Third best for A Third best for B

**Source:** Frank (1985).

**Note:** Clean mine: \$200 a week. Dusty mine: \$250 a week.



## Chapter Two

# An Analysis of the Determinants of Subjective Well-Being in Developing Countries: The Case of South Africa

### Abstract

Are subjective well-being patterns structurally the same when comparing rich and poor countries? Using cross-sectional data from South Africa in 1993, this chapter shows that the relationships between the reported well-being and socioeconomic variables have a generally similar structure in South Africa as in the advanced industrialised countries. Higher levels of satisfaction are associated with greater household wealth. Dissatisfaction with life is prevalent among the unemployed. Black Africans are the least satisfied racial group. However, a further sub-sample analysis reveals a significant variation in the determinants of well-being by race and region in South Africa, suggesting that subjective well-being data in a developing country setting should be analysed at the sub-cultural level, as well as at the national level.

“[Happiness] is nothing else but a sudden glory arising from some sudden conception of some eminency in ourselves, by comparison with the infirmity of others, or with our own formerly”

- *Thomas Hobbes (17th Century Philosopher).*

## 2.1 Introduction

For centuries, the question of “What is *a good life*?” has continued to be one of the most prolonged topics of public debate for academic scholars and government officials alike throughout the world. What makes individuals happy? What contributes to happy societies? These are important questions, considering that the aim of most economic policies is to enhance welfare for as many people as possible within a given set of resource constraints.

In a continuous effort to try and find common determinants of ‘a good life’ for all, the recent trend of economic analysis on human welfare has benefitted from advances in psychology over the last three decades. By asking people to rate how happy they are with their life as a whole onto a numerical scale, economists have been able to follow the path paved by psychologists and demonstrate how these well-being responses can be shown to correlate well - in the anticipated directions - with economic factors such as wealth, unemployment, inflation, and institutional conditions. In addition to economic determinants, research into happiness seems to offer mainstream economists food for thought by producing seemingly paradoxical results that challenge traditional economic assumptions. For instance, aggregate levels of happiness do not seem to increase as societies grow wealthier, even though within countries wealthier individuals have reported higher well-being levels, on average, than poorer ones. These findings, which suggest that economic progress buys only a small amount of happiness, seem to hold true for the US economy and many other developed countries in Europe (East-erlin, 1974, 1995; Blanchflower and Oswald, 2004). The results thus help to illustrate one of the psychological assumptions generally ignored by most economic models: the importance

of relative income differences in determining individual's perceptions of welfare.

However, the impression given by the existing research on subjective well-being is that it focuses only on wealthy nations. This is not very far off from the truth. Happiness research has focused largely on developed economies, simply because adequate data are more readily available from these countries. Yet developing economies offer more opportunities for economists to study poverty and inequality, as well as the volatility in various socioeconomic and macroeconomic factors, and their implications for the happiness of people living there. With greater regional and cultural differences in less developed nations, it is also possible for happiness to differ much more significantly across subpopulations in poorer countries than in more affluent ones. If this is the case, can we still, then, be reasonably satisfied with the perception that the general structure of happiness equations is the same in poor and rich countries?

In an attempt to build on the small (but growing) literature concerning the economic of happiness in developing countries, this chapter focuses on the correlates of subjective well-being in a very poor economy, at least by western standards, namely the South African economy during the end of apartheid in 1993. The responses to the survey question, which asked representative individuals about the perceived quality of life at the household level, are taken from the South African Labour Research Unit data set and analysed using an ordered probit model. We regard this method as complementary to the more standard approach to poverty and welfare analysis, which normally measures aggregate welfare according to the number of people who fall below the constructed poverty line. Consistent with previous

findings in the advanced industrial nations, our full sample analysis reveals that higher wealth - as measured by levels of expenditure *per capita* and home ownership status - is shown to be strongly positively correlated with the perceptions of household welfare. We also find strong evidence of significant correlations, with the expected directions, between the usual socio-economic factors and the self-rated household welfare. However, sub-sample analysis suggests that subjective household welfare data should be studied separately by race and region due to the large cultural discrepancies across these demographic groups in South Africa.

Section 2.2 discusses existing literature on subjective well-being research, focusing particularly on the validation and application of happiness data. Section 2.3 looks at the background of well-being measures and quality of life data set for South Africa. The empirical strategy and main findings are discussed in Section 2.4, and conclusions are set out in Section 2.5.

## **2.2 The Economics of Happiness Literature: A Review**

### **2.2.1 Introduction**

Psychologists have been spending a considerable amount of time analyzing the sources of human satisfaction in detail for decades<sup>3</sup>. In their view, happiness, or subjective well-being, is conceived to be the degree of how one views one's life as a whole, or some particular

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<sup>3</sup>Recent work includes Argyle (1989), Fox and Kahneman (1992), Myers (1992) and Diener and Suh (2000). For a comprehensive review on the research progress in the last three decades of subjective well-being, see Diener et al (1999).

domain of one's life, as favorable (Veenhoven, 1993). As an attitude that is not accessible to public observation, psychologists believe that a concept such as subjective well-being can be studied, in part, by asking people how they feel.

How, then, can subjective well-being be captured? One way to measure an individual's subjective well-being is through surveys, which may include single-item or multiple-item questions on how one views one's state of well-being. An example of a single-item question comes from the standard happiness question in the World Values Survey, which asks people, "*Taken all together, how happy would you say you are: very happy, quite happy, not very happy, not at all happy?*" Each response then scores one to four points so that one has a numerical scale, running from the lowest well-being level (1. "Not at all happy") to the highest well-being level (4. "Very happy"). This is very similar to the three-point scale of one of the General Social Surveys of the United States, which asks, "*Taken all together, how would you say things are these days - would you say that you are very happy, pretty happy, or not too happy?*" Another one of the most commonly used, single-item scales is the life satisfaction scale. The standard life satisfaction question, which can be found in the Eurobarometer Survey, asks individuals, "*On the whole are you very satisfied, fairly satisfied, not very satisfied, or not satisfied with the life you lead?*"

While single-item scales enjoy the benefit of brevity, many psychologists have considered them to be less reliable and to have less validity when compared to multi-item scales. This is because random measurement errors tend to be smaller on average in multi-item scales than single-item scales. Among multi-item scales, one of the most prominent measures of an

individual's subjective well-being is the General Health Questionnaire (GHQ) in the British Household Panel Survey. The GHQ assesses positive and negative affect according to the responses to the following twelve questions: "Have you recently, a) been able to concentrate on whatever you're doing, b) felt that you were playing a useful part in things, c) felt capable of making decisions about things, d) been able to enjoy your normal day-to-day activities, e) been able to face up to problems, f) been feeling reasonably happy, all things considered, for *positive affect*, and g) lost much sleep over worry, h) felt constantly under strain, i) felt you could not overcome your difficulties, j) been feeling unhappy or depressed, k) been losing confidence in yourself, l) been thinking of yourself as a worthless person?", for *negative affect*. The optional responses for the GHQ-12 questions are rated on a four-point Likert scale, with possible answers ranging from "1. More so than usual" to "4. Much less than usual" for positive affect and from "1. Not at all" to "4. Much more than usual". The unweighted scores are then summed up to form a single index, with higher scores indicating lower psychological well-being.

For a long time, such happiness measures have been used by psychologists to analyse the composition of individual's well-being. Yet only recently has it become the subject of economic analysis. One of the main reasons why economists have traditionally shied away from using such subjective information is because of the justifiable concerns that subjective well-being responses are subject to nonsampling bias. For instance, people may overstate their happiness level in order to maintain their self-esteem over the interviewer, whilst situational factors such as mood and weather may affect their responses at the time of the

survey (Bertrand and Mullainathan, 2001). Thus, traditional economists prefer to focus their analyses on actual behaviour, such as revealed preferences in consumption, savings, and labour market participation, in the assumption that individuals rationally process all the information at their disposal before making their choices accordingly to maximise utility.

In recent years, there seems to be growing concern among numerous scholars as to whether utility can generally be derived by observable choices. The introduction of bounded rationality concept, in which individuals are assumed to have access only to a limited or local information and make decision according to heuristic rules rather than optimization calculations, suggests that preferences may not, in some cases, be recovered through observations of human behaviour alone, even if, under ideal observational conditions, human behaviour can be observed directly (Simon, 1978; Conlisk, 1996; Kahneman, 2003). In addition, norms or rules may lead to seemingly irrational behaviour that is guided not so much by utilitarian calculus but by the principles of, or the fear of social sanctions (Thaler, 1992; Akerlof, 1980). Frey and Stutzer (2002, p.405) conclude from a review of relevant literature that: “The exclusive reliance on an objectivist approach by standard economic theory is thus open to doubt, both theoretically and empirically. In any case, it restricts the possibility of understanding and influencing human well-being.” Thus the above argument suggests that given observable choices are not enough to provide all the information required to infer the utility of outcomes, a subjective approach, which allows us to capture well-being directly, should also be studied in part by economists.

### 2.2.2 Validation

Researchers remain sceptical as to whether self-rated well-being data, in its terminology, is valid and reliable. A first argument in defence of using happiness data comes from evidence that it has often been shown to correlate substantially with other subjective data. These include, for instance, how self-rated happiness can be shown to be correlated well with subjective recall of positive and negative events (Siedlitz *et al*, 1997), with assessments of the person's happiness by friends and family (Diener, 1984; Pavot and Diener, 1993; Sandvik *et al*, 1993), reports by spouses (Costa and McCrae, 1988), reports from clinical experts (Goldings, 1954), and with memory measures, in which people must remember good versus bad events from their lives (Balatsky and Diener, 1993). A second argument is based on findings within psychology literature, of a well-defined correlation between happiness data and various physical measures. For example, reported subjective well-being has been shown to be positively associated with the duration of genuine or the so-called "Duchenne" smile (Eckman *et al*, 1990), and measures of responses to stress such as heart rate and blood pressure (Shedler *et al*, 1993). Subjective well-being measures have also been used to predict the length of the person's life (Palmore, 1969) as well as the risk of getting a coronary heart disease (Sales and House, 1971).

Regarding the nonsampling issue, it is believed that such a deterministic bias from an individual's desire to maintain a high degree of happiness depends on the respective culture the respondent is from. Hence, for a given set of subjective well-being distribution within a population of the same culture, there will also be a bias distribution. Given that the



average pressure to overstate one's true well-being decreases with average true well-being for populations of the same culture, it seems plausible to assume that higher reported well-being reflects higher true well-being, provided that an increase in true well-being does not reduce the bias by the same extent, or more. Therefore, provided the cultural differences of the populations compared are not too large, reported subjective well-being can be used as a sufficiently valid ordinal measure of true average well-being (Diener and Suh, 2000; Holländer, 2001). In addition, a review of studies carried on countries in which more than one language is spoken show that happiness scores across language groups are similar (Ouweenel and Veenhoven, 1991). A further argument in favor of happiness data is that psychologists have been able to identify a number of subjective well-being correlations that are not only highly plausible, but have also turned out to be stable across populations and over time (Argyle, 1989; Diener and Suh, 2000). As Holländer (2001, p.243) points out in his assessment of the subject: "The fact that subjective well-being data enabled psychologists to identify circumstances that, on average, make a life satisfying and happy for those who live it, should convince economists that it is worth the while to try the same for economic circumstances." For a more comprehensive review of the reliability and validity of happiness measures, see also Diener (1984), Myers (1992) and Konow and Earley (1999).

### **2.2.3 Application**

One of the appealing facts to contemporary economists about happiness data is that it contains not only decision utility but also experienced utility based on an individual's past

experiences, as well as expected utility, which represents an individual's expectation of the future (Kahneman *et al*, 1997; Kahneman and Thaler, 1997; Harsanyi, 1997; and Rabin, 1998). These papers argue, in essence, that there are circumstances where measures of experienced and expected utility can be derived (such as happiness responses) that are reasonable substitutes for observing individual outcomes. In his pioneering work, Easterlin (1974) has shown for the US from 1946-1970 that, while happiness is associated positively with higher incomes in the cross-sectional analysis for each of the observed years, its average remains stagnant despite tremendous economic growth over that period. Later studies seem to have confirmed Easterlin's findings as to the stagnant long-run relationship between happiness and real GDP in America (Easterlin, 1995; Di Tella *et al*, 2003). This is different from what standard utility theory would predict: increasing incomes should increase utility, but they simply do not. The results, however, can be explained by introducing income aspirations into people's utility which capture their concerns for relative income, as well as their adaptation to their previous income level (Easterlin, 2001). In other words, increasing income for all leads to an increase in all aspiration levels, leaving individual utility unaffected. Easterlin's empirical contribution on relative utility theory is also supported by growing evidence that favorable comparison income levels, against which the individual compares himself, are strongly correlated with higher reported well-being for people for different populations and time period, holding absolute income constant (see van de Stadt *et al*, 1985; Tomes, 1986; Clark and Oswald, 1996; Ferrer-i-Carbonell, 2002; Stutzer, 2002, among others).

Regarding other factors that affect happiness, Oswald (1997, p.1823) notes that “Reported happiness is high among those who are married, on high income, women, whites, the well-educated, the self-employed, the retired, and those looking after the home. Happiness is apparently U-shaped in age (minimizing around the 30s).” The results are not only consistent with the findings on the literature of psychology (for instance, see Wilson, 1967) but also seem to hold across different countries, different time periods and even different measures of well-being (see, for example, Frey and Stutzer, 2000, for Switzerland; Gerdtham and Johannesson, 2001, for Sweden; Frijters *et al*, 2002, for Germany).

Other than testing the relative income hypothesis, economists also use happiness data to test old hypotheses in a new way. Though by no mean exhaustive, economists have used subjective well-being data to measure the non-pecuniary effects of unemployment (Clark and Oswald, 1994; Darity and Goldsmith, 1996; Theodossiou, 1998; Winkelmann and Winkelmann, 1998), to study social norms in the labour market and past unemployment (Clark *et al*, 2001; Clark, 2003; Stutzer and Lalive, 2003), to understand people’s preferences between unemployment and inflation (Di Tella *et al*, 2001), to study the relationship between happiness and economic growth (Kenny, 1999), to measure the effects of political institution (Frey and Stutzer, 2000), as well as to examine other intangible factors such as airport noise (van Praag and Baarsma, 2004), on well-being.

The impression given by the existing literature on the economics of happiness is that it only focuses on wealthy nations. This is not very far from the truth. Subjective well-being research has focused largely on developed economies, simply because adequate data are more

readily available from these countries. Yet developing economies offer more opportunities for economists to study poverty and inequality, as well as the volatility in various socio-economic and macroeconomic factors, and their implications for the happiness of people living there.

Two of the small number of people working on happiness data from developing economies are Carol Graham and Stefano Pettinato (2002). They compare happiness in Latin America and in Russia, using data from 1997 to 2000 from the Latinobarometer, and from 1995 to 1998 from the Russia Longitudinal Monitoring Survey. They find that favorable relative income differences and change in status - as measured by income mobility over the years - have strong positive effects on reported well-being for both sets of data. In addition, they find most of the socio-demographics of happiness in Latin America and in Russia similar to those of advanced industrialized economies. Using the same data set for Russia, Ravallion and Lokshin (2001, 2002) show how self-rated economic welfare, one of the domain satisfactions of global well-being, is determined not only by absolute income but also by changes in household income and health status, as well as relative income in the area of residence. For other countries, Namazie and Sanfey (2001) and Lelkes (2002) find that socioeconomic variables such as age, gender, income, education levels, employment and marital status have similar effects on self-reported happiness levels in Kyrgyzstan and Hungary, respectively, as in the more developed western economies. Nevertheless, there remains little research that draws upon happiness data from developing countries, compared to that of advanced industrialized nations.

## 2.3 On Quality of Life Measures in South Africa

### 2.3.1 General Background

According to a report by the Inter-ministerial Committee on Poverty and Inequality (ICPI)<sup>4</sup>, South Africa is classified as an upper-middle-income country with a per capita income higher than that of Poland and Thailand, and similar to that of Brazil and Malaysia<sup>5</sup>. Yet despite this relative wealth, South Africa still ranks behind most countries with a similar income per capita, according to the Human Development Index (HDI) league table, where HDI represents a composite of the three following factors: (i) longevity (as measured by life expectancy); (ii) education attainment (as measured by adult literacy and enrolment rates); and (iii) real standard of living (as measured by real GDP per capita).<sup>6</sup>

The experience of around 50% of the South African population is either one of outright poverty, or of continued vulnerability to becoming poor. Despite being classified as one of the upper-middle-income countries, the nation holds to date one of the most unequal distributions in income and wealth in the world. This claim is supported by the Gini coefficient and the income shares of households. According to the 1996 World Development Report, the Gini coefficient in South Africa - a measure of its degree of income inequality - is the second highest in the world in 1996, at 0.58 (behind Brazil of 0.63), where 0 signifies

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<sup>4</sup>The complete report can be downloaded from the South African government webpage at <http://www.welfare.gov.za/Documents/2000/Docs/1998/Pov.html>. (Document viewed April, 2003).

<sup>5</sup>GNP per capita US\$ (1994): Poland (\$2,410), Thailand, (\$2,410), Brazil (\$2,970), South Africa (\$3,040), Malaysia (\$3,480). Source: Inequality and Poverty Report, South Africa (1998).

<sup>6</sup>The HDI for selected middle-income countries in 1992 were (rated out of 1): Poland (0.815), Thailand (0.798), Malaysia (0.794), Brazil (0.756), South Africa (0.677). Source: the United Nations Development Programme (UNDP).

absolute equality and 1 indicates absolute concentration. The measurement of income shares of deciles of households informs us that the poorest 40% of households - equivalent to around 50% of the total population - only have 11% of total income, while the richest 10% of households - 7% of the total population - have over 40% of the total income. Not surprisingly, between-group inequality is also considered to be very large in South Africa, where diversity is one of the key features, and where between-race inequality accounts for around 37% of total inequality. As for within-race inequality, the calculated Gini coefficients by race at the end of 1993, drawn from a sample of approximately 8,000 households, also display substantial values at 0.449, 0.412, 0.377, and 0.336 for Blacks, Coloureds, Indians, and Whites respectively, see Deaton (1997: p.157).

Looking more closely at the poor, a disaggregated analysis in the ICPI report on living standards has shown that there remains a strong racial and regional dimension to poverty in South Africa. Around 70% of households classified as 'poor' in the ICPI report using a consumption-based poverty measure are found to be living in rural areas, while 61% of the households from the same category come from the population of black Africans. Almost all of the 'poor' households, the majority of whom were black Africans, are deprived of access to basic services such as running water, electricity, and telephone in dwelling, as well as from decent education and secured employment. There are also clear relationships to be found between poverty and other human development indicators such as ill-health and poor nutrition in-take, as well as owning no material goods and having to live in a violent environment in South Africa. Moving out of poverty is also considered to be extremely

difficult for the majority of people in South Africa. A panel study by Carter and May (2001) and a later summary on income mobility drawn up by Graham and Pettinato (2002) suggest that a significantly higher proportion of the poverty of South Africa remains chronic or permanent than in any other studied countries, namely Peru, Russia, and USA, with around 66% of those below the poverty line in 1993 still remaining in the same place in 1998.

Other evidence relating to South Africa's poverty background, which is more closely related to the analysis in this chapter, derives from a subjective measurement of poverty conducted by the recent South African Participatory Poverty Assessment (SA-PPA) team in 1997. The exercise was carried out by asking people from a number of participating communities to subjectively place themselves (or their households) on the community wealth ladder. The SA-PPA team found that subjective responses correlated with many of the objective characteristics, and other nonincome variables of the respondents. For example, the experiment carried out on members of the community of Nhlanguwini in the province of KwaZulu-Natal leads to the following findings. People who had reported themselves to be in the poor category (38 out of 79 households) had all or some of the following criteria: no family member working for cash or only doing cheap labour, ill-health, no parents, or were farm workers. The criteria for people in the average category (21 households) consisted of households with regular-wage workers or with some incomes coming from farming. The situation improves significantly for people who classified themselves as rich (17 households). As it happens, some of these 'rich' households ran more than one business while others had a number of family members in salaried work. Other supporting work in terms of subjective

well-being in South Africa can also be found in Klasen (1997) and Møller (1998). However, the relationships between subjective well-being and socioeconomic factors established in these studies were made through general observations only, and not by econometric evaluation.

All in all, the evidence given above has provided us with two main rationales for the first part of this chapter. One is that the problems of poverty and inequality in South Africa represent much more serious, wide-spread issues at the core of human development than would seem the case through general observation, and thus provides us with a useful framework on which to base our research. The second is that happiness responses in South Africa can be correlated with various objective characteristics of households, as earlier studies suggest.

### **2.3.2 The South African Integrated Household Survey**

The current chapter uses household data from the South African Labour Research Unit (SALDRU) survey. The SALDRU is a nationally representative, cross-sectional household survey which contains information on a series of subjects including - but not limited to - household composition, education, employment status, and other income earning activities. The survey, carried out during the last five months of 1993 - shortly before the election that made Nelson Mandela the South African president in 1994, consists of approximately 8,800 randomly selected households in as many as 360 communities. The data are collected by personal interviews with the respondents, and are made publicly available on the World



Bank's Living Standard Measurement Study (LSMS) website<sup>7</sup>. The proxy subjective well-being measure, which is a single-item life satisfaction at the household level scale, is the Perceived Quality of Life (PQOL, henceforth). It asks the respondents: "*Taking everything into account, how satisfied is this household with the way it lives today?*" The five possible answers were 'very satisfied', 'satisfied', 'neither satisfied nor dissatisfied', 'dissatisfied', and 'very dissatisfied'. We rearrange these in order that the highest level of happiness - 'very satisfied' - is recorded as a 5, 'satisfied' as a 4, 'neither satisfied nor dissatisfied' as a 3, 'dissatisfied' as a 2, and the lowest level of happiness - 'very dissatisfied' - as a 1<sup>8</sup>.

There is a high response rate to the PQOL question (99% of the sample). There is also a sampling weight given to each observation, making the reduced sample representative at the national level. The raw sample of PQOL distribution is given in Table 2-1. At the end of apartheid, over 23% households have reported to be 'very dissatisfied' with the life that they lead, whilst only 8% described themselves as 'very satisfied'. The mean household satisfaction score for the SALDRU is 2.62. The next section of this chapter presents some empirical models whose purpose is to capture the relationship between PQOL and socio-demographic variables, and to outline our estimation procedures on cross-sectional data.

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<sup>7</sup>See the LSMS website at <http://www.worldbank.org/html/prdph/lms/index.htm> for access to the dataset. Last viewed April, 2004.

<sup>8</sup>To our knowledge, the PQOL data has been studied in part once by Kingdon and Knight (2004) where they conclude using the South African survey that individuals in high unemployed households have generally reported lower life satisfaction than individuals residing in low unemployed households.

## 2.4 Empirical Results for South Africa

### 2.4.1 Basic Models

We begin this section by reintroducing a reported well-being function that is used by others with regard to US and European data before us, that is

$$r_i = h(u(e, \bar{e}, z, X)) + \mu \quad (2.1)$$

where  $r$  is the self-reported well-being by individual  $i$ ,  $h(\cdot)$  is a non-differentiable function that relates actual to reported well-being,  $u(\cdot)$  is the true well-being only observable to that individual,  $e$  is real expenditure,  $\bar{e}$  is a spending level against which the individual compares himself or herself (such a comparison could be made against the individual's cohort's spending levels or past expenditure),  $z$  is a set of demographic personal characteristics, and  $\mu$  is an error term that subsumes the inability of human beings to communicate accurately their well-being levels. The variable  $X$  includes all other household characteristics that are shared among household members. The reported well-being function is assumed to increase with expenditure,  $e$ , and reduce with comparison expenditure level,  $\bar{e}$ . In order to make the well-being function more relevant to the happiness survey in South Africa, we readjust equation (2.1) to give

$$r = h\left(\frac{1}{N} \sum_{i=1}^N u(e, \bar{e}, z, X)\right) + \mu \quad (2.2)$$

where  $r$  now becomes the reported well-being at the household level by an individual. It is thought to contain the respondent's evaluation of household well-being, which is based on the average well-being of all individuals across the household. The error term  $\mu$  therefore captures the inability of respondents to evaluate accurately the well-being levels of other household members as well as their own, while  $N$  is the number in the household. Using this simple happiness model as our benchmark, we may begin our empirical modelling on the reported perceived quality of life in South Africa.

As the PQOL is ordinal, not cardinal, ordered probit regressions are used to estimate the following first, simple-form equation

$$r_h = \gamma e_h + X_h \lambda + \mu_h \quad (2.3)$$

where  $r_h$  is the reported well-being level for household  $h$ , taking on the values  $\{1, 2, \dots, J\}$  for some known interger  $J^9$ . The probit model for  $r_h$  (conditional on explanatory variables on the right-hand side) can be derived from latent variable model. Assume that a latent variable  $r_h^*$  is determined by  $r_h^* = \gamma e_h + \lambda z_h + \mu_h$ ,  $\mu_h | e_h, z_h \sim \text{Normal}(0,1)$ . Let  $\alpha_1 < \alpha_2 < \dots < \alpha_J$  be unknown cut points, and define

$$\begin{aligned} r_h &= 1 & \text{if } r_h^* \leq \alpha_1, \\ r_h &= 2 & \text{if } \alpha_1 \leq r_h^* \leq \alpha_2, \dots \\ r_h &= J & \text{if } r_h^* > \alpha_J. \end{aligned} \quad (2.4)$$

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<sup>9</sup>In the case of PQOL, the known interger  $J$  is 5.

Given the standard normal assumption for  $\mu_h$ , we can derive the conditional distribution of  $r_h$  given all the explanatory variables; each response probability can be computed as follows:

$$P(r_h = 1|e_h, X_h) = P(r_h^* \leq \alpha_1|e_h, X_h) = \Phi(\alpha_1 - \gamma e_h - X_h \lambda), \quad (2.5)$$

$$P(r_h = 2|e_h, X_h) = P(\alpha_1 \leq r_h^* \leq \alpha_2|e_h, X_h) = \Phi(\alpha_2 - \gamma e_h - X_h \lambda) - \Phi(\alpha_1 - \gamma e_h - X_h \lambda), \dots$$

$$P(r_h = J|e_h, X_h) = P(r_h^* > \alpha_J|e_h, X_h) = 1 - \Phi(\alpha_J - \gamma e_h - X_h \lambda).$$

The parameters  $\alpha$ ,  $\gamma$ , and  $\lambda$  can be estimated by maximum likelihood. For each  $h$ , the log-likelihood function is  $\ell_h(\alpha, \gamma, \lambda) = 1[r_h = 1] \log[\Phi(\alpha_1 - \gamma e_h - X_h \lambda)] + 1[r_h = 2] \log[(\Phi(\alpha_2 - \gamma e_h - \lambda z_h) - \Phi(\alpha_1 - \gamma e_h - X_h \lambda))] + \dots + 1[r_h = J] \log[1 - \Phi(\alpha_J - \gamma e_h - X_h \lambda)]$ . In other words, someone with  $r_h^* \leq \alpha_1$  will respond that he is ‘very dissatisfied’ with the way his household lives today; someone for whom  $\alpha_1 \leq r_h^* \leq \alpha_2$  will fall in the ‘dissatisfied’ category, and so on up to the highest ‘very satisfied’ category.

The variable  $e_h$  represents a natural log of total household monthly expenditure per capita<sup>10</sup>, whilst  $X_h$  includes a vector of other controlled household characteristics that include household race, homeowner status, and location (rural/urban/metropolitan). For simplicity, we have left personal characteristics  $z$  out of our first regression. Lastly, as the sample is a clustered one - with clusters mainly being small communities or villages - households living in the same cluster are more likely to share not only the same infrastructures such as navigable

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<sup>10</sup>The expenditure, which was calculated by the World Bank Group, includes all household expenditure and remittance during the past month.

roads but also the same climate, food prices, crime rate, or even the same eccentric local traits (Deaton, 1997). As a result, homogeneity in group data may lead to estimations having small standard errors. To correct for underestimated standard errors, community cluster controls have been included in our estimations so as to capture any grouping effects present within the data set. See Moulton (1990) for more discussions as to the potential pitfalls of estimating aggregate variables on micro units when standard errors are not corrected for.

The regression results in panel A of Table 2-2 may serve to provide some confidence in the structure of the responses in the subjective well-being question in South Africa. We can clearly see the robust relationships between household race and reported quality of life: individuals living in an African household, which is the omitted category in the regression, are more likely to report, on average, a lower subjective well-being score relative to individuals living in either a coloured (non-white of mixed race in South Africa), an Indian, or a white household, even after income and durable assets ownership are controlled for. Individuals from white households, on the other hand, have in general reported the highest level of PQOL scores. This result is consistent with earlier findings found on race and happiness in US and UK data (Oswald, 1997; Di Tella *et al*, 2003). This is also in keeping with other results from Latin America, where those individuals who self-reported in terms of their nationality (Peruvian or Chilean, for example) first rather than as a racial minority are happier than others (Graham, 2002). One explanation for the depressed PQOL could be the mind set shaped by years of discrimination during the apartheid years, despite the fact that the majority of the population are black. To take just a few examples, racial

discrimination of various kinds in South Africa appears in studies on job discrimination (Knight and McGrath, 1977), as well as wage discrimination (Knight and McGrath, 1977; Moll, 1990). Hence, the result obtained from the PQOL is consistent with other studies that suggest possible racial discrimination against black households living in South Africa.

The log of household expenditure per capita variable enters the regression with a positive and significant coefficient, while household size is associated with higher reported PQOL levels. A possible explanation for the positive correlation in the household size variable might be that once we normalise for total household expenditure per capita an increase in the size of the household may raise the overall household productivity level, especially for those who lived and worked on farmlands in rural South Africa. Moreover, living in urban and metropolitan areas is negatively associated with reported well-being. This could be explained partly by stress-related and overcrowding problems such as high unemployment and crime rates normally found in urban living. Urban areas in many developing countries are also vulnerable to large influxes of migration from the rural population looking for a better life in the city, but often, these people find themselves living in poor conditions, with no access either to jobs or health care. Urban households may also have higher aspirations and reference norms, as they have more readily available information about how others around them live. In addition, the low PQOL scores recorded among people living in urban areas could have been caused by some hidden political unrest in urban South Africa in the early 1990s, which we have not been able to control for in our model.

Panel B extends to include internal wealth comparison variable into the regression. This

attitudinal variable comes from a dummy variable containing information as to whether the individual *thinks* that the financial position of his household today is better, the same, or worse when compared with that of his parents when they were at the same point in the life cycle<sup>11</sup>. This subjective variable acts as proxy for the individual's subjective assessment of the current household's status, in comparison to his or her past experience, regardless of today's actual earning level. For example, an individual who grows up with wealthy parents seems likely to have a higher consumption standard than an individual who grows up in poverty, *ceteris paribus*. We find strong evidence of people reporting high PQOL scores when they believe that the household is doing as well financially - if not better - as compared to its past, even after controlling for the current income. The result is in keeping with the previous work on the effects of the perception of past progress: the perception of one's present situation in a positive light compared to the past has positive and significant effects on subjective well-being, see McBride (2001) and Graham and Pettinato (2002).

#### 2.4.2 Personal and Community Characteristics

Table 2-3 controls for a number of personal characteristics and community traits (denoted by  $z_h$ ), adding aggregated variables for age and gender, marital status, education, health, employment, as well as relative expenditure, cluster food price, crime and unemployment rate at the community level. We also include dummy variables for the language spoken at home and the relationship of the PQOL respondent to the head of the household. Descriptive

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<sup>11</sup>The question is phrased as followed: "When you compare your situation today with that of your parents, do you think you are richer, about the same, or poorer than they were? - 1.Poorer, 2.The same, 3.Richer."

statistics of all variables are provided in Appendix 2A. The estimate of panel A of Table 2-3 shows that personal and community variables have a strong influence on reported PQOL scores, whilst household variables remain qualitatively the same as in Table 2-2. A subjective well-being indicator deems pensioner households to have the highest quality of life, *ceteris paribus*. Since income is not controlled for in the regression, one possible interpretation is that pensioner households may gain more than others from the pension benefits that the family now receives. Higher ratios of married individuals are associated with higher reported PQOL levels. Self-rated quality of life at the household level rises with a higher proportion of college or university graduates. Higher ratios of household unemployment, employment with casual wages, and students are shown to be strongly negatively correlated with self-rated welfare, whilst reported PQOL drops with the number of sick individuals in the household.

Among the community characteristics, relative expenditure, which has been defined as the ratio of household monthly expenditure per capita over the average household monthly expenditure per capita in the cluster, is shown to be moderately negatively correlated with the reported quality of life<sup>12</sup>. Despite its relatively weaker correlation with subjective welfare than other variables, the result for relative expenditure is particularly interesting as it contradicts relative utility theory: higher expenditure rank should raise well-being, not lower it. This calls for a more in-depth analysis on the relationship between relative expenditure and subjective well-being for South Africa. We shall come back to this point

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<sup>12</sup>The mean expenditure used in the calculation of relative expenditure variable is based on a reasonable sample-size with an average of 30.61 households per cluster.



later in the section. Table 2-3's other results show that the reported PQOL score is lower for those with high cluster unemployment rate and that there is a positive, albeit insignificant, relationship between self-rated welfare and the cluster crime rate. The coefficient on cluster food price index is positive but insignificant.

So far we have been assuming in our regressions that the differences in culture between black and non-black South Africans are relatively small. However, it seems highly improbable that this would be the case, given the long apartheid era in South Africa. Taking this into account, panels B and C of Table 2-3 separate the data by race. Interesting differences emerge. It can be seen, in panel B, that only pensioner households from the non-black demographic group are significantly happier with quality of life, holding other things equal. One interpretation of this is the significantly biased pension benefits system in favor of non-black populations during the apartheid years. This hypothesis is supported by the difference in the coefficient sign on the retirement category between black (negative) and non-black (positive). The positive correlation between the ratio of married individuals and reported PQOL is significant only for the non-black sample. Household unemployment, employment with casual wages, and students are shown to be strongly correlated with lower well-being only for the black South African group. The coefficients on average age across all household members and the number of sick individuals are negative and significant only for the non-black population, while relative expenditure and cluster food price index variables are significant (both at the 5% level) only for the black sample. Furthermore, we can carry out a simple test for equality of coefficients using the pooled data. Here, equation (2.3) is

re-estimated using the following specification

$$r_h = \gamma_1 e_h + \gamma_2 (e_h * D[Black]) + \dots + \mu_h, \quad (2.3\bar{l})$$

where  $D[Black]$  is a dummy variable representing black households. An equality test of whether  $\gamma_1 = \gamma_2$  (for example) can then be carried out using this method. Equality tests on all of the main coefficients presented in the last column suggest that some of the significant point estimates differ markedly when comparing blacks to non-blacks. The coefficient on log household monthly expenditure per capita among only the black sample, for instance, is less than one quarter the size compared to the non-black sample, and we can reject the equality test at the 1% level.

The marginal effects in the ordered probit estimation indicate the change in the probability of people belonging to a self-rated quality of life category when the independent variable is increased by one unit. For the sake of simplicity, only the marginal effects of the highest quality of life (PQOL score of 5) are shown in Table 2-3. This approach allows for a relatively more meaningful comparison to be made between the coefficients across different racial groups. For example, a unit increase in the log of household monthly expenditure per capita variable raises the share of people reporting very high quality of life by 9.9 percentage points for the non-black sample and by 0.8 percentage points for the black sample. A unit increase in cluster unemployment, on the other hand, lowers the share of people reporting very high quality of life by 32.8 percentage points for the non-black sample, compared to 8.7 percentage points for the black sample. The results in Table 2-3 thus suggest that

the discrepancies in culture between black and non-black groups may be too great in South Africa as compared to other countries of multi-racial societies, such as the US and the UK, because of the long history of apartheid. Given such cultural differences between black and non-black South Africans, it may be very difficult for the results to have basic believability if all the racial groups are to be pooled together in the regression.

So far we have been assuming in our regressions that representative individuals weigh up the average well-being across their household members when evaluating subjective welfare at the household level. However, given the fact that a representative individual may weigh up their own well-being differently from that of other household members, an interpretation of the coefficients on pooled personal attributes in our previous tables may not be straightforward. Taking this into account, Column 1 and 2 of Table 2-4 separate the pooled personal variables, as estimated in Table 2-3, into (i) individual characteristics of the PQOL respondent, and (ii) pooled individual characteristics across all *other* household members, and estimate the new specification by race. It is worth noting that the new specification only allows the use of those households that have recorded more than one household member to be estimated.

Column 1 and 2 of Table 2-4 respectively look at the non-black and black samples. There seems to be a pronounced U-shaped relationship between the respondent's age and reported PQOL, minimizing around the mid 40s, only for the non-black sample. Self-rated household welfare seems to be negatively associated with the respondent's own education for both racial groups. One explanation for this is that the return to higher education in

developing countries may be measured purely in terms of higher wealth. The correlation between education and expenditure is probably higher in less developed countries, whereas in more advanced economies, more educated people probably have the luxury or security of working in lower paying but more satisfying jobs, as in NGOs or universities, for example (Graham and Pettinato, 2001). The theory of high aspiration levels found among people who are highly educated can also help to explain the negative relationship between education and happiness, when wealth variables (i.e. expenditure and household ownership, etc.) are controlled for in the regression. Married respondents are more likely to report higher well-being than that of their non-married counterpart for the black sample, while black male respondents are, on average, less satisfied with the overall quality of life of the household as compared to their black female counterparts. In contrast to the non-black sample, black respondents who are either unemployed, employed with casual wages, house-keepers, retired, or disabled report, on average, a significantly lower satisfaction score compared to those employed with regular wages.

The lower half of Column 1 and 2 of Table 2-4 report the results for other household members' individual characteristics. Reported well-being is associated with higher proportions of well-educated members (namely those who have completed a college course or hold a university degree) for both black and non-black groups, *ceteris paribus*. This is an interesting result, which suggests that it is the respondent's education level, not the aggregated household education level, which is the sole source for high aspirations that appear to reduce subjective well-being in South Africa. One interpretation could be that the more

educated (and less happy) respondents still prefer to live - and indeed benefit from living - with more educated family members. The ratio of others' unemployment is shown to be strongly negatively correlated with reported well-being for black households (i.e. significant at the 1% level), while the same relationship is significant at the 10% level for the non-black group. Increasing the proportion of those employed with casual wages, those self-employed, and student members reduce well-being at the household level only for the black sample, whilst higher ratio of those looking after home raises subjective household welfare for the non-black demographic group.

It would also be useful to know if, using the new sample (i.e. household size is greater than one), but with the old (Table 2-3) specification, the results on pooled personal attributes in Table 2-4 will stay essentially the same. The regression results using the old specification on the new sample for both racial groups are reported in Appendix 2B. By comparing the point estimates between the two specifications, we can see a number of notable changes in the size and significance of the estimated coefficients on pooled personal attributes in both Column 1 and 2 of Table 2-4. For instance, the coefficient on the ratio of those who completed a college course or hold a university degree, when estimated using the old specification on the new sample, is insignificant for the black demographic group. By separating the PQOL respondent's characteristics from pooled individual characteristics, the coefficient on the ratio of other members who completed a college course or hold a university degree becomes significant at the 1% level. Though not shown in the table, the coefficients on household characteristics have nevertheless remained essentially the same with both old (Table 2-3)

and new (Table 2-4) specifications.

### **2.4.3 Geographical Differences in Well-being: Rural versus Urban**

Apart from the significant cultural differences that come with race, well-being pattern may also vary according to the geographical settings in South Africa. Since rural South Africa may represent economic developing conditions more so than urban South Africa, Table 2-5 divides the sample to be estimated according to categorized geographical settings - with rural area in Column 1, and urban/metropolitan area in Column 2. Owing to large cultural discrepancies between black and non-black South Africans at the time of the interview in 1993, only black demographic group will be examined here.

With Table 2-3's specification, only seven variables (namely, same wealth as parents dummy, richer than parents dummy, tertiary education dummy, household unemployment, employment with casual wages, average age in the household, and cluster unemployment) are well-defined at conventional significance levels in both columns. Household variables such as the natural log of expenditure per capita and household size are insignificantly correlated with the well-being of black South Africans in the urban and metropolitan area. Relative expenditure is shown to be strongly negatively correlated with reported PQOL for black people living in rural areas, while home ownership raises subjective well-being only for the black urban sample. In addition, further equality tests on the main coefficients in the last column indicate that there are significant differences in six out of the twenty-six main regression coefficients between rural black people and urban black people. The results on equality

tests remain qualitatively unchanged if we were to run Table 2-4's specification on the rural black and urban black sub-samples. This confirms our earlier hypothesis that the well-being microeconomic structure in rural South Africa may be significantly different from urban South Africa, and may be a better representation of economic developing conditions for the nation as a whole. However, it must be noted that the location of choice (rural or urban) can be chosen, even among the black African households, and therefore the point estimates should be treated with caution.

#### **2.4.4 Results on Relative Expenditure Revisited**

We explore in this section the negative relationship between reported well-being and relative expenditure in the community among black South Africans. As shown earlier in Table 2-3, the estimates suggest that for the black sample, a one unit increase in the relative expenditure within one's locality lowers the share of people reporting very high quality of life by 0.6 percentage points. This negative correlation is also well-defined; the coefficient on relative expenditure is significant at the 5% level.

For further analysis, Columns 1-3 of Table 2-6 introduce non-linear forms of relative expenditure into Table 2-3's specification. Looking across the columns, it can be seen that both non-linear forms of relative expenditure (i.e. relative expenditure-squared and relative expenditure-cubed) enter well-being regressions with significant coefficients for the black sample, as well as for the black-by-region sub-samples. For example, the estimates in the second-order polynomial regression in Column 1 suggest a convex relationship between

relative expenditure within one's locality and the reported well-being, minimizing at around 5.81 in relative expenditure. In other words, predicted well-being for the black sample is at the minimum point when the average household expenditure per capita is 5.81 times greater than the average household expenditure per capita in the community, holding other things constant. Further calculations reveal the estimated minimum points to be 6.81 and 2.32 for rural blacks and urban blacks, respectively. However, the point estimates on relative expenditure and relative expenditure-squared in the second-order polynomial regression are insignificant for the urban black sample.

The coefficient on relative expenditure-cubed is negative and significant in all of the three third-order polynomial regressions. This indicates another turning point where well-being stops rising with household expenditure relative to others in the community. For instance, the respective estimated turning points for the black demographic group are approximately 3.21 (minimum) and 11.95 (maximum) in relative expenditure. Hence, relative expenditure is associated positively with reported well-being for approximately 1.20% of the total black sample. The estimates in Column 2 also suggest a positive correlation between relative expenditure and reported well-being, though it is only significant for 0.65% of the rural black sample. However, there seems to be a significantly larger proportion of urban black households compared to other subpopulations, who tended to report higher welfare with higher ratios of own household expenditure to the average community spending: the relative expenditure variable is shown to be strongly positively correlated with well-being for approximately 13.37% of the urban black group. However, considering that this is a high



level of equation fitting, the results should not be taken too literally.

While we can probably interpret the positive correlation between relative expenditure and subjective welfare in the normal way, one potential explanation for the negative impact of the relative expenditure finding is that higher average community spending may correlate with numerous desirable conditions within the cluster. The identification problem here is that people in a wealthy community may benefit directly from roads, mass transit, health care, schools, and other services that are more readily available in affluent regions. Furthermore, average household spending per capita for other households in the community level can also be used as an indicator of the business cycle, and hence, of opportunities and expected gains for the respondent. Thus it is possible that people may be able to derive positive effects from observing others' fast progression if they interpret this movement as a sign that they, too, will progress soon. Hirschman (1973) dubbed this the "Tunnel effect", where initially those who are stuck in a stalled lane in a traffic jam gain hope from movements in other lanes<sup>13</sup>. Therefore, one hypothesis is that the positive correlation between average community spending and reported life satisfaction at the household level could just be a matter of picking up the impact of local amenities, or expectations about our own financial status through seeing others' progress, with regard to well-being<sup>14</sup>. An increase in average community spending, holding household's own spending constant, will therefore result in a

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<sup>13</sup>Supporting evidence of Hirschman's tunnel effect hypothesis can be found in the work by Claudia Senik (2004), where she finds the impact of average income in one professional's group on life satisfaction to be positive and significant for transitional economies such as Russia and Hungary.

<sup>14</sup>To test this hypothesis, relative expenditure has been replaced by log of average community spending per capita in the well-being regression. As a result, the log of average community spending per capita enters the well-being regression with a positive and significant coefficient of 0.380 and a standard error of 0.082 for the black sample, holding everything else constant.

drop in the relative expenditure variable. This would partly explain the negative correlation between relative expenditure and household welfare found in the data. However, our analysis of the SALDRU suggests that it may be very difficult to interpret cross-sectional results on relative expenditure provided that unobserved wealth in the community cannot be controlled for.

## **2.5 Summary of Findings**

Through the useful insight provided here into the structure of happiness equations in less-developed economies, we have examined in this chapter the contemporaneous relationships between a set of micro-economic variables and self-rated household welfare for South Africa in 1993. While the study has been carried out on those who are extremely poor by western standards, the estimates from our full sample analysis suggest that, in most comparable cases, the coefficient signs of the usual socio-economic factors in the life satisfaction regression equations for South Africa are typically similar to that which would have been expected from data in the more-developed countries.

Our other main findings are the following.

First, we find household wealth - as measured by levels of household expenditure per capita and home ownership - to be strongly positively correlated with subjective household welfare. The size of the household is strongly positively correlated with the perceived quality of life, even when household expenditure per capita is controlled for in the regression. Black Africans appear to be much less content with the life that they lead compared to the non-

black group, despite constituting the majority of the population. This may be because the best part of the population has been governed for generations by apartheid law. Past perception of financial well-being at the household level is also important in the evaluation of subjective well-being: people tended to report relatively higher levels of subjective household welfare if they perceive that their current household situations are the same or better than that of their parents at the same age. Furthermore, the geographical setting of the household seems to matter to the perceptions of subjective well-being: urban people are generally less satisfied with life than those living in rural areas.

In addition to household characteristic determinants, we also find that aggregate individual attributes across household members correlate well with the reported perceived quality of life in the full sample. People living in households with high proportions of unemployed members tended to report one of the lowest well-being scores, *ceteris paribus*. Subjective household welfare is positively associated with higher proportions of pensioners, married persons, and individuals with at least a college degree, whilst the number of sick individuals in the household seems to reduce it. With respect to geographical influences, the perceived quality of life is shown to be significantly negatively correlated with average cluster unemployment rate, as well as relative expenditure within one's locality.

Finally, it appears that there are significant ethnological and regional variations in the determinants of well-being in South Africa. For instance, owning a home outright has a positive influence on subjective household welfare for all racial groups, but the estimated effect is only significant for the non-black sample. On the other hand, the estimated coefficient

on the number of sick individuals in the household is negative and significant for the rural blacks, but not for the urban blacks. We also find evidence of considerable disparities in the estimated coefficient size across subpopulations. For example, while the estimated coefficient on household expenditure is positive and well-defined for all racial groups in South Africa, its marginal welfare impact is estimated to be around nine-times larger for the non-blacks than for the blacks. Hence, these findings seem to support the notion that subjective data on well-being may differ more significantly across within-nation sub-samples in the poorer countries than the more affluent ones.

In conclusion, we see our findings for South Africa as preliminary evidence in a research area that is fairly new, at least for the developing economies. Thus, we believe that our results reveal valuable information about the determinants of happiness in developing country settings that goes beyond the role of absolute income gains.

**Table 2-1: The Distribution of Household Quality of Life Responses  
in South Africa (1993)**

Perceived Quality of Life	Observations	Percentage	Cumulation
Very Dissatisfied	2,049	23.49%	23.49%
Dissatisfied	2,882	33.04%	56.52%
Neither	815	9.34%	65.86%
Satisfied	2,312	26.50%	92.37%
Very Satisfied	666	7.63%	100.00%
<b>Total</b>	<b>8,724</b>	<b>100.00%</b>	

**Table 2-2: Quality of Life Equations with Household Variables for South Africa  
(Ordered Probit), 1993**

	Panel A		Panel B			
	Coefficient	Std. Error	Coefficient	Std. Error		
<b>Household Variables</b>						
Coloured	0.650	(0.090)	***	0.308	(0.155)	**
Indian	0.819	(0.101)	***	0.419	(0.178)	**
White	0.990	(0.103)	***	0.692	(0.178)	***
Own house outright? (Yes = 1)	0.068	(0.064)		0.073	(0.043)	*
Urban	-0.257	(0.097)	***	-0.284	(0.096)	***
Metropolitan	-0.527	(0.106)	***	-0.484	(0.111)	***
Household size	0.020	(0.007)	***	0.010	(0.006)	*
Log of household expenditure per capita	0.283	(0.043)	***	0.216	(0.031)	***
Same overall wealth as parents				0.501	(0.041)	***
Richer in the overall wealth than parents				0.512	(0.040)	***
Provincial dummies	No			Yes		
Language dummies	No			Yes		
N	8,634			8,595		
Pseudo R-squared	0.0747			0.1018		

**Note:** \* 10% C.I., \*\* 5% C.I., \*\*\* 1% C.I. Reference variables are: Black, Rural, and Poorer in the overall than Parents (Comparisons with Parents).

**Table 2-3: Quality of Life Equations for South Africa, 1993**  
**(Ordered Probit) - Individual Characteristics at the Aggregate Level included**

Household Variables	Panel A			Panel B (Non-black Sample)			Panel C (Black Sample)			Equality test on the coefficients t-statistics (a)	
	Coefficient	Std. Error		Coefficient	Std. Error		Coefficient	Std. Error			
	Marginal effect score of 5			Marginal effect score of 5			Marginal effect score of 5				
Coloured	0.368	(0.144)	***	(reference)							
Indian	0.476	(0.164)	***	-0.063	0.130						
White	0.594	(0.164)	***	-0.080	0.134						
Own house outright? (Yes = 1)	0.111	(0.043)	***	0.190	0.060	***					
Urban	-0.173	(0.090)	*	-0.179	0.130						
Metropolitan	-0.356	(0.106)	***	-0.346	0.123	***					
Household size	0.021	(0.008)	***	0.068	0.020	***					
Log of household expenditure per capita	0.158	(0.045)	***	0.467	0.062	***					
Same overall wealth as parents	0.473	(0.039)	***	0.344	0.068	***					
Richer in the overall wealth than parents	0.475	(0.041)	***	0.425	0.056	***					
							0.049	(0.056)		0.003	-1.69
							-0.135	(0.102)		-0.009	0.32
							-0.396	(0.147)	***	-0.026	-0.32
							0.020	(0.009)	**	0.001	-2.10
							0.121	(0.056)	**	0.008	-3.83
							0.519	(0.046)	***	0.034	2.35
							0.478	(0.052)	***	0.031	0.96

Table 2-3 (continued)

	Panel A			Panel B (Non-black Sample)			Panel C (Black Sample)			Equality test on the coefficients t-statistics (a)
	Coefficient	Std. Error		Coefficient	Std. Error		Coefficient	Std. Error		
<b>Individual characteristics (in proportion)</b>										
Small children	-0.370	(0.180)	**	-0.665	0.344	**	-0.278	(0.219)	-0.018	0.85
Older children	-0.288	(0.160)	*	-0.585	0.312	*	-0.171	(0.197)	-0.011	1.11
Adult female	-0.139	(0.120)	*	-0.350	0.206	*	-0.070	(0.153)	-0.005	0.78
Adult male	-0.289	(0.117)	**	-0.495	0.211	**	-0.225	(0.145)	-0.015	0.68
Married individuals	0.101	(0.062)	*	0.274	0.095	***	0.005	(0.075)	0.000	-1.71
Primary/secondary education	0.020	(0.068)		-0.049	0.140		0.028	(0.078)	0.002	0.42
Tertiary education	0.015	(0.072)		0.042	0.132		0.016	(0.088)	0.001	-0.09
College/university education	0.324	(0.122)	***	0.292	0.172	*	0.189	(0.185)	0.012	-0.40
Unemployed	-0.405	(0.063)	***	-0.226	0.164	***	-0.484	(0.071)	-0.031	-1.26
Casual wage employment	-0.402	(0.098)	***	0.243	0.190	***	-0.602	(0.104)	-0.039	-4.00
Self-employed	-0.039	(0.076)		-0.119	0.152		-0.065	(0.091)	-0.004	0.38
Student	-0.183	(0.083)	**	-0.015	0.193		-0.272	(0.096)	-0.018	-0.88
House-keeping	-0.052	(0.071)		0.261	0.131	**	-0.172	(0.089)	-0.011	-2.46
Retired	-0.092	(0.083)		0.414	0.164	**	-0.288	(0.098)	-0.019	-3.79
Disabled	-0.160	(0.192)		0.326	0.458		-0.320	(0.220)	-0.021	-1.29
Age (average across household)	-0.002	(0.002)		-0.011	0.004	***	-0.001	(0.003)	0.000	1.90
Number of still sick individuals	-0.052	(0.023)	**	-0.077	0.042	*	-0.037	(0.028)	-0.002	0.81
<b>Geographical variables</b>										
Relative expenditure	-0.036	(0.021)	*	-0.026	0.024		-0.092	(0.040)	-0.006	-1.70
Average cluster unemployment	-1.557	(0.322)	***	-1.551	0.445	***	-1.348	(0.362)	-0.087	0.08
Average cluster crime rate	0.123	(0.302)		-0.133	0.330		0.053	(0.447)	0.003	0.35
Cluster food price index	0.003	(0.002)		-0.005	0.005		0.005	(0.003)	0.000	1.66
Provincial dummies		Yes	Yes		Yes	Yes				
Language dummies		Yes	Yes		Yes	Yes				
Relation to head of household dummies		Yes	Yes		Yes	Yes				
N		8,510			2,247					
Pseudo R-squared		0.1150			0.0966					

**Note:** (a) t-statistics based on an equality test using the pooled data that  $\gamma_{black} = \gamma_{nonblack}$ . Relative expenditure = household monthly expenditure per capita/average community household monthly expenditure per capita. Additional reference variables are Number of pensioners (age  $\geq$  65), No Education, and Unemployment.

**Table 2-4: Quality of Life Equations with Controls for Other Household Members  
for South Africa, 1993 (Ordered Probit)**

	Non-black		Black		
	Coefficient	Std. Error	Coefficient	Std. Error	
<b>The respondent's characteristics</b>					
Male	-0.047	(0.102)		-0.141	(0.060) **
Age	-0.043	(0.017)	**	0.004	(0.008)
Age-squared/100	0.046	(0.019)	**	-0.004	(0.008)
Married	0.011	(0.109)		0.129	(0.070) *
Primary/secondary education	-0.212	(0.111)	*	-0.020	(0.049)
Tertiary education	-0.198	(0.101)	**	-0.033	(0.066)
College/university education	-0.020	(0.111)		-0.210	(0.117) *
Unemployed	-0.096	(0.127)		-0.278	(0.058) ***
Casual wage employment	0.027	(0.146)		-0.447	(0.100) ***
Self-employed	-0.193	(0.117)		-0.116	(0.085)
Student	-0.358	(0.190)	**	0.005	(0.077)
House-keeping	0.074	(0.080)		-0.124	(0.065) *
Retired	0.086	(0.151)		-0.232	(0.095) **
Disabled	0.097	(0.303)		-0.500	(0.190) ***
<b>Other members' attributes (in proportion)</b>					
Married individuals	0.114	(0.137)		-0.110	(0.090) -
Primary/secondary education	0.142	(0.145)	-	0.115	(0.086) -
Tertiary education	0.230	(0.131)	* -	0.103	(0.117) -
College/university education	0.249	(0.144)	* +	0.588	(0.212) *** -
Unemployed	-0.236	(0.142)	* -	-0.254	(0.064) *** +
Casual wage employment	-0.050	(0.168)	-	-0.227	(0.110) ** +
Self-employed	0.074	(0.186)	-	0.197	(0.095) ** -
Student	-0.078	(0.153)	-	-0.178	(0.069) *** +
House-keeping	0.220	(0.114)	* +	-0.061	(0.089)
Retired	0.131	(0.172)	+ -	-0.020	(0.108) +
Disabled	-0.164	(0.280)	-	-0.207	(0.170) +
Age (average across household)	-0.006	(0.004)	+ -	0.001	(0.003) -
<b>Household Variables</b>					
Individual characteristics (in proportion)	Yes			Yes	
Geographical variables	Yes			Yes	
Provincial dummies	Yes			Yes	
Language dummies	Yes			Yes	
Relation to head of household dummies	Yes			Yes	
N	1,909			4,768	
Pseudo R-squared	0.1042			0.0589	

**Note:** Household size is greater than one. + (-): significant (not significant) as an average variable across all household members estimated using specification in table 2-3 (see appendix 2b). Household level averaged data for 'other' household members consist of average personal variables taken from all household members, excluding the PQOL respondent from each household.



**Table 2-5: Quality of Life Equations for South Africa, 1993 (Ordered Probit):**

**Rural Blacks versus Urban/Metro Blacks**

	Black Rural		Black Urban/Metro		Equality test on the coefficients		
	Coefficient	Std. Error	Coefficient	Std. Error	t-statistics (a)		
<b>Household Variables</b>							
Own house outright? (Yes = 1)	-0.034	(0.085)	0.136	(0.075)	*	-2.64	***
Household size	0.030	(0.009)	***	0.003	(0.020)		1.55
Log of household expenditure per capita	0.190	(0.062)	***	0.009	(0.090)		1.85
Same overall wealth as parents	0.470	(0.050)	***	0.502	(0.077)	***	-0.25
Richer in the overall wealth than parents	0.400	(0.068)	***	0.516	(0.079)	***	-1.41
<b>Individual characteristics (in proportion)</b>							
Small children	0.030	(0.244)		-0.746	(0.442)	*	1.44
Older children	-0.094	(0.233)		-0.228	(0.373)		0.41
Adult female	-0.273	(0.196)		0.137	(0.246)		-1.15
Adult male	-0.221	(0.192)		-0.179	(0.248)		0.08
Married individuals	0.044	(0.102)		0.005	(0.091)		0.71
Primary/secondary education	0.133	(0.095)		-0.154	(0.130)		1.47
Tertiary education	0.245	(0.106)	**	-0.285	(0.144)	**	2.35
College/university education	0.531	(0.339)		-0.189	(0.198)		1.25
Unemployed	-0.353	(0.102)	***	-0.572	(0.094)	***	1.20
Casual wage employment	-0.455	(0.173)	**	-0.588	(0.136)	***	0.27
Self-employed	-0.028	(0.141)		0.022	(0.120)		-0.60
Student	-0.174	(0.109)		-0.256	(0.177)		-0.05
House-keeping	-0.064	(0.118)		-0.089	(0.170)		-0.36
Retired	-0.129	(0.122)		-0.469	(0.229)	**	0.86
Disabled	-0.107	(0.272)		-0.570	(0.341)	*	0.43
Age (average across household)	0.005	(0.003)	*	-0.008	(0.004)	**	2.54
Number of still sick individuals	-0.064	(0.033)	**	-0.010	(0.045)		-0.64
<b>Geographical variables</b>							
Relative expenditure	-0.102	(0.043)	**	-0.028	(0.077)		-1.26
Average cluster unemployment	-0.707	(0.365)	**	-1.935	(0.550)	***	1.87
Average cluster crime rate	-0.891	(0.589)		0.866	(0.626)		-2.24
Cluster food price index	0.006	(0.003)	**	0.004	(0.005)		-0.11
Provincial dummies	Yes			Yes			
Language dummies	Yes			Yes			
Relation to head of household dummies	Yes			Yes			
N	4,021			2,242			
Pseudo R-squared	0.0684			0.0748			

Note: (a) t-statistics based on an equality test using the pooled data that  $\gamma_{urban/metro} = \gamma_{rural}$ .

**Table 2-6: Testing for Non-linearity in Relative Expenditure Variable for Black South Africans**

	Black Sample			Black (Rural)		Black (Urban/Metro)		
	Coefficient	Std. Error		Coefficient	Std. Error	Coefficient	Std. Error	
<b>1) 2nd order polynomial</b>								
Relative expenditure	-0.244	(0.069)	***	-0.286	(0.076)	***	-0.246	(0.168)
Relative expenditure <sup>2</sup>	0.021	(0.007)	***	0.021	(0.007)	***	0.053	(0.039)
Pseudo R-squared	0.0630			0.0696			0.0754	
<b>2) 3rd order polynomial</b>								
Relative expenditure	-0.461	(0.106)	***	-0.459	(0.122)	***	-0.921	(0.277) ***
Relative expenditure <sup>2</sup>	0.091	(0.024)	***	0.073	(0.026)	***	0.419	(0.122) ***
Relative expenditure <sup>3</sup>	-0.004	(0.001)	***	-0.003	(0.001)	**	-0.051	(0.016) ***
Pseudo R-squared	0.0638			0.0701			0.0777	
<b>Turning points</b>								
a) Minimum	3.214			4.265			1.522	
b) Maximum	11.953			11.957			3.955	
<b>Summary of relative expenditure</b>								
Mean	0.975			0.978			0.970	
Standard deviation	(0.713)			(0.749)			(0.643)	
Minimum	0.026			0.065			0.026	
Maximum	15.010			15.010			6.416	
Relative expenditure < minimum (%)	98.27%			98.94%			85.54%	
Relative expenditure > maximum (%)	0.53%			0.41%			1.09%	
Rising well-being with relative expenditure (%)	1.20%			0.65%			13.37%	

Note: (a) minimum turning point: relative expenditure that will give the lowest predicted well-being. (b) maximum turning point: relative expenditure that will give the highest predicted well-being.

## Appendix 2A: Data Description for South Africa, 1993

Variable	Mean	Definition
perceived quality of life	2.617 (1.302)	taking everything into account, how satisfied is this household with the way it lives today? (1=very dissatisfied, 5=very satisfied)
log of household expenditure per capita	8.127 (1.130)	log of household expenditure per capita (per annum) - with remittance
race	1.602 (1.109)	race of household (1=african, 2=coloured (i.e. mixed race), 3=asian, 4=white)
household size	4.959 (3.296)	number of family members in the household (all)
education: no education	0.231 (0.256)	proportion of household members with no formal education
education: primary/secondary	0.436 (0.320)	proportion of household members completed school grade 1-6
education: tertiary	0.270 (0.304)	proportion of household members completed school grade 7-12
education: college/university	0.056 (0.178)	proportion of household members completed college/university
small children	0.168 (0.183)	proportion of small children (age less than 10)
older children	0.108 (0.144)	proportion of older children (10 <= age < 16)
adult female	0.318 (0.226)	proportion of adult female (16<age<=65)
adult male	0.346 (0.287)	proportion of adult male (16<age<=65)
pensioner	0.059 (0.169)	proportion of old-age pensioner (age>65)
urban	0.222 (0.415)	area dummy, 1=urban
metropolitan	0.287 (0.452)	area dummy, 1=urban
married	0.294 (0.301)	proportion of married individuals
age	29.152 (12.228)	average age across the household
employed with regular wages	0.235 (0.424)	proportion of household members employed with regular wages
unemployed	0.019 (0.137)	proportion of household members unemployed
employed with casual wages	0.042 (0.199)	proportion of household members employed with casual wages
self-employed	0.050 (0.172)	proportion of self-employed in the household
student	0.130 (0.218)	proportion of students in the household
house-keeping	0.121 (0.220)	proportion of house-keepers in the household
retired	0.102 (0.230)	proportion of retired members in the household
disabled	0.012 (0.070)	proportion of disabled members in the household
home ownership	0.653 (0.476)	whether own household outright (1=yes)
number of still sick individuals	0.384 (0.679)	number of household members who have been sick (and still sick) for the past 2 weeks
same overall wealth as parents	0.228 (0.420)	subjective welfare: same over all wealth as parents
richer in the overall wealth than parents	0.243 (0.429)	subjective welfare: richer in the overall wealth as parents
relative expenditure	1.025 (0.899)	household expenditure per capita/mean household expenditure in the cluster
average cluster unemployment	0.187 (0.114)	average unemployment in the cluster
average cluster crime rate	0.106 (0.104)	average crime (or victimization rate) in the cluster
cluster food price index	5.253 (4.992)	cluster food price index in the cluster
<b>observations</b>	<b>8,724</b>	

Note: Standard deviation in parentheses.

**Appendix 2B: Quality of Life Equations with Table 2-3's  
Specification on the Sample with Household Size greater than one**

	Non-black		Black		
	Coefficient	Std. Error	Coefficient	Std. Error	
<b>Individual characteristics (in proportion)</b>					
Married individuals	0.149	(0.127)	-0.093	(0.076)	
Primary/secondary education	-0.050	(0.180)	0.056	(0.101)	
Tertiary education	0.068	(0.168)	0.019	(0.117)	
College/university education	0.324	(0.188)	*	0.362	(0.244)
Unemployed	-0.306	(0.197)		-0.584	(0.091) ***
Casual wage employment	0.021	(0.192)		-0.655	(0.150) ***
Self-employed	-0.185	(0.174)		0.099	(0.118)
Student	-0.173	(0.193)		-0.310	(0.104) ***
House-keeping	0.244	(0.138)	*	-0.174	(0.117)
Retired	0.317	(0.188)	*	-0.280	(0.134) **
Disabled	-0.055	(0.400)		-0.586	(0.249) **
Age (average across household)	-0.009	(0.005)	*	0.003	(0.004)
<hr/>					
<b>Household Variables</b>	Yes		Yes		
<b>Individual characteristics (in proportion)</b>	Yes		Yes		
<b>Geographical variables</b>	Yes		Yes		
Provincial dummies	Yes		Yes		
Language dummies	Yes		Yes		
Relation to head of household dummies	Yes		Yes		
N	1,909		4,768		
Pseudo R-squared	0.1001		0.0569		

## **Chapter Three**

# **Are There Geographical Variations in the Psychological Costs of Unemployment in South Africa?**

### **Abstract**

Are certain groups of unemployed individuals hurt less by unemployment than others? This paper is an attempt to test the hypothesis that non-pecuniary costs of unemployment may vary between societies with different unemployment rates. Using cross-sectional data from South Africa in 1993, we show that individuals' reported well-being levels are inversely related to unemployment for South African adults as to be expected in richer countries. Reported well-being levels are shown to be associated negatively with regional unemployment rates for the employed. However, unemployment appears to hurt less for the individual if unemployment rates in the society are high.

### 3.1 Introduction

Recent research concerning the link between unemployment and measures of subjective well-being has generated growing interest from economists and social scientists alike. A common result of studies on the psychological effects of joblessness on individuals in advanced western economies (Fryer and Payne, 1986; War et al, 1988; Clark and Oswald, 1994; Darity and Goldsmith, 1996; Theodossiou, 1998; Winkelmann and Winkelmann, 1998; Frey and Stutzer, 1999; Di Tella *et al*, 2001; Blanchflower and Oswald 2004) is that unemployment is significantly correlated with lower levels of reported well-being, even when controlling for the effects of income. Similar results are also obtained for transitional economies (Namazie and Sanfey, 2001 for Kyrgyzstan; Lelkes, 2002 for Hungary) and other less-developed countries (Graham and Pettinato, 2001 for Latin Americas, and Kingdon and Knight, 2004 for South Africa).

However, less attention has been paid to the question of whether certain groups of individuals are hurt less by unemployment than others. One of the potential concerns is with regard to the extent to which people suffer from their own unemployment when a large proportion of other people living in the region are also out of work. The current proposition is that stigma of joblessness is abated when there is more of it around, partly because social disapproval of the unemployed will be less prevalent if unemployment hits many other people at the same time. Early evidence of positive externality from others' unemployment on the psychological well-being of the unemployed comes from the findings in medical literature relating to better mental health (Jackson and Warr, 1986) and fewer

suicide attempts (Platt and Kreitman, 1990; Platt *et al*, 1992) by the unemployed in high unemployment regions. Clark (2003) extends the analysis to the reported mental well-being of the unemployed across different parts of the UK, using a rich panel data from the British Household Panel Survey (BHPS). Through a multivariate analysis, he shows that others' unemployment at the regional level, as well as partner and household levels, is significantly and positively correlated with the well-being of the unemployed. Given the importance of behaviour models where an individual's behaviour is typically derived from utility maximization, the varying incidence of unemployment across different regions can have important psychological implications for regional labour market hysteresis. This is because, as with unemployed individuals in the UK, a smaller well-being gap between the employed and the unemployed (when unemployment rate for other people in the area is higher) may provide a reduced incentive for the unemployed to find work: according to Clark's final results, those who are hurt less by unemployment were also less likely to look for a new job, and one wave into the future, are more likely to remain unemployed<sup>4</sup>.

In this chapter we follow Clark's studies on the unemployed people's well-being in the UK and explore a similar question to a different data set. We investigate possible geographical variations in the "psychological costs" of unemployment in South Africa, using the same cross-sectional data from the South African Labour and Development Research Unit

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<sup>4</sup>It is worth noting that job seekers may also become more and more discouraged about their job prospects as others' unemployment in the area increases (see Kingdon and Knight, 2004). The discouraged job seekers are also more likely to give up the job search as the number of unemployed others in the area goes up, leading to an alternative explanation of geographical variation of unemployment hysteresis.

(SALDRU) of 1993 as in chapter 2<sup>5</sup>. We find strong evidence of positive externality from others' unemployment on the well-being of the unemployed household. We find that (i) measures of household unemployment are negatively correlated with the perceptions of subjective household welfare, (ii) the well-being of the employed household is often lower when the unemployment rate of others in the geographical cluster is high, and (iii) household unemployment hurts less when there is a large proportion of other people who are also out of work in the cluster is not rejected by the data. Note that the unit of relevant local labour market used in this analysis is the geographical cluster, which is a unit smaller than province. There is an average of 15.94 clusters per province. Each cluster unit contains a random sample of households in the local labour market, with an average of 78.61 (30.60) active individuals (households) per cluster. Nevertheless, a closer examination reveals the correlation between measures of unemployment and subjective household welfare to be significant only for the urban black sample, indicating that employment may be defined differently between races and regional settings in South Africa.

This chapter is structured as follows. Section 3.2 describes the data and how subjective well-being is measured in South Africa. Section 3.3 looks at the contemporaneous relationship between own unemployment status and reported well-being. Section 3.4 presents the main empirical results concerning the role of others' unemployment in the regression, and examines other related issues, and Section 3.5 concludes.

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<sup>5</sup>Although we recognise that panel data would be better, it is still interesting to look at a cross-section in an unusual country like South Africa.



### 3.2 Data and Measure of Subjective Well-being

The current chapter uses data from the national survey of South Africa, carried out jointly by the World Bank and the South African Labour and Development Research Unit (SALDRU) in Cape Town, with approximately 8,800 randomly selected households, from as many as 360 geographical cluster areas, taking place in the survey<sup>6</sup>. The data is of a cross-sectional nature, and collected during the last five months of 1993, shortly before the election that made Nelson Mandela the South African president in 1994, and contains sets of information on household composition and personal sociodemographic status.

As part of the project, one representative from each household was asked to evaluate the overall well-being at the household level. The Perceived Quality of Life (PQOL, henceforth) question was “*Taking everything into account, how satisfied is this household with the way it lives these days?*” (Section 9, Question 1). The ordinal answers, ranking from being very satisfied (5) to very dissatisfied (1) with life, are used as proxy utility data in our analysis.

To consider the case for happiness regression equations, let us consider previous studies using the same set of proxy well-being data. Through general observation analyses, Møller (1996) and Klasen (1997) found unequivocal links between poor living conditions and low PQOL scores. A more formal investigation carried out by Kingdon and Knight (2004) confirms some of the relationships between household’s well-being levels and the aggregated household-level data found in previous literature. For instance, they find household unemployment levels to be negatively correlated with reported well-being at the household-level,

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<sup>6</sup>As community cluster is defined by geographical region, we will use, for simplicity, the term “regional” and “cluster” interchangeably throughout this chapter.

after controlling for income and other sociodemographic variables. Important for the discussion here, however, is that previous studies of PQOL data have consistently suggested the structure of the well-being responses to be similar in South Africa to the more advanced industrial economies<sup>7</sup>.

The analysis uses the same sample set of PQOL respondents, as in our previous chapter. This gives us a total number of 8,724 households, 3,202 of which had at least one person of working age (16 to 65) unemployed at the time of the interview<sup>8</sup>. Further calculations suggest an average unemployment rate (measured as the ratio of unemployed persons to the sample of working-age individuals) of around 17%. Taking the unemployment rate by community cluster and allowing it to vary across individuals gives an average regional unemployment rate of 18.7%, with a maximum rate of 53% for a single cluster.

### **3.3 The Correlations Between Unemployment and Perceived Quality of Life Response**

We begin our analysis of South Africa in the same vein as that of other scholars by asking whether unemployed people are on average significantly less dissatisfied with life than employed people with regular wages. Unemployment is defined here as relating to working-age individuals who are active in the labour market, but are not employed in either the formal or informal sector. Note also that as we are dealing with a slightly different measure of

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<sup>7</sup>See Easterlin (1974, 1995), Di tella et al (1997) Oswald (1997), Frey and Stutzer (2000), Gerdtham and Johannesson (2001), Blanchflower and Oswald (2003) for some examples of happiness research in the advanced industrial economies.

<sup>8</sup>For a distribution of the PQOL response, please refer to table 2.1 in chapter 2.

subjective welfare (one that measures well-being at the household level) our analysis will be on the correlations between the reported well-being and household unemployment rate only, and not on the welfare impacts of unemployment at the individual level.

To provide some information about the correlations in the raw data, Figure 3-1 summarises the relationship between PQOL and the proportion of unemployed members in the household. In consonance with other happiness studies, people living in households with higher proportion of unemployed members tend to report a lower well-being score as compared to those living in households with lower unemployment rates. Further checks - though not reported here - show that we can reject the null hypothesis that the means of PQOL between households with at least one unemployed member and households with no unemployed members are equal at the 1% level.

We consider the well-being function to have the general form of

$$r_h = r(Ue_h, \dots) \quad (3.1)$$

where  $r_h$  is the well-being index at the household level of some description, and  $Ue_h$  is the number of unemployed members as a proportion of working age individuals in the household. We hypothesise that, holding everything else constant, a higher proportion of unemployed members is associated with lower levels of PQOL, via their effect on expected future household income, or through the effect of unemployment on the overall self-esteem for all household members. The well-being index at the household level,  $r_h$ , is thought to be captured by responses to the question on quality of life, PQOL, on a scale of 1 to

5. As the PQOL score is measured ordinally, not cardinally, the ordered probit model is used to estimate the empirical counterpart to the well-being equation (3.1). To correct the correlated errors, we include in the estimation cluster controls at the community level to capture any grouping effects present in the data set (Moulton, 1990).

Table 3-1 reports the results of happiness regressions using the SALDRU data. Panel A presents a simple specification that includes only the proportions of household members who fall within each of the labour force category, the omitted group being the proportion of those members in regular wage employment. The household unemployment rate enters the well-being equation with a negative and significant coefficient, with a z-statistic of -11. Without additional controls, people living in households with higher proportions of informal workers (the self-employed and casual wage employment) or non-participants in the labour market (housewives, students, the disabled, and the retired) tend to report lower well-being compared to those living in households with higher proportions of employed with regular wages member.

Panel B controls for a number of household characteristics and the socio-demographic status of householders, adding a natural log of household expenditure per capita, household race, homeowner status, location (rural/urban/metropolitan) and internal wealth comparison<sup>9</sup>, as well as aggregate variables for age and gender, marital status, education, and health variable. We also include a vector of geographical variables, adding a relative expenditure

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<sup>9</sup> This internal wealth comparison variable measures a personal consumption experience and is represented by a dummy variable containing information as to whether the individual thinks that the financial position of his household today is better, the same, or worse off when compared with that of his parents when they were at the same point in their lives.

variable - defined as the ratio of household monthly expenditure per capita over the average household monthly expenditure per capita in the cluster, cluster food price, crime and unemployment rate at the community level, as well as control variables for the language spoken at home, and the relationship of the PQOL respondent to the head of the household. With this broad specification, the estimated coefficient on household unemployment rate continues to be negative and significant, with a slightly reduced  $z$ -statistic of 7.75. Regarding other nonunemployment variables, only the coefficients on employment with casual wages and student category have remained negative and significant at the 1% level.

Panel C extends the analysis to examine the well-being gap of households with no unemployed member and those with at least one member unemployed, adding a dummy variable with a value of 1 if there is at least one person unemployed in the household and 0 otherwise. The unemployed dummy and household unemployment rate variable are both highly significant; respondents living in households with at least one unemployed member tended to say that they are less satisfied with life as compared to the people living in households with no unemployment, while higher proportions of unemployed members are still associated negatively with the perceived quality of life for the unemployed households. Consistent with our previous findings in chapter 2, Table 3-11's other results show a positive correlation between the log of household expenditure per capita and the reported well-being levels, whilst black African households are more likely to report, on average, a much lower PQOL score than any other race, *ceteris paribus*. Reported well-being is high among those people living in households with higher proportions of pensioners (age 65 and over), married couples, healthy

individuals, and the well-educated, as well as people living in the rural area and those looking after home.

The coefficients on unemployment variables are also sizeable, as well as statistically significant. Since the coefficients from ordered probits cannot be interpreted directly as marginal effects, 'compensating expenditure variations' can be calculated instead to illustrate the size of the estimated psychological effect of unemployment on households. Given that the expenditure variable is in terms of log household expenditure, compensating expenditure variations (*CEV*) equation can be written as follows:

$$CEV = e \cdot \left( \exp \frac{\beta_1 - \beta_0}{\lambda_{\ln EP}} - 1 \right) \quad (3.2)$$

where *CEV* refers to compensating expenditure variations, i.e. expenditure required to compensate an average household for a drop in psychological well-being resulting from unemployment, *e* is current household expenditure,  $\beta_1$  represents the reference coefficient for the non-unemployed household,  $\beta_2$  as the coefficient for a dummy representing whether there is at least one unemployed member in the household, and  $\lambda$  is the estimated coefficient on log household expenditure. Based on an average cluster unemployment rate of 18.7%, the calculation suggests that it would take an extra household expenditure of around R18,341 per annum to compensate for having at least one unemployed member, for an average household spending of R20,659 per annum. Controlling for the number of unemployed people in the household as a proportion of the household size, the estimated compensation

expenditure variation of having at least one member unemployed is roughly equal to that of losing homeowner status (R13,402), one-half of migrating from the rural area to the urban area (R57,714), and one-tenth of switching household race from being white to being black (R866,982).

### **3.4 The Role of Others' Unemployment at the Regional Level**

#### **3.4.1 Raw Data Evidence**

We investigate in this section the role of the cluster unemployment rate on the reported well-being of the unemployed. The first and standard externality from the local unemployment rate is negative: e.g. the higher the cluster unemployment rate, the lower the chance of becoming re-employed again if I myself am unemployed. On the other hand, the stigmatizing effect of unemployment is thought to be less prevalent when there is more of it around. With less social disapproval in high unemployment areas, the externality from others' unemployment on the unemployed's well-being can be positive as well as negative: e.g. the higher the cluster unemployment rate, the less bad I feel about myself for being out of work.

The two opposing effects of others' unemployment on the unemployed's well-being are difficult to untangle in theory, making the question on whether which type of externality affects the unemployed more of an empirical question. However, recent evidence suggests that the correlation between cluster unemployment rate and psychological well-being might be positive, rather than negative, for the unemployed (Clark and Oswald, 1994; Clark,

2003<sup>10</sup>). This chapter is one of the first to use a less-developed country data to test the importance of others' unemployment on the unemployed's well-being.

Table 3-2 updates the above analysis, using the South African data set. Here, the average PQOL score of households with no unemployed member and those with all members unemployed is calculated by province. We then perform cross-tabulation between the difference in the reported well-being and the average cluster unemployment rate (measured as the ratio of unemployed individuals to all working-age individuals in a given community cluster) by province. The last two columns of Table 3-2 show a negative correlation between this well-being gap and the cluster unemployment rate. For instance, while the Natal province has one of the lowest average rates of cluster unemployment in the sample at 12.8% (ranked 14th), it also has one of the largest average well-being gaps of 0.602 (ranked 3rd). On the other hand, the Ciskei province, with the second highest ranking in the cluster unemployment rate with 27.2%, has one of the smallest average well-being gaps in the sample with 0.024 (ranked 13th).

Figure 3-2 illustrates the above relationship by plotting the well-being gap against the cluster unemployment rate by province; there seems to be a robust trade-off between the PQOL difference and the cluster unemployment rate. Running an ordinary least square (OLS) regression with the PQOL gap on the Y-axis reveals a negative and significant coeffi-

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<sup>10</sup> According to Clark (2003: p.338), explanations other than reduced stigmatising effects from higher regional unemployment are possible. An alternative is that, as unemployment in the area rises, relatively happier people are moving into unemployment. This will raise the unemployed's average well-being, providing that they are less affected by this transition than others. However, he finds no significant correlation between the initial well-being score of those moving into unemployment and the regional unemployment rate for the UK sample, suggesting that a shift-share argument is unlikely to be behind the regional patterns.



cient of -0.125, with a standard error of -0.035. Hence, the results provide some of the first raw data evidence that cluster unemployment rate correlates negatively with the well-being of the employed household but is positively correlated with the well-being of the unemployed household in South Africa.

### 3.4.2 Empirical Strategy and Main Results

The preliminary evidence of a positive relationship between others' unemployment at the cluster level and the unemployed's well-being can be explained using Akerlof's (1980) social norm model. Here, an individual's well-being function,  $r_i$ , is

$$r_i = r(R, A, d^c, X), \quad (3.2)$$

where  $R$  is the reputation in the community,  $A$  is a dummy variable for obedience or disobedience of the code,  $d^c$  is belief or disbelief of the community code, and  $X$  is personal tastes. Reputation is a function of both individual's own action,  $A$ , and the proportion of population believing in the code,  $\theta$ :  $R = R(A, \theta)$ . By this definition,  $R$  is equal to zero if the individual follows the code ( $A = 1$ ) but is negative if  $A = 0$ .

Let the community code,  $A$ , be employment in this case. As in Clark (2003), the  $d^c$  variable is dropped because we have no way of measuring an individual's belief, and identify  $\theta$  with the proportion of the population who actually follow the code, that is, the cluster employment rate. Since the PQOL is measured at the household level, the welfare function-

equation can be written as

$$r_h = r(R, 1 - Ue_h^d, 1 - Ue_h, X), \quad (3.4)$$

where  $Ue_h^d$  is a dummy for whether there is at least one unemployed person in the household or not. A linear form is used for  $R$ :  $R = -Ue_h^d(1 - OTHERUe_h)$ , where  $OTHERUe_h$  is the cluster unemployment rate. This follows Akerlof's (1980) criteria of no reputation effect if the employment code is followed ( $Ue_h^d = 0$ ), but a negative effect of  $(1 - OTHERUe_h)$  if the code is respected. The reputation effect from not following the code diminishes as the proportion of the population not following the code ( $OTHERUe_h$ ) increases. In addition, the well-being function at the household level is assumed to increase as household employment rate rises,  $(1 - Ue_h)$ , as discussed in the previous section. Substituting  $R$  into  $r$  produces

$$r_h = r(-Ue_h^d(1 - OTHERUe_h), 1 - Ue_h^d, 1 - Ue_h, X), \quad (3.5)$$

which suggests that respondents from unemployed households will be less satisfied with their lives as compared to people living in households with no unemployed members, through the first and second term, and that higher proportions of members unemployed reduce well-being at the household level, through the third term. However, equation (3.5) also implies that the well-being of the respondents from unemployed households increases with others'

unemployment at the cluster level. The empirical counterpart to equation (3.5) is

$$r_h = \beta_1 Ue_h^d + \beta_2 OTHERUe_h + \beta_3 (Ue_h^d \times OTHERUe_h) + \beta_4 Ue_h + X_h \lambda + \mu_h, \quad (3.6)$$

where  $r_h$  is the self-rated perceived quality of life for household  $h$ ,  $Ue_h^d$  is a dummy variable with a value of 1 if there is at least one person unemployed in the household and 0 otherwise, while  $OTHERUe_h$  is others' unemployment at the cluster level. This proxy cluster unemployment rate comes from within-sample, measured as the ratio of unemployed individuals to all working-age individuals in a given community cluster. It is also based on a reasonable sample size, with an average of 78.61 active individuals per community cluster (over 350 data points on cluster unemployment rate), and is allowed to vary across households. The variable  $Ue_h$  is the proportion of unemployed members in the household, and automatically takes the value of 0 when  $Ue_h^d = 0$ .  $X$  is a vector of aggregated personal and other household and community characteristics affecting well-being, whereas  $\mu_h$  is the error term. We also include in the regression a dummy variable for informal workers and non-participating members in the labour market (IWNP, henceforth) and its interaction with the cluster unemployment rate, so that  $\beta_2$  represents the estimated impact of others' unemployment on the welfare of those people living in households with all members in full-time employment. The specification of (3.6) thus allows us to test the hypothesis that, all other things being equal, unemployed households will tend to report lower subjective welfare at the household level compared to households with no unemployment ( $\beta_1 < 0$  and  $\beta_4 < 0$ ), and that others' unemployment at the cluster level hurts for those respondents living in

households with all members in full-time employment ( $\beta_2 < 0$ , where  $\beta_2$  represents the main effect of others' unemployment on the well-being of the employed household when  $Ue_h^d = 0$ ), through their effect on the expected job loss for the employed in the area. However, we hypothesise that others' unemployment may not hurt as much if you are both unemployed and living in higher unemployment regions ( $\beta_3 > 0$ , where  $\beta_3$  represents the additive effect of others' unemployment in the area on the well-being of the unemployed household when  $Ue_h^d = 1$ )<sup>11</sup>. Note that this last hypothesis contradicts the discouraged worker theory, whereby the unemployed are more discouraged (and therefore less happy) about their job prospects as others' unemployment in the area increases (Kingdon and Knight, 2004).

Table 3-3 reports some preliminary evidence on the interaction between the unemployed dummy and others' unemployment at the cluster level for South Africa. The estimated coefficient on the interaction term, as in equation (3.6), is strong and positive, while the main effect of the unemployed dummy continues to be negative and significant at the 1% level. As in Table 3-2, the well-being gap between the employed household and the unemployed household is smaller in higher unemployment regions. Higher proportions of unemployed members in the household continue to attract a negative coefficient, with a z-statistic of -1.75. The variable for cluster unemployment rate enters the well-being equation with a strong and negative coefficient, indicating that a lower well-being score is recorded on average by the employed households in higher unemployment regions. While respondents living in unemployed households tended to report higher well-being when the cluster unemployment

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<sup>11</sup>Note that in cases where  $\beta_2 < \beta_3$ , then the well-being of the unemployed is increasing with the unemployment rate in the area.

rate is higher, the null hypothesis that the raw sum of “cluster unemployment rate” and “cluster unemployment rate and the unemployed dummy” is positive ( $-2.259 + 0.939 > 0$ ) can nevertheless be rejected at the 1% level.

Of particular interest is the finding regarding the interaction between the IWNP dummy and the unemployment of relevant others in the region in Table 3-3's regression; the interaction term yields a positive coefficient of 1.060 (with the  $z$ -statistic of 2.50). Respondents living in households with only informal workers or non-participants in the labour market tended to report higher well-being in higher unemployment regions. One explanation for this is that the IWNP group may identify themselves as one with the unemployed group. Given the labour market conditions in South Africa where jobs with regular wages are typically scarce, it is possible that people of working age may not have entered the informal sector or become inactive by choice, but rather are forced into it because there are no jobs available in the formal sector. This interpretation is consistent with Graham and Pettinato's (2001) findings of lower life satisfaction among the self-employed and the retired in Latin America and Russia. While higher cluster unemployment rates lower an individuals' chances of being re-employed, respondents from IWNP households may also feel less negatively about themselves for not having a job in the formal sector when unemployment rate in the area is also high.

### 3.4.3 Further Results by Race and Region

One question of interest is whether these interactions with others' unemployment at the cluster level hold more strongly for certain groups of unemployed individuals than for others. We investigate this possibility in Table 3-4 by separating the data into black and non-black households. For the non-black sample, Column 1 reveals a negative and insignificant correlation between reported well-being and the unemployed variables (the estimated coefficient on the unemployed dummy is -0.109, with a standard error of 0.162), while higher proportions of inactive members in the household are not significantly associated with the perceptions of welfare at the household level. The interaction between the unemployed dummy and the cluster unemployment rate attracts a positive coefficient of 0.334, though with a very large standard error of 0.771. The well-being of the employed household, on the other hand, is shown to have a strong negative correlation with reference group unemployment at the cluster level for the non-black sample. This suggests that higher cluster unemployment rates may reduce the well-being for the employed households with non-black members, but are not associated positively with higher well-being for the non-black households with all members in unemployment. The estimated coefficient on the interaction between the IWNP dummy and others' unemployment rate at the cluster level is positive, but is only significant at the 10% level. Given that there are 416 out of 2,303 households (or 18%) with at least one unemployed member in the non-Black sample, it seems more likely that the insignificance of the estimated coefficients in the non-Black sample may have come from low estimated coefficients rather than from high standard errors caused by small cell size in the unemployed

group.

Column 2 reports the results for the black sample; the unemployed dummy continues to have a well-defined negative relationship with the reported PQOL among black households (the estimated coefficient on the unemployed dummy is -0.358, with a standard error of 0.130). Black respondents living in households with higher proportions of unemployed members, as well as informal workers and inactive members in the labour force, also tended to say that they are less satisfied with the way they live today. Reference group unemployment enters the well-being equation with a well-defined negative coefficient, while the interaction between the unemployed dummy and others' unemployment at the cluster level is positive and significant at the 1% level. In other words, a higher proportion of cluster unemployment rate is significantly negatively correlated with the well-being of employed black households but is significantly positively correlated with the well-being of unemployed black households. Nevertheless, the test that  $-2.339 + 0.894 > 0$  is rejected by the data at conventional significance levels. With respect to inactivity and those working in the informal sector, the estimated coefficient on the interaction between the IWNP dummy and cluster unemployment rate is also positive with a robust z-statistic of 2.27; although we can also reject the null hypothesis that the raw sum of the "cluster unemployment rate" and "cluster unemployment rate and the IWNP dummy" is positive at the 1% level.

One question of interest is whether these interactions are the same across different geographical settings in South Africa. The reason for this is that rural South Africa may represent economic developing conditions more than urban South Africa. To test this,

Columns 1 and 2 of Table 3-5 split the data according to cluster context - with the rural area as one category, while the other category combines people from the urban area with those living in the metropolitan area. Since the unemployed dummy and its interaction with others' unemployment are significant in the black sample and not in the non-black sample regressions (as reported above), only those respondents living in households with black members are used in Table 3-5. For the rural sample, Column 1 reveals that only higher proportions of casual workers, students, and retired members are negatively and significantly correlated with reported well-being at the household level, *ceteris paribus*. One interpretation is that the idea of unemployment in rural area may not be as clearly defined as in the urban area. With approximately 22% of the labour force unemployed, there must be non-formal ways by which these unemployed people engage in some sort of productive activity in the rural sample that does not fall within the 'informal workers', i.e. employment with casual wages or self-employment category.

Column 2 of Table 3-5 reports the results for the urban black sample; the unemployed dummy continues to enter well-being equation with a negative and significant coefficient, whilst a higher proportion of unemployed members in the household is associated with a lower level of reported household welfare. A higher cluster unemployment rate has a significant negative correlation with the well-being of employed households, *ceteris paribus*. However, the unemployed's well-being is shown to have a strong positive correlation with others' unemployment at the cluster level for the urban black group. Furthermore, while the IWNP dummy attracts a negative and well-defined coefficient, with a roughly equal effect



to the unemployed dummy (we cannot reject the hypothesis that  $-0.492 + 0.466 = 0$ ), the interaction between the IWNP dummy and reference group unemployment at the cluster level is positive and significant at the 1% level. The hypothesis that the well-being gap between the IWNP and the employed groups tended to be lower in higher unemployment regions is not rejected by the urban black sample.

The estimated coefficients from ordered probits are difficult to interpret. By way of illustration, Figure 3-3 plots the estimated effects of the unemployed dummy on the probability of reporting a PQOL score of 5 (very satisfied category) against others' unemployment at the cluster level. These welfare impacts of unemployment are based on the estimated coefficients taken from Column 2 of Table 3-5's ordered probit regression for the urban black sample. Note that all other nonunemployment variables are held at the respective sample means for these calculations.

It can be seen from Figure 3-3 that the gap between the employed and the unemployed in the probability of reporting a well-being score of 5 (maximum well-being possible) decreases as cluster unemployment rate rises. For an 'average' urban black household<sup>12</sup>, an increase in the cluster unemployment rate from 5% to 10% reduces this difference from around 3.89% to 2.64%, while a further 5% rise in the percentage point in the cluster unemployment rate takes this difference down from 2.64% to 1.71%. The estimates also imply that, controlling for other relevant factors, employed and unemployed households have equal well-being at

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<sup>12</sup>The average urban/metropolitan black household has 5 household members with an annual expenditure per capita of R1721.602. The household unemployment rate is 17% for an average household with at least one member unemployed.

a cluster unemployment rate of around 33% (the coefficient of unemployed dummy + the coefficient of cluster unemployment rate average cluster unemployment rate:  $-0.466+1.400 \times 0.33 = 0$ ), which accounts for more than 13% of unemployed households in the urban black sample. Therefore, the estimated coefficient on others' unemployment at the cluster level is not only statistically well-defined, it is also sizeable as well.

### 3.5 Conclusion

This chapter uses subjective well-being data to test whether there are significant geographical variations in the psychological costs of unemployment in South Africa. The hypothesis is that the negative welfare impact of unemployment will be reduced by a higher level of unemployment among relevant others in the region via social comparison effects, as in Akerlof (1980). In consonance with past research for the advanced industrialised nations we find that, over all respondents in the data, self-rated household welfare is typically negatively correlated with measures of unemployment at the household level for South Africa in 1993. Second, while others' unemployment at the cluster level is negatively correlated with the well-being of the employed household, there is strong evidence of a positive correlation with the well-being of the unemployed household in our full sample analysis. In other words, the data supports our earlier hypothesis that it may be psychologically easier to be unemployed in a region with high level of joblessness. Thus, our results replicate Clark (2003)'s finding of a positive externality of others' unemployment on the unemployed's well-being for Great Britain. Third, we show in our well-being regression equations that not only the unemployed

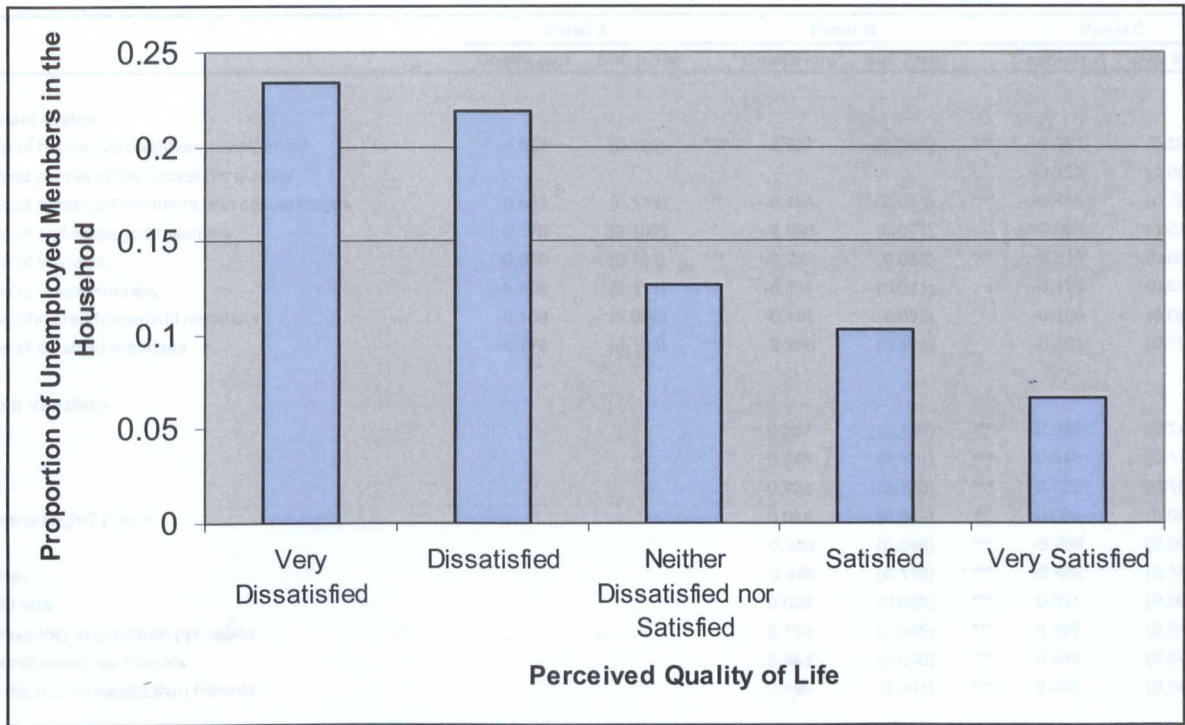
benefit from the presence of an externality linked to others' unemployment in the region, but so do the employed in the informal sector as well as the non-participants in the labour market. Like the unemployed group, people who fall within the IWNP category may also feel less negatively about themselves for not holding a job in the formal sector when cluster unemployment rate among relevant others is high.

However, a closer examination on different groups of the unemployed household reveals a distinct pattern in the psychological costs of unemployment by race and regional setting. Sub-sample analysis shows strong evidence of a positive correlation between the well-being of the unemployed and others' unemployment for the urban black group, whilst measures of unemployment are found to be typically insignificantly related to the reported well-being for the non-black sample and for the black sample living in rural areas of South Africa. The effect of others' unemployment on the well-being of the unemployed is also sizeable as well as statistically significant; the estimated coefficients from the urban black sample regression suggest that the employed and the unemployed have equal well-being at a cluster unemployment rate of around 33%.

We provide in this chapter some preliminary evidence of a positive externality of others' unemployment on the well-being of some groups of the unemployed in a developing country setting such as that of South Africa. Given that a smaller well-being gap between the employed and the unemployed may provide a reduced incentive for the unemployed to find work, via the utility effects of a changing employment norm in the area, this study may help to explain why unemployment is more persistent for some parts of South Africa than for others.

It is worth noting here, however, that the results may not be robust over time. It is possible that the imminent elections raise the sense of well-being of some households, and if there is a significant variation of this effect across different local labor markets, then the unemployment results are sensitive to this specific historical time period. This calls for the same well-being equation regressions to be run on a more sophisticated panel survey, with preferably information about the individual's psychological well-being and future employment status, in order to make a proper test of the hypotheses of social norms and unemployment hysteresis in South Africa.

**Figure 3-1: Comparison of Household Unemployment and Perceived Quality of Life for South Africa, 1993**



Individual characteristics (in proportion)	Panel A	Panel B	Panel C	
Smallest children	-0.118	(0.173)	-0.449	(0.170)
Older children	-0.280	(0.158)	-0.774	(0.159)
Adult females	-0.136	(0.131)	-0.130	(0.131)
Adult males	-0.205	(0.135)	-0.292	(0.135)
Mother ill/weak	-0.077	(0.065)	-0.074	(0.065)
Primary/secondary education	0.030	(0.060)	0.021	(0.060)
Tertiary education	0.015	(0.075)	0.000	(0.075)
College/university education	0.319	(0.117)	0.307	(0.117)
Age (average across household)	-0.001	(0.000)	-0.000	(0.000)
Number of still sick individuals	0.050	(0.000)	0.051	(0.000)
Geographical variables	Yes	Yes	Yes	
Provincial dummies	Yes	Yes	Yes	
Language dummies	Yes	Yes	Yes	
N	2,717	2,717	2,717	
Pseudo R-squared	0.028	0.179	0.191	

Notes: \* 10% C.I., \*\* 5% C.I., \*\*\* 1% C.I. (unemployment in the household dummy represents whether there is at least one member unemployed in the household). Geographical variables include expenditure (ln) in the community (i.e. Household expenditure per capita/average household expenditure per capita in the cluster), average cluster crime rate, and cluster food price. The exact question for the dependent variable is: "Take everything into account, how satisfied is this household with the way it lives today?" Reference variables are proportion of employed members with regular wages (employment status), black (race), rural (region), poorer than parents (inter-generational comparison of wealth), proportion of pensioners (household composition), and group (marital status) and no formal education (completed education level).

**Table 3-1: Well-Being Regressions and  
Household Unemployment for South Africa, 1993 (Ordered Probit)**

	Panel A			Panel B			Panel C		
	Coefficient	Std. Error		Coefficient	Std. Error		Coefficient	Std. Error	
<b>Employment Status</b>									
Proportion of household members unemployed	-1.087	(0.100)	***	-0.527	(0.068)	***	-0.351	(0.096)	***
Unemployed people in the household dummy							-0.122	(0.053)	**
Proportion of employed members with casual wages	-0.839	(0.133)	***	-0.461	(0.099)	***	-0.458	(0.100)	***
Proportion of self-employed members	-0.170	(0.102)	*	-0.096	(0.077)		-0.096	(0.077)	
Proportion of students	-0.598	(0.111)	***	-0.223	(0.084)	***	-0.219	(0.084)	**
Proportion of house-keepers	-0.405	(0.111)	***	-0.117	(0.071)		-0.120	(0.071)	*
Proportion of retired household members	-0.168	(0.096)	**	-0.154	(0.082)	*	-0.150	(0.082)	*
Proportion of disabled members	-0.776	(0.195)	***	-0.268	(0.193)		-0.251	(0.192)	
<b>Household Variables</b>									
Coloured				0.387	(0.149)	***	0.392	(0.148)	***
Indian				0.546	(0.171)	***	0.548	(0.170)	***
White				0.724	(0.170)	***	0.722	(0.169)	***
Own house outright? (Yes = 1)				0.094	(0.043)	**	0.096	(0.043)	**
Urban				-0.258	(0.098)	***	-0.256	(0.098)	***
Metropolitan				-0.465	(0.118)	***	-0.462	(0.118)	***
Household size				0.026	(0.008)	***	0.031	(0.007)	***
Log of household expenditure per capita				0.195	(0.045)	***	0.192	(0.045)	***
Same overall wealth as Parents				0.483	(0.040)	***	0.484	(0.040)	***
Richer in the overall wealth than Parents				0.486	(0.041)	***	0.486	(0.041)	***
<b>Individual characteristics (in proportion)</b>									
Small children				-0.415	(0.177)	**	-0.449	(0.178)	***
Older children				-0.342	(0.158)	**	-0.374	(0.158)	***
Adult female				-0.136	(0.121)		-0.140	(0.121)	
Adult male				-0.290	(0.117)	**	-0.292	(0.117)	**
Married individuals				0.072	(0.060)		0.072	(0.060)	
Primary/secondary education				0.035	(0.069)		0.031	(0.069)	
Tertiary education				0.018	(0.073)		0.020	(0.073)	
College/university education				0.315	(0.121)	***	0.313	(0.121)	***
Age (average across household)				-0.002	(0.002)		-0.002	(0.002)	
Number of still sick individuals				-0.052	(0.023)	**	-0.051	(0.023)	**
<b>Geographical variables</b>									
Geographical variables	No			Yes			Yes		
Provincial dummies	No			Yes			Yes		
Language dummies	No			Yes			Yes		
N	8,717			8,510			8,510		
Pseudo R-squared	0.0264			0.1098			0.1101		

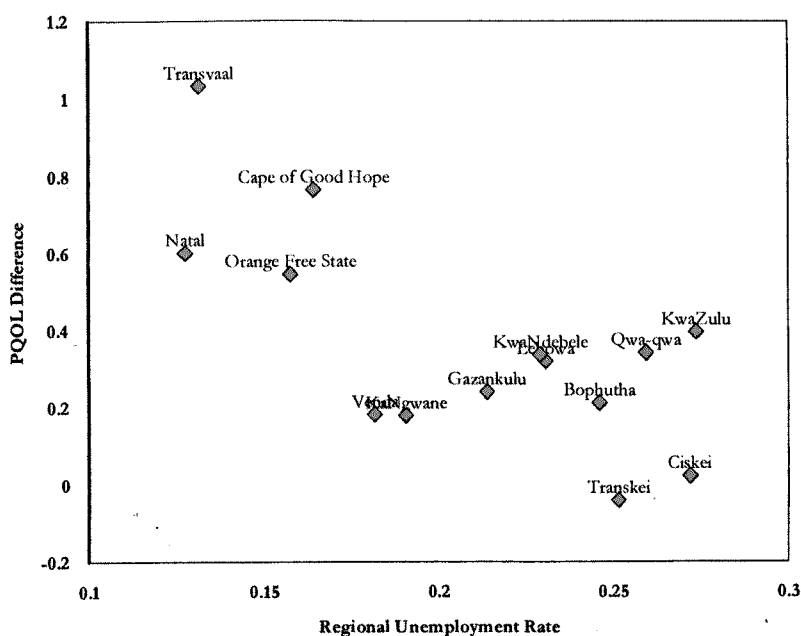
**Note:** \* 10% C.I., \*\* 5% C.I., \*\*\* 1% C.I. Unemployment in the household dummy represents whether there is at least one member unemployed in the household. Geographical variables include expenditure rank in the community (i.e. Household expenditure per capita/average household expenditure per capita in the cluster), average cluster crime rate, and cluster food price. The exact question for the dependent variable is: "Take everything into account, how satisfied is this household with the way it lives today?" Reference variables are proportion of employed members with regular wages (employment status), black (race), rural (region), poorer than parents (internal comparison of wealth), proportion of pensioners (household composition), non-marital group (marital status), and no formal education (completed education level).

**Table 3-2: Comparison of Cluster Unemployment and Well-Being Gap Between No Unemployment and Full Unemployment Households by Old South African Provinces, 1993**

Old Provinces	Unemployment at the Cluster Level	PQOL Difference	Rank of Cluster Unemployment Rate (Highest to Lowest)	Rank of PQOL Difference (Highest to Lowest)
Cape of Good Hope	0.164	0.766	11	2
Natal	0.128	0.602	14	3
Transvaal	0.132	1.033	13	1
Orange Free State	0.158	0.548	12	4
KwaZulu	0.274	0.398	1	5
KaNgwane	0.191	0.181	9	12
Qwa-qwa	0.260	0.344	3	6
Gazankulu	0.214	0.242	8	9
Lebowa	0.231	0.320	6	8
KwaNdebele	0.229	0.337	7	7
Transkei	0.252	-0.039	4	14
Bophutha	0.246	0.214	5	10
Venda	0.182	0.183	10	11
Ciskei	0.272	0.024	2	13

**Note:** PQOL difference = (average PQOL of households with no unemployment - average PQOL of households with full unemployment) by old South African province.

**Figure 3-2: PQOL Difference against Cluster Unemployment Rate by Old South African Province, 1993**



**Table 3-3: Well-Being Regressions and Interactions with Regional Unemployment Rate for South Africa, 1993 (Ordered Probit)**

	Coefficient	Std. Error	
<b>Employment Status</b>			
Unemployed people in the household dummy	-0.344	(0.102)	***
Proportion of household members unemployed	-0.176	(0.103)	*
Regional unemployment rate	-2.277	(0.478)	***
Unemployed dummy*Regional unemployment rate	0.934	(0.372)	**
Proportion of employed members with casual wages	-0.356	(0.099)	***
Proportion of self-employed members	-0.010	(0.077)	
Proportion of students	-0.249	(0.104)	***
Proportion of house-keepers	-0.143	(0.100)	**
Proportion of retired household members	-0.169	(0.098)	**
Proportion of disabled members	-0.235	(0.206)	
IWNP in the household dummy	-0.012	(0.084)	
IWNP*Regional unemployment rate	0.666	(0.333)	***
<b>Household Variables</b>			
Coloured	0.393	(0.143)	***
Indian	0.503	(0.163)	***
White	0.577	(0.163)	***
Own house outright? (Yes = 1)	0.114	(0.044)	***
Urban	-0.148	(0.089)	*
Metropolitan	-0.332	(0.104)	***
Household size	0.023	(0.007)	***
Log of household expenditure per capita	0.148	(0.045)	***
Same overall wealth as Parents	0.475	(0.039)	***
Richer in the overall wealth than Parents	0.475	(0.041)	***
<b>Individual characteristics (in proportion)</b>			
Small children	-0.385	(0.178)	**
Older children	-0.293	(0.158)	*
Adult female	-0.134	(0.120)	
Adult male	-0.294	(0.117)	**
Married individuals	0.115	(0.055)	**
Primary/secondary education	0.015	(0.068)	
Tertiary education	0.032	(0.072)	
College/university education	0.328	(0.123)	***
Age (average across household)	-0.002	(0.002)	
Number of still sick individuals	-0.053	(0.023)	**
<hr/>			
Geographical variables	Yes		
Provincial dummies	Yes		
Language dummies	Yes		
N	8,510		
Pseudo R-squared	0.1149		

**Note:** Regional unemployment rate is defined as the ratio of the unemployed others as a proportion to the working-age individuals in a given community cluster, and is allowed to vary across households. Informal workers and non-participants (IWNP) dummy represents those who classified themselves as either self-employed, or employed with casual wages, as well as student, housekeeper, retired, or disabled member.



**Table 3-4: Well-Being Regressions by Race in South Africa, 1993**

	Non-black		Black African			
	Coefficient	Std. Error	Coefficient	Std. Error		
<b>Employment Status</b>						
Unemployed people in the household dummy	-0.109	(0.162)	-0.358	(0.130)	***	
Proportion of household members unemployed	-0.084	(0.265)	-0.240	(0.111)	**	
Regional unemployment rate	-2.183	(0.581)	***	-2.339	(0.617)	***
Unemployed dummy*Regional unemployment rate	0.334	(0.771)	0.894	(0.456)	**	
Proportion of employed members with casual wages	0.256	(0.190)	-0.539	(0.105)	***	
Proportion of self-employed members	-0.131	(0.152)	-0.020	(0.092)		
Proportion of students	-0.091	(0.265)	-0.313	(0.111)	***	
Proportion of house-keepers	0.180	(0.253)	-0.246	(0.108)	***	
Proportion of retired household members	0.370	(0.229)	-0.359	(0.109)	***	
Proportion of disabled members	0.316	(0.484)	-0.393	(0.236)	**	
IWNP in the household dummy	-0.033	(0.143)	-0.157	(0.144)		
IWNP dummy*Regional unemployment rate	0.897	(0.523)	*	1.200	(0.529)	**
<hr/>						
<b>Household Variables</b>	Yes		Yes			
<b>Individual characteristics (in proportion)</b>	Yes		Yes			
Geographical variables	Yes		Yes			
Provincial dummies	Yes		Yes			
Language dummies	Yes		Yes			
N	2,247		6,263			
Pseudo R-squared	0.0951		0.0629			

Note: See Table 3-3 for other controls.

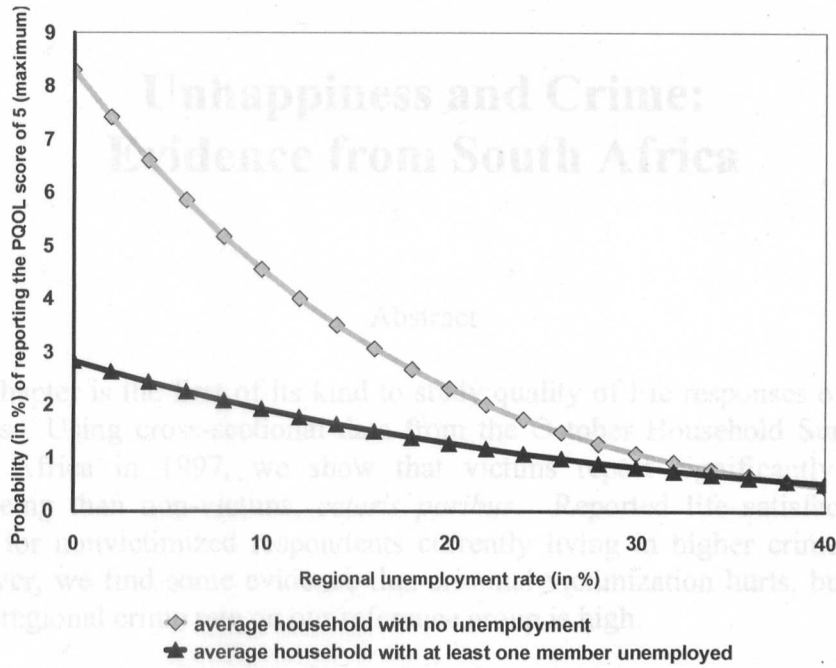
**Table 3-5: Well-Being Regressions for Black Africans in South Africa, 1993:****Rural Blacks versus Urban/Metro Blacks**

	Black (rural)		Black (urban/metro)		
	Coefficient	Std. Error	Coefficient	Std. Error	
<b>Employment Status</b>					
Unemployed people in the household dummy	-0.136	(0.153)	-0.466	(0.188)	**
Proportion of household members unemployed	-0.149	(0.155)	-0.323	(0.165)	**
Regional unemployment rate	-0.561	(0.730)	-3.048	(0.584)	***
Unemployed dummy*Regional unemployment rate	-0.073	(0.543)	1.400	(0.645)	**
Proportion of employed members with casual wages	-0.484	(0.173)	*** -0.499	(0.130)	***
Proportion of self-employed members	-0.035	(0.138)	0.051	(0.123)	
Proportion of students	-0.329	(0.117)	*** -0.071	(0.245)	
Proportion of house-keepers	-0.239	(0.139)	0.033	(0.214)	
Proportion of retired household members	-0.316	(0.131)	** -0.376	(0.238)	
Proportion of disabled members	-0.311	(0.287)	-0.471	(0.372)	
IWNP in the household dummy	0.239	(0.157)	-0.492	(0.185)	***
IWNP dummy*Regional unemployment rate	-0.194	(0.611)	1.928	(0.652)	***
<hr/>					
<b>Household Variables</b>	Yes		Yes		
<b>Individual characteristics (in proportion)</b>	Yes		Yes		
Geographical variables	Yes		Yes		
Provincial dummies	Yes		Yes		
Language dummies	Yes		Yes		
N	4,021		2,242		
Pseudo R-squared	0.0672		0.0752		

**Note:** See Table 3-3 for other controls.

**Figure 3-3: Predicted Probabilities: Probability (%) of PQOL Score of 5 (Highest Level)**

**for Black South Africans in Urban/Metropolitan Sample**



**Note:** The marginal effects of cluster unemployment rate are calculated at the same means of all the other variables. The 'average' urban/metropolitan black household has 5 household members with an annual expenditure per capita of R1721.602. The household unemployment rate is 17% for an average household with at least one member unemployed.

## Chapter Four

# Unhappiness and Crime: Evidence from South Africa

### Abstract

This chapter is the first of its kind to study quality of life responses of crime victims. Using cross-sectional data from the October Household Survey of South Africa in 1997, we show that victims report significantly lower well-being than non-victims, *ceteris paribus*. Reported life satisfaction is lower for nonvictimized respondents currently living in higher crime areas. However, we find some evidence that criminal victimization hurts, but hurts less if regional crime rate on our reference group is high.

“The one who throws the stone forgets; the one who is hit remembers forever”

- *Angolian Proverb*

“Fear defeats more people than any other one thing in the world”

- *Ralph Waldo Emerson*

## 4.1 Introduction

Politicians around the world have been expressing concern for decades about the extent to which rising crime rates can affect the lives of individuals in the society. The growing distress over the effects of crime on individuals in rich and poor countries alike is thought to have been fueled by the perception that crime victims suffer greatly from their experiences in terms of financial loss and psychological trauma. There is also an increasing awareness among policy makers that this exposure to crime can have a long-lasting impact on the victims and those close to them. As a result, crime and the perception of personal safety are important factors in any assessment of social well-being and an individual's happiness level. Yet less attention has been paid in terms of research on the link between crime-related variables and measures of satisfaction with quality of life in general.

This paper has two aims. The first is to test whether crime victims report significantly lower levels of subjective well-being than the nonvictimized. The second is to investigate whether the subjective well-being is also affected by the fear of crime, as well as the direct experience of it. In other words, we test whether crime on others in the region correlate negatively with the nonvictimized's well-being. We also test the hypothesis that, even though criminal victimization hurts, people may feel relatively better once they know that a large part of the population living in the same neighbourhood as they are is also effected by crime. Using the perceived quality of life data taken from the post-apartheid South Africa in 1997, we argue below that all of the above ideas are strongly supported by the data and that there is a robust relationship between crime-related variables and subjective measures

of well-being.

There are, however, limitations to our analysis. We acknowledge the possibility of a reverse causality from unhappiness to criminal victimization, i.e. unhappy people may involve themselves in a more risky behaviour, which may expose them more to being a crime victim. While it would be desirable to have instrumental variables for criminal victimization, in this chapter we follow the simpler route of providing single-equation estimates with no adjustment for possible endogeneity. Our instinct is that solving for the endogeneity of crime may be particularly difficult here. Future work has to return to this issue.

We briefly discuss in Section 4.1 some of the key literature in psychology, sociology, and economics. Section 4.2 describes the data set for South Africa. Section 4.3 begins empirical analysis on the correlation between criminal victimization and the reported well-being. We present in Section 4.4 the main results on regional crime rate. Conclusions are then set out in Section 4.5.

## **4.2 Previous Literature**

Criminal damages have so far been studied by economists in terms of the pecuniary costs on individuals and the society. The cost of murder, for example, can be measured by loss of earnings for victims and accumulated public spending on policemen and court personnel to increase the probability of criminal apprehension and conviction (Becker, 1968). The current chapter, however, takes a more psychological approach to the analysis of individuals' welfare, following criminal victimization by looking directly at the reported subjective well-being of

crime victims.

While the link between criminal victimization measures and subjective well-being responses remains largely ignored by economists, the idea has been studied intensively by psychologists and partly by sociologists for decades. A common comment within the psychology literature is that crime victims have been found to suffer from a variety of significant and persistent psychological problems which include, for example, depression, anxiety, fear, and post-traumatic stress disorder as well as feelings of hostility and personal violation (e.g., Atkeson *et al*, 1982; Davis and Friedman, 1985; Kilpatrick *et al*, 1985; Frieze *et al*, 1987; Skogan, 1987; Burnam *et al*, 1988, Sorenson and Golding, 1990; Norris and Kaniasty, 1992). These psychological symptoms commonly found among crime victims, especially fear and anxiety, are shown to be negatively associated with an individual's subjectively measured health (Ross, 1993) and measures of subjective well-being and overall perceived quality of life (Michalos, 1991). Attitudes towards crime-related issues in the area, i.e., whether individuals view local crime to be a problem or not, have a negative impact on the reported satisfaction with the neighbourhood (e.g., Hartnagel, 1979; Parkes *et al*, 2002). Furthermore, using data from the city of Prince George, British Columbia survey (N = 633), Michalos and Zumbo (2000) show that measures of fear and actual cases of victimization correlate negatively with measures of happiness and satisfaction with life as a whole. A recent study by Kingdon and Knight (2003) also reports a similar finding regarding the correlation between the reported subjective well-being and the victim of crime variable. Using a sample size of approximately 900 victimized households from the South African Labour and Development Research Unit

(SALDRU) survey of 1993, they have shown that crime victims report significantly lower subjective well-being than the nonvictimized. However, despite growing attention to the subject paid by sociologists recently, the literature on empirical analysis of crime and subjective well-being is still relatively small as compared to studies in psychology concerning the victim's mental health following criminal victimization.

### **4.3 Data and Descriptive Statistics**

The current chapter uses a rich data set from the October Household Survey (OHS) study of South Africa. The OHS is an annual, nationally-representative survey based on a probability survey of a large number of households, carried out - with different sample designs for each year - by the Statistics South Africa (StatsSA). Our analysis will refer to the OHS study of 1997, which covers around 30,000 randomly selected households across 3,000 community clusters. This general survey contains detailed information on a series of socio-demographic characteristics including - but not limited to - household composition, education, employment status, and expenditure activities. It also includes, in a section to be completed by one of the household representatives, a battery of questions on perceived quality of life and on crime committed on household members in the past year. The proxy utility measure used in this article is the measure of Perceived Quality of Life (PQOL, henceforth). This is captured by the question "*Taking everything into account, how satisfied is this household with the way it lives these days?*" Responses range on a 5-point scale from the lowest "1.Very dissatisfied" to the highest "5.Very satisfied". The analysis will refer to those PQOL respondents of



working age (16-65). This produces 24,949 observations in as many as 2,500 enumeration areas in total. Table 1 provides a first look at the distribution of PQOL for the sample population. The distribution in Table 1 shows a skewness in the reported quality of life towards the “satisfied” category commonly found in data on developed nations, with a mean PQOL score of 3.64 and over 16% report the maximum score of 5.

Victim of crime status is made up from the responses to the two following questions: (i) “During the past 12 months, has this household experienced any burglaries, robberies, or housebreaking?”, or (ii) “During the past 12 months, has anyone been murdered while he/she was a member of this household?”. The number of property crime victims (i.e. burglaries, robberies, housebreaking) dominates the number of violent crime (i.e. murder) victims by 10 to 1:  $N = 1,933$  and 188 reported property and violent crime victims, respectively. Note that there only 0.1% of the sample who had experienced both types of crime on household. The total number of crime victims used in the analysis is therefore 2,121, giving an average crime rate across the population sample of 8.5%.

#### 4.4 The Correlation Between Criminal Victimization and Perceived Quality of Life Response

We assume that there exists a reported well-being function of the general form

$$r = h\left(\frac{1}{N} \sum_{i=1}^N u(VC, z, X)\right) + \mu \quad (4.1)$$

where  $r$  represents the well-being at the household-level reported by an individual, and is adequately captured by responses to a question on perceived quality of life, on a scale of 1 to 5,  $h(\cdot)$  is a non-differentiable function that relates actual to reported well-being,  $u(\cdot)$  is the true well-being only observable to that individual,  $X$  is a vector of household characteristics that are shared among household members,  $z$  is a set of socio-demographic characteristics across household members, and  $\mu$  is an error term that subsumes the inability of human beings to communicate accurately the true well-being levels, as well as unobserved personal traits such as optimism and intelligence. The variable  $VC$  is the victim of crime variable, taking the value of 1 if the household has been victimized by crime in the past 12 months and 0 otherwise. In this paper we aim to investigate whether the reported perceived quality of life is associated negatively with the victim of crime variable, *ceteris paribus*. Note that measures of subjective well-being and experiences of criminal victimization in the OHS97 are recorded at the household-level, not at the individual-level. Hence, this implies that we can only make inter-household comparisons of reported well-being, not comparisons between individuals living in the same households, in our victim of crime analysis.

To provide some information about the correlations in the raw data, Table 4-2 describes reported PQOL levels for different groups. In consonance with the findings from the psychology literature, respondents from the nonvictimized households report, on average, a significantly higher subjective well-being level than the respondents from the victimized households. The means of perceived quality of life for the nonvictimized and victimized households are 3.660 and 3.395, respectively. A similar result is also obtained for both male

and female respondents. The figures in parentheses represent the t-statistic for the null hypothesis that the means of the two groups are the same, and in all cases the test strongly rejects at the conventional level the equality of the means for the two groups. This is our first tentative evidence of lower psychological well-being following criminal victimization.

A more systematic analysis of the reported PQOL data begins in Table 4-3. As the measure of PQOL is ordinal, not cardinal, the preferred method of estimation is by ordered probit (Zavoina and McKeley, 1975). We also correct for underestimated standard errors by including enumerator or cluster controls in the estimations, so as to capture any grouping effects present within the data set. See Moulton (1990) for more discussions on the potential pitfalls of estimating aggregate variables on micro units when standard errors are not corrected for.

Table 4-3 explores the relationship between criminal victimization and perceived quality of life when other factors are held constant, by estimating a simple micro-econometric counterpart to equation (4.1). Descriptive statistics of all variables are provided in Appendix 4A. The dummy for victim of crime enters the regression in a theoretically expected negative way, with a robust  $z$ -statistic of -10.99.

It is worth noting here that the PQOL measure of well-being is rather unusual in the literature, i.e. a household and not an individual measure. The question is whether the main respondent is able to evaluate the well-being of all individuals in the household, especially those who have a direct experience of crime. However, considering that both types of crimes (e.g. residential burglaries and murder of at least one of the household members in

the last 12 months) recorded in the survey are probably better thought of as crimes against households and less so as crimes that are committed with a specific aim to affect only a particular individual living in the premises, the negative effects may be equally spread across all existing household members, making PQOL a valid measure of the well-being impact of criminal victimization.

Other results from Table 4-3 show quality of life to associate positively with log of household expenditure, while household size enters the equation with a negative sign. One possible explanation for this is that an increase in household size may lead to a reduction in household expenditure per capita, and hence reduces the quality of life for everybody in the household (Graham and Pettinato, 2002). Controlling for household expenditure quintiles and the right to ownership of the dwelling, individuals with a telephone connection in the dwelling have reported, on average, higher PQOL levels than those without one. Black respondents have reported, on average, a significantly lower well-being score than individuals of other races, especially individuals of mixed race. The searching unemployed (i.e., those unemployed and looking for a job) and part-time workers have significantly reported lower well-being than those in full-time employment, while reported well-being is higher for PQOL respondents with higher level of education (measured by the levels of school grade completed by the main respondent). As with other findings from developed countries, there is also a U-shaped relationship between well-being response and age for South Africa, minimizing around the early 40s (Warr, 1992; Clark *et al*, 1996). Those who were married under the civil law, which is a more recent type of marriage arrangement, rather than South

Africa's customary or traditional law, have the highest level of well-being. One possible explanation for this could be that people who were married under the civil law may have had more freedom in choosing their current partners and have more legal rights compared to those married under the customary law. Those who are divorced or separated, on the other hand, have reported the lowest current well-being. The results are robust to controls for average unemployment rates measured at the magistral district level (which is generated within-sample) and personal characteristics of household members other than the main respondent. Hence, it can be concluded that, in most comparable cases, the coefficient signs of the already identified socio-economic factors in the well-being regression equations are the same in South Africa as is the case in more-developed countries.

Of further interest is the role of crime type in determining victim of crime variable in these equations. In particular, we would like to know whether the negative correlation between victim of crime and perceived quality of life is driven by a single type of crime and not the other. A direct test splits victim of crime variable into property and violent cases. The introduction of these split case variables (the results are not shown here) suggests that victims of residential burglaries report lower well-being than those victims with at least one household member murdered within the last 12 months, in contrast with Davis and Friedman's (1985) finding of lower psychological well-being among the violent crime victims as compared to property crime victims. The result thus implies that the negative correlation between victims of crime and perceived quality of life may be largely driven by property crimes ( $N = 1,933$ ) than by violent crimes ( $N = 188$ ). One possible explanation could be

that while burglaries or housebreaking normally take place in the household, a murder could have been committed elsewhere away from the household. In addition, although property crimes are more likely to affect all household members equally, there may be a degree of variation in the psychological impact of murder, which can depend upon whether the actual murder victim is closely related to the PQOL respondent. However, it can still be concluded from our estimations that respondents from victimized households, from either property or violent crimes, have reported lower well-being than the nonvictimized households, *ceteris paribus*.

The well-being impacts of crime are quantitatively important as well as statistically significant. Since the coefficients from ordered probits cannot be interpreted directly as marginal effects, ‘compensating expenditure variations’ can be calculated instead to illustrate the size of the estimated psychological effect of crime on households. Given that our expenditure variable is in terms of log household expenditure, compensating expenditure variations (CEV) equation can be written as follows:

$$CEV = e \cdot \left( \exp \frac{\beta_1 - \beta_0}{\lambda_{\ln EP}} - 1 \right) \quad (4.2)$$

where  $CEV$  is compensating expenditure variations, i.e. expenditure required to compensate an average household for a drop in psychological well-being resulting from crime,  $e$  is current household expenditure,  $\beta_1$  represents the reference coefficient for nonvictimized,  $\beta_0$  as the coefficient for criminal victimization, and  $\lambda$  is the estimated coefficient on log household expenditure. Based on an average crime rate of 8.5% across the population sample, the

calculation suggests that it would take an extra household expenditure of around R97,424 (or approximately US\$21,142) per month to compensate for being victimized by crime, for an average household spending of R1,187 (or US\$240) per month. In other words, an average household would require a financial package worth 82 times their current spending to make them feel indifferent to their experiences of crime. The estimates of other life events, on the other hand, have quantitatively smaller valuations comparing to the estimated main effect of crime. For example, the searching unemployment (as compared to employment with regular wages) and no formal education (as compared to the highest level of education) for the respondent is estimated to be worth about R4,300 (US\$933) and R7,370 (US\$1,600) on average. This estimation implies that crime has the largest psychological cost as compared with changes in other relevant socio-demographic factors, for an average household in the sample. However, as expenditure is potentially endogenous in the happiness regression, the interpretation of these results are only illustrative and should therefore be treated with caution.

Table 4-4 gives our estimates by sub-samples for South Africa in 1997; the estimated coefficient on victim of crime dummy continues to be negative and significant across all groups, with roughly equal proportionate effects by gender and race. However, crime seems to hurt individuals more in the urban area than in the rural area, as indicated by the large t-statistic based on the test that the two coefficients between regional groups are equal.

## 4.5 The Role of Others' Crime Rates By Region

While it has been robustly established in the last section that victims of crimes are worse off than non-victims in terms of their perceived quality of life, the relationship between crime on other societal members in the community and measures of subjective well-being remains relatively unexplored. Suggestive evidence comes from Kingdon and Knight (2003), who find the negative relationship between the reported well-being and the victim of crime variable to be more significant for the poor-households (those defined as earning less than the household supplementary level of poverty line), where regional crime rates are lower as compared to areas lived by their non-poor counterparts. However, to our best knowledge, the only work that explicitly includes a crime rate variable in the happiness regressions comes from a paper by Alesina *et al* (2001), which compares the effects of inequality on happiness across Europe and America. By using a set of individual-level data from the US General Social Survey (1972-1994), they have shown for the US sample that there is a negative, albeit insignificant, relationship between murder rate and reported happiness scores. However, they have failed to distinguish in their regression results the effects of murder rate between individuals from households with murder victims and those from nonvictimized households.

In this section, we aim to extend the idea by Alesina *et al*, and, first, examine whether regional crime rate correlates significantly with the well-being of the nonvictimized households. The standard externality of regional crime rate on others is negative: e.g. an increase in the regional crime rate may heighten the feelings of fear and insecurity for the nonvictimized households in the neighbourhood, etc. The other question of interest is whether certain



groups of individuals are hurt less by crime than others. A hypothesis in economics and psychology suggests that the stigmatizing effect from crime may in fact be lower in high crime rate regions. With less social disapproval towards crime victims in high crime areas, the externality from local crime rate on the overall well-being of the victimized households may be positive: e.g. the higher the regional crime rate, the better I feel about myself for being one of the victims.

Hence, the current section aims to test the following two hypotheses of interest:

(i) crime on “relevant others” - i.e. other people living in the same region as the respondents - reduces the current well-being of the nonvictimized households.

(ii) the correlation between the victim of crime variable and perceived quality of life is smaller for those crime victims who have been living in an area with a high crime rate.

In doing so, we extend the well-being equation (1) to include a measure of crime on relevant others,  $\overline{VC}$ , to be estimated in Table 4-5 as follows:

$$r_h = \beta_1(VC)_h + \beta_2(\overline{VC})_h + \beta_3(VC_h \times \overline{VC}_h) + X_h\lambda + z_h\delta + \mu_h. \quad (4.3)$$

The analysis will focus on two different measures of crime rate for South Africa in 1997. The first measure of crime rate - or rather, victimization rate - comes from within-sample, generated according to the reported crime cases by the magistrial district level in the OHS97. This experimental variable is based on a reasonable sample-size with an average of 168.53 households per district area (over 150 data points on regional crime rate), and is allowed to vary across households. The second measure of crime rate comes from the Crime Information

Analysis Centre (CIAC) reports on the provincial specific crime statistics, published annually since 1994 by the South African Police Service in South Africa. To make it consistent with the crime rate generated within the OHS97 data, we will refer only to the reported incidences of residential burglaries and murder at the provincial level for the year 1997 (see appendix 4B for the official crime statistics in 9 provinces). The numbers are i) reported burglaries (and attempt) on residential premises, and not on business premises, per 100 of population, and reported murder per 100 of population for the year 1997.

In addition to full sample analysis, we intend to examine the role of others' crime rate on reported well-being levels according to the gender of the PQOL respondents. The current hypothesis is that female respondents who were selected to evaluate the well-being at the household-level for everybody else may possess a very different attitude towards crime-related issues in the area as compared to male respondents. For example, females tend to be more convinced that crime in their region has increased, to be more worried about being victimized (e.g. Giles-Sims, 1984; Lira and Andrade-Palos, 1993), to perceive more neighbourhood problems, to be less satisfied with their own and their family's safety in their neighbourhood, and to be less likely to walk alone in their neighbourhood at night than males (e.g. Gomme, 1988; Sprott and Doob, 1997; Michalos and Zumbo, 2000). On the other hand, females tend to communicate more to each other about their experiences of crime, whereas males have a greater unwillingness to admit or talk about their fears relating to criminal victimization in general (e.g. Stanko and Hobdell, 1993; Walklate, 1997). In addition, we also intend to examine the role of others' crime rate on the perceived quality of life by race, as well as by

region, for South Africa in 1997.

The first column of Table 4-5 produces full sample evidence, adding the crime rate measured at the relatively micro-level (i.e. by magistrial district) and the macro-level (i.e. by province). Note that there is an average of 20 magistrate districts per one province in the OHS97 data. It can be seen in the first panel that the victim of crime variable continues to enter the equation with a negative and significant coefficient. The interaction between own experiences of crime and regional crime rate at the magistrial district level attracts a strongly positive coefficient (with a z-statistic of 2.06), whereas the main relationship between regional crime rate and reported well-being is negative and significant. This result suggests that the well-being gap between crime victims and non-victims may be smaller in high crime rate regions. It is also worth noting that there is no significant geographical variation in the supply for both police services and victim support programs by magistrial district (in terms of financial or clinical helps) in South Africa (and, in any case, should there be any significant variation in the police support by provincial level, the effects will be captured by the province dummies).

Consistent with Alesina *et al*'s results on the US data, the main effect of regional crime rate on the reported well-being scores continues to be negative and significant in the second panel, where the measure of crime rate at the micro-level is replaced by the measure of crime rate at the macro-level. The estimated coefficients (z-statistics in parentheses) for residential burglaries and murder cases per 100 of the population in the two separate regressions are -0.317 (-5.36) and -7.103 (-10.10), respectively. The coefficient on crime victim variable

remains negative and significant with the introduction of crime statistics at macro-level, whilst the interaction terms are insignificant (with mixed signs) in both of our specifications.

Table 4-5, columns 2 and 3, deviate from the full sample analysis to examine the correlations between crime-related variables and the reported well-being by gender of the main respondent. The victim of crime and regional crime rate (both micro- and macro-level measures) variables continue to be associated negatively with the reported well-being for both sexes, but are more significant for females than males. The gender results also reveal a positive interaction term between own experiences of crime and crime rate on relevant others measured at the district level for both male and female respondents, but only slightly significant (with a z-statistic of 1.70) for females. The interaction between own experiences of crime and provincial crime rate of residential burglaries is negative but insignificant for both males and females. However, we fail to reject based on a simple equality test described in Chapter 2 the hypothesis that  $\beta_{Males} = \beta_{Females}$  for all estimated coefficients by gender. Lastly, the interaction term between own experiences of crime and provincial crime rate of murder is positive but largely insignificant for both sexes. Hence there are some significant evidence in the data set that crime hurts less in high crime areas at the magistrial district level, but not at the provincial level.

Columns 4 and 5 of Table 4-5 separate the data by race. While victim of crime dummy continues to enter well-being equation with a negative and significant coefficient for both races in our first specification (with crime rate at the micro-level), we can reject - based on the relevant t-statistic - that  $\beta_{Black} = \beta_{Nonblack}$ . In other words, our first estimates imply that

crime hurts more for the respondents from non-black households compared to the respondents from black households. The coefficient on regional crime rate at the micro-level is negative and significant for both races; however, the estimated coefficient on others' victimization rate is significantly smaller for blacks compared to the non-black sample. Nonetheless, the interaction between own experiences of crime and regional crime rate at the magistrial district level is positive and significant only for the non-black group. On the other hand, the regional crime rate at the macro-level (both robbery and murder) variables are shown to have a strong negative association with the reported PQOL only for the black sample. However, since it is the majority of black Africans that lived in the rural area, the results by race may just be picking up the effects of crime rate on the perceived quality of life by different regional settings.

Column 6 and 7 of Table 4-5 give our respective estimates for urban and rural areas in South Africa. The estimated coefficients on victim of crime and regional crime rate (both micro- and macro-level measures) are negative and significant for both regional groups. Nevertheless, we can reject the null hypothesis that the coefficients on regional crime rate (either at the magistrial district or at the provincial level) are the same across the urban sample and the rural sample. While crime on others seems to hurt more for the non-victims in the rural area, the interaction terms (at the micro-level and the provincial murder rate) are positive and significant only for those respondents from rural households.

In order to illustrate how regional crime rate - at least at the micro-level - affects the reported well-being of victims and non-victims differently, we can calculate an average in-

dividual the probability of recording the highest level of PQOL (= 5) based on the coefficients of the regression, and see how this probability varies as regional crime rate on others changes. The method generalizes as it has also been used by Clark *et al* (2001) to illustrate for Germany the different effects of past unemployment on the reported life-satisfaction of the unemployed and those in employment. Figures are presented for the full sample taken from the first column of Table 4-5.

Table 4-6 shows how the gap in the probability of recording a PQOL score of 5 between victims and non-victims reduces as regional crime rate on others rises. An initial increase in the regional crime rate from 0% to 10% reduces this gap from almost 4% to around 3.33%, while a further rise of 10% reduces this gap by a similar amount (from 3.33% to 2.92%). Further calculation implies that, controlling for other relevant factors, an average respondent from a victimized household would have reported the same current well-being as an average respondent from a nonvictimized household at a regional crime rate of approximately 36% ( $-0.497 + 1.363 \times 0.36 = 0$ ). This is an unusually high figure for a crime rate at the magistrial district level, and in a sense is a reflection of a small (positive) impact of crime rate on the well-being of crime victims. However, the limitation of this finding comes from the fact that our regional crime rate variable has been generated within-sample of the OHS97 data set, and hence the results should be viewed with care.

## 4.6 Conclusion

The aim of this chapter has been to examine the relatively unexplored link between subjective well-being and crime. It estimates for South Africa microeconomic well-being equations based on the perceived quality of life response for the year 1997. Controlling for household expenditure and relevant factors, we find that respondents from victimized households report a substantially lower subjective well-being score, on average, compared to those from nonvictimized households. Second, we show that crime on others in the area is associated with lower levels of perceived quality of life for the respondents from nonvictimized households. One interpretation is that crime on others in the neighbourhood may increase the probability of victimization, and therefore heighten the levels of fear and anxiety for the non-victims living in the area. Third, we show that although the victim of crime variable is associated sharply with lower levels of subjective well-being, the negative correlation is attenuated - at least at the magistral district level - as crime on others rises. The estimated coefficients suggest that a representative victim living in an area where roughly 36% of other people are crime victims is indifferent in terms of current subjective well-being between victimization and non-victimization. A possible explanation is that crime victims may feel less victimized if a larger part of the population living in the area also shares their same experiences of crime.

The findings reported here have important policy implications. One of them is to supply and channel sufficient professional services for the victimized. Despite the evidence presented in this article suggesting an urgent need of mental help services for victims of crime, studies

in the medical literature reveal that, at present, only a small proportion of victims receive such professional help (Golding *et al*, 1988; Norris *et al*, 1990). Furthermore, the weak role of the expenditure variable in well-being regressions casts doubt on the efficacy of governmental policy aimed solely at giving financial support to victims. Thus, significant improvements in terms of clinical help per case of victimization is needed if the overall levels of quality of life were to be raised in the society. Secondly, the presence of externalities linked to other crime victims at the micro-level suggests that not everyone in the region benefits from crime prevention programs, in cases where these programs are not 100% effective in taking crime away from the neighbourhood. This is because victims of crime may suffer less stigma from victimization in regions with higher crime rates, according to the results in Table 4-5. Given that this result holds generally, an alternative way of tackling the issue is for the authorities to take some advantages from the externalities linked to regional crime rate by encouraging better contacts among the victimized, especially in areas where there is no centralized victim support unit for crime victims to meet up should they want to. Future research should therefore focus on how these externalities could influence the rates with which these individuals can recover from victimization over time.



**Table 4-1: Distribution of Perceived Quality of Life for South Africa, 1997**

<b>Perceived Quality of Life</b>	<b>Observations</b>	<b>Percentage</b>	<b>Cumulation</b>
Very Dissatisfied	860	3.45%	3.45%
Dissatisfied	2801	11.23%	14.68%
Neither	4951	19.84%	34.52%
Satisfied	12238	49.05%	83.57%
Very Satisfied	4099	16.43%	100.00%
<b>Total</b>	<b>24949</b>	<b>100%</b>	<b>100%</b>

Source: October Household Survey (OHS), 1997.

**Table 4-2: Victim of Crime and Perceived Quality of Life Means, By Category**

<b>Categories</b>	<b>Observations</b>	<b>Percentage</b>	<b>Mean Perceived Quality of Life</b>
Non-victim	22828	91.99%	3.660
Victim	2121	8.01%	3.395 (11.78)
Male; non-victim	7215	90.46%	3.677
Male; victim	761	9.54%	3.440 (6.02)
Female; non-victim	15613	91.50%	3.653
Female; victim	1360	8.50%	3.370 (10.13)

**Note:** Values in parentheses are t-statistics based on the test that the two populations have equal means.

**Table 4-3: Perceived Quality of Life Regression with Victim of Crime Variable for South Africa, 1997 (Ordered Probit Results)**

	Coefficient	z-statistic
Victim of Crime (=1)	-0.358	(-10.99)
<b>A) Household Characteristics</b>		
Ln(Household Expenditure)	0.081	(6.24)
Household Size	-0.017	(-4.30)
Urban (=1)	-0.071	(-2.17)
Home Ownership (=1)	0.030	(1.00)
Phone in Dwelling (=1)	0.163	(5.83)
<b>B) Main Respondent's Characteristics</b>		
Race: Coloured	0.282	(4.84)
Race: Indian	0.082	(1.27)
Race: White	0.054	(1.22)
Male (=1)	-0.050	(-2.13)
Unemp; Looking for work	-0.124	(-5.13)
Unemp; Not looking for work	-0.089	(-1.41)
Working part-time	-0.127	(-2.79)
Housewife/Students	-0.048	(-2.12)
Retired	0.023	(0.55)
Disabled	-0.095	(-1.02)
Education: Standard Level 1-3	-0.013	(-0.26)
Education: Standard Level 4-6	0.063	(1.90)
Education: Standard Level 7-9	0.094	(3.05)
Education: Standard Level 10 and higher	0.160	(4.67)
Age	-0.011	(-2.38)
Age <sup>2</sup> /100	0.011	(2.03)
Married: Civil	0.122	(3.29)
Married: Traditional (Custom)	0.003	(0.09)
Living together with partner	-0.007	(-0.16)
Widower/widow	-0.074	(-1.67)
Divorced/separated	-0.100	(-1.75)
Province dummies (9)	Yes	
Relation to head of household (9)	Yes	
N	20,634	
Log Likelihood	-26491.058	
Pseudo R <sup>2</sup>	0.0345	

**Note:** Reference variables are: black (race), working full-time (employment status), no education (education level), never married (marital status). Other controls include unemployment rate measured at the magistrate district level, the ratios of other male members in the household, as well as the education levels and employment status of household members other than the main respondents.

**Table 4-4: Perceived Quality of Life Regression with Victim of Crime Variable for South Africa, 1997 (Ordered Probit Results) - By Group**

	Coefficient	z-statistic	Coefficient	z-statistic	t-statistics
	<b>Male</b>		<b>Female</b>		
Victim of Crime (=1)	-0.370	(-6.86)	-0.353	(-8.90)	-0.560
	<b>Black</b>		<b>Non-Black</b>		
Victim of Crime (=1)	-0.326	(-8.58)	-0.415	(-6.79)	1.500
	<b>Urban</b>		<b>Rural</b>		
Victim of Crime (=1)	-0.400	(-9.95)	-0.259	(-4.76)	-2.250 **

**Note:** The t-statistics are based on an equality test using the pooled sample that the two coefficients between groups are equal. Control variables are as table 4-3, which include log of household expenditures, household size, urban, home ownership, phone in dwelling, race, gender of the respondent, employment status, education, marital status, age, age-squared, provincial dummies, and relation to the head of the household dummies.

**Table 4-5: Perceived Quality of Life Regressions with Victim of Crime Variable and Different Measures of Crime Rates for South Africa, 1997 (Ordered Probit Results)**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)			
	All	Males	Females	t-statistics (a)	Black	Non-black	t-statistics (b)	Urban	Rural	t-statistics (c)
<b>A) Crime Rates at Micro-level</b>										
Victim of Crime (=1)	-0.497 (-6.64)	-0.533 (-3.98)	-0.484 (-5.59)	-0.36 (-4.80)	-0.395 (-4.80)	-0.788 (-5.16)	2.74	*** (-5.18)	-0.530 (-4.96)	-0.12
Crime Rates at the Magistrate District Levels	-0.982 (-3.51)	-1.004 (-2.30)	-0.973 (-3.17)	-0.89 (-2.52)	-0.824 (-2.52)	-1.210 (-2.14)	2.52	*** (-1.96)	-1.607 (-3.89)	2.31**
Victim of Crime*Average Crime on Others	1.363 (2.06)	1.565 (1.34)	1.292 (1.70)	0.18 (1.02)	0.746 (1.02)	3.220 (2.46)	-2.01	** (1.33)	3.262 (3.09)	-1.55
<b>B) Crime Rates at Macro-level</b>										
Victim of Crime (=1)	-0.255 (-3.10)	-0.206 (-1.48)	-0.290 (-2.93)	0.49 (-2.74)	-0.270 (-2.74)	-0.185 (-0.99)	0.04	-0.295 (-2.70)	-0.457 (-2.46)	0.49
Provincial Crime Rates: Reported Burglaries, 1997*	-0.317 (-5.36)	-0.305 (-3.72)	-0.316 (-4.75)	-1.28 (-5.67)	-0.398 (-5.67)	-0.131 (-1.17)	-2.22	** (-3.18)	-0.811 (-6.46)	3.69***
Victim of Crime*Reported Burglaries, 1997	-0.157 (-1.30)	-0.213 (-1.09)	-0.112 (-0.76)	-0.51 (-0.62)	-0.102 (-0.62)	-0.293 (-1.30)	0.36	-0.131 (-0.91)	0.430 (1.13)	-1.18
Victim of Crime (=1)	-0.470 (-4.04)	-0.467 (-2.38)	-0.493 (-3.60)	0.08 (-3.24)	-0.386 (-3.24)	-0.896 (-2.89)	1.60	-0.538 (-2.94)	-0.528 (-3.58)	-0.19
Provincial Crime Rates: Reported Murder, 1997**	-7.103 (-10.10)	-7.657 (-6.89)	-6.900 (-9.07)	-1.44 (-10.91)	-7.720 (-10.91)	-2.949 (-1.20)	-2.55	*** (-4.27)	-5.416 (-9.63)	1.92*
Victim of Crime*Reported Murder, 1997	1.821 (1.00)	1.759 (0.58)	2.197 (1.02)	-0.16 (0.56)	1.116 (0.56)	6.848 (1.55)	-1.20	2.197 (0.81)	5.240 (1.97)	-0.74

Note: See Table 4-3 for other controls. T-statistics (a) = t-statistics based on the test using the pooled sample that  $\beta_{Males} = \beta_{Females}$ . T-statistics (b) = t-statistics based on the hypothesis that  $\beta_{Black} = \beta_{Nonblack}$ . T-statistics (c) = t-statistics based on the hypothesis that  $\beta_{Urban} = \beta_{Rural}$ . 1) Crime rates on others at the magistrate district levels, calculated using the OHS97 data. 2) Burglaries - residential premises (and attempt) in South Africa, 1997: ratio per 100 of the population. 3) Murder in South Africa, 1997: ratio per 100 of the population. Absolute z-values in parentheses; other controls as in Table 3.

**Table 4-6: Predicted Probabilities of PQOL score of 5 (Highest Level)**

	<b>ordered probit on full sample</b>
Non-victim; magistrate district crime rate of 0%	6.58%
Non-victim; magistrate district crime rate of 10%	6.11%
Non-victim; magistrate district crime rate of 20%	5.66%
Non-victim; magistrate district crime rate of 30%	5.23%
Victim; magistrate district crime rate of 0%	2.64%
Victim; magistrate district crime rate of 10%	2.78%
Victim; magistrate district crime rate of 20%	2.92%
Victim; magistrate district crime rate of 30%	3.06%

**Note:** PQOL - Perceived Quality of Life.

## Appendix 4A: Variable Means, Standard Deviation (in parentheses), and Definitions

Variable	Mean	Definition
perceived quality of life	3.638 (0.995)	taking every thing into account, how satisfied is this household with the way it lives today? (1=very dissatisfied, 5=very satisfied)
victim of crime	0.085 (0.279)	during the last 12 months, has this household experienced robbery, burglaries, housebreaking, or has any household member murdered? (1=yes)
crime at the magistrate district levels	0.085 (0.048)	average crime on other households in the same magistrate district as the respondents, calculated using the OHS97 information.
ln(household expenditure)	6.481 (1.011)	log of household expenditure per month
race	1.453 (0.928)	race of household (1=af rican, 2=coloured (i.e. mixed race), 3=asian, 4=white)
household size	4.752 (2.655)	number of person currently living in the household
education: standard level 1-3	0.038 (0.192)	highest education dummy, 1=completed grade 1-3
education: standard level 4-6	0.156 (0.363)	highest education dummy, 1=completed grade 4-6
education: standard level 7-9	0.380 (0.486)	highest education dummy, 1=completed grade 7-9
education: standard level 10 and higher	0.287 (0.452)	highest education dummy, 1=completed grade 10 and higher
gender	0.320 (0.466)	gender dummy, 1=male
urban	0.539 (0.498)	area dummy, 1=urban
married - civil	0.355 (0.478)	marital status dummy, 1=married under civil law
married - traditional (custom)	0.147 (0.354)	marital status dummy, 1=married under traditional, South African law
living with partner	0.064 (0.245)	marital status dummy, 1=cohabiting with a partner
widower/widow	0.078 (0.268)	marital status dummy, 1=widowed
divorced/separated	0.042 (0.200)	marital status dummy, 1=divorced or separated
age	38.053 (13.074)	age of respondents
age <sup>2</sup> /100	16.189 (10.617)	square of age of respondents/100
unemploy ed, looking for work	0.235 (0.424)	employ ment status dummy, 1=unemploy ed and looking for work
unemploy ed, not looking for work	0.019 (0.137)	employ ment status dummy, 1=unemploy ed but not looking for work
working part-time	0.042 (0.199)	employ ment status dummy, 1=working part-time
housewif e/student	0.304 (0.459)	employ ment status dummy, 1=housewife or student
retired	0.057 (0.232)	employ ment status dummy, 1=retired
disabled	0.013 (0.113)	employ ment status dummy, 1=disabled and unable to work
home ownership	0.808 (0.394)	whether own household outright (1=yes)
phone in dwelling	0.232 (0.423)	whether have phone in the dwelling (1=yes)
proportion of other male household members	0.514 (0.395)	average male members other than the main respondent in the household
other household members with education level 1-3	0.034 (0.147)	average number of other household members completed grade 1-3
other household members with education level 4-6	0.145 (0.287)	average number of other household members completed grade 4-6
other household members with education level 7-9	0.417 (0.402)	average number of other household members completed grade 7-9
other household members with education level 10+	0.294 (0.391)	average number of other household members completed grade 10 and higher
other unemploy ed (looking) household members	0.235 (0.349)	average number of unemploy ed (looking) members in the household
other unemploy ed (not looking) household members	0.020 (0.113)	average number of unemploy ed (not looking) members in the household
other part-time workers in the household	0.038 (0.161)	average number of part-time workers in the household
other housewif e/student in the household	0.321 (0.369)	average number of housewives/students in the household
other retired household members	0.048 (0.174)	average number of retired members in the household
other disabled household members	0.009 (0.083)	average number of disabled members in the household
relation to head of household	1.996 (1.583)	the relationship between the respondent and the head of household dummies (9)
provinces	5.114 (2.595)	South African province dummies (9)
observ ations	24,949	

## Appendix 4B: Reported Provincial Crime Statistics in South Africa, 1997

	Burglaries per 100 of population	Murder per 100 of population
Western Cape	0.986	0.080
Eastern Cape	0.427	0.066
Northern Cape	0.577	0.063
Free State	0.607	0.048
KwaZulu Natal	0.482	0.073
North West	0.462	0.040
Gauteng	1.047	0.076
Mpumalanga	0.570	0.044
Northern Province	0.266	0.020

**Source:** Crime Information Analysis Centre: Provincial Crime Specific Statistics, 1997. Note that crime statistics for burglaries include only reported burglaries (and attempt) on residential premises, and not on business premises.



## **Chapter Five**

# **A Cross-Sectional and Panel Analysis of Subjective Economic Ladder for Indonesia**

### **Abstract**

This chapter investigates the cross-sectional and longitudinal determinants of subjective economic ladder in Indonesia. It examines why most of those Indonesian adults who feel that they are poor are not classified as such on the objective scale, and most who are classified as poor do not feel this to be the case. Cross-sectional estimates imply that individual perceptions of economic rank in the economy are more dependent on a number of socio-economic characteristics, as well as attitudes towards future economic welfare, than the current spending behaviour would normally reveal. We also find significant, albeit weaker, expenditure effects on an individual's subjective economic ladder when an individual's inborn predispositions are controlled for in the panel regression.

## 5.1 Introduction

For about three decades (1965-1995), Indonesia has been regarded by the World Bank as one of the eight economic miracles, defined as experiencing rapid and sustained growth with equitable income distribution. Indonesia's economy during these times grew, on average, at around 7% per annum (World Bank, 1993). However, Asian financial crisis of the late 1990s saw the nation experiencing major political and economic turmoil. According to the Central Statistical Bureau of Indonesia, output in 1998 has fallen by 15% from its level in 1997. Inflation is estimated to be about 75-80% for 1998. The proportion of households below the poverty line between 1997 and 1998 is estimated to have risen by 25% with larger effects in urban than rural areas (Frankenberg *et al*, 1999). Despite signs of economic recovery in the year 2000, the Asian financial crisis has left Indonesia with a persistently high incidence of expenditure poverty by the beginning of the new millennium (for reviews on consumption poverty during the economic crisis, see Pradhan *et al*, 2000 and Suryahadi *et al*, 2003).

The impact of the financial crisis on the economic ladder of the Indonesian population has so far been analysed in terms of loss in real purchasing power of the average household, as measured by *per capita* levels of expenditure. This chapter, however, takes a more psychological approach to the analysis of individuals' economic ladder three years after the economic crisis. We ask the question, "*How well can objective, expenditure-based, measures be used to explain people's perceptions of their own economic ladder.*" The answer, as it turns out, is, "not very well". As will be presented later, a majority of the poorest (say) 40%

of Indonesians do not place themselves in the two lowest rungs of the subjective economic ladder position. Rather, it appears that most Indonesian people tend to put themselves in the middle rung of the subjective economic ladder, even when they are either below or above that of the middle income group.

For the first time in this thesis, the current chapter follows the work of Ravallion and Lockshin (2001, 2002) and implements the use of panel data to study subjective well-being at an individual level. The aim here is to make a comparative analysis between cross-sectional and longitudinal properties of subjective responses. In particular, we discuss why subjective assessments of economic ladder in Indonesia deviate so much from objective, expenditure-based measures at the cross-section. Could the differences between the two measures be explained by noneconomic variables widely reported in past studies on subjective economic ladder? Or could the discrepancies reflect the endogeneity bias that results from omitted inborn dispositions? More importantly, can subjective measure of economic ladder - which have been included in many of the household surveys created by the World Bank organization - be used to capture the most important dimension of individual's economic welfare, the global feeling of poorness? While we are able to demonstrate that the two measures of economic ladder have a strong positive correlation with one another, our cross-sectional estimates imply that individual perceptions of economic ladder in Indonesia are more dependent on a number of socio-economic characteristics, as well as attitudes towards future economic ladder, than current spending behaviour would normally reveal. By using panel data, we subsequently show that omitted personality factors in fact explain more than half

of the variance in the reported subjective economic ladder. In addition, the welfare impact of the expenditure variable is weakened considerably when inborn psychological differences are controlled for in the regression.

This chapter is structured as follows. We describe our Indonesian data set in section 5.2. Section 5.3 presents the results of the correlates of subjective economic ladder for Indonesia. Section 5.4 concludes.

## 5.2 Data Description

In assessing subjective economic ladder in Indonesia, the current chapter uses the Indonesia Family Life Survey (IFLS) for the year 2000. The IFLS is an on-going panel survey in Indonesia, designed to provide data for studying individual and household level behaviour during the rapid economic changes in the 1990s<sup>13</sup>. The survey contains a wealth of information collected at the individual and household level, including multiple indicators of economic well-being (i.e. incomes, expenditures, and assets), education, and labour market outcomes, as well as health and marital status. The first two waves of the IFLS were conducted in 1993 and then in 1997, with approximately 22,000 adults from 13 of the 27 in the country taking place in the survey. The latest wave of the IFLS - the IFLS3 - was conducted in 2000 (three years after the economic crisis) and expanded to include 25,289 adults from 10,085 households. The IFLS3, however, extends to include a set of questions on an individual's attitudes towards past, present, and future economic ladder. We shall

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<sup>13</sup>Information on the IFLS data sets and how to download them can be found on the following website: <http://www.rand.org/labor/FLS/IFLS>.

use, for the first part of this chapter, the following economic ladder question (ELQ) as a proxy for subjective economic ladder: *“Please imagine a six-step ladder where on the bottom (the first step), stand the poorest people, and on the highest step (the sixth step), stand the richest people. On which step are you today?”*

Note that by using the words ‘poor’ and ‘non-poor’ in the question, the ELQ scale is not a well-being measure like the life satisfaction or happiness question. Rather, it attempts to capture each individual’s perceived wealth and income<sup>14</sup>. The raw distribution of ELQ responses is given in Table 5-1.

There is a high response rate to the ELQ question of around 84% of the total adult sample. The distribution in Table 5-1 also shows a skewness in the reported ELQ towards the middle income range in the economic ladder question, with a mean of 2.903 and a standard deviation of 0.783. We will examine in the next section how these ELQ responses vary with a wide range of individual and household characteristics.

## **5.3 Empirical Results**

### **5.3.1 Preliminary Findings at the Cross-Section**

Central to the question of how individuals assess their economic ladder is an understanding of how individuals rate their economic status with the rest of the economy. A number of indicators of economic status are potentially relevant. In this section we shall begin

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<sup>14</sup>A similar set of EWL question also appears in the Eurobarometer and the Russian Longitudinal Monitoring Survey (RLMS), but uses a ladder from one to seven in the former and from one to nine in the latter survey.

by focusing on objective, expenditure-based measures. One of the most commonly used expenditure-based indicators in the analysis of living standards in Indonesia is the real monthly household expenditure per capita<sup>15</sup>. Such an expenditure variable is thought to be less prone to measurement error than income, and because it incorporates a household's ability to maintain a living standard by borrowing or spending down savings, it is likely to give a more accurate picture of individual's economic position over a longer period than the reported level of current income, given that current income is a poor representation of the permanent income received by the individual over the life cycle (Frankenberg *et al*, 1999).

Table 5-2 reports the joint distribution of household expenditure-based and reported subjective economic ladder for the year 2000. We assigned individuals to categories of expenditure groups in such a way that the number of respondents in each category is equal to the number of respondents in the corresponding subjective welfare group. Note that we have decided to merge the highest fifth and sixth rungs of the ELQ into one due to a small number of respondents in these two rungs (only 65 of 21,118 individuals have placed themselves in the highest rung).

As can be seen from Table 5-2, approximately 46% of the ELQ respondents have placed themselves where there were complete agreements between the two objective and subjective economic ladder groups. However, there are larger mismatches in some categories of expenditure group than others. For example, of the 5,234 individuals who placed themselves in

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<sup>15</sup>The average composite consumer price index (CPI) of 43 cities in Indonesia used in this chapter comes from the Central Bank of Republic of Indonesia. See [http://www.bi.go.id/bank\\_indonesia\\_english/main/statistics/](http://www.bi.go.id/bank_indonesia_english/main/statistics/)

the two lowest first and second rungs, only 1,368 were among the poorest 40% in terms of real expenditure per capita. In fact, more than 53% of the poorest 40% have put themselves on the middle income rung of the economic ladder. The weak correlation between household expenditure per capita and ELQ responses is confirmed in the Cramer's  $V$  test; the Cramer's  $V$ -statistic is closer to 0 than 1 or -1 at 0.1342<sup>16</sup>. Despite the low correlation between expenditure variable and subjective economic ladder, we can nevertheless reject - based on the Pearson- $\chi^2$  - the null hypothesis of zero correlation between the two welfare measures at the 1% level.

The weak matching of household expenditure per capita and reported subjective economic ladder suggests that other factors, such as household composition and wealth, may influence an individual's responses to the ELQ question. For instance, self-rated economic ladder may also depend on the structure of the family (i.e. how many adult males there are compared to the number of young children in the household), as well as on the moving average of past expenditures rather than just on current household consumption. This calls for a multivariate approach. Assuming that we can model the ELQ response as a continuous latent variable, running from 'poor' to 'rich', we can use ordered probit to estimate the following simple-form equation

$$r_i = \lambda \ln(e)_i + \delta z_i + \mu_i, \quad (5.1)$$

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<sup>16</sup>Cramer's  $V$  is a correlation coefficient that indicates the relationship among two categorical variables. Like Pearson's coefficient, Cramer's  $V$  ranges from -1 to 1, with 0 indicating no relationship and -1 or 1 indicating a perfect relationship.

where  $r_i$  represents the reported economic ladder by individual  $i$  and is assumed to be dependent on the natural log of real monthly household expenditure per capita,  $\ln(e)$ , as well as other household variables, denoted by  $z$ . The error term  $\mu$  is thought to capture the inability of respondents to evaluate accurately their own true welfare levels. We also control for provincial dummies as well as correct for underestimated standard errors by including cluster community controls in the estimations so as to capture any grouping effects present within the data set.

Table 5-3 reports a simple regression-equation test of whether household composition and wealth variables are significantly correlated with the reported, subjective economic ladder<sup>17</sup>. Controlling for household composition variables and provincial dummies, the natural log of real household expenditure per capita enters the regression in Panel A with a positive and significant coefficient. There is a positive association between household size and reported economic ladder, while pensioner households appear to perceive themselves as less poor than others *ceteris paribus*. Since income is not controlled for in the regression, one possible interpretation is that pensioner households may gain more than others from the pension benefits that the family now receives, making them feel more financially secure. The other explanation is that pensioner households, as distinct from employed households, may have lower expectations of their economic well-being. Panel B sees the size of the coefficient on log expenditure reduces by nearly a half when past expenditure and the estimated worth of total household assets are included into the regression. Household size now enters Panel

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<sup>17</sup>See Appendix 5A for data description.



B's regression with a negative, albeit insignificant, coefficient. The coefficient on past expenditures (represented by the natural log of real household expenditure per capita in 1997) is positive and significant at 0.090, which is around one-third of the size of the coefficient on log of current household spendings. The estimated worth of total household assets is also positively and significantly correlated with the reported ELQ, with an estimated coefficient of 0.151. There is, however, a potentially large degree of measurement error associated with the estimated worth of household assets, and the coefficient should therefore be treated with caution. However, the positive correlations between the reported ELQ and other objective variables suggest that subjective economic ladder may also be dependent on household wealth that is sustainable over longer periods of time than current household spendings would reveal.

Table 5-4 presents the distribution of the predicted subjective rank (based on the estimation of the model in Panel A of Table 5-3) against the reported economic ladder. The cross-tabulation shows slight improvements in the degree of correlation; there is an increase of 0.0443 points in the Cramer *V*-statistic, from 0.1342 in Table 5-2 to 0.1785 in Table 5-4. There are now 48% of the ELQ respondents who have fallen into the categories where there are complete agreements between the predicted and reported subjective economic ladder.

According to Ravallion and Lokshin (2002), there may well be factors other than objective indicators at the household level that affect an individual's assessments of economic ladder. Personal attributes such as education and marital status, for example, may influence how people feel at their current expenditure level, through their effects on future economic ladder. Subjective economic ladder may also be associated with the relative expenditure standings

against others that live locally. Taking this into account, Panel A of Table 5-5 extends  $z_{it}$  in equation (5.1) to include a vector of personal characteristics, adding variables for age, gender, marital status, and education, as well as health, illiteracy, religion, and employment status. We also include three additional geographical variables, adding relative expenditure (defined as the ratio of own household expenditure over the average household expenditure at the *kabupaten* level<sup>18</sup>), relative value of total household assets (defined as the ratio of the total value of household assets over the average value of household assets at the *kabupaten* level), and whether the household is in a rural or an urban setting, as well as including dummies for previous household circumstances, as represented by recalled economic disturbances in the past year.

It can be seen that by adding the above variables into the regression, we can significantly improve the explanatory power of the model, as indicated by a 14% increase in the pseudo- $R^2$  from the Panel B of Table 5-3. The natural log of real household expenditure per capita in the year 2000 continues to enter the equation with a positive and significant coefficient. The coefficients on past expenditures and estimated value of total assets also remain positive and significant at the 5% and 1%, respectively. While the size of the coefficient on past expenditures has reduced by half, with the additional variables in the regression, the size of the coefficient on current household expenditure remains relatively the same as in Table 5-3. Pensioner households continue to be the most financially secured, while households with small children perceived themselves to be poorer than others, holding expenditure-based measures

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<sup>18</sup>District, political unit between a province and a sub-district *kecamatan*.

and other factors constant. Other main results in Panel A of Table 5-5 show that age is positively correlated with higher economic ladder; this probably reflects earning potentials with age in Indonesia. We have also tried including age-squared into the regression, but this produces insignificant results for both age and age-squared coefficients. Males report a significantly lower economic ladder on average than their female counterparts.

Contrary to the standard economic assumption, being married to someone is not associated with the feeling of being more affluent in the economy for the respondents, as compared to being single. Separated and divorced individuals, on the other hand, are more likely to report lower economic ladder than others, controlling for expenditures and household size. Self-rated economic ladder rises with education levels, while healthier people (by their own rating) have a higher self-evaluation of economic ladder. Illiterate individuals put themselves on a lower rung of economic well-being *ceteris paribus*. Self-rated economic ladder is lower amongst non-Islamic minorities (which only makes up around 12% of the population sample). The coefficient on unemployment status, as represented by a dummy variable for whether the respondent worked in the past year, is negative but insignificant. The inclusion of additional dummy variables for a number of employment status (i.e. attending school, retired, housekeeping, disabled, unemployment - searching and non-searching) did not significantly change the estimated coefficient on whether the person worked last year or not, whilst the employment dummies themselves are mostly insignificant.

There is an insignificant difference in the reported ELQ between respondents from rural and urban areas. Relative wealth variables (as measured by relative expenditure and relative

estimated value of total assets against one's locality), on the other hand, are shown to be negatively associated with subjective economic ladder. The results for relative wealth therefore contradict relative utility theory: higher wealth rank should make the individual feel richer than others in the community, not lower it. One possible explanation for this may have come from the way the ELQ question is phrased. Since the ELQ question leaves it up to the respondents to decide who they make their economic comparisons, affluent individuals in the community may be more inclined to compare themselves with other people of similar economic status, or even those who are wealthier than they are, outside their area. The idea is that as people become richer, they tend to associate themselves with those of one's own socio-economic status who may be living outside their confined environment, and hence tend to make upward rather than downward comparison. There are only two significant relationships between the recalled economic disturbances in the past year and the reported ELQ; only those respondents whose households have suffered either crop loss or job loss for the householders report lower economic ladder *ceteris paribus*.

The welfare impacts of current household expenditure are also quantitatively important as well as statistically significant. Based on the relative size of any two coefficients in Panel A of Table 5-5's regression, our calculations suggest that, for an individual living in a household with an average household spending per capita of 88,300 Rupiah (or US\$9) per month, it would take an extra household expenditure per capita of around 130,250 Rupiah (or approximately US\$13)<sup>19</sup> per month to compensate for being divorced. The compensation

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<sup>19</sup>US\$1 = 10,260.8 Rupiah (Source: CIA Factbook: <http://www.cia.gov/cia/publications/factbook/geos> (Document last viewed: July, 2004).

package is even larger for separation; it would take an extra household expenditure per capita of around 325,000 Rupiah (or approximately US\$32) per month for an average Indonesian person. In other words, an average individual would require a financial package worth 3.5 times of the current household spending to make them feel economically indifferent about his or her separation. While we need to treat this sort of calculation cautiously, the figures highlight the size of the estimated coefficient on real expenditure per capita with relative to other variables.

Panel B of Table 5-5 adds in a set of attitudinal variables related to the expected position of economic ladder ladder one year into the future and whether the respondent thinks there are too many poor people in the community. Adding these attitudinal variables to the first panel's estimation greatly improves the explanatory power of the model, as indicated by the fact that the pseudo- $R^2$  is more than quadrupled. The cross-tabulation of the predicted and reported economic ladder (based on the estimation of the model in Panel B of Table 5-5) in Table 5-6 also shows a significant rise in the Cramer  $V$ -statistic to 0.5234. Respondents who expect to be moving up the economic ladder one year into the future are less likely to see themselves as poor today, controlling for current household spendings and other variables. This cancels out the effects of education, illiteracy problem, and health, suggesting that education and health, as well as the ability to read and write, are significant in Panel A's estimation, because they pick up expectations about future economic position. In addition, past expenditures now have an insignificant effect on the reported economic ladder, suggesting that experiences of expenditure growth only matter to self-rated economic ladder

today if they signify possible significant improvements in the future economic ladder. On the other hand, respondents who feel that there may be too many poor people in society are significantly more likely to see themselves as poor. It is also worth noting here that while these variables may well have significantly improved the explanatory power of the self-rated economic ladder model, we realise that they also create concerns about their endogeneity to the reported ELQ. As a result of this, the estimated coefficients in Panel B's regression should therefore be treated with care.

Since we are dealing with a data set that contains in itself great cultural and ethnic diversity such as that of the Indonesian data, we should also consider the possibility that subjective economic ladder pattern may vary significantly across different population groups. Tables 5-7 and 5-8 take this into account, and report separate regression results, analogous to Panel B of Table 5-5, according to the main spoken language (Indonesian versus other languages) and region (urban versus rural) respectively.

Looking across the panels in both tables, however, we can observe little difference in terms of the coefficient size from the equality test among different spoken language groups and regional settings. Regarding the significance of the coefficients, a respondent whose spoken language is Indonesian is significantly more likely to feel poor, for example, if he or she either worked last year or comes from a household with a large proportion of small children. The same does not apply, however, for those respondents whose main spoken languages are not Indonesian. The coefficient on past expenditure is only positive and significant for the urban sample, while being married is shown to be strongly negatively correlated with

the reported ELQ only for the rural sample. Gender makes no robust difference to the reported ELQ in the rural area, while in the urban area males feel significantly poorer than their female counterparts. Self-rated economic ladder is negatively associated with higher relative household wealth only for the urban group. Crop loss, a fall in income due to low production prices, and a loss of job for the householders are shown to have a strong negative correlation with self-rated economic ladder only in the urban area, and not in the rural area. Similar results on the differences in the coefficients across population groups are obtained if we were to estimate the restricted model, analogous to that of Panel A of Table 5-5, on the sub-samples.

### **5.3.2 Observed Discrepancies in the Reported Economic Ladder Over Time**

So far in this chapter, we have been working under the assumption that there are no individual fixed effects in the subjective economic ladder model. Nonetheless, one of the issues known to affect an individual's self-rated welfare is the omitted inborn dispositions of the respondent, which do not to change over time. According to the literature of psychology, people who are born with persistent personality traits such as extroversion and agreeableness, for example, are likely to report higher levels of subjective well-being than those who were not born with the same attributes (De Neve and Cooper, 1999). Some of these time-invariant characteristics, such as self-esteem and unrealistic optimism, may even have been shaped by strong cultural norms in the early childhood years of the respondent (Diener and Suh, 2000). Given that these psychological factors jointly influence reported well-being and

observed socio-economic factors (such as current spending behaviour and unemployment), cross-section equations will be unreliable if these in-born dispositions are not controlled for in the regressions (Clark and Oswald, 2002; Ferrer-i-Carbonell and Frijters, 2004). For instance, it may be possible that certain personality traits (like self-esteem) make people disinclined to say that they are poor in the survey, while at the same time encouraging them to spend their incomes on various consumptions. Thus, it may be argued that the correlation between expenditure and subjective economic ladder will be overestimated.

In allowing for the presence of an individual's inborn dispositions in our self-rated economic ladder model, we first rewrite equation (5.1) in the following simple form:

$$r_{it} = \lambda_t \ln(e)_{it} + \delta_t z_{it} + \eta_i + \mu_{it}, \quad t = 1, 2. \quad (5.2)$$

where the subscript  $t$  represents the time periods, and  $\eta_i$  is a time-invariant individual effect, representing personality traits and any other sources of latent heterogeneity;  $\eta_i$  is allowed to be correlated with log of real expenditure per capita,  $\ln(e)_{it}$ , and the other observable household and personal characteristics of interest,  $z_{it}$ . Note that we allow for the parameter vectors  $\beta_t$  and  $\gamma_t$  to vary over time, reflecting the fact that the effects of (say) household expenditure and the value of total household assets may be dependent on the mean levels set by the respondent's social reference-group at each survey date, as discussed in the previous section. We also make the standard assumption that the function is static, in that  $r_{it-1}$  does not affect  $r_{it}$  given  $\ln(e)_{it}$  and  $z_{it}$ .

To correct for time-invariant effects, we adopt the same estimation technique as described



by Ravallion and Lokshin (2001) in estimating a ‘utility gap function’ on the reported economic ladder in Russia. To outline the method more formally, let us begin by taking first-difference of equation (5.2) so as to eliminate  $\eta_i$  in the normal way. Equation (5.2) now becomes

$$\Delta r_{it} = \lambda_t \Delta \ln(e)_{it} + \Delta \lambda_t \ln(e)_{it-1} + \delta_t \Delta z_{it} + \Delta \delta_t z_{it-1} + \Delta \mu_{it}, \quad (5.3)$$

where  $\Delta r_{it} = r_{i2} - r_{i1}$  is the change in subjective economic ladder for individual  $i$ ,  $\Delta \ln(e)_{it} = \ln(e)_{i1} - \ln(e)_{i2}$  is the change in real monthly household expenditure per capita,  $\Delta z_{it} = z_{i2} - z_{i1}$  is the vector of changes over time in the observed characteristics, while  $\Delta \lambda_t = \lambda_2 - \lambda_1$  and  $\Delta \delta_t = \delta_2 - \delta_1$  are the corresponding vectors of changes over time in the parameters. Note that a variable (such as gender) that does not change over time still has a non-zero parameter in equation (5.3) if the parameters of the subjective economic ladder function in levels (as in equation (5.2)) change over time. However, having eliminated  $\eta_i$  from the utility function, we are unable to identify permanent effects on subjective economic ladder of these time-invariant variables.

We cannot estimate equation (5.3) directly as  $\Delta r_{it}$  is not directly observable. Rather, we know the respondent’s position at each two given survey dates on the reported economic ladder with  $R$  rungs. There is no one-to-one mapping from changes in subjective economic ladder to changes in the economic ladder position, since respondents on the same ladder rung can have different initial rungs. Let  $g_{it}(k)$  be the perceived increment to utility required by individual  $i$  to advance  $k$  rungs. For example, if between dates  $t - 1$  and  $t$  utility falls by

more than  $g_{it}(-2)$ , then one will be at least two rungs lower at  $t$  than at  $t - 1$ . If  $\Delta r_{it}$  falls within the interval  $[g_{it-1}(-1), g_{it}(1)]$ , then one will be on the same rung at period  $t$  as  $t - 1$ .

Since it is unlikely that the utility gaps are the same across all individuals, the key assumption is that the utility gap function,  $g_{it}(k)$ , contains a common additive component across all individuals, and an idiosyncratic component that depends on current characteristics similar to that of the utility function. The specific functional form we assume is

$$g_{it}(k) = c(k) + \xi \ln(e)_{it} + \phi z_{it} + v_{it}, \quad (5.4)$$

where  $\bar{c}(k)$ ,  $\delta$ , and  $\phi$  are parameters and  $v_{it}$  is the zero-mean error term<sup>20</sup>. While equation (5.4) allows for heterogeneity in utility gaps across all individuals, it does not allow for a latent individual effect, just as equation (5.2) does not allow for an individual fixed effect in the changes in subjective economic ladder. Thus, equation (5.4) implies that people with the same observed characteristics tend to agree, on average, on the utility gap required to move up the subjective economic ladder by  $k$  rungs. This assumptions allow us to estimate an ordered probit on the observed changes in economic ladder positions where the latent continuous variable is the change in utility net of the idiosyncratic components in the lagged

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<sup>20</sup>Note that normalities imply that it is possible for the welfare gap to be negative, i.e. lower positions of welfare at  $t$  than at  $t - 1$ .

utility gap:

$$y_{it} \equiv \Delta r_{it} - g_{it-1}(k) + c(k) = \lambda_t \Delta \ln(e)_{it} + (\Delta \lambda_t - \xi) \ln(e)_{it-1} + \delta_t \Delta z_{it} + (\Delta \delta - \phi)_t z_{it-1} + \omega_{it}, \quad (5.5)$$

where the composite error term,  $\omega_{it} = \Delta \mu_{it} - v_{it-1}$ , is normally distributed under the assumptions specified above. The reported ladder position will be unchanged if  $y_{it}$  is within the interval  $[c(-1), c(1)]$ , which is equivalent to requiring that  $\Delta r_{it}$  is found in the lagged utility gap function  $[g_{it-1}(-1), g_{it-1}(1)]$ , given the definition of  $y_{it}$  in equation (5.5) and the assumed form of the gap function as specified in equation (5.4). In a ladder of  $R$  rungs, there are  $2(R-1)$  possible rung changes and  $2(R-1)$  values of  $c(k)$ , giving the appropriate common cut-offs in the  $y_{it}$  dimension. While  $c(k)$  is strictly increasing in  $k$ , we do not require that  $c(k)$  be positive (negative) when  $k$  is positive (negative). Thus, by taking first differences over time in the utility function and netting out idiosyncratic differences between people in their perceived utility gaps relative to the ladder rungs, an ordered probit for the changes in the economic ladder rungs allows us to estimate the  $\lambda_t$  parameters in the economic ladder function and the cut-offs in utility gap. In other words, equation (5.5) allows us to difference out the presence of the latent individual effects in the utility function, whilst still generate a one-to-one mapping from the latent continuous variable to the observed changes in ladder positions once the idiosyncratic components in the lagged utility gap (e.g.  $\ln(e)_{it-1}$  and  $z_{it-1}$ ) are controlled for in the regression.

This section aims to apply the above econometric technique on the ELQ data in In-

indonesia. Nonetheless, despite the longitudinal nature of the IFLS data, it is only the most recent survey - the IFLS3 - that contains a set of attitudinal questions on the respondent's perception of economic ladder. There is, however, one attitudinal question that asks the respondent to recall his or her position on the economic ladder three years ago. The actual wordings of this past subjective economic ladder question are: *"Please imagine a six-step ladder where on the bottom (the first step), stand the poorest people, and on the highest step (the sixth step), stand the richest people. On which step were you just before economic crisis occurred (end of 1997)?"*

We shall be using the responses to the above ELQ question as a proxy for the individual's position on the economic ladder at period  $t - 1$ . The raw distribution of the recalled ELQ responses is given in Table 5-9. The respective mean and standard deviation of this ELQ distribution is 2.932 and 0.884.

While the so-called self-rated 'recalled economic ladder' data may contain important information about the true economic position experienced by the respondent at  $t - 1$ , it also creates concerns about the likely measurement errors associated with the way people assess their past economic ladder. For instance, there is no good reason to assume that the ability to recall experienced economic position is constant across all respondents, given the three-year gap between survey dates. Some people may have a clear memory of their financial situation three years ago, while others may only possess a vague memory of what their lives were like just before the economic crisis occurred. Hence, individuals may only rate their past economic ladder as based on how they feel about their economic situations today,

making it possible that  $r_{it-1}$  will be strongly correlated with  $r_{it}$ , and weakly correlated with  $\ln(e)_{it-1}$  and  $z_{it-1}$ . Despite the potential measurement errors in the data, we have been able to present some evidence, from running an ordered probit on the recalled economic ladder against other explanatory variables measured in 1997, and comparing the estimates with the results from the year 2000, that self-rated economic ladder equations have a generally similar patterns today, in terms of the coefficient sign and significance, as three years ago (see Appendix 5B)<sup>21</sup>. In other words, the estimates suggest that people's recollections of past economic ladder are relatively stable across all respondents at the cross-section. This therefore helps to ease some of the fears about the validity of the recalled economic ladder data.

Table 5-10 summarizes the responses to the ELQ for 1997 and 2000. The row and column totals report the number of respondents in each ladder rung. Comparing the column and row totals, we can see that there is a higher proportion of adults reporting that they were in the poorest two economic rungs in 1997 than in 2000. If we were to take these two poorest economic rungs to be subjectively poor, then the difference in the subjective poverty rate between the two survey dates is around 3% (a rise from 25% in 1997 to 28% in 2000). Of the 5,115 adults who recalled their economic ladder in 1997 to be on the poorest two economic rungs, 1,480 put themselves on the third or higher rung in 2000. By this definition, around 29% of those who reported themselves to be subjectively poor in 1997 escaped poverty within three years. However, some of the movements out of the two lowest economic rungs in 2000

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<sup>21</sup>Note that some of the explanatory variables (used in table 5-5's regressions) had to be dropped from the estimation because they were not available in both 1997 and 2000 surveys.

are matched by the movements into the subjectively poor category; of the 5,259 adults who put themselves in the poorest two economic rungs in 2000, 824 said they had been on the third or higher rung three years earlier.

The panel nature of the IFLS data set also allows us to compare in Table 5-11 the differences in economic ladder positions with changes in real monthly expenditure per capita over the three-year period. We find that the average growth rates of real expenditure per capita tend to rise as the gain in the economic ladder rungs rises. However, the cross-tabulation results also suggest of a very low degree of association between differences in economic ladder rungs and the growth rates of real expenditure per capita; the Cramer  $V$ -statistic is only 0.0306 (though we can still reject - based on the Pearson- $\chi^2$  - the null hypothesis of zero correlation between subjective and objective measures at the 1% level). There seems to be a significant number of individuals reporting a rise of at least one rung in their subjective economic ladder among those experiencing the largest expenditure drops, and *vice versa*, suggesting a high variance in growth rates within each category.

Since there may be other over-time changes in the observed characteristics that influence the size of the discrepancies in the self-rated economic ladder, Table 5-12 estimates a utility-gap equation analogous to that of equation (5.5). We consider most of the explanatory variables used in the regressions in Table 5-5 and drop some variables that are likely to have changed during the three-year period, such as economic disturbances in the past year, but were not available in the 1997 survey. We continue to include a set of variables that do not (or are not likely to) change over time, such as gender and religion, since their coefficients

may change over time. It is also worth noting that while equation (5.5) does not allow for a latent personality trait in utility gaps, nor does it allow for a latent individual mood effect in the same manner. This can be explained by the fact that the responses to the recalled economic ladder question are likely to suffer from the same endogeneity bias with respect to mood effects at the time of the interview as the responses to the current subjective economic ladder question. Assuming that mood effects are relatively stable across all attitudinal questions for each individual, we can eliminate them by taking first difference of the reported economic ladder in the normal way<sup>22</sup>.

Table 5-12 gives our utility gap estimates for Indonesia. While the change in log of real household expenditure per capita variable is shown to be highly significant at the 1% level, the effect is weakened considerably when individuals' fixed-effects are controlled for in the regression; the estimated coefficient on log of household expenditure is now 0.075, with a standard error of 0.029. The changes in the log of estimated worth of household assets, though positive, are insignificant. The other results in Table 5-12 reveal only weak evidence of socio-demographic effects. Male respondents, as well as individuals of non-Islamic minorities, tend to report that their economic ladder had worsened over time. In contrast to our earlier cross-sectional results, respondents who became unemployed tended to say that they are worse off, controlling for the loss of household expenditure. Individuals who had been employed in both rounds tended to say that their economic ladder rung had improved over the three-year period. Changes in the perceived health status, on the

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<sup>22</sup>The endogeneity with respect to mood effects is one of the biases that were not dealt with by Ravallion and Lokshin (2003).

other hand, have no significant impacts on self-rated economic ladder. With respect to the 'goodness of fit' of the model, the bulk of the log-likelihood of qualitative perceptions of economic ladder is left unexplained even with a full set of controls; the pseudo- $R^2$  of 0.0124 is much smaller compared to what had been obtained earlier in our cross-sectional analysis. These results thus highlight the importance of the omitted latent individual heterogeneity, such as personality traits and mood effects, as one of the main determinants of self-rated economic ladder in Indonesia.

Finally, it can be seen from Table 5-12's results that the impact of household expenditure is significantly smaller as compared to other variables. The standard deviation of  $\Delta \log$  of real household expenditure per capita is 0.74. Since the mean of log of real household expenditure per capita in 1997 is 11.02, a move from one standard deviation below the mean of household expenditure to one standard deviation above is therefore a change from 10.28 to 11.76. Given a conservative central estimate of  $\Delta \log$  of real household expenditure per capita to be 0.075, the implied change in the (latent) subjective variable is approximately 0.11. The estimates imply that a unit increase in the log of household expenditure per capita ( $\simeq$  a 240% increase in the mean household spending per capita from 1997) can only compensate for around 56% of the negative effect resulting from an individual's experience of unemployment. The large sum of money required to compensate for joblessness is perhaps a reflection of the low value of extra household expenditure found earlier in our cross-sectional analysis for Indonesia.



## 5.4 Concluding Remarks

The overall measure of real household spending per capita is one of the most widely used indicators of individuals' economic ladder in developing countries today. While being less prone to measurement error compared to income, the expenditure variable is also thought to be a better representation of a household's ability to maintain a living standard by borrowing or spending down savings compared to income. As a result, economists usually assume - without further detailed evidence - that a person who has the capability to spend more money than others must be feeling richer than others.

This chapter begins by investigating what is one of the central tenets in economics is supported by the Indonesian data; our preliminary cross-tabulation results indicate a seemingly positive cross-sectional relationship between per capita levels of real household expenditure and an individual's self-rated economic ladder in the post-economic crisis Indonesia in 2000. As implied by the positive and well-defined Cramer's  $V$ -statistic in Table 5-2, it appears that respondents with higher family spending per capita are less likely to report themselves as pertaining to the 'poorest' rung of subjective economic ladder ladder, and they are more likely to place themselves in upper rungs. This conforms to what economists would expect.

However, we also find large discrepancies between subjective and objective measures. For instance, around 62% of those in the lower 40% of the expenditure distribution did not put themselves in either one of the two poorest subjective economic ladder rungs, while over 57% of the total sample put themselves in the middle rung of self-rated economic ladder. This finding is also confirmed in our multivariate analysis of the two variables; running an ordered

probit on the self-rated economic ladder against log of real household expenditure per capita at the cross-section, though produces an estimated coefficient of 0.394 and a standard error of 0.017, only yields an extremely small pseudo- $R^2$  of 0.0330.

It is evident from our initial results that, while the reported economic ladder is shown to be strongly positively correlated with the expenditure variable, the objective economic indicator normally used in assessing economic ladder in Indonesia has only limited power in explaining individual perceptions of economic ladder. It seems, in other words, that perceptions are only loosely related to the objective facts. The value of pseudo- $R^2$  improves significantly, however, when we expand the model to control for a number of individual attributes, and household characteristics, as well as estimated household wealth, comparison expenditure variables, and economic disturbance in the past year. We find that most of the determinants of subjective economic ladder are similar to those found using the Russian data (Ravallion and Lokshin, 2002). Higher levels of estimated material wealth, as well as past expenditures, are associated with higher levels of subjective economic ladder. Pensioner households appear to be financially better off than others, whilst females tend to report higher economic ladder than their male counterpart. There appears to be a positive relationship between age and self-rated economic ladder. Healthier, better educated, and married individuals tend to put themselves in a higher economic ladder rung, controlling for household expenditure per capita. The non-Islamic respondents are more likely to perceive themselves as less poor compared to others. Relative wealth also matters within the local community; living in a rich area seems to raise economic well-being for the individual, pos-

sibly via the effects of desirable local amenities and own expected future contentment (or income). Those respondents whose households have experienced either crop loss or job loss for the household members tend to perceive themselves as worse off, holding expenditure and other relevant factors constant.

Expectations about future economic ladder also appear to have a strong explanatory power in explaining individual economic ladder of Indonesia. While these attitudinal variables are to some extent endogenous to individual perceptions of current economic position, when their significance is seen in combination with our results on the importance of past expenditures, we are drawn to conclude that individual perceptions of economic ladder are dependent on economic position averaged over a longer period of time than current household spendings would normally reveal. In addition, it appears that perceptions of 'local inequality', as indicated by the respondent's belief that there may be too many poor people in the society, are also associated negatively and significantly with self-perceptions of economic ladder.

We then propose and implement the use of panel data to address the issue of endogeneity bias, resulting from omitted inborn dispositions that are known to influence subjective economic ladder, as well as expenditures and other personal and household characteristics. By treating these personality traits as time-invariant variables, we can use an ordered probit regression to retrieve the mean effects of changes in observed characteristics (between 1997 and 2000) from the reported differences in the perceived current and past economic ladder recorded in the year 2000 survey. This allows for endogenous 'utility gaps', which must be

spanned to change one's ladder rung, to be estimated (Ravallion and Lokshin, 2001). With a broad set of control variables, household expenditure continues to have a positive and well-defined effect on self-rated economic ladder, even after controlling for individual-specific effects in the regression. However, the size of the estimated effect of expenditure variable is effectively smaller compared to the one obtained in our cross-sectional analysis. Also, losing one's job appears to have a negative impact on subjective economic ladder, while improvements in subjective health status over time are positive but insignificant. The welfare impacts of other socio-demographic and economic factors, on the other hand, are not robust to controls for individual fixed effects. Finally, there appears to be a bulk of subjective economic ladder that remains unexplained - even with a broad set of socio-economic variables - after controlling for the time-invariant effects in the welfare regression, which reflects the importance of personality factors as one of the main determinants of subjective economic ladder in Indonesia.

More generally, the current chapter has made an attempt to address a number of problems that cloud the inferences that can be drawn from responses on subjective economic ladder. One of the main sources of bias we find in this study is an individuals' personality traits, which may have been attributed to inborn personal differences in the nervous system or influenced in the early childhood years. Given that inborn psychological differences average out in a large sample, the degree of endogeneity bias may depend more on the cultural norm that individuals live in. This could well be the case for Indonesia where collectivism (i.e. the

tendency to conform to the socially acceptable means) dominates (Hofstede, 1980)<sup>23</sup>, which probably explains why more than 53% of the poorest 40% of the Indonesian population put themselves on the middle rung of economic ladder. To the extent that this cultural norm also influences how people normally behave, the estimated coefficients on some of the observables (e.g. expenditure and unemployment) will be biased. As a result, one should always try to conduct comparative tests at both cross-sectional and longitudinal level wherever possible in order to identify the true effects of objective economic measures on the reported economic ladder.

Finally, it should be noted that there are limitations as to how much subjective economic ladder statistics can be used to capture people's true economic welfare. One of the main problems is the issue of reference norm: who do we imagine as the rich and poor people in the economy when answering the subjective economic ladder question? Given that the choice of our reference groups may be correlated with our personal characteristics such as education and age, our results are subject to further omitted variable bias. Hence a better measure of subjective economic welfare can be one that asks about an individual's overall financial satisfaction rather than about one's subjective economic rank in the economy.

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<sup>23</sup>Out of 53 countries of Hofstede's collectivism scale, Indonesia ranks 5th in the table.

**Table 5-1: Economic Subjective Ladder in Indonesia, 2000**

Economic Subjective			
Welfare	Observations	Percentage	Cumulation
Poorest 1	961	4.55%	4.53%
2	4,308	20.37%	24.90%
3	12,040	56.94%	81.86%
4	3,551	16.79%	98.65%
5	220	1.04%	99.69%
Richest 6	65	0.31%	100.00%
<b>Total</b>	<b>21,144</b>	<b>100.00%</b>	

**Note:** The actual wordings of the economic ladder question is, "Please imagine a six-step ladder where on the bottom (the first step) stands the poorest people, and on the highest step (the sixth step) stands the richest people. On which step are you today?"

**Table 5-2: Comparison of Economic Subjective Ladder with Real Monthly Household Expenditure Per Capita in Indonesia, 2000**

Predicted probability rank based on table 2	Economic Subjective Ladder					Total
	Lowest 1	2	3	4	Highest 5+	
1	344	1,233	1,594	198	18	3,387
2	176	895	1,929	349	28	3,377
3	98	643	2,084	508	49	3,382
4	72	414	2,142	696	63	3,387
5	41	226	1,915	1,104	83	3,369
<b>Total</b>	<b>731</b>	<b>3,411</b>	<b>9,664</b>	<b>2,855</b>	<b>241</b>	<b>16,902</b>

Cramer's V = 0.1861; Pearson Chi-square = 2340 (significant at p < 0.0005)

**Note:** Rungs 5-6 of economic subjective welfare were aggregated because of small number of responses.

**Table 5-3: Economic Subjective Ladder Regressions  
for Indonesia, 2000 (Ordered Probit) - Household Composition and Wealth included**

	Panel A		Panel B			
	Coefficient	St.error	Coefficient	St.error		
Log of real household expenditure per capita, 2000	0.454	(0.019)	***	0.267	(0.023)	***
Log of real household expenditure per capita, 1997				0.090	(0.020)	***
Log of estimated worth of total household assets				0.151	(0.010)	***
<b>Household characteristics</b>						
Household size	0.044	(0.006)	***	-0.006	(0.006)	
Proportion of small children (age<10)	-0.341	(0.077)	***	-0.283	(0.088)	***
Proportion of older children (10<=age<16)	-0.222	(0.087)	***	-0.100	(0.100)	
Proportion of adult male	-0.076	(0.079)		-0.244	(0.095)	***
Proportion of adult female	-0.160	(0.084)	*	-0.220	(0.106)	**
Provincial Dummies		Yes			Yes	
N		20,961			16,877	
Pseudo R-squared		0.0422			0.0591	

Note: \* 10% C.I., \*\* 5% C.I., \*\*\* 1% C.I. Reference group: proportion of pensioners.

**Table 5-4: Comparison of Re-weighted Objective Indicator with Economic Subjective Ladder**

Re-weighted rank based on table 2	Economic Subjective Ladder					Total
	Lowest				Highest	
	1	2	3	4	5+	
1	344	1,233	1,594	198	18	3,387
2	176	895	1,929	349	28	3,377
3	98	643	2,084	508	49	3,382
4	72	414	2,142	696	63	3,387
5	41	226	1,915	1,104	83	3,369
<b>Total</b>	731	3,411	9,664	2,855	241	16,902

Cramer's V = 0.1861; Pearson Chi-square = 2340 (significant at p < 0.0005)

**Table 5-5: Economic Subjective Ladder Regressions  
for Indonesia, 2000 (Ordered Probit) - Personal and Attitudinal Variables included**

	Panel A			Panel B		
	Coefficient	St.error		Coefficient	St.error	
Log of real household expenditure per capita, 2000	0.278	(0.033)	***	0.169	(0.035)	***
Log of real household expenditure per capita, 1997	0.048	(0.019)	**	0.021	(0.022)	
Log of estimated worth of total household assets	0.150	(0.012)	***	0.092	(0.012)	***
<b>Household characteristics</b>						
Household size	-0.007	(0.006)		-0.006	(0.006)	
Proportion of small children (age<10)	-0.306	(0.088)	***	-0.131	(0.100)	
Proportion of older children (10<=age<16)	-0.044	(0.100)		0.044	(0.107)	
Proportion of adult male	-0.168	(0.100)	*	0.023	(0.109)	
Proportion of adult female	-0.265	(0.105)	**	-0.192	(0.119)	
<b>Individual characteristics</b>						
Age	0.002	(0.001)	**	0.009	(0.001)	***
Male	-0.135	(0.023)	***	-0.050	(0.024)	*
Married	-0.044	(0.033)		-0.099	(0.038)	**
Separated	-0.429	(0.197)	**	-0.358	(0.180)	*
Divorced	-0.252	(0.122)	**	-0.266	(0.131)	*
Widowed	-0.063	(0.081)		-0.079	(0.076)	
Education: junior high school	0.079	(0.030)	***	-0.034	(0.035)	
Education: high school	0.235	(0.028)	***	0.031	(0.031)	
Education: college or university	0.327	(0.045)	***	0.071	(0.053)	
Not able to read and write (Yes=1)	-0.182	(0.037)	***	-0.007	(0.040)	
Subjective evaluated health: somewhat healthy	0.078	(0.028)	***	-0.006	(0.036)	
Subjective evaluated health: very healthy	0.120	(0.046)	**	-0.007	(0.056)	
Religion: Non-Islam	-0.080	(0.045)	*	0.031	(0.047)	
Worked last year? (Yes=1)	-0.014	(0.021)		-0.059	(0.025)	**



Table 5-5 (continued)

	Panel A		Panel B			
	Coefficient	St.error	Coefficient	St.error		
<b>Geographical characteristics</b>						
Rural	0.011	(0.036)	0.010	(0.038)		
Relative expenditure at the kabupaten level	-0.039	(0.021)	*	-0.030	(0.022)	
Relative value of total asset at the kabupaten level	-0.023	(0.010)	**	-0.021	(0.008)	**
<b>Economic disturbance in the past year</b>						
Death of a family member	-0.024	(0.060)		-0.096	(0.069)	
Sickness and hospitalization of a family member	-0.020	(0.036)		0.009	(0.038)	
Crop loss	-0.066	(0.034)	*	-0.037	(0.040)	
Household/business loss due to natural disaster	0.026	(0.110)		-0.104	(0.123)	
Lost of job for the householders	-0.152	(0.049)	***	-0.158	(0.061)	***
Fall in income due to very low price of products	0.081	(0.054)		-0.040	(0.050)	
<b>Attitude variables</b>						
Rank of future economic well-being: step 2				2.203	(0.152)	***
Rank of future economic well-being: step 3				4.105	(0.180)	***
Rank of future economic well-being: step 4				5.494	(0.198)	***
Rank of future economic well-being: step 5				6.316	(0.215)	***
Rank of future economic well-being: step 6 (Richest)				6.743	(0.324)	***
Few poor people in the community				-0.145	(0.038)	***
Many poor people in the community				-0.171	(0.032)	***
<b>Provincial Dummies</b>						
		<b>Yes</b>		<b>Yes</b>		
N		16,867		16,417		
Pseudo R-squared		0.0673		0.3865		

**Note:** Relative expenditure = household monthly expenditure per capita/average household monthly expenditure per capita in the kabupaten. Relative value of total asset = estimated value of total household asset/average estimated value of total household asset in the kabupaten. Additional reference groups: female, single (marital status), no formal education, very unhealthy (health status), Islam, urban, no poor people in the community.

**Table 5-6: Comparison of Actual and Predicted Economic Subjective Ladder from Table 5-5 (with attitudinal variables) for Indonesia, 2000**

Rank based on predicted values based on table 4	Economic Subjective Ladder						Total
	Lowest	Indonesian as language		Other spoken languages		Highest	
	1	2	3	4	5+		
1	619	2,166	481	15	2	3,283	
2	26	622	2,597	36	2	3,283	
3	16	351	2,863	52	1	3,283	
4	14	128	2,283	851	7	3,283	
5	17	39	1,169	1,833	224	3,282	
<b>Total</b>	<b>692</b>	<b>3,306</b>	<b>9,393</b>	<b>2,787</b>	<b>236</b>	<b>16,414</b>	

Cramer's V = 0.4657; Pearson Chi-square = 14237 (significant at p < 0.0005)

**Table 5-7: Economic Subjective Ladder Regressions  
for Indonesia, 2000 (Ordered Probit) - by Spoken Language**

	Indonesian as main language			Other spoken languages			Equality test on the coefficients
	Coefficient	St.error		Coefficient	St.error		t-statistics (a)
Log of real household expenditure per capita, 2000	0.194	(0.047)	***	0.157	(0.051)	***	0.16
Log of real household expenditure per capita, 1997	0.026	(0.029)		0.008	(0.032)		0.19
Log of estimated worth of total household assets	0.081	(0.015)	***	0.110	(0.020)	***	-1.58
<b>Household characteristics</b>							
Household size	-0.001	(0.008)		-0.011	(0.008)		1.02
Proportion of small children (age<10)	-0.290	(0.139)	**	0.072	(0.139)		-2.09
Proportion of older children (10<=age<16)	-0.045	(0.149)		0.170	(0.177)		-0.71
Proportion of adult male	-0.084	(0.133)		0.153	(0.164)		-1.18
Proportion of adult female	-0.286	(0.159)	*	-0.079	(0.179)		-0.78
<b>Individual characteristics</b>							
Age	0.009	(0.002)	***	0.008	(0.002)	***	0.07
Male	-0.036	(0.031)		-0.060	(0.041)		0.59
Married	-0.076	(0.045)		-0.132	(0.065)	*	0.84
Separated	-0.278	(0.245)		-0.465	(0.263)	*	0.95
Divorced	-0.235	(0.176)		-0.330	(0.208)	*	0.14
Widowed	-0.209	(0.114)		-0.025	(0.107)		-0.70
Education: junior high school	-0.027	(0.045)		-0.028	(0.061)		0.29
Education: high school	0.095	(0.042)	*	-0.064	(0.061)		1.74
Education: college or university	0.118	(0.070)		0.074	(0.088)		-0.49
Not able to read and write (Yes=1)	-0.016	(0.057)		0.014	(0.054)		0.44
Subjective evaluated health: somewhat healthy	0.037	(0.048)		-0.065	(0.054)		1.57
Subjective evaluated health: very healthy	-0.023	(0.078)		0.034	(0.078)		0.08
Religion: Non-Islam	0.018	(0.050)		0.084	(0.101)		1.40
Worked last year? (Yes=1)	-0.070	(0.032)	**	-0.062	(0.044)		-0.20

Table 5-7 (continued)

	Indonesian as main language		Other spoken languages		Equality test on the coefficients
	Coefficient	St.error	Coefficient	St.error	t-statistics (a)
<b>Geographical characteristics</b>					
Rural	0.006	(0.054)	0.003	(0.047)	0.55
Relative expenditure at the kabupaten level	-0.030	(0.029)	-0.034	(0.030)	0.64
Relative value of total asset at the kabupaten level	-0.022	(0.010)	**	-0.015 (0.013)	0.49
<b>Economic disturbance in the past year</b>					
Death of a family member	-0.100	(0.070)	-0.088	(0.118)	-0.52
Sickness and hospitalization of a family member	-0.011	(0.047)	0.047	(0.069)	-0.15
Crop loss	-0.057	(0.061)	-0.025	(0.046)	-1.06
Household/business loss due to natural disaster	-0.019	(0.136)	-0.213	(0.207)	0.99
Lost of job for the householders	-0.174	(0.075)	**	-0.101 (0.091)	-0.48
Fall in income due to very low price of products	-0.069	(0.073)	-0.009	(0.083)	-0.66
<b>Attitude variables</b>					
Rank of future economic well-being: step 2	1.974	(0.207)	***	2.485 (0.182)	*** 1.35
Rank of future economic well-being: step 3	3.722	(0.238)	***	4.601 (0.230)	*** 0.88
Rank of future economic well-being: step 4	5.039	(0.264)	***	6.091 (0.252)	*** 0.62
Rank of future economic well-being: step 5	5.867	(0.281)	***	6.936 (0.291)	*** 0.39
Rank of future economic well-being: step 6 (Richest)	6.055	(0.425)	***	7.624 (0.480)	*** -0.88
Few poor people in the community	-0.155	(0.053)	***	-0.135 (0.053)	*** -0.64
Many poor people in the community	-0.146	(0.045)	***	-0.195 (0.050)	*** 0.23
<hr/>					
Provincial Dummies	<b>Yes</b>		<b>Yes</b>		
N	9,924		6,491		
Pseudo R-squared	0.3626		0.4245		

**Note:** (a) t-statistics based on the equality test using the pooled sample that  $\beta_{Indonesian} = \beta_{other\_languages}$ . Other spoken languages at home include, for example, Javanese, Sudanese, Ballnese, Batak, Chinese, etc.

**Table 5-8: Economic Subjective Ladder Regressions  
for Indonesia, 2000 (Ordered Probit) - by Region**

	Rural		Urban		Equality test on the coefficients t-statistics (a)	
	Coefficient	St.error	Coefficient	St.error		
Log of real household expenditure per capita, 2000	0.128	(0.048) ***	0.225	(0.045) ***	1.42	
Log of real household expenditure per capita, 1997	-0.011	(0.026)	0.080	(0.033) **	2.31	**
Log of estimated worth of total household assets	0.097	(0.017) ***	0.079	(0.017) ***	-1.05	
<b>Household characteristics</b>						
Household size	-0.006	(0.008)	-0.007	(0.008)	-0.54	
Proportion of small children (age<10)	-0.147	(0.128)	-0.106	(0.159)	0.06	
Proportion of older children (10<=age<16)	0.148	(0.146)	-0.071	(0.168)	-1.36	
Proportion of adult male	0.100	(0.145)	-0.098	(0.160)	-1.42	
Proportion of adult female	-0.149	(0.157)	-0.296	(0.180)	-0.99	
<b>Individual characteristics</b>						
Age	0.008	(0.002) ***	0.010	(0.002) ***	0.45	
Male	-0.031	(0.038)	-0.087	(0.041) **	-1.07	
Married	-0.115	(0.060) *	-0.097	(0.064)	0.58	
Separated	-0.284	(0.273)	-0.431	(0.227) *	-0.31	
Divorced	-0.314	(0.188) *	-0.228	(0.181)	0.20	
Widowed	-0.048	(0.111)	-0.109	(0.106)	-0.60	
Education: junior high school	-0.074	(0.051)	0.000	(0.047)	1.38	
Education: high school	-0.034	(0.054)	0.060	(0.046)	1.49	
Education: college or university	0.135	(0.088)	0.040	(0.072)	-1.38	
Not able to read and write (Yes=1)	-0.038	(0.046)	0.101	(0.075)	1.74	*
Subjective evaluated health: somewhat healthy	-0.044	(0.045)	0.038	(0.054)	0.98	
Subjective evaluated health: very healthy	-0.048	(0.075)	0.033	(0.081)	0.70	
Religion: Non-Islam	-0.022	(0.068)	0.095	(0.060)	1.63	
Employment: unemployed, searching for job	0.140	(0.121)	0.062	(0.110)	-0.39	
Employment: unemployed, not searching for job	0.129	(0.092)	0.121	(0.088)	0.08	
Employment: attending school	0.051	(0.044)	0.038	(0.050)	0.08	
Employment: house-keeping	0.019	(0.128)	0.307	(0.088) ***	1.90	*
Employment: retired	0.008	(0.061)	-0.093	(0.060)	-0.30	
Employment: sick/disabled	-0.141	(0.177)	0.077	(0.325)	0.89	
Employment: other	0.250	(0.098) **	0.274	(0.192)	0.40	

Table 5-8 (continued)

	Rural		Urban		Equality test on the coefficients		
	Coefficient	St.error	Coefficient	St.error	t-statistics (a)		
<b>Geographical characteristics</b>							
Relative expenditure at the kabupaten level	-0.011	(0.030)	-0.065	(0.028)	**	-1.17	
Relative value of total asset at the kabupaten level	-0.008	(0.012)	-0.028	(0.009)	***	-1.46	
<b>Economic disturbance in the past year</b>							
Death of a family member	-0.120	(0.105)	-0.075	(0.075)		0.28	
Sickness and hospitalization of a family member	-0.075	(0.055)	0.117	(0.051)	**	2.36 **	
Crop loss	-0.020	(0.042)	-0.096	(0.122)		-0.31	
Household/business loss due to natural disaster	0.171	(0.157)	-0.377	(0.153)	**	-2.11 **	
Lost of job for the householders	-0.066	(0.085)	-0.226	(0.085)	***	-1.09	
Fall in income due to very low price of products	-0.052	(0.061)	-0.028	(0.087)		-0.60	
<b>Attitude variables</b>							
Rank of future economic well-being: step 2	2.441	(0.167)	***	1.831	(0.267)	***	-0.52
Rank of future economic well-being: step 3	4.362	(0.217)	***	3.734	(0.298)	***	-0.06
Rank of future economic well-being: step 4	5.720	(0.240)	***	5.167	(0.330)	***	-0.23
Rank of future economic well-being: step 5	6.574	(0.268)	***	5.988	(0.351)	***	-0.69
Rank of future economic well-being: step 6 (Richest)	7.112	(0.442)	***	6.201	(0.471)	***	-1.16
Few poor people in the community	-0.160	(0.055)	***	-0.118	(0.051)	**	0.57
Many poor people in the community	-0.214	(0.047)	***	-0.104	(0.043)	**	1.99 **
<b>Provincial Dummies</b>							
		<b>Yes</b>		<b>Yes</b>			
N		8,597		7,816			
Pseudo R-squared		0.3911		0.3811			

Note: (a) t-statistics based on the equality test using the pooled sample that  $\beta_{urban} = \beta_{rural}$ .

**Table 5-9: Economic Subjective Ladder in Indonesia, 1997**

Economic Subjective Welfare, 1997			
Welfare, 1997	Observations	Percentage	Cumulation
Poorest 1	1,033	4.88%	4.88%
2	4,882	23.06%	27.94%
3	10,629	50.21%	78.15%
4	3,904	18.44%	96.59%
5	553	2.61%	99.20%
Richest 6	169	0.80%	100.00%
<b>Total</b>	<b>21,144</b>	<b>100.00%</b>	

**Note:** The actual wordings of the economic welfare question is, "Please imagine a six-step ladder where on the bottom (the first step) stands the poorest people, and on the highest step (the sixth step) stands the richest people. On which step were you just before the economic crisis (end of 1997)?"

**Table 5-10: Cross-Tabulation of Subjective Economic Ladder, 1997-2000**

1997	2000					Total
	1	2	3	4	5+	
1	731	228	64	5	5	1,033
2	150	3,326	1,315	85	6	4,882
3	58	654	9,174	715	27	10,628
4	6	64	1,364	2,392	77	3,903
5+	12	30	111	349	170	672
<b>Total</b>	<b>957</b>	<b>4,302</b>	<b>12,028</b>	<b>3,546</b>	<b>285</b>	<b>21,118</b>

**Note:** The number within each cell represents the number of respondents in 2000 with combination of answers to what their economic ladder is on a six-rung ladder in 2000, and was in 1997 (Rungs 5-6 were aggregated because of small number of responses).

**Table 5-11: Changes in Subjective Economic Ladder Versus Real Expenditure Per Capita**

Change in Subjective Economic Ladder 1997-2000	Number of responses (%)	Falling real household expenditure per capita (monthly)					Rising real household expenditure per capita (monthly)					
		< -80 +	-80-60	-60-40	-40-20	-20-0	0-20	20-40	40-60	60-80	80-100	100+
Fall by 2 +	272 (1.40)	8 (2.94%)	25 (9.19%)	45 (16.54%)	33 (12.13%)	34 (12.50%)	32 (11.76%)	16 (5.88%)	19 (6.99%)	10 (3.68%)	10 (3.68%)	40 (14.71%)
Fall by 1	2,271 (11.65)	41 (1.81%)	204 (8.98%)	294 (12.95%)	350 (15.41%)	348 (15.32%)	266 (11.71%)	167 (7.35%)	128 (5.64%)	94 (4.14%)	76 (3.35%)	303 (13.34%)
No change	14,595 (74.89)	213 (1.46%)	1,034 (7.08%)	1,905 (13.05%)	2,210 (15.14%)	2,025 (13.87%)	1,766 (12.10%)	1,193 (8.17%)	884 (6.06%)	610 (4.18%)	519 (3.56%)	2,236 (15.32%)
Rise by 1	2,163 (11.10)	27 (1.25%)	151 (6.98%)	266 (12.30%)	297 (13.73%)	281 (12.99%)	239 (11.05%)	201 (9.29%)	143 (6.61%)	105 (4.85%)	91 (4.21%)	362 (16.74%)
Rise by 2 +	187 (0.96)	2 (1.07%)	5 (2.67%)	23 (12.30%)	27 (14.44%)	23 (12.30%)	23 (12.30%)	15 (8.02%)	22 (11.76%)	6 (3.21%)	6 (3.21%)	35 (18.72%)
<b>Total</b>		291	1,419	2,533	2,917	2,711	2,326	1,592	1,196	825	702	2,976



**Table 5-12: Ordered Probit for the Changes in Subjective Economic Ladder  
for Indonesia, 1997-2000**

	Coefficient	St.error	
Δ Log of real household expenditure per capita	0.075	(0.029)	***
Log of real household expenditure per capita, 1997	-0.005	(0.029)	
Δ Log of estimated worth of total household asset	0.006	(0.012)	
Log of estimated worth of total household assets, 1997	0.015	(0.013)	
<b>Household characteristics</b>			
Δ Household size	0.004	(0.009)	
Household size, 1997	-0.002	(0.008)	
Δ Proportion of small children (age<10)	0.216	(0.150)	
Proportion of small children (age<10), 1997	0.234	(0.130)	*
Δ Proportion of older children (10<=age<16)	0.085	(0.153)	
Proportion of older children (10<=age<16), 1997	0.103	(0.145)	
Δ Proportion of adult male	0.065	(0.121)	
Proportion of adult male, 1997	0.234	(0.142)	*
Δ Proportion of adult female	0.187	(0.138)	
Proportion of adult female, 1997	0.312	(0.165)	*
<b>Individual characteristics</b>			
Age	-0.002	(0.002)	
Male	-0.117	(0.035)	***
Married	-0.010	(0.054)	
Separated	-0.409	(0.224)	*
Divorced	-0.054	(0.142)	
Widowed	-0.186	(0.123)	
Not able to read and write (Yes=1)	-0.026	(0.041)	
Religion: Non-Islam	-0.143	(0.064)	**
<b>Change in employment status</b>			
Employed in both rounds	0.127	(0.042)	***
Unemployed to employment	-0.004	(0.041)	
Employment to unemployment	-0.197	(0.061)	***
<b>Education, 1997</b>			
Education: junior high school	-0.053	(0.048)	
Education: high school	-0.117	(0.041)	***
Education: college or university	-0.084	(0.066)	

Table 5-12 (continued)

	Coefficient	St.error
<b>Change in health status</b>		
Subjective evaluated health: somewhat healthy, 1997	0.026	(0.042)
Subjective evaluated health: very healthy, 1997	0.001	(0.059)
$\Delta$ Health: to somewhat healthy	0.004	(0.062)
$\Delta$ Health: to very healthy	0.021	(0.084)
<b>Geographical characteristics</b>		
Rural	-0.039	(0.037)
<i>Common cut-offs in utility gap</i>		
c(-5)	-3.235	(0.376)
c(-4)	-2.775	(0.365)
c(-3)	-2.555	(0.367)
c(-2)	-2.102	(0.345)
c(-1)	-0.977	(0.339)
c(1)	1.304	(0.338)
c(2)	2.478	(0.336)
c(3)	3.316	(0.372)
c(4)	3.585	(0.377)
c(5)	3.933	(0.428)
<b>Provincial Dummies</b>		
N		Yes
		10,501
Pseudo R-squared		0.0124

Note: \* 10% C.I., \*\* 5% C.I., \*\*\* 1% C.I.

## Appendix 5A: Data Description for Indonesia, 2000

Variable	Mean	Definition
economic subjective ladder	2.903 (0.783)	please imagine a six-rung ladder where on the bottom (the first rung), stand the poorest people, and on the highest rung (the sixth rung), stand the richest people. On which rung are you today? (1=Poorest, 6=Richest)
log of real household expenditure per capita, 1997	11.022 (0.816)	log of real household expenditure per capita (per month), year=1997
log of real household expenditure per capita, 2000	11.042 (0.788)	log of real household expenditure per capita (per month), year=2000
log of estimated worth of total household assets	16.764 (1.725)	log of estimated worth of total household assets, year=2000
household size	6.331 (2.896)	number of family members in the household
education: junior high school	0.164 (0.370)	proportion of household members completed junior high school
education: high school	0.250 (0.433)	proportion of household members completed high school
education: college/university	0.087 (0.282)	proportion of household members completed college/university
not able to read and write (yes=1)	0.141 (0.348)	not able to read and write in any languages (yes=1)
small children	0.154 (0.160)	proportion of small children (age less than 10)
older children	0.093 (0.125)	proportion of older children (10 <= age < 16)
adult female	0.291 (0.158)	proportion of adult female (16<age<=65)
adult male	0.273 (0.170)	proportion of adult male (16<age<=65)
pensioner	0.060 (0.108)	proportion of old-age pensioner (age>65)
marital status	1.922 (0.852)	marital status: single=1, married=2, separated=3, divorced=4, widowed=5
rural	1.497 (0.500)	area dummy, 1=rural
age	34.870 (13.497)	age of the respondent
employment: working/earning income	0.609 (0.488)	employment and earning income
employment: unemployed, searching for job	0.013 (0.115)	unemployed, searching for job
employment: unemployed, not searching for job	0.085 (0.279)	unemployed, not searching for job
employment: attending school	0.071 (0.257)	attending school
employment: house-keeping	0.202 (0.402)	house-keeping
employment: retired	0.008 (0.090)	retired
employment: sick/disabled	0.005 (0.068)	sick/disabled
employment: other	0.006 (0.078)	other types under employment category
subjectively evaluated health	2.959 (0.452)	subjectively evaluated health (1=very unhealthy, 4=very healthy)
religion: non-Islam	0.120 (0.325)	religion: non-Islamic dummy
death of a family member	0.069 (0.253)	economic disturbance dummy: death of a family member (last year)
sickness and hospitalization of a family member	0.115 (0.319)	economic disturbance dummy: sickness and hospitalization of a family member (last year)
crop loss	0.116 (0.320)	economic disturbance dummy: crop loss (last year)
household/business loss due to natural disaster	0.018 (0.132)	economic disturbance dummy: household/business loss due to natural disaster (last year)
lost of job for the householders	0.054 (0.227)	economic disturbance dummy: lost of job for the householders (last year)
fall in income due to very low price of products	0.050 (0.218)	economic disturbance dummy: fall in income due to very low price of products (last year)
relative expenditure at the kabupaten level	1.009 (1.079)	household expenditure per capita/mean household expenditure in the kabupaten
relative value of total asset at the kabupaten level	0.106 (0.104)	estimated worth of total household assets/mean value of assets in the kabupaten
rank of future economic ladder	3.249 (0.913)	on which rung (of economic subjective well-being) do you expect to find yourself one year from now? (1=poorest, 6=richest)
are there any poor people in the community?	2.639 (2.422)	are there any poor people in this village? (0=none, 2=many)
relation to head of household	5.321 (3.803)	Indonesian province dummies (17)
<b>observations</b>	<b>21,144</b>	

**Note:** All variables are taken from the year 2000, if not stated otherwise. Standard deviation in parentheses.

### Appendix 5B: Subjective Economic Ladder Equations for 1997 and 2000

	Recalled Economic Ladder for the Year 1997		Self-rated Economic Ladder for the Year 2000			
	Coefficient	St.error	Coefficient	St.error		
Log of real household expenditure per capita	0.192	0.030	***	0.306	0.031	***
Log of estimated worth of total household assets	0.116	0.012	***	0.155	0.011	***
<b>Household characteristics</b>						
Household size	-0.017	0.007	**	-0.008	0.005	
Proportion of small children (age<10)	-0.224	0.102	**	-0.310	0.084	***
Proportion of older children (10<=age<16)	-0.034	0.107		-0.059	0.096	
Proportion of adult male	-0.286	0.117	**	-0.150	0.096	
Proportion of adult female	-0.228	0.132		-0.254	0.101	**
<b>Individual characteristics</b>						
Age	0.003	0.001	**	0.001	0.001	
Male	-0.036	0.026		-0.113	0.022	***
Married	-0.020	0.043		-0.026	0.032	
Separated	0.279	0.340		-0.400	0.183	**
Divorced	-0.107	0.126		-0.230	0.115	**
Widowed	0.131	0.112		-0.063	0.078	
Education: junior high school	0.140	0.037	***	0.111	0.029	***
Education: high school	0.281	0.036	***	0.279	0.029	***
Education: college or university	0.344	0.053	***	0.369	0.044	***
Subjective evaluated health: somewhat healthy	0.043	0.038		0.096	0.027	***
Subjective evaluated health: very healthy	0.134	0.050	***	0.143	0.046	***
Religion: Non-Islam	-0.055	0.043		-0.119	0.042	***
Worked last year? (Yes=1)	-0.074	0.028	***	-0.026	0.020	
<b>Geographical characteristics</b>						
Rural	0.023	0.038		-0.015	0.035	
Relative expenditure at the kabupaten level	-0.018	0.011	*	-0.042	0.020	**
Relative value of total asset at the kabupaten level	-0.001	0.011		-0.024	0.010	**
<hr/>						
Provincial Dummies		<b>Yes</b>		<b>Yes</b>		
N		11,459		18,060		
Pseudo R-squared		0.0393		0.0660		

**Note:** All explanatory variables are measured at their relevant survey dates. For example, the age variable will take two different values for each column (i.e. 25 in the year 1997 regression, and 28 in the year 2000 regression).

## Chapter Six

# For Better and For Worse? A Direct Evidence for Utility Interdependence in Marriage

### Abstract

This paper studies utility interdependence in marriage. It draws upon panel information on life satisfaction from a sample of people living in the UK over the period 1996-2002. Using health satisfaction to provide an instrument for the partner life satisfaction, and allowing controls on individual fixed effects, we find strong evidence of an interdependent relationship in the reported life satisfaction between spouses, which is not present for those whom are merely cohabiting.

“If I love my wife, her happiness is one of the main things determining mine; we therefore have a common interest in making her happy. If she also loves me, we also have a common interest in making me happy”

- *David D. Friedman's The Economics of Love and Marriage (1986)*

## 6.1 Introduction

The intrinsic motivation for marriage has been studied within a wide range of disciplines. Evolutionary scientists, for example, argue that the fundamental reason for marriage is the creation of one's own children. The idea is that parents would much rather rear their own children than rear those of other people, and given that much of child-rearing is most conveniently done in the home of the rearer, it is helpful if a child's parents are married to each other.

In contrast, economists often view marriage as an exchange between two parties in which couples agree to share common resources such as income and housing, as well as a collection of productive activities that may include cooking, feeding, and rearing children (Becker, 1973; Friedman, 1986). It can also lead to specialization within the family in which one of the spouses is equipped with advantageous conditions for human capital accumulation in the task demanded in the labor market (Becker, 1981). It is reflected in a number of studies where married men have been found to significantly earn more than their single counterparts, *ceteris paribus* (Dolton and Makepeace; 1987, Korenman *et al*, 1991; Loh, 1996)<sup>24</sup>.

In his seminal work on *A Theory of Marriage*, Becker (1974) argued that the gain in terms of marriage can be measured, in part, through the level of intrahousehold sharing of “nonmarketable household commodities” that includes a partner's expressed love and caring,

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<sup>24</sup>Only Dolton and Makepeace present evidence on the effects of marriage on both males and females earnings. Their estimates of the residual earnings differentials for UK graduates indicate that being married affects male earnings favorably by up to 5.8%. On the other hand, being married affects female earnings unfavorably by up to 4% conditional on participation and the number of young children in the household.

as well as other emotional attachments, such as sexual activity or frequent contact with a particular person. It is these implications of “loving” and “caring” in a marriage that are thought to contribute directly to an individual’s physical and mental health conditions, holding other things constant. For instance, with marriage comes greater social contact, and this in turn leads to a possible reduction in the risks that individuals run in terms of suffering from illnesses that are related to both stress and loneliness. The positive impact of marriage on an individual’s health is reflected in the medical literature’s findings of lower risk of mortality among married individuals compared to those who are single (Hu and Goldman, 1990; Wilson and Oswald, 2002). This impact of marriage on health is also found to be substantial; one study has shown that the estimated effect of marriage on a reduced mortality risk is so large that it can almost exactly offset the consequent (negative) effect generated by smoking (Gardner and Oswald, 2004).

Given that the desired effects of a long-term companionship on health could well be a powerful inducement to marry, it may also be the case that other indirect implications of love also matter when it comes to marrying and staying married to someone. For instance, since loving someone usually involves affectionate caring about what happens to him or her, if  $M$  cares about  $F$ , this implies that  $M$ ’s utility levels depend on  $F$ ’s utility levels<sup>25</sup>. Hence, given that marriage provides an opportunity for two individuals to consume out of common resources, an exogenous decrease in the labour income for  $F$  will effectively lead

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<sup>25</sup>This is equivalent to saying that  $M$ ’s utility depends on  $F$ ’s consumption of household commodities. Becker’s work, however, considered only the case where commodities are transferable, and hence divisible, within households. The current article, on the other hand, concentrates on household commodities that are not divisible, but can be transferred to  $M$  only if they raise  $F$ ’s utility levels.

to a rise in money transfers from  $M$  to  $F$ , partially offsetting the idiosyncratic shocks to  $F$ 's earnings (Becker, 1974; see also a review by Ermisch, 2003). Several economists have also used the same assumption of interdependence in utility to analyse the sharing of labour income risk in different scenarios. Kotlikoff and Spivak (1981) explore the gains from marriage in terms of risk-sharing when expected lifetimes are unknown. Anderberg (2001) assumes interdependence in utility when he considers the possibility of endogenous breakups by partners sharing risk. Hess (2004) even goes so far as to make explicit the connection between marriage for the sole reason of diversifying labour income risk and marriage for love.

While the idea of interdependence in utility plays a central role in the economic analysis of intrahousehold distribution of income and consumption, its existence, from real life observation, is taken much for granted and is rarely questioned because of a clear simultaneity problem between an individual and his or her partner's welfare. It is not a straightforward task, for example, to come up with a valid exclusion restriction that identifies the true effect of  $M$ 's utility on  $F$ 's utility. This is partly because most household commodities are shared between  $M$  and  $F$ , and hence are perfectly transferable within the household<sup>26</sup>. Therefore, unless we can determine how household commodities are being shared between the married couple, an instrumental variables (IV) approach to the effect of  $M$ 's utility on  $F$ 's utility will yield biased results.

The purpose of this chapter is to suggest a simple framework for analyzing the identifi-

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<sup>26</sup>While the hypothesis of interdependent utility has never been tested between members of the same household, an attempt has been made between the utilities of parents and those of children who have left home (Schwarze and Winkelmann, 2005), where the instrumental variable used in their paper concerns the consumption of the children in the extended family.



cation issue involved. we first argue, based on findings from the psychology literature, that one's utility can be consistently, albeit only partially observed by one's partner. This allows us to investigate some of the basic questions in the field of the economics of marriage, such as the direct effect of one's partner's happiness on one's own happiness<sup>27</sup>. My approach therefore relies on the estimation of a partner's subjective well-being, instrumented by his or her person-specific variable, on one's own subjective well-being.

We begin my empirical analysis of utility interdependence in a family by presenting a simple correlation in the reported life satisfaction between partners in a relationship. We then propose to test the hypothesis that the utility of one's partner affects one's utility directly by using the "residual" self-rated health of the respondent's partner (or health satisfaction that cannot be explained by one's actual physical condition and the standard socio-economic indicators) to provide an instrument for the partner's proxy utility data. This variable, which is the difference between self-reported and objective health status, is defined by psychologists as a mood-dispositional dimension that reflects pervasive individual differences in negative emotionality and self-concept (Tellegen, 1982; Watson and Clark, 1984). Hence, the IV approach relies on the assumption that the unexplained health satisfaction of a partner is correlated with the partner's life satisfaction, but uncorrelated with the respondent's life satisfaction for reasons beyond its effect on the endogenous regressor.

This chapter also tests whether married persons and those in a cohabiting relationship

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<sup>27</sup>There is also a similar conjecture in psychology made by Argyle (1999) on utility interdependence in marriage. Here, it was suggested how one spouse's happiness may encourage directly the happiness, as well as lessen the feelings of unhappiness, of the other in a marriage.

behave similarly in terms of risk-sharing. The increasing popularity of cohabitation as a format for partnership over the past few decades has fueled the perception that couples in cohabiting relationships can also benefit from the diversification of risk without having to get married. We test this hypothesis by comparing the degrees of interdependent utility between married and cohabiting union samples in the regressions.

The current chapter can also be understood as an empirical application to *experienced* utility, a concept advocated in a seminal work by Kahneman *et al* (1997). It argues, in essence, that measures of experienced utility (such as an overall view of one's satisfaction with life) can be used as reasonable substitutes to observing individual choices. For more detailed theoretical discussions on the link between subjective well-being data and experienced utility, see also Kahneman and Thaler (1991), and Rabin (1998).

Section 6.2 considers the utility model of married couples and discusses the issues involved in the empirical estimation. Section 6.3 outlines the data and the empirical strategy used in this chapter. Section 6.4 shows by using cross-sectional and longitudinal information on individuals' life satisfaction that there is a strong and positive effect of the partner's well-being on the respondent's well-being among married couples, which is absent for the cohabiting partners. Section 6.5 concludes.

## 6.2 The Utility Model of Married Couples: Theory and The Simultaneity Problem

Consider a simple utility function of a married individual at any given time, which can be written as

$$U^r = U^r(y_r, E_r, U^s(y_s, E_s)), \quad (6.1)$$

where  $U^r$  represents the individual's utility,  $U^s$  is the spouse's utility,  $y_r$  and  $y_s$  are labour income of individuals  $R$  and  $S$ , while  $E_r$  and  $E_s$  are dummy variables representing the employment status of  $R$  and  $S$ .  $R$ 's utility is assumed to be increasing with  $y_r$ , which is divisible and can be transferred within households. We also assume that  $R$  cares about  $S$ , so that  $R$ 's utility would depend on the labour income of  $S$  as well as on his own. Hence an increase in  $y_s$  will raise  $R$ 's utility through the effect on  $S$ 's utility. The allocation of  $y_r$  within the household therefore depends on  $R$ 's preference between his own income and  $S$ 's (assuming that  $S$  does not care about  $R$ ). Each individual also prefers employment ( $E = 1$ ) to unemployment ( $E = 0$ ). Unlike the allocation of labour incomes, each individual's employment status is person-specific and cannot be transferred from one spouse to the other (i.e. when  $E_s = 0$ ,  $R$  cannot transfer his employment to  $S$  even if he prefers  $S$ 's employment to his own). However, recent evidence has shown that there may be other external effects of one's spouse's unemployment on one's utility (e.g. Winkelmann and Winkelmann, 1995; Clark, 2003). That is, a shock in  $S$ 's employment status (e.g.  $e_s = 0$ ) is assumed to lower

$S$ 's utility independent of income effects, while at the same time having an indirect effect on  $R$ 's utility through the drop in  $S$ 's utility, as well as through heightening job insecurity for  $R$  and a loss in the family's reputation in the society, as in Akerlof (1980). Hence, the non-pecuniary or "psychological" costs of  $S$ 's unemployment on  $R$ 's utility can still take place even if  $R$  does not care about  $S$ . The utility function is highly stylized and abstracts from a number of issues that can be expected to be important, i.e. we assume no children and other relations-specific investment in the household. The idea is that we could conduct a direct test for the degree of interdependence between  $R$ 's utility and  $S$ 's utility using a direct (and valid) measure of utility taken from survey questions on subjective well-being, or happiness. Given that we have good proxy information of each spouse's utility, the empirical counterpart to equation (6.1) for a marriage between two individuals,  $i$  and  $j$ , is given by

$$U_{it} = \alpha_0 + \alpha_1 U_{jt} + \alpha_2 Y_t + \alpha_3 He_t + \varepsilon_{it}, \quad (6.2)$$

$$U_{jt} = \beta_0 + \beta_1 U_{it} + \beta_2 Y_t + \beta_3 He_t + \varepsilon_{jt}, \quad (6.3)$$

where  $U_{it}$  and  $U_{jt}$  are the well-being level reported by individuals  $i$  and  $j$  in year  $t$ ,  $Y_t$  is household income,  $He_t$  is the employment rate at the household level, and  $E(\varepsilon_{it}, \varepsilon_{jt} | Y_t, He_t) = 0$ . Equations (6.2) and (6.3) imply that  $U_{it}$  and  $U_{jt}$  are endogenous variables,  $X_t$  and  $Y_t$  are exogenous variables, while  $\varepsilon_{it}$  and  $\varepsilon_{jt}$  are the stochastic disturbance terms. The parameters  $\alpha_1$  and  $\beta_1$  are both positive and can be defined such that the higher the value of  $\alpha_1$  ( $\beta_1$ ) the more satisfaction individual  $i$  ( $j$ ) can derive from the same increase in his or her spouse's utility. This is equivalent to saying that the larger the parameter  $\alpha_1$  ( $\beta_1$ ) the more altruistic

individual  $i$  ( $j$ ) becomes, provided that altruists derive satisfaction from an increase in their beneficiary's welfare.

The reduced forms of (6.2) and (6.3) are

$$U_{it} = \Pi_1 + \Pi_2 Y_t + \Pi_3 H e_t + v_{1t}, \quad (6.4)$$

$$U_{jt} = \Pi_4 + \Pi_5 Y_t + \Pi_6 H e_t + v_{2t}, \quad (6.5)$$

where the parameters are defined as

$$\begin{aligned} \Pi_1 &= \frac{\alpha_0 \beta_1 + \alpha_0}{1 - \alpha_1 \beta_1}, & \Pi_2 &= \frac{\alpha_2 \beta_1 + \beta_2}{1 - \alpha_1 \beta_1}, & \Pi_3 &= \frac{\alpha_3 \beta_1 + \beta_3}{1 - \alpha_1 \beta_1}, \\ \Pi_4 &= \frac{\alpha_1 \beta_0 + \beta_0}{1 - \alpha_1 \beta_1}, & \Pi_5 &= \frac{\alpha_1 \beta_2 + \alpha_2}{1 - \alpha_1 \beta_1}, & \Pi_6 &= \frac{\alpha_1 \beta_3 + \alpha_3}{1 - \alpha_1 \beta_1}, \end{aligned} \quad (6.6)$$

with the error terms  $v_{1t} = \frac{\alpha_1 \varepsilon_{jt} + \varepsilon_{it}}{1 - \alpha_1 \beta_1}$  and  $v_{2t} = \frac{\beta_1 \varepsilon_{it} + \varepsilon_{jt}}{1 - \alpha_1 \beta_1}$ . It then follows from the structural equation that  $Cov(U_{it}, \varepsilon_{jt}) = \frac{\alpha_1 \sigma_j^2}{1 - \alpha_1 \beta_1}$  and  $Cov(U_{jt}, \varepsilon_{it}) = \frac{\beta_1 \sigma_i^2}{1 - \alpha_1 \beta_1}$ , which violates the assumption of classical linear regression model that the disturbances are independent or at least uncorrelated with the explanatory variables. For the simplest case ( $\alpha_0, \beta_0 = 0; \alpha_2, \beta_2 = 0; \alpha_3, \beta_3 = 0$ ), the probability limits of  $\hat{\alpha}_1$  and  $\hat{\beta}_1$  are

$$\text{plim } (\hat{\alpha}_1) = \alpha_1 + \frac{\alpha_1 \sigma_j^2 / (1 - \alpha_1 \beta_1)}{\alpha_1^2 \sigma_j^2 / (1 - \alpha_1 \beta_1)^2 + \sigma_i^2 / (1 - \alpha_1 \beta_1)^2}, \quad (6.7)$$

$$\text{plim } (\hat{\beta}_1) = \beta_1 + \frac{\beta_1 \sigma_i^2 / (1 - \alpha_1 \beta_1)}{\beta_1^2 \sigma_i^2 / (1 - \alpha_1 \beta_1)^2 + \sigma_j^2 / (1 - \alpha_1 \beta_1)^2}. \quad (6.8)$$

Given that  $\alpha_1$  and  $\beta_2$  are both greater than zero but less than one, it is clear from equations (6.7) and (6.8) that  $\text{plim}(\hat{\alpha}_1)$  and  $\text{plim}(\hat{\beta}_1)$  will always be greater than  $\alpha_1$  and  $\beta_1$ . Hence, OLS estimation of equations (6.2) and (6.3) will be biased upward.

## 6.3 Life Satisfaction Distributions of Married and Cohabiting Partners in Great Britain

### 6.3.1 Data

The data set used in this analysis is taken from six waves, Wave 6-10 and Wave 12<sup>28</sup>, of the British Household Panel Survey (BHPS) for the year 1996 to 2002. This general survey is a nationally-representative household panel covering a total sample of approximately 19,000 randomly selected individuals from 10,000 British households. The data set contains information on a series of subjects about individual and household demographics, education, health, employment status, and income. There is both entry into and exit from the panel, leading to unbalanced data with an increased number of individual interviews over time. This is due to the inclusion of children who turn 16 in the original household sample, and of the new members of household formed by original panel members.

Our analysis will refer to married individuals and people in a cohabiting union of working age (16-65 years)<sup>29</sup>. This produces 36,706 observations in total, covering 11,363 different individuals. Of these, 8,331 people are married, and 2,375 of whom are present in all waves.

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<sup>28</sup>The life satisfaction question was first introduced in wave 6 of the BHPS. It was then dropped for wave 11, but reintroduced again for wave 12.

<sup>29</sup>While married and cohabiting individuals as young as 16 were being included in the analysis, the younger cohort (aged 16-21) only makes up to less than 1% of the whole sample.

In contrast, there are only 3,032 individuals cohabiting with a partner in the sample, with 179 of whom are present in all waves. Some summary statistics are given in Appendix 6A.

The proxy utility measure used in this chapter is the single-item, self-completion life satisfaction scale, with seven possible response categories ranging from “1.very dissatisfied” to “7. very satisfied”. The distributions of life satisfaction for married individuals and people in cohabitation are reported in Table 6-1. On average, married persons report fractionally higher life satisfaction score than those individuals who merely live together, with approximately 48% of the married sample compared to 45% of the cohabitation sample having scored more than 5 on the life satisfaction scale. Figure 6-1 presents a simple cross-tabulation of life satisfaction for spouses, while Figure 6-2 presents a cross-tabulation of life satisfaction for cohabiting male and female partners in the United Kingdom. The preliminary results reveal a positive and almost complete monotonic relationship in the reported life satisfaction between spouses, as well as between partners who merely live together in the raw data. Among the least satisfied married males with the life that they lead the mean life satisfaction score of their spouse is 4.07, while for the most satisfied married males the mean of spouse’s life satisfaction is 5.69. A similar pattern is obtained for couples in a cohabiting relationship; among the least satisfied cohabiting male partners the mean life satisfaction score of their female partner is 4.33, while for the most satisfied cohabiting male partners the mean life satisfaction of their female partners is significantly higher at 5.56.

### 6.3.2 Validation and Consistency

In this subsection, we briefly review some of the definitions and arguments that have been used in defence of using life satisfaction data. The term ‘life satisfaction’ has been defined by psychologists as a “global evaluation by the person of his or her life” (Pavot and co-authors, 1991). This definition suggests that in making an evaluation of life satisfaction, a person examines the tangible aspects of his or her life, weighs the good against the bad, and arrives at a judgement of overall life satisfaction (Lucas *et al*, 1996). It can also be thought of as an aggregate measure of domain satisfactions such as satisfactions with job, finance, health, leisure time, and marriage as well as social life, politics, and environment (Van Praag and Ferrer-i-Carbonell, 2004). Although the single-item scale is based on the cognitive judgement of how one views one’s life as a whole, it is often found to be moderately to highly correlated with other measures that assess the affective component of subjective well-being (i.e. happiness). For instance, Blanchflower and Oswald (2004) show that answers to a life satisfaction question correlate well with the answers to question: “*Are you happy?*” for the US and the UK. A similar finding is obtained for a large scale data set of individuals living in the OECD countries (Di Tella *et al*, 2003). In addition, life satisfaction is shown to correlate well with the other well-being measures in the BHPS data. For the overlapping waves, the correlation between life satisfaction and the multi-item ‘General Health Questionnaire’ scale, which measures both ‘pleasant’ and ‘unpleasant’ feelings recently experienced by the individual (such as “*how often has the respondent lost sleep over worry, or felt constantly under strain?*”), is 0.57. However, it is also worth noting here that, despite the seemingly



high correlations with other measures of well-being, life satisfaction in contrast to a single-item happiness scale shows considerably more stability over time (Heady and Wearing, 1989).

A further argument in defence of life satisfaction data as a valid proxy subjective utility measure is that they are also highly correlated with certain objective circumstances in the individual's life, such as marital status (Blanchflower and Oswald, 2004), health status (Matthews and co-authors, 2002), as well as economic conditions such as income (Frijters *et al*, 2004), inflation (Di Tella *et al*, 2003), unemployment (Winkelmann and Winkelmann, 1998; Clark *et al*, 2001), and opportunities for political participation (Frey and Stutzer, 2000). In particular, reported life satisfaction has also been shown to correlate well with reports by family and friends of the target person's life satisfaction, with numerous memories of satisfying experiences, as well as other multi-item measures of life satisfaction (Pavot and Diener, 1993)<sup>30</sup>.

### 6.3.3 A Sketch of Identification

The idea is that identification in IV will be achieved if there is a valid instrument that affects the utility of one's partner but not one's own life utility. That is, there must exist a variable which is a determinant of one's partner's life satisfaction that can legitimately be omitted from one's life satisfaction equation. However, it is not a straight forward task to come up with a valid exclusion restriction that identifies the true effect of a partner's utility on an individual's utility, provided that the composition of each household within the data

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<sup>30</sup>For a comprehensive review on the validity of well-being measures, see Konow and Earley (1999) and Holländer (2000).

set remains unidentified. That is, unless we can distinguish between private consumption from the consumption of public goods for each of the households in the BHPS, personal variables that can be shared within household, such as individual's income or ownership of some personal assets, are considered as poor instruments for each individual's utility. The same problem of identification arises if we were to instrument an individual's well-being through personal characteristics that can affect a partner's well-being in more than one way (e.g. unemployment and physical health status).

In this chapter we propose to use the partner's unobserved characteristics, those that can neither be shared with the respondent nor have other known externalities on the respondent's utility, as an instrument. One of these individual-specific variables is the "residual" health satisfaction that is not correlated with the objective health status and the usual socio-demographic determinants of subjective health status. This unexplained health component is derived from responses to the question on individual's satisfaction with health. Similar to the life satisfaction question, the health satisfaction question asked individuals in confidence how dissatisfied or satisfied they are with their current health, with seven possible response categories ranging from "1. very dissatisfied" to "7. very satisfied". The self-completion section in the BHPS is strategically designed so that individuals are asked to rate their health satisfaction (as well as other domain satisfactions such as satisfactions with job, finance, marriage, and social life) before their overall life satisfaction. This helps to reduce the problem of reverse causality that may run from life satisfaction to satisfactions in other domains of life.

There are several main arguments for the use of a partner's residual health satisfaction as a valid instrument for the partner's overall utility levels. The first relies on the substantive evidence of strong correlations between interpretation of health (as one of the domain satisfactions) and life satisfaction (for a recent review on health satisfaction and life satisfaction, see Van Praag and Ferrer-i-Carbonell, 2004). In other words, for a marriage between two individuals,  $i$  and  $j$ ,  $Cov(U_{it}, H_{it}) \neq 0$  and  $Cov(U_{jt}, H_{jt}) \neq 0$ , where  $H$  is the individual's health satisfaction at wave  $t$ <sup>31</sup>.

The second relies on the findings from the psychology literature concerning the relatively weaker relationship between objective health, as opposed to perceived health, and subjective well-being (Zautra and Hempel, 1984; Okun and George, 1984). Brickman *et al* (1978) have gone so far as to conclude that severely ill patients (e.g. spinal-cord-injured accident victims) report only a slightly different score on the global life satisfaction scale compared to non-patients. Thus, the results have led many psychologists to hypothesize that subjectively interpreted health is determined not only by one's actual physical condition but also by one's level of emotional adjustment (discussed in Diener and Lucas, 2000). This temperamental component is thought to reflect pervasive individual differences in negative emotionality and self-concept (Tellegen, 1982), and can be measured either as a state (i.e. transient fluctuations in mood) or as a trait (i.e. inborn individual differences in general affective level). Despite the differences in the way that they are measured, both emotional dimensions (e.g. traits and moods) are found to correlate strongly and consistently with health complaint

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<sup>31</sup> While numerous studies have shown that health satisfaction and life satisfaction share a lot in common variance, they are certainly not equivalent constructs (see Diener *et al*, 1985).

scales, i.e. subjective health measures that reflect an individual's perception and interpretation of physical and emotional symptoms and sensations (Costa and McCrae, 1987; Watson and Pennabaker, 1989; Brief and co-authors, 1993; Vassend and Skrondal, 1999). In other words, individuals who are born with a negative genetic predisposition are more likely than others to experience intense states of negative affect over time and across situations, and therefore tend to have a less favourable self-image with regard to their objective life circumstances, *ceteris paribus* (Watson and Clark, 1984). While measures of negative self-view over one's health (such as neuroticism and anxiety scales) have been shown to correlate well with measures of self-rated health, accumulated research has shown no direct links between negative affect states (i.e. feelings of anxiety about physical health) and objective health indicators such as cholesterol level, health care visits, hospitalization or health-related absences from work or school (Costa and McCrae, 1987; Watson and Pennabaker, 1989).

Hence, the function of satisfaction with health for individual  $i$  at wave  $t$  is  $H_{it} = H(P_{it}, \phi_{it}, \eta_i)$ , where  $P_{it}$  is the socio-demographic and economic determinants of actual physical health status (as represented, for example, by reported physical health problems, age and hospitalization),  $\phi_{it}$  represents the negative affective level or transient distress related to health, which can subsume a broad range of aversive mood states including nervousness, tension, worry, disgust, guilt and depression. The time-invariant variable,  $\eta_i$ , is the inborn negative affective level or neuroticism related to health. Therefore, the likelihood of overstating or understating one's true health depends on the relative contributions of both  $\sigma_\phi$  and  $\sigma_\eta$  to  $\sigma_H$ .

We hypothesise that  $P_{it}$  is correlated with individual  $j$ 's utility,  $U_{jt}$ . This is because an individual's objective health condition is thought to have a direct effect on the partner's utility through a number of physical externalities. For example, an individual's ill health may lead to a shortfall in current (and expected) household earnings, while it may also interfere with the partner's work or daily activities. There is also a possibility of a correlation between the time-invariant variables,  $\eta_i$  and  $\eta_j$ , as would arise in the case of assortative mating where people select their match based on the personality traits of their potential partner. On the other hand, given that measures of life satisfaction are laden more heavily on cognitive content as opposed to affective content (Brief and co-authors, 1993; Lucas *et al.*, 1996), the welfare impacts of transient distress over health of  $i$  on global life satisfaction of  $j$ , controlling for physical health conditions, should be mediated through how individual  $i$  interprets his or her satisfaction with life. In other words, while there are possibilities that both  $P_{it}$  and  $\eta_i$  are correlated with  $U_{jt}$  (or life satisfaction of  $j$ ), it is unlikely that  $\phi_{it}$  will be correlated with  $U_{jt}$  for reasons beyond its effect on individual's  $i$  utility,  $U_{it}$ <sup>32</sup>.

Since we require only one emotional dimension to instrument for the partner's well-being, we can eliminate the time-invariant  $\eta_i$  by estimating the linear-relation  $\Delta H_{it} = \Delta P_{it} + \epsilon_{it}$ , and use  $\epsilon_{it}$  - which is a proxy for  $\phi_{it}$  - to instrument for  $U_{it}$ . However, it is worth noting here that the general residual health- $\phi$  relationship is reversed in our analysis, so that people who overstate their subjective health (i.e. high values of  $\epsilon$ ) are normally those with a low

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<sup>32</sup> However, we acknowledge that time-variant unobserved characteristics of the respondent and his or her partner could also be positively correlated (e.g.  $COV(\phi_{it}, \phi_{jt}) > 0$ ), which would mean that the error term of the life satisfaction equation and the instrument will be positively correlated. If this is the case, then we would expect the estimated coefficients  $\alpha_1$  and  $\beta_1$  to be biased upward.

negative self-view over their health.

The person-specific variable used to instrument for the partner's life satisfaction can be derived from taking the following two steps. First, we estimate in Appendix 6B self-rated health satisfaction equations for each individual's partner. The main results in the second column (fixed-effects regression) in contrast to the first column (pooled OLS regression) of Appendix 6B are encouraging, in the sense that while the health satisfaction of each individual's partner is significantly related to most of actual physical health problems and some of the personal characteristics (i.e. employment statuses such as unemployment, family care, retirement, and disability, as well as accident and hospitalization in the previous year) in both equations, it is uncorrelated with household income and most of the dummies representing shared local environments and the state of the accommodation<sup>33</sup>, as well as his or her partner's physical health problems and personal characteristics, once individual's fixed effects are controlled for in the equation. Hence the fixed-effect results support the hypothesis that subjective health is partly determined by actual physical health conditions, and, therefore is not easily influenced by other objective variables that are not directly related to health (i.e. household income and number of children). This helps to reduce any elements of surprise that there may be other objective variables that can influence both the respondent's subjective health status as well as his or her partner's life satisfaction. Second, the instrument, which is taken to be proxy for each partner's person-specific  $\phi_{it}$ , can be derived by taking residual subjective health status from Column 2's fixed-effect regression.

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<sup>33</sup>With two exceptions on whether there are damp walls and floors, and whether there are any rots in windows and floors in the accommodation.

Figure 6-3 follows the same format as Figure 6-2 and illustrates for married and cohabiting individuals the relationships between one's life satisfaction, the reported health satisfaction of one's partner, and the residual health satisfaction of one's partner. It is clear from Figure 6-3 that there is a noticeable positive correlation between one's life satisfaction and the mean scores of the reported health satisfaction of one's partner. However, the relationship between one's life satisfaction and the mean scores of the residual health satisfaction of one's partner is a lot less obvious for both married individuals and people in cohabitation. In addition, as noted in Cameron and Taber (2004) that while it is impossible to test for the validity of an instrument without a maintained assumption that it is valid, it is often informative to examine the relationship between the excluded variable and the observables in the life satisfaction equation. OLS estimation of the partner's residual health on various observable characteristics (43) in the life satisfaction equation produces insignificant coefficients for all variables included in the regression, resulting in an  $F$  statistic of 0.58 and an  $R^2$  of 0.0003. While the lack of a relationship between observable determinants of one's life satisfaction and the residual health of one's partner does not prove that there is no relationship between unobservable determinants of one's life satisfaction and the instrument, it does lend some credence to its use.

## 6.4 Estimates of Utility Interdependence in Marriage Using IV Approaches

### 6.4.1 Pooled IV Results

Table 6-2 reports the estimates for the pooled OLS and conventional IV approaches. Since the BHPS is longitudinal in nature, the observations are not independent, but the groups of the observations are independent. Hence, in order to correct for aggregation bias standard errors are clustered by year in all specifications (Moulton, 1990). Assuming cardinality in the life satisfaction data<sup>34</sup>, OLS produces an estimated coefficient of the partner's life satisfaction of 0.213. However, it is clear from the second column of Table 6-2 that IV estimated coefficient of the partner's life satisfaction is significantly smaller than that estimated by OLS. Note that identification here is achieved only through the inclusion of the partner's residual health satisfaction and that it is significant in the first-stage regression reported in Table A3 in the Appendix. These results suggest the endogeneity in the reported life satisfaction between partners, and this conclusion is supported by the rejection of the Durbin-Wu-Hausman  $t$  test for endogeneity of the partner's life satisfaction ( $t$  statistic = 12.8).

For illustrative and comparative purposes, the last three columns of Table 6-2 report estimates from other IV specifications that used the partner's (i) predicted health satisfaction,  $P_{it}$ , from the estimation in the second column of Appendix 6A, (ii) time-invariant health

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<sup>34</sup>Past research has shown that it virtually makes no difference whether one assumes ordinality or cardinality of subjective well-being data (see Ferrer-i-Carbonell and Frijters (2004) for a recent review on the importance of methodology in the estimation of the determinants of happiness).



traits,  $\eta_i$ , and (iii) employment status (e.g. a dummy of whether the partner is employed with regular wages) - all of which are assumed to be correlated with the error term in the structural equation - as excluded instruments. It can be seen from Appendix 6B that the predicted health satisfaction, time-invariant health traits, and employment status of the partner are positive and well-defined in the first-stage regressions. However, all of the IV regressions yield estimated coefficients on the partner's life satisfaction that are markedly larger ( $\approx 18\%$  to  $78\%$ ) than that estimated by OLS, which support the earlier claims about the invalidity of these instruments.

A significant understanding has emerged over the past few years that the use of "weak instruments" (e.g. the instruments that are weakly correlated with the endogenous variable) can lead to a large bias in the IV estimates even when there is only a small correlation between the potential instruments and the error in the structural equation (Bound *et al*, 1995). One of the recommended possible diagnostics for the presence of the weak instrument problem is to examine the partial  $R^2$  (or the associated  $F$  statistic) on the excluded variable after the predetermined variables have been partialled out of the reduced form equation. A test on the partner's residual health satisfaction, once common exogenous variables have been partialled out from the reduced form equation, yields a partial  $R^2$  of 0.024 (and an  $F$  statistic of 1,019.99), suggesting that there is a correlation between the instrument and the endogenous variable which is large enough to eliminate the possibility of quantitatively important finite-sample biases.

Other IV estimates in the second column of Table 6-2 show that men tend to report

lower life satisfaction scores than women, and that there is a U-shaped pattern in age, minimizing around the late-30s. Married individuals are more satisfied with their lives, on average, compared to those merely living with a partner. The estimated coefficient of log of real annual household income per capita is positive and significant in the life satisfaction equation. Unemployed people report, on average, a significantly lower life satisfaction score than employed individuals. This is consistent with the finding from previous studies on the non-pecuniary costs of unemployment on an individual's subjective well-being levels (see Darity and Goldsmith, 1996; Winkelmann and Winkelmann, 1998). With a broad set of specification, the first column produces the following ranking of worst recorded life satisfaction score among the BHPS' employment statuses: the first was disabled people, then unemployed people, followed by those looking after home or housewives, students, the self-employed and then the retired. Life satisfaction is higher for those owning their home outright, while the levels of education obtained appear to be negatively correlated with how one views one's life at the cross-section. As expected, a proxy for poor objective health status (e.g. the number of days the respondent stayed in hospital the previous year) is negatively and significantly associated with the overall life satisfaction. There is, however, a stronger correlation between predicted health satisfaction (determined by the respondent's reports on their own physical health problems, e.g. chest pain, blood pressure, diabetes, etc.) and reported life satisfaction.

## 6.4.2 Fixed-Effects Results

While the estimated IV coefficient of the partner's life satisfaction is consistent under the assumption that there is zero correlation between the instrument and the error term (e.g.  $E(\phi_{it}, \varepsilon_{jt}) = 0$ ), the presence of fixed personality traits can nevertheless affect the overall estimates if they are correlated with other observed socio-economic factors in the life satisfaction equation (see, for example, Ferrer-i-Carbonell and Frijters, 2004). Repeated observations on the same individual allow controls for these time-invariant personal characteristics in the normal way. Table 6-3 presents the main results from least square fixed-effects regressions. Fixed-effects (FE) estimator yields an estimated coefficient of the partner's life satisfaction of 0.115, which is roughly half the size of that estimated by OLS in Table 6-2. This result strongly suggests that each individual's time-invariant personal characteristics (say  $\delta_i$  and  $\delta_j$ ) are positive and that  $Cov(\delta_i, \delta_j) > 0$ , thereby leading to an upward bias in both  $\alpha_1$  and  $\beta_1$  when the model is estimated by OLS. It is also worth noting that some of the results of the FE model are quite different from the OLS results. For one, the coefficient of income without individual fixed effects is much larger. In addition, the effect of cohabitation is now positive and significant (the reference group here being those who are married) when individual fixed effects have been taken into account in the regression. This means that although married individuals tend to report higher life satisfaction than those who are merely living together, a short-run transition from cohabitation to being married does not necessarily lead to an increase in the overall well-being for the individual.

One question of interest is whether the positive effect of one's partner's life satisfaction on

one's life satisfaction is stronger for married individuals than for cohabiting partners. The second column of Table 6-3 reports FE estimates that included an additional interaction term between the "cohabiting with partners" dummy and the partner's reported life satisfaction. The interaction term enters the life satisfaction equation with a negative albeit insignificant coefficient, while the main effect of the partner's life satisfaction remains positive and well-defined. Thus, these results suggest that there are no significant differences in the changes of the reported life satisfaction between spouses and between partners in cohabitation when the model is estimated by FE regression estimator. In other words, there is evidence that changes in the reported life satisfaction are interdependent between spouses as well as between cohabiting partners when the simultaneity bias is not corrected for in the regression.

Turning to the estimates for fixed-effects instrumental variable (FE-IV), the estimated coefficient of the partner's life satisfaction is approximately 12% smaller than that estimated by an ordinary FE estimator. Note that the partner's residual health satisfaction continues to be positive and significant in the reduced form equation for FE-IV, with a partial (within)  $R^2$  of 0.078 (and an associated  $F$  statistic of 1,797.10). It is also worth noting that the coefficient of the predicted partner's life satisfaction estimated by FE-IV is roughly the same as that estimated by the IV estimator in the second column of Table 6-2.

The fourth column of Table 6-3 shows that while the main effect of the predicted partner's life satisfaction (derived from the reduced form regression reported in the last column of Table A3 in the Appendix) continues to be positive and well-defined, the interaction between the "cohabiting with partners" dummy and the predicted partner's life satisfaction is negative

and significant at the conventional levels. A  $t$  test on the null hypothesis that the sum of the predicted partner's life satisfaction and its interaction with the "cohabiting with partners" dummy is equal to zero ( $0.124 + (-0.135) = 0$ ) is not rejected by the data. In other words, the FE-IV estimates clearly suggest that only those who are married (as opposed to those who merely live together) share their levels of "satisfaction" with their partner, *ceteris paribus*<sup>35</sup>. One potential explanation for this is that individuals who live in a cohabiting union tend not to be as committed as married couples. Consequently, they tend to care more about their own personal autonomy and less about the well-being of their partner over time. This is consistent with recent sociological literature's findings of higher break-up rates, and eventual marital failures, by those cohabiting with a partner compared to spouses (e.g. Popenoe and Whitehead, 2002).

The size of the coefficient is also qualitatively important as well as being statistically significant. The mean of the predicted partner's life satisfaction score for the married sample is 5.14 and a 'with-in' standard deviation of 0.20. A one standard deviation move from one below the mean of the partner's life satisfaction score to one above implies a change from 4.94 to 5.34. Taking a conservative central estimate of the predicted partner's life satisfaction score to be 0.124 for the married couples, the implied change in the individual's life satisfaction is approximately 0.05. Given the distribution of life satisfaction, this is a sizeable effect. It is very close to the satisfaction derived from owning home outright; it can

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<sup>35</sup>Note that the FE estimates on the cohabiting sample are based on an average (standard deviation) of 2.12 (1.31) years of living together, as opposed to 2.71 (1.59) years for married individuals in the sample. In addition, despite the fact that there are 161 observations of same sex cohabiting union in the panel, the small sample size makes our analysis heterosexual in nature.

compensate for around 21% of the non-pecuniary effect of unemployment; it is equal to not having to spend around a week in the hospital last year.

Given the possibilities that the degree of utility interdependence may be stronger for some groups of married individuals than others, it seems useful to examine sub-samples of the population. The last four columns do this by splitting the data according to the gender of the respondent. Table 6-3, columns V and VII, show that the FE-IV estimates on the partner's life satisfaction are positive for both sexes, although less precisely estimated for men ( $t = 1.63$ ) than for women ( $t = 4.38$ ). Consistent with the results obtained from the full sample regression, columns VI and VIII of Table 6-3 reveal that only husbands and wives, as opposed to those who merely live with their partner, derived satisfaction from a rise in the partner's well-being: we cannot reject for both males and females sub-samples the hypothesis that the sum of the predicted partner's life satisfaction and its interaction with the "cohabiting with partners" dummy is equal to zero.

Table 6-4 examines whether the presence of other factors can also affect the degree of utility interdependence between partners. For one, the effect of reciprocal sharing of satisfactions may be significantly stronger for married couples who have been together for much longer than others. The first panel of Table 6-4 shows for the married sample that while the coefficient of the predicted partner's life satisfaction is positive and significant, its interaction between the number of married years yields a coefficient that is insignificant and close to zero. This means that there is no significant variation in the degree of utility interdependence between spouses by the number of years they have been married. The

second panel of Table 6-4 also shows that the degree of utility interdependence between partners does not appear to depend significantly on the number of children in the household. Finally, the evidence of utility interdependence among married couples that cannot be found among those who merely live together may have been the result of a selection bias. Couples who live together may only agree to marry one another if there is enough reciprocal sharing of satisfactions between them. If this is true, then it is an alternative explanation to why the coefficient of the predicted partner's life satisfaction is insignificant only for the cohabiting union sample. A simple test for this is carried out in the last panel of Table 6-4. By interacting the predicted partner's life satisfaction with an additional dummy of "cohabiting with a partner and will marry within the next five years" ( $N = 3,398$ ), we can conduct a  $t$  test on whether the raw sum of the coefficients is positive and significant. The main effect of the predicted partner's life satisfaction remains positive and well-defined, whereas the interaction between the predicted partner's life satisfaction and the "cohabiting with partners" dummy continues to be negative and significant at the 1% level. The coefficient of the added interaction term is positive but insignificant. This means that the total effect of the predicted partner's life satisfaction for those who will marry their partner within the next five years is positive ( $0.119 - 0.146 + 0.068 > 0$ ), although we fail to reject the null hypothesis that the raw sum is equal to zero at the conventional levels. Thus, this result rejects the hypothesis of selection bias and supports the earlier finding that only spouses as opposed to cohabiting partners share their levels of satisfaction within the household.

## 6.5 Conclusion

This chapter uses well-being data to test theories of interdependent utility and mental risk-sharing between spouses in marriage. Consistent with Becker (1974), it finds evidence for such interdependence. After presenting a simple correlation in the life satisfaction data, we exploit, with some help from the psychology and medical literature's findings, the psychological nature of individual-effect transient health components in the standard health model in order to provide an instrument for each partner's current life satisfaction at different time periods. The main results are consistent with the standard assumptions in the economics literature: controlling for individual fixed effects, the IV estimates reveal a strong and positive effect of the partner's life satisfaction on one's own perceptions of life as a whole. The estimated impact of one's spouse's life satisfaction on one's life satisfaction is also sizeable, given the distribution of life satisfaction over the years. For instance, a change in the spouse's life satisfaction from one standard deviation below the mean to one standard deviation above the mean can offset around 20% of the negative impact of unemployment on well-being. However, the FE-IV suggest that there is no supporting ground for utility interdependence among those couples who prefer cohabitation to marriage. Considering the magnitude of this conclusion, this finding may come as a surprise to some economists who are used to the assumption that the idea of risk-sharing between couples also applies to partners in non-marital groups. More generally, these results provide some of the first direct evidence of utility being jointly determined in marriage.

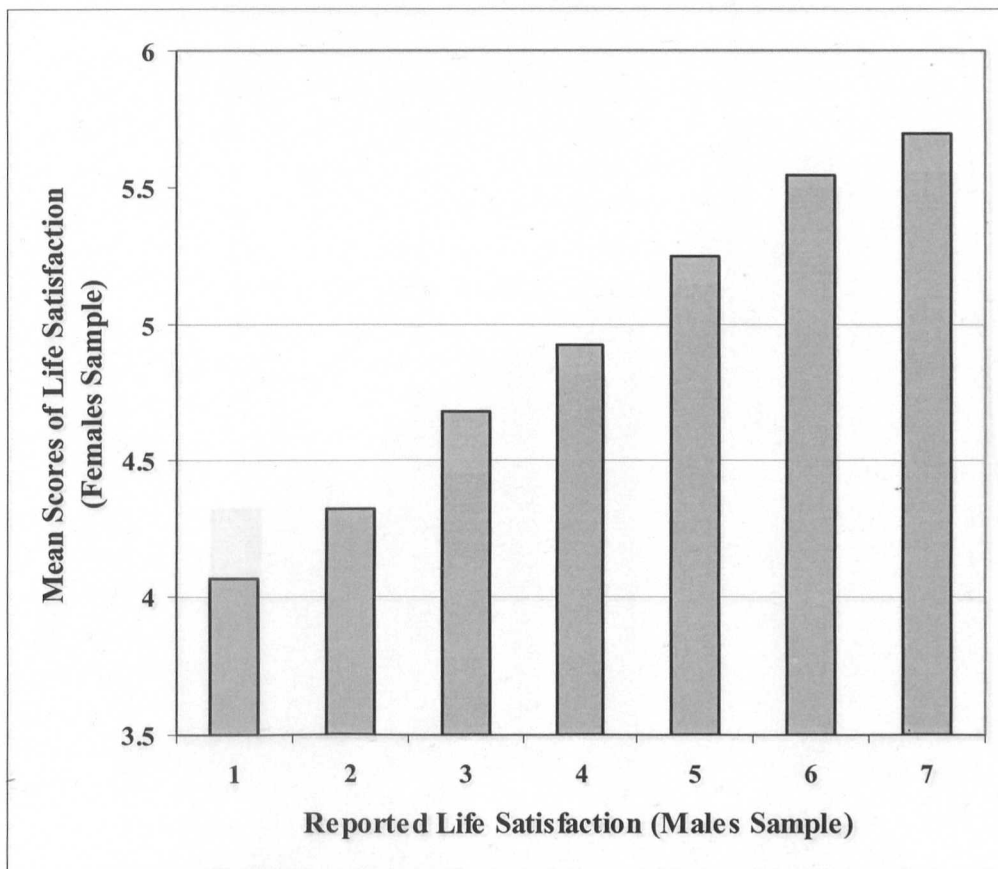


**Table 6-1: The Distribution of Life Satisfaction in the United Kingdom**  
**By Marital Status: 1996-2000 and 2002 (Percentages %)**

<b>Life satisfaction</b>	<b>Married</b>	<b>Cohabited</b>
Not satisfied at all	1.16	0.96
2	1.81	1.88
3	5.49	6.06
4	13.06	14.40
5	30.64	32.05
6	35.46	34.12
Completely satisfied	12.37	10.52
<b>Mean</b>	5.26 (1.22)	5.19 (1.20)
<b>Observations</b>	29,645	7,061

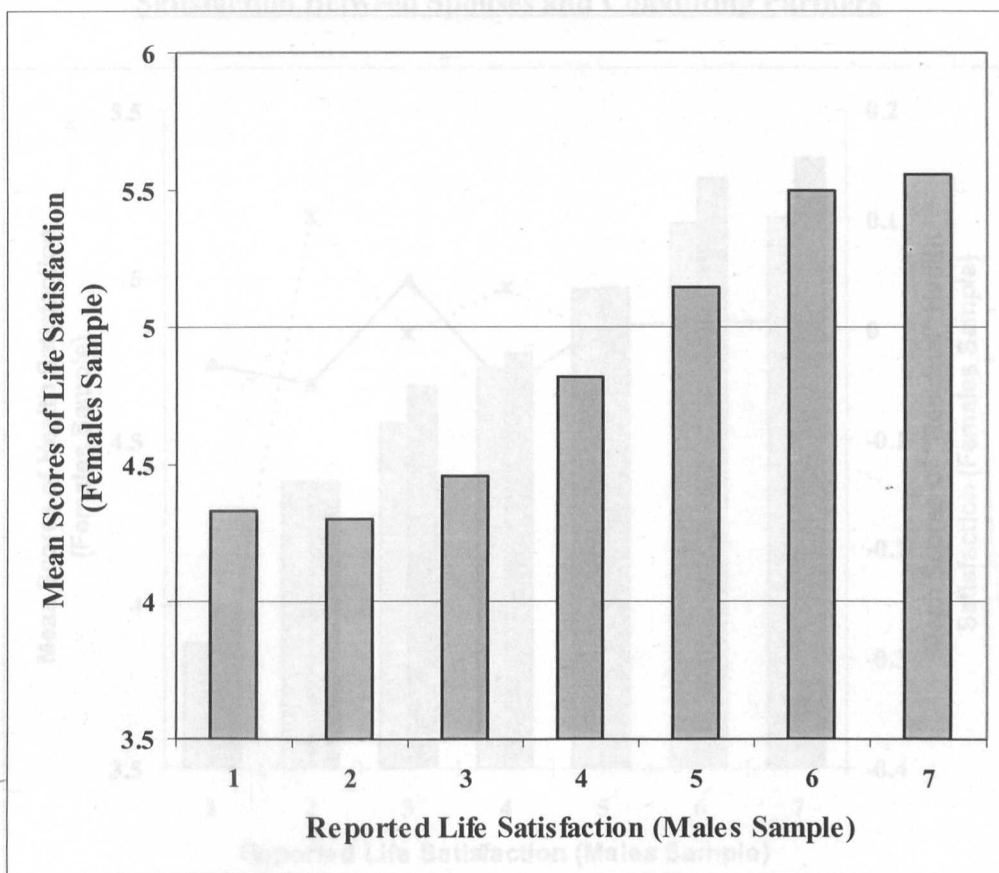
**Note:** BHPS = British Household Panel Survey. The life satisfaction question asks individuals, “*How dissatisfied or satisfied are you with your life overall?*” Standard deviations are in parentheses.

**Figure 6-1: Cross-Tabulations of the Life Satisfaction Scores of Wives and Their Husbands**



Source: BHPS, Waves 6-10 and 12.

**Figure 6-2: Cross-Tabulation of the Life Satisfaction Scores of Cohabitees and their Partners**

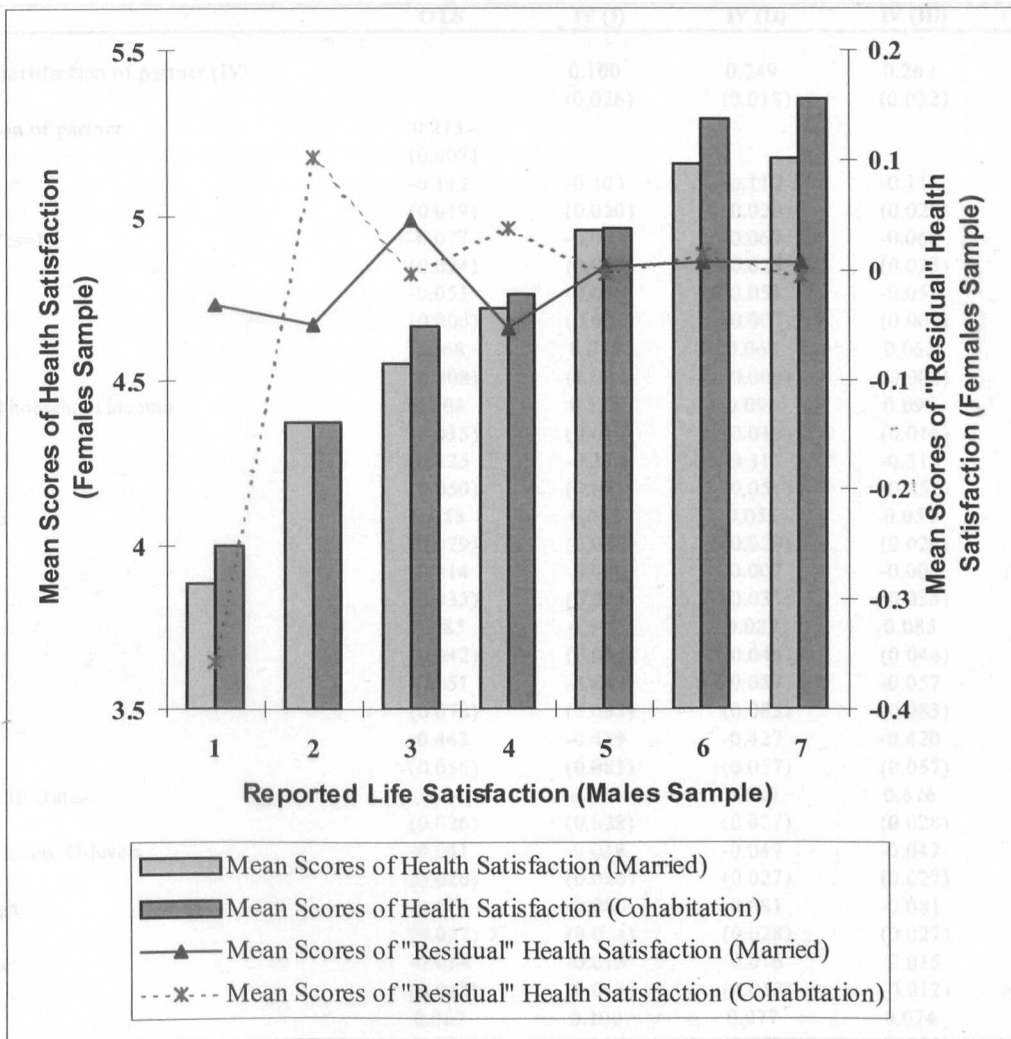


Source: BHPS, Waves 6-10 and 12.

Source: BHPS, Waves 6-10 and 12.

**Figure 6-3: Cross-Tabulations of the Health Satisfaction Scores and Residual Health**

**Satisfaction Between Spouses and Cohabiting Partners**



Source: BHPS, Waves 6-10 and 12.

**Table 6-2: Life Satisfaction Equations with Partner's Life Satisfaction  
as an Independent Variable (Married and Cohabiting Sample)**

	OLS	IV (I)	IV (II)	IV (III)	IV (IV)
Predicted life satisfaction of partner (IV)		0.100 (0.026)	0.249 (0.018)	0.262 (0.032)	0.379 (0.139)
Life satisfaction of partner	0.213 (0.007)				
Male	-0.112 (0.019)	-0.105 (0.020)	-0.112 (0.020)	-0.112 (0.020)	-0.119 (0.020)
Cohabiting (Yes=1)	-0.077 (0.024)	-0.083 (0.025)	-0.069 (0.025)	-0.068 (0.025)	-0.060 (0.028)
Age	-0.053 (0.006)	-0.058 (0.007)	-0.051 (0.007)	-0.050 (0.007)	-0.044 (0.010)
Age <sup>2</sup> /100	0.068 (0.008)	0.075 (0.008)	0.066 (0.008)	0.065 (0.008)	0.058 (0.012)
Log of annual household income	0.108 (0.015)	0.125 (0.016)	0.096 (0.016)	0.094 (0.016)	0.075 (0.031)
Unemployed	-0.325 (0.050)	-0.351 (0.052)	-0.317 (0.051)	-0.315 (0.052)	-0.284 (0.061)
Self-employed	0.058 (0.029)	0.053 (0.030)	0.055 (0.029)	0.054 (0.029)	0.058 (0.029)
Family cared	-0.014 (0.033)	-0.020 (0.034)	-0.007 (0.033)	-0.004 (0.033)	0.000 (0.035)
Retired	0.085 (0.042)	0.107 (0.045)	0.087 (0.044)	0.085 (0.044)	0.063 (0.047)
Student	-0.051 (0.078)	-0.049 (0.083)	-0.057 (0.083)	-0.057 (0.083)	-0.054 (0.081)
Disabled	-0.443 (0.056)	-0.459 (0.083)	-0.427 (0.057)	-0.420 (0.057)	-0.405 (0.065)
Predicted Health Status	0.684 (0.026)	0.723 (0.028)	0.680 (0.027)	0.676 (0.028)	0.636 (0.048)
Education: A-levels, O-levels	-0.041 (0.026)	-0.038 (0.028)	-0.047 (0.027)	-0.047 (0.027)	-0.050 (0.028)
Education: high	-0.076 (0.027)	-0.080 (0.028)	-0.081 (0.028)	-0.081 (0.027)	-0.077 (0.027)
Household size	-0.014 (0.012)	-0.018 (0.013)	-0.016 (0.012)	-0.015 (0.012)	-0.012 (0.012)
Home owner	0.087 (0.028)	0.100 (0.030)	0.077 (0.029)	0.074 (0.029)	0.060 (0.036)
Number of days in hospital last year	-0.010 (0.002)	-0.010 (0.002)	-0.009 (0.002)	-0.009 (0.002)	-0.009 (0.002)
Number of children	-0.000 (0.014)	0.001 (0.015)	-0.001 (0.014)	-0.002 (0.014)	-0.003 (0.014)
Constant	0.827 (0.222)	1.215 (0.244)	0.827 (0.238)	0.776 (0.254)	0.386 (0.495)
Instrumental variables (partner's characteristics)		residual health satisfaction	time-invariant health traits	predicted health satisfaction	employed with regular wages
Number of observations	36,369	32,037	32,037	32,086	36,369
R-squared	0.159	0.149	0.161	0.161	0.133

**Note:** Standard errors are in parentheses. In the reference group are 'female', 'married', 'employed people', and 'no formal education'. Additional control variables are for regional dummies (19 regions) and year dummies (6).

**Table 6-3: Life Satisfaction Equations with Partner's Life Satisfaction****(Fixed Effects Instrumental Variable Results)**

	All (I)	All (II)	All (III)	All (IV)	Males (V)	Males (VI)	Females (VII)	Females (VIII)
Predicted life satisfaction of partner			0.101 (0.024)	0.124 (0.026)	0.052 (0.032)	0.082 (0.034)	0.162 (0.037)	0.178 (0.039)
Predicted life satisfaction of partner*cohabited				-0.135 (0.050)		-0.170 (0.068)		-0.098 (0.076)
Life satisfaction of partner	0.115 (0.006)	0.115 (0.007)						
Life satisfaction of partner*cohabited		-0.004 (0.015)						
Cohabiting (Yes=1)	0.080 (0.032)	0.103 (0.087)	0.107 (0.035)	0.866 (0.285)	0.083 (0.048)	1.034 (0.380)	0.122 (0.051)	0.673 (0.428)
Age	-0.050 (0.023)	-0.050 (0.023)	-0.042 (0.026)	-0.045 (0.026)	-0.080 (0.036)	-0.084 (0.036)	-0.004 (0.039)	-0.007 (0.039)
Age^2/100	0.050 (0.014)	0.050 (0.014)	0.045 (0.015)	0.048 (0.015)	0.064 (0.020)	0.068 (0.020)	0.027 (0.022)	0.031 (0.022)
Log of annual household income	0.028 (0.015)	0.028 (0.015)	0.017 (0.017)	0.016 (0.017)	0.014 (0.024)	0.013 (0.024)	0.019 (0.026)	0.018 (0.026)
Unemployed	-0.227 (0.038)	-0.228 (0.038)	-0.235 (0.041)	-0.237 (0.041)	-0.288 (0.052)	-0.289 (0.052)	-0.173 (0.068)	-0.175 (0.068)
Self-employed	-0.018 (0.033)	-0.019 (0.033)	-0.038 (0.035)	-0.039 (0.035)	0.004 (0.042)	0.002 (0.042)	-0.141 (0.064)	-0.141 (0.064)
Family cared	-0.122 (0.030)	-0.122 (0.030)	-0.115 (0.033)	-0.116 (0.033)	-0.154 (0.122)	-0.156 (0.122)	-0.104 (0.037)	-0.104 (0.037)
Retired	-0.013 (0.041)	-0.013 (0.041)	0.011 (0.045)	0.007 (0.045)	-0.053 (0.060)	-0.059 (0.060)	0.068 (0.069)	0.066 (0.069)
Student	0.115 (0.071)	0.115 (0.071)	0.079 (0.081)	0.081 (0.081)	-0.142 (0.136)	-0.141 (0.136)	0.182 (0.103)	0.183 (0.103)
Disabled	-0.320 (0.047)	-0.320 (0.047)	-0.279 (0.050)	-0.282 (0.051)	-0.342 (0.070)	-0.344 (0.070)	-0.235 (0.074)	-0.237 (0.074)
Predicted Health Status	0.328 (0.022)	0.328 (0.022)	0.328 (0.024)	0.329 (0.025)	0.308 (0.036)	0.307 (0.036)	0.346 (0.034)	0.346 (0.034)
Education: A-levels, O-levels	0.014 (0.067)	0.014 (0.067)	-0.026 (0.072)	-0.026 (0.072)	0.003 (0.099)	0.003 (0.099)	-0.065 (0.105)	-0.064 (0.105)
Education: high	0.019 (0.063)	0.019 (0.063)	-0.000 (0.067)	-0.001 (0.067)	0.064 (0.092)	0.064 (0.092)	-0.068 (0.099)	-0.068 (0.099)
Household size	-0.049 (0.013)	-0.049 (0.014)	-0.066 (0.015)	-0.065 (0.015)	-0.051 (0.020)	-0.051 (0.020)	-0.080 (0.022)	-0.079 (0.022)
Home owner	0.053 (0.031)	0.053 (0.031)	0.072 (0.034)	0.071 (0.034)	0.081 (0.046)	0.079 (0.046)	0.058 (0.050)	0.057 (0.050)
Number of days in hospital last year	-0.006 (0.001)	-0.006 (0.001)	-0.007 (0.001)	-0.007 (0.001)	-0.008 (0.002)	-0.008 (0.002)	-0.005 (0.002)	-0.005 (0.002)
Number of children	0.043 (0.016)	0.043 (0.016)	0.052 (0.017)	0.051 (0.017)	0.054 (0.023)	0.053 (0.023)	0.051 (0.025)	0.051 (0.025)
Constant	4.101 (0.834)	4.100 (0.834)	4.126 (0.956)	4.073 (0.956)	5.625 (1.321)	5.566 (1.320)	2.629 (1.381)	2.586 (1.381)
Number of observations	36,369	36,369	32,037	32,037	16,052	16,052	15,989	15,989
R-squared (within)	0.036	0.036	0.026	0.026	0.025	0.026	0.030	0.029
Number of groups	11,168	11,168	10,884	10,884	5,456	5,456	5,428	5,428
T-test the hypothesis that predicted life satisfaction of partner + predicted life satisfaction of partner *cohabited = 0 (P-values in parentheses)		64.33 (0.000)		0.05 (0.819)		1.90 (0.168)		1.22 (0.269)

Note: See Table 2.

**Table 6-4: Further Life Satisfaction Equations with Partner's Life Satisfaction**

	FE-IV
<b>Socio-demographic and household variables</b>	Yes
<b>Regional and year dummies</b>	Yes
<b>(1) Number of years married (married sample only)</b>	
Predicted life satisfaction of partner	0.096 (0.036)
Predicted life satisfaction of partner*married years	0.001 (0.001)
<b>(2) Number of children under 16</b>	
Predicted life satisfaction of partner	0.101 (0.029)
Predicted life satisfaction of partner*number of children	-0.001 (0.018)
<b>(3) Individuals who later marry their partner</b>	
Predicted life satisfaction of partner	0.119 (0.027)
Predicted life satisfaction of partner*cohabitation	-0.146 (0.052)
Predicted life satisfaction of partner*cohabitation; will marry	0.068 (0.073)

**Note:** standard errors are in parentheses. The added dummy in the last panel indicates that the cohabiting individual will marry his or her partner within the next five years in the BHPS.

## Appendix 6A: Data Description and Summary Statistics

Variables	Descriptions	Married		Cohabitation	
		Mean	(Pooled) (Within)	Mean	(Pooled) (Within)
Life satisfaction	satisfaction with life score, coded so that 1 = very dissatisfied, 7 = very satisfied	5.26	(1.22) (0.68)	5.19	(1.20) (0.63)
Health satisfaction	satisfaction with health score, coded so that 1 = very dissatisfied, 7 = very satisfied	5.01	(1.59) (0.86)	5.01	(1.50) (0.78)
Predicted health satisfaction	predicted health satisfaction, based on own physical health status	5.01	(0.41) (0.19)	5.07	(0.36) (0.17)
Residual health satisfaction	predicted "unexplained" health satisfaction (not related to objective indicators)	-0.00	(0.82) (0.81)	0.00	(0.79) (0.74)
Predicted life satisfaction	predicted life satisfaction, based on first-stage IV regression on residual health	5.14	(0.47) (0.20)	5.64	(0.48) (0.18)
Log of real household income per annum	log of equivalent household income per annum, adjusted to CPI index	8.99	(0.68) (0.29)	9.04	(0.74) (0.28)
Male	gender (male = 1)	0.50	(0.50)	0.51	(0.50)
Age	age	43.71	(10.81) (1.61)	32.43	(9.84) (1.29)
Age <sup>2</sup> /100	age-squared/100	20.27	(9.61) (1.45)	11.48	(7.34) (0.92)
Unemployed	employment status, unemployed = 1	0.02	(0.15) (0.11)	0.06	(0.24) (0.14)
Employed full-time	employment status, employed full-time = 1	0.65	(0.50) (0.22)	0.72	(0.45) (0.21)
Self-employed	employment status, self-employed = 1	0.10	(0.30) (0.13)	0.08	(0.26) (0.12)
Family-cared	employment status, family-cared = 1	0.10	(0.30) (0.15)	0.08	(0.27) (0.12)
Student	employment status, student = 1	0.00	(0.07) (0.05)	0.02	(0.15) (0.08)
Retired	employment status, retired = 1	0.07	(0.25) (0.13)	0.01	(0.09) (0.05)
Disabled	employment status, disabled = 1	0.05	(0.22) (0.10)	0.03	(0.16) (0.08)
Education: high	education level, higher education, i.e. university level	0.41	(0.49) (0.12)	0.47	(0.50) (0.13)
Education: A-levels, O-levels	education level, tertiary education, i.e. A-levels, O-levels	0.45	(0.50) (0.13)	0.47	(0.50) (0.13)
Household size	number of people living in the household	3.34	(1.20) (0.37)	2.86	(1.14) (0.34)
Own home outright	whether the respondent owns home outright (yes = 1)	0.18	(0.38) (0.15)	0.06	(0.23) (0.09)
Number of days in hospital last year	the number of days spent in hospital last year for the respondent	0.68	(4.36) (3.31)	0.55	(2.86) (1.91)
Number of children	number of children who are under 16 in the household	0.91	(1.11) (0.32)	0.67	(0.98) (0.26)
Total number of observations		29,645		7,061	

**Note:** standard deviations are in parentheses.



**Appendix 6B: Health Satisfaction Equations for Each Individual's Partner**  
**(Married and Cohabiting Sample)**

	Pooled OLS		Fixed-effects	
<b>Partner's physical health problems</b>				
Arms, legs, hands, etc.	-0.447 (0.015)	***	-0.245 (0.014)	***
Sight	-0.172 (0.035)	***	-0.106 (0.029)	***
Hearing	-0.112 (0.024)	***	-0.044 (0.029)	
Skin conditions, allergy	-0.050 (-0.050)	**	-0.028 (0.018)	
Chest pain, breathing	-0.386 (0.020)	***	-0.244 (0.022)	***
Heart, blood pressure	-0.374 (0.049)	***	-0.282 (0.022)	***
Stomach or digestion	-0.445 (0.023)	***	-0.281 (0.022)	***
Diabetes	-0.375 (0.049)	***	-0.292 (0.066)	***
Anxiety, depression, etc.	-0.501 (0.023)	***	-0.375 (0.022)	***
Alcohol or drugs	-0.241 (0.107)	**	-0.223 (0.107)	**
Epilepsy	-0.317 (0.060)	***	-0.025 (0.110)	
Migrane	-0.206 (0.019)	***	-0.133 (0.020)	***
Other	-0.580 (0.028)	***	-0.385 (0.023)	***
<b>Partner's characteristics</b>				
Married? (Yes=1)	-0.032 (0.016)		0.012 (0.025)	
Age	0.004 (0.001)	***	-0.007 (0.006)	
Education: A-levels, O-levels	0.054 (0.016)	***	0.023 (0.049)	
Education: high	0.088 (0.017)	***	0.050 (0.046)	
Unemployed	-0.116 (0.030)	***	-0.062 (0.030)	**
Self-employed	0.016 (0.019)		0.006 (0.025)	
Family carer	-0.095 (0.021)	***	-0.067 (0.024)	***
Retired	-0.125 (0.029)	***	-0.115 (0.032)	***
Student	-0.049 (0.057)		-0.085 (0.058)	
Disabled	-0.724 (0.033)	***	-0.427 (0.037)	***
Number of days in hospital last year	-0.022 (0.003)	***	-0.018 (0.001)	***
Smoker	-0.093 (0.014)	***	0.024 (0.022)	
Are you being looked after by your current spouse? (Yes=1)	-0.034 (0.025)		0.012 (0.031)	
Have had an accident in the previous year? (Yes=1)	0.056 (0.014)	***	-0.064 (0.014)	***

<b>Respondent's characteristics</b>			
Predicted satisfaction with health	0.051	*	0.031
	(0.027)		(0.030)
Number of days in hospital last year	-0.000		-0.003
	(0.002)		(0.002)
Smoker? (Yes=1)	-0.007		-0.012
	(0.025)		(0.038)
<b>Household characteristics</b>			
Number of children	0.021		0.031
	(0.016)		(0.021)
Household size	-0.025	*	-0.005
	(0.014)		(0.018)
Log of annual household income	0.003		-0.015
	(0.018)		(0.021)
Home owner	0.038		0.057
	(0.033)		(0.041)
<b>Local environment/accommodation</b>			
Shortage of space	-0.061	***	-0.022
	(0.022)		(0.021)
Noise from neighbours	-0.035		0.010
	(0.028)		(0.027)
Street noise	-0.060	**	-0.011
	(0.026)		(0.024)
Not enough light	-0.064	*	0.005
	(0.037)		(0.033)
Lack of adequate heating	-0.053		-0.041
	(0.042)		(0.039)
Condensation	0.017		0.012
	(0.026)		(0.025)
Leaky roof	0.027		0.001
	(0.043)		(0.043)
Damp walls, floors, etc.	-0.023		-0.020
	(0.035)		(0.033)
Rot in windows, floors, etc.	0.016		-0.000
	(0.032)		(0.030)
Pollution, environment problems	-0.060	*	-0.009
	(0.034)		(0.031)
Vandalism or crime	-0.010		0.003
	(0.025)		(0.023)
Constant	5.445	***	6.259
	(0.242)		(0.499)
<hr/>			
Regional dummies	Yes		Yes
Wave dummies	Yes		Yes
Number of observations	32,037		32,037
R-squared	0.393		
R-squared (within)			0.080
Numer of groups			10,884

**Note:** \* Significant at 10% C.I. \*\* Significant at 5% C.I. \*\*\* Significant at 1% C.I. Standard errors are in parentheses. Respondent's characteristics, other than physical health problems, include the number of days spent in hospital last year and a dummy for whether the respondent smokes.

## Appendix 6C: Reduced Form Estimations of Partner's Life Satisfaction

Dependent variable: life satisfaction of partner	Pooled OLS				Fixed Effects
	(I)	(II)	(III)	(IV)	(V)
<b>Instrumental variables (partner's characteristics)</b>	residual health satisfaction	time-invariant health traits	predicted health satisfaction	employed with regular wages	residual health satisfaction
IV coefficient	0.231 (0.008)	0.480 (0.005)	0.624 (0.013)	0.138 (0.014)	0.231 (0.005)
<b>household Characteristics</b>					
Log of annual household income	0.192 (0.012)	0.130 (0.011)	0.121 (0.012)	0.174 (0.012)	0.030 (0.017)
Household size	-0.016 (0.009)	-0.020 (0.008)	-0.015 (0.009)	-0.016 (0.009)	-0.065 (0.014)
Home owner	0.159 (0.021)	0.155 (0.019)	0.118 (0.020)	0.179 (0.020)	0.107 (0.033)
Number of children	0.013 (0.011)	0.009 (0.010)	-0.038 (0.011)	0.018 (0.010)	0.054 (0.017)
<b>The respondent's characteristics</b>					
Male	0.043 (0.014)	0.094 (0.013)	0.037 (0.014)	0.048 (0.013)	
Cohabiting (Yes=1)	-0.098 (0.019)	-0.039 (0.017)	-0.155 (0.019)	-0.105 (0.018)	0.095 (0.034)
Age	-0.049 (0.005)	-0.045 (0.004)	-0.036 (0.005)	-0.054 (0.005)	-0.054 (0.025)
Age <sup>2</sup> /100	0.059 (0.006)	0.044 (0.005)	0.064 (0.006)	0.066 (0.006)	0.023 (0.014)
Unemployed	-0.227 (0.039)	-0.186 (0.035)	-0.197 (0.038)	-0.221 (0.037)	-0.140 (0.040)
Self-employed	-0.013 (0.023)	-0.030 (0.021)	-0.049 (0.023)	0.014 (0.022)	-0.113 (0.034)
Family cared	-0.084 (0.025)	-0.061 (0.023)	-0.021 (0.025)	-0.078 (0.024)	-0.018 (0.032)
Retired	0.140 (0.036)	0.113 (0.032)	0.149 (0.035)	0.159 (0.034)	0.053 (0.044)
Student	0.062 (0.073)	0.092 (0.067)	0.032 (0.072)	0.027 (0.068)	0.048 (0.078)
Disabled	-0.213 (0.035)	-0.163 (0.032)	-0.119 (0.034)	-0.204 (0.034)	-0.022 (0.049)
Predicted Health Status	0.288 (0.019)	0.215 (0.017)	0.175 (0.018)	0.286 (0.018)	0.075 (0.024)
Education: A-levels, O-levels	0.059 (0.018)	0.030 (0.016)	0.019 (0.018)	0.049 (0.017)	-0.074 (0.070)
Education: high	0.007 (0.019)	0.009 (0.017)	-0.035 (0.019)	0.008 (0.018)	-0.075 (0.065)
Number of days in hospital last year	-0.003 (0.002)	-0.005 (0.001)	-0.002 (0.002)	-0.003 (0.002)	-0.005 (0.001)
Constant	3.047 (0.183)	4.169 (0.169)	0.604 (0.189)	3.297 (0.179)	6.743 (0.910)
Number of observations	32,307	32,307	32,086	36,369	32,037
R-squared	0.071	0.234	0.110	0.049	
R-squared (within)					0.091
Number of groups					10,884

Note: See Table 2.

# **Chapter Seven**

## **Conclusions**

This thesis has studied the determinants of subjective well-being in less-developed economies. It adds to an emerging research field that empirically examines the subjective notion of utility, or happiness, in economics.

We have used a combination of data, both cross-sectional and longitudinal, to investigate previously explored issues of interest. A contribution of the thesis is that it takes into account new developing country data. Using a cross-sectional data set for South Africa, Chapter 2 tests whether the general structure of microeconomic life satisfaction is similar in rich and poor countries. Chapter 3 pays particular attention to the structural relationship between measures of unemployment and reported well-being for South Africa. The role of household expenditures in explaining individual assessments of economic ladder is investigated for Indonesia in Chapter 5.

This thesis has also used measures of subjective well-being to provide new tests of economic hypotheses. In Chapter 3 we use such data to test whether unemployment hurts individuals less in terms of household life satisfaction when a large proportion of other people in the area are also unemployed. Chapter 4 explores the link between measures of criminal victimization (e.g. personal experiences and crime on others in the area) and reported life satisfaction at the household level for South Africa in 1997. It also examines whether crime victims suffer less from the experience in higher crime areas. Finally, Chapter 6 tests one of the most fundamental ideas in the field of the economics of marriage, that one's happiness depends on one's spouse's happiness. Using panel surveys for Great Britain, the concept of interdependence in utility among married couples is studied in detail.

Chapter 2 focuses on whether the general structure of subjective well-being equations in South Africa in 1993 is similar to that which would have been expected from data in the more-developed countries. Ordered probit estimates of the variables representing household wealth (e.g. expenditures and home ownership) on the reported life satisfaction at the household level are, as anticipated, positive and well-defined for the full sample. The relationship between household unemployment and the perceived quality of life is typically negative and statistically significant. Black households have been shown to be extremely dissatisfied with life compared to people of other race. Moreover, subjective assessments of life satisfaction at the household level are positively associated with higher proportions of pensioners, married persons, and individuals with at least a college degree, whilst the number of sick individuals in the household lowered it

The role of cultural differences in determining subjective well-being was also analysed in the second chapter. The results from sub-sample regressions implied substantial discrepancies with regard to how people of different races and regions in South Africa assess their overall well-being. For example, while the estimated coefficient on household unemployment is negative and significant for those living in the urban area, the same robust relationship cannot be obtained for the rural population, controlling for race in the regression. In contrast, we find some evidence of disparities in the estimated coefficient size across subpopulations. Despite the fact that the estimated coefficient on household expenditure is positive and significant for all racial groups, its marginal welfare impact is predicted to be around nine-times larger for the non-black households than for the black households. This

provides supporting evidence that subjective well-being data in developing countries should be analysed at the sub-cultural level, as well as at the aggregated level.

Chapter 3 studies whether the stigma of unemployment in South Africa abates when there is more of it around in the area. The proposition is that the psychological cost of unemployment is lower in regions of high unemployment rate, partly because social disapproval on the unemployed will be less prevalent if unemployment hits many other people at the same time. Consistent with Clark (2003)'s finding on the positive externality of others' unemployment on the unemployed's well-being in Britain, we find from our full sample analysis that household unemployment significantly depresses the perception of well-being at the household level, and the regional unemployment rate hurts even those with no unemployed members in the household. However, household unemployment hurts less when the unemployment of others in the same region is higher. Similar results are obtained for those who did not participate in the labour market: the overall well-being of the non-participating households is positively correlated with the regional unemployment rate. Results remained robust only for the urban black sample, however, when subpopulations were analysed. Here, the estimates imply that, *ceteris paribus*, employed and unemployed households have equal well-being at a regional unemployment rate of around 33%, which accounted for more than 13% of the unemployed households in the urban black sample. Given that a smaller well-being gap between the employed and the unemployed may provide a reduced incentive for the unemployed to find work, via the utility effects of a changing employment norm in the area, the results thus provide supporting psychological evidence that potentially may help

to explain why unemployment is more persistent for some areas of South Africa than for others.

Chapter 4 examines the relatively unexplored link between measures of criminal victimization and reports of subjective well-being. As far as we know, this is some of the first work of its kind. We use a different data set for South Africa to test whether crime victims report a significantly lower level of life satisfaction at the household level, on average, compared to non-victims. As anticipated, we find that experiences of crime in the past year (e.g. robbery and/or murder) markedly depress people's perceptions of household life satisfaction. In other words, crime makes people very unhappy. For the full sample, the non-pecuniary cost of crime is estimated, at the mean, to be worth approximately \$21,142 per month, for an average household spending \$240 per month. Regressions on subpopulations also reveals that crime affected the rural population more than those in urban areas.

This chapter also investigates the role of the regional crime rate in determining life satisfaction at the household level. The well-being of the non-victimized household is demonstrated to be strongly negatively correlated with regional victimization rate at both the magistrate district level and the provincial level. However, we also find that while experiences of crime have been shown to have a strong negative correlation with individual perceptions of household welfare, the negative correlation was attenuated - at least at the magistrate district level - as crime against others rises. This result is robust in terms of controlling for reference group of regional unemployment, and average household expenditures of relevant others in the magistrate district. Moreover, it is also robust to estimation,



allowing for correlated errors within the magistrate district area. The estimated impact of regional victimization rate on the well-being of crime victims is small, however, considering that it would require a very high victimization rate at the regional level of approximately 36% to make a respondent from an average victimized household feels indifferent in terms of life satisfaction about his or her own experiences of crime. Nevertheless, the results seem to provide new evidence in favor of interdependence in utility among crime victims living in the same geographical unit in South Africa.

Chapter 5 introduces for the first time in this thesis the use of panel data to help with the study of subjective well-being in a less-developed economy. Whilst cross-sectional regressions have provided useful insights about the correlates of individual perceptions of well-being, their estimates can be biased whenever unobservable characteristics (like a person's natural cheerfulness) are correlated with observable variables (like expenditures). This chapter attempts to deal with personality bias.

It first examines how subjective economic ladder in Indonesia is determined three years after the financial crisis in 1997. In the cross-section, the correlation between *per capita* levels of household expenditure and self-rated economic ladder, albeit positively related, is a weak one. Rather, it appears that individual perceptions of economic ladder were more dependent on a number of socio-economic characteristics, as well as attitudes towards future economic rank in the economy, than the current spending behaviour would normally reveal.

The extent of personality bias in influencing our cross-sectional results is then examined in the latter half of the fifth chapter. Controlling for the individual fixed effects, ordered

probit estimates of the utility gap model reveal a weaker welfare impact of the expenditure variable compared to the one obtained earlier from the cross-sectional estimation. In contrast to the finding of a largely insignificant cross-sectional relationship between personal unemployment status and individual assessments of economic welfare, a change from employment in period  $t$  to unemployment in period  $t + 1$  is observed to be associated with a sharp drop in reported economic welfare. The differences between cross-sectional and panel estimates thus emphasizes the relative importance of personality traits in determining individual assessments of subjective well-being. More generally, the evidence argues for better panel studies to be undertaken in developing countries that are similar to those in other advanced industrialised economies.

Chapter 6 investigates one of the central tenets in the field of the economics of marriage, that a married person becomes happier when his or her spouse becomes happier. Whilst the idea of interdependence in utility between married partners is taken much for granted from real life observation, it is rarely brought to test. This is probably because of a clear simultaneity problem between an individual and his or her partner's well-being. The analysis within this chapter seems to have two advantages. First, individuals are followed longitudinally and the same person's well-being and his or her partner's well-being are measured at different points in time. Second, the partner's well-being (or reported life satisfaction in this case) is instrumented by his or her person-specific, 'unexplained' subjective health index. This time-varying variable, as defined by psychologists as a proxy for mood-dispositional dimension, is derived by taking a residual from a 'within' least squares

regression on the partner's self-rated health status.

The British evidence did, indeed, suggest, as theory would predict, that one's well-being depends on the well-being of one's partner in a marriage. There is therefore evidence of utility interdependence. The estimated coefficient on the spouse's life satisfaction, after instrumentation, is positive and well-defined, even after controlling for individual fixed effects. An increase in the spouse's life satisfaction from one standard deviation point below the mean to one standard deviation above the mean was more than enough to compensate for around 20% of the non-pecuniary cost of unemployment on one's life satisfaction in the British sample. The same significant result could not be obtained, however, for those couples in a cohabiting union: utility interdependence is weaker outside formal marriage. Hence, evidence within this chapter suggests that measures of subjective well-being can be used fruitfully by economists to provide relevant new insights into theories of the economics of marriage.

Overall, this thesis finds similarities between the subjective well-being equations as estimated for developed and developing nations. It also builds upon the small but rapidly growing research work on the determinants of subjective outcome using developing countries data.

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