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# Subjective Questions to Measure Welfare and Well-being

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# **Subjective Questions to Measure Welfare and Well-Being: A survey**

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# **Subjective Questions to Measure Welfare and Well-Being: A survey**

## **Abstract**

This paper provides arguments in favor of using subjective questions as a proxy to measure welfare and well-being. This approach makes it possible to avoid having to define welfare and well-being means and having to identify the relevant indicators. Instead, individuals themselves define their level of welfare and well-being. For a meaningful analysis of subjective questions, two main assumptions are needed: namely, that individuals are able to evaluate their own situation, and that responses among individuals can be compared. Both assumptions are discussed here. Next, empirical studies that use subjective questions are surveyed. This offers a first approximation of the structure of individual well-being and preferences. Finally, four areas of application are identified, along with a short survey of relevant studies.

**Keywords:** Preferences; Satisfaction; Welfare measurement; Well-being measurement.

**JEL classification:** D6, I30, I31.

**PsycINFO classification:** 3120, 3040

## 1. Introduction

Individual satisfaction with life, quality of life, happiness and well-being are broad concepts that include not only material achievements but also other aspects of life, such as health, love, employment, and having children. In other words, individual satisfaction with life is a multi-dimensional concept. This implies, *inter alia*, that income falls short on assessing it. Economics, however, often defines individual welfare in terms of income or material satisfaction. In this paper, the term *well-being* is used to denote individual satisfaction with life, and *welfare* refers to the more narrow concept of financial satisfaction. In order to be more specific, the various aspects of life relevant for individual welfare and well-being need some clarification. In common language, people speak about ‘individual  $x$  being happy’ or ‘country  $y$  having a high quality of life’. In science, however, researchers are often skeptical about using concepts like happiness and well-being, mainly because it is difficult to measure and define them. Nevertheless, national policymakers and international organizations are in need of quality of life indicators for the evaluation and comparison of the socio-economic performance of countries. A well-known example is the Human Development Index of the United Nations. To construct such an index, subindicators need to be selected. For example, if education and health are believed to be relevant for the well-being of a population, indicators such as literacy and hospital beds can enter the index. The choice of subindicators of well-being or quality of life depends on the dimensions that are considered to be relevant: for instance, education, health, employment and income.

In standard economics, utility theory is mainly used as a theoretical tool to explain and predict behavior. Most economists are, however, very reluctant to bring utility into an empirical framework, so as to measure and compare utility levels of different people. In fact, for most economists the measurement of welfare is a non-issue. Instead, income is often considered as a good proxy for (material) welfare. This becomes most clear in the widespread use of GDP/capita as an indicator of country performance.

This paper starts from the premise that one can use subjective questions as a proxy to measure welfare and well-being. Most economists have argued that good definitions for utility, welfare, and well-being are lacking so that these concepts are not measurable. Simon (1974), however, has argued that the use of proxy variables does not require such

definition. Therefore, subjective questions can be used as a proxy for measuring welfare and well-being. This article reviews the main approaches that use subjective questions, along with assumptions, characteristics and some applications. Subjective questions on welfare and well-being have been included in household questionnaires for many decades. While some psychologists and economists have been reluctant to use such questions, others have made ample use of them (for a survey, see Kahneman et al., 1999). By using the answers to subjective questions, one does not need to define precisely what welfare and well-being mean. Instead, individuals define their level of welfare and well-being themselves. Subsequently, the relationship between the subjective answers and objective economic and non-economic variables, such as income, employment situation, or marital status, can be statistically examined.

The paper is organized as follows. Section 2 introduces the main subjective questions that are being used to measure welfare and well-being. Section 3 briefly discusses the two main assumptions underlying the use of subjective questions: namely, that individuals are able to evaluate their own situation, and that responses among individuals are comparable. Section 4 reviews findings on the determinants of welfare and well-being, which offer insight into the structure of welfare and well-being. Section 5 presents some relevant applications of subjective questions. Section 6 concludes.

## **2. Main subjective questions for measuring welfare and well-being**

Subjective questions on well-being ask individuals about their life satisfaction in general or with respect to various domains of life, such as job, housing, or health. Subjective questions on welfare ask respondents to evaluate their actual income, any hypothetical income, or their general financial situation. Responses to questions on satisfaction with life in general are often referred to as Subjective Well-Being (SWB) or General Satisfaction (GS). Responses to subjective questions about satisfaction with concrete domains of life are referred to as Domain Satisfaction (DS), the main ones in the economic literature being Financial Satisfaction (FS), Job Satisfaction (JS), and Health Satisfaction (HS).

A relevant characteristic of the subjective measures is that they take into account individual perceptions. This has the implication that SWB can remain constant over time

even when the individual situation, as measured by objective variables such as income, changes. This dichotomy can be explained by the adaptation of individuals to a new situation through a change in their expectations. Another possible explanation is that individual subjective well-being and welfare are relative concepts that should be seen in a social context. For instance, individual welfare does not necessarily improve with a higher income, if the income of individuals in the same reference group is increasing as well.

Psychologists have measured individual well-being by means of subjective questions since the late 1960s, starting with Cantril (1965), Wilson (1967) and Bradburn (1969). An overview of this literature is presented in Kahneman et al. (1999). More recently, a large number of studies by economists have made use of subjective questions on welfare, well-being, and satisfaction with the domains of life. These include Clark (1997, 1999, 2000), Clark and Oswald (1994, 1996), DiTella et al. (2001), Easterlin (1974, 1995, 2000), Ferrer-i-Carbonell and van Praag (2000, 2001), Frey and Stutzer (1999, 2000a, 2000b), Frijters (2000), Frijters and van Praag (1998), Kapteyn (1994), Ng (1996, 1997), Oswald (1997), Pradhan and Ravallion (2000), Ravallion and Lokshin (1999, 2000), van Praag and Plug (1995), van Praag et al. (2000), and Woittiez and Theeuwes (1998).

The remainder of this section presents a review of the subjective questions that are most relevant for economic studies. The ‘Cantril question’ is one of the most well-known questions on individual well-being. This question developed by Cantril in 1965 and variations of it, such as the Likert-Scale (Likert, 1932), have been widely applied for various countries. The World Data Base of Happiness by Veenhoven (1995) presents an overview of questionnaires that include this type of subjective question on life satisfaction, well-being, and happiness. They are usually termed subjective well-being questions. The original Cantril question is as follows:



Here is a picture of a ladder, representing the ladder of life. Suppose we say the top of the ladder (step 10) represents the best possible life for you, and the bottom (step 0) represents the worst possible life for you. Where on the ladder do you feel you personally stand at the present time? Please mark the appropriate step.

**Figure 1: The Cantril Question**

An answer to this or any similar subjective well-being question represents an individual's Subjective Well-Being (SWB) or General Satisfaction (GS). In some questionnaires, respondents are also asked about where on the ladder they were 5 years before and where they expect to be after 5 years. The latter questions are relevant for testing the importance of "adaptation theory" (see Section 4.2). In addition, respondents are sometimes asked where on the ladder they would put their own country as a whole. This question is relevant for assessing the importance of an individual's perceived relative well-being position in society (see Section 4.2). In some surveys, the SWB question is asked twice, i.e. at the beginning and at the end of the questionnaire. This allows the researcher to see the effect on the responses of the individual having gone through the whole questionnaire, which makes the respondent possibly more conscious about his or her own situation. Indeed, it is found that respondents often change their perception of their own well-being after having considered various aspects of their life as stimulated by a questionnaire.

The answers to SWB questions have been econometrically estimated, so as to find the relationship between individual well-being and objective variables, such as income and employment status. Since the answers to SWB questions take discrete values, these questions have been mostly estimated by means of (ordered) probit or logit techniques.

Asking about well-being or general satisfaction often involves posing questions about individual satisfaction with respect to some domains of life, such as employment, financial situation, health, housing, leisure, marriage, and environment. These questions have the following structure<sup>1</sup>:

How satisfied are you with the (financial) situation of your family?										
0	1	2	3	4	5	6	7	8	9	10
Not at all									Very	
satisfied									satisfied	

**Figure 2: The Subjective Financial Satisfaction Question**

The answers to this question illustrate individuals' own evaluation of a concrete domain satisfaction (DS), in this case their financial situation. Like the SWB question, the DS questions have been empirically examined with econometric techniques. Generally, it is assumed that domain satisfactions depend on objective variables. The Financial Satisfaction (FS) question is considered as a measure of welfare, and the other DS questions are components of individuals' well-being. Some economists have used a health satisfaction question in evaluation and QALY (Quality of Adjusted Life Years) studies (see, e.g., Cutler and Richardson, 1997; Ferrer-i-Carbonell and van Praag, 2000; Groot, 2000; and Kerkhofs and Lindeboom, 1995). Other economists have used the job satisfaction question or the SWB question to study individuals' behavior on the job market (see, e.g., Clark and Oswald, 1994; Clark, 1997, 1999 and 2000; Drakopoulos and Theodossiou, 1997; Groot and Maassen van den Brink, 1999; Wottiez and Theeuwes, 1998). A full model of the structure of individual well-being has been estimated by van Praag et al. (2000). They explain GS by objective variables and by various DS.

The answers to subjective questions, both SWB and DS, are qualitative and take discrete values ranging from, for example, 0 to 10. The responses to the SWB questions are, therefore, discrete and ordered, so that they belong to the class of qualitative or limited variables. Hence, SWB questions are, in most cases, analyzed by using econometric techniques, such as ordered probit or logit. Furthermore, various researchers make use of panel data, in which case ordered probit or logit techniques with individual effects are used (see, for example, Ravallion and Lokshin, 2000; and van Praag et al., 2000).

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<sup>1</sup> For illustration, the question from the German Socio-Economic Panel (Wagner et al., 1993) is used.

### **3. Main assumptions underlying the analysis of subjective questions**

#### **3.1 People can evaluate their own situation**

Most economists are skeptical about subjective and hypothetical questions. They have instead focused on observed behavior in market situations (i.e. revealed preferences), or in controlled settings (i.e. experimental economics). Revealed preferences studies include the valuation of nonmarket goods, such as noise and pollution, through house prices (Smith and Huang, 1995), and the evaluation of risk attitudes through the examination of job or insurance markets (Viscusi, 1993). Nevertheless, some studies on individual behavior and preferences have been based on subjective or hypothetical questions. Examples are questionnaires in which respondents are asked about risk attitudes and hypothetical lotteries (see, e.g., Donkers and van Soest, 1999; Hartog et al., 2000) and contingent valuation studies on willingness to pay (WTP) (see, e.g., Bateman et al., 2000).

Currently, most economists regard utility as a theoretical concept to explain and predict economic behavior. Indeed, the use of the notion of utility has slowly shifted from representing ‘satisfaction’ or ‘welfare level’ to merely expressing individual preferences. Gibbard (1996) argues that emphasizing preference as the fundamental element of utility implies that welfare is defined as the extent to which preferences can be satisfied. In this context, revealed preferences indicate welfare. Focusing attention on observed behavior ignores the fact that individual behavior is driven not only by the achievement of higher levels of utility or well-being but also by feelings of revenge and jealousy, imitation of others, social norms and institutions, and legal prohibitions (Gibbard, 1996). This means, for instance, that certain preferences will never be revealed. For example, an individual who has a desire to consume drugs may not reveal this because of legal repercussions or social norms. Therefore, studying individual welfare by only looking at market behavior will not enable one to capture the positive impact that consuming illegal drugs would have on this individual’s welfare. In other words, revealed preferences are an incomplete image of the set of individual preferences.

Non-economists should note that utility in modern economics is a subjective concept. Utility, to the surprise of most language students, does not express ‘value’ or ‘usefulness’ but ‘desiredness’ and ‘satisfaction’. In Black’s words: “utility in the sense of

desiredness is a purely subjective concept, clearly distinct from usefulness or fitness for a purpose” (1987, p. 295). Hence, given that utility is a subjective concept, one would tend to think that subjective questions could best capture and measure it. Similarly, Diener et al. (1997), psychologists working on happiness and well-being, argue that individuals themselves are the ones that can best judge their own situation regarding well-being, and therefore subjective questions seem to be most suitable for this purpose.

Psychologists studying well-being have compared different measures of SWB and found that these are often mutually consistent. For example, self-reported SWB correlated with the amount of smiling (Sandvik et al., 1993). Nevertheless such findings are not always conclusive, and the development and comparison of alternative measures of SWB are being studied by many psychologists so as to develop better instruments for measuring it (Diener and Biswas-Diener, 2000).

For more than three decades, psychologists, sociologists, and economists have used a range of statistical-econometric techniques to analyze answers to subjective questions on welfare and well-being. They have found that, in general, studies provide consistent results that, moreover, agree with our common sense (see Section 4). This indicates that individuals understand and are able to answer subjective questions.

### **3.2 Interpersonal comparisons are possible**

A meaningful analysis of subjective questions of welfare and well-being requires that individuals’ responses are mutually comparable. In other words, it is assumed that individuals understand and respond to subjective questions in similar ways. Findings indicate that, at any rate within the same language community, individuals have a very similar understanding of concepts such as welfare, well-being, and happiness. Van Praag (1991) has found evidence that individuals belonging to the same language community translate verbal labels in a context-free framework into similar numerical values. More specifically, not only are the meanings of “good” and “bad” the same for all respondents, but also the equivalence between these verbal labels and a numerical scale (e.g., 0 to 10) is judged in a similar way by respondents.

Most economists, however, have resisted the comparison of individual feelings, perceptions, welfare, utility, and well-being. Actually, the use of the utility concept for

normative purposes has been practically ruled out by the economic literature, based on the assumption that individual utilities or welfare are incomparable.

The utility concept was first introduced by Jeremy Bentham (1789) as an instrument for predicting behavior and for normative analysis, such as interpersonal comparison. In the early studies, interpersonal comparability was not considered impossible even though it was understood to be difficult (Black, 1987). Important economists of the late 19th century, such as Marshall, Menger, and Walras, were receptive to the possibility of interpersonal (or inter-group) comparison of utility or welfare (Black, 1987). Bentham and Walras spoke about *total utility* and *maximum of utility*, respectively (Black, 1987; Sen, 1999). At the beginning of the 20th century, Pigou (1920) defended the use of income as a proxy to compare welfare among individuals. Later on, starting in the 1930s with Lionel Robbins, most economists started to question the measurement of utility. Together with the establishment of the difference between cardinal and ordinal utility and the domination of the Pareto efficiency concept, the impossibility of interpersonal comparisons became a widespread belief (Gibbard, 1996; Hammond, 1996; Scitovsky, 1951; Sen, 1995, 1999). Robbins (1932, 1938), who can be considered the father of the New Welfare Economics, argued that interpersonal comparability was a normative concept that should not be brought into economics. Like most economists of that time, Robbins was profoundly influenced by the philosophy of logical positivism that even now still dominates in economics. A decade later, Arrow's (1950, 1951) famous Impossibility Theorem put welfare economics in disarray, as it showed that the construction of a Social Welfare Function is impossible in the absence of interpersonal comparisons of individual welfare. Arrow (1950) reflects the opinion of the followers of the New Welfare Economists, when stating that: "It will continue to be maintained that there is no meaningful interpersonal comparison of utilities..." (p.343). Many economists have responded to Arrow's approach by relaxing this assumption. With ordinal interpersonal comparisons, unique social welfare orderings can be derived, i.e. the construction of a Social Welfare Function becomes possible (see Sen, 1999). Furthermore, it has been shown that interpersonal comparability of individual welfare and well-being can be derived from empirical work, either by comparing objective indicators of individuals' material achievements (e.g. Atkinson and Burgounion, 1982; Jorgenson,

1990; Pollak and Walles, 1979) or by comparing subjective indicators, such as those derived from SWB questions. Thus, one has to ask what is to be compared (Sen, 1999): material achievements, such as income, or subjective states, such as well-being? This paper does not enter into issues regarding methods for interpersonal comparison, definitions of equality, or discussions on welfare economics. For an outstanding exposition on social choice and interpersonal comparisons, see the Nobel Prize lecture given by Sen (Sen, 1999).

Many economists have argued in favor of different degrees of interpersonal comparison, so as to allow social welfare judgments of socially relevant issues, such as poverty and inequality (e.g., Hammond, 1996; Harsanyi, 1987; Ng, 1996, 1997; Sen, 1999 and Tinbergen, 1991). In fact, many policies that re-distribute income use interpersonal comparisons based on income as a unit of comparison. In other words, distribution policy as performed in most countries regards income as a proxy variable for welfare or utility and assumes that welfare can be compared among individuals on the basis of income. According to Hammond (1996), the main exception to the reluctance to make interpersonal comparison has been the “... almost certainly unethical comparisons that result from weighting all individuals’ dollars equally” (p. 411). Scitovsky (1951) argues that policy recommendations always imply some degree of interpersonal comparison. Actually, to avoid interpersonal comparisons, policy decisions would need to be strictly based on the pareto-criterion. Furthermore, in everyday situations individuals always make interpersonal comparisons when deciding, for example, to whom they will give a present—for instance, a spare ticket for a soccer game (Harsanyi, 1987; Simon, 1974; Hammond, 1996).

#### **4. Determinants of welfare and well-being**

This section presents a selection of empirical findings in the literature that use subjective questions of welfare and well-being. The objective of this is twofold. First, the comparison of the results obtained in several studies allows us to disentangle the determinants of welfare and well-being. This in turn offers a first approximation of the structure of individual welfare and well-being. Second, the empirical findings in the literature of subjective welfare and well-being can be used to examine the consistency,

across time and countries, of the answers to subjective questions. Consistency among studies would provide support for the significance and reliability of the method that uses subjective questions to measure welfare and well-being. In other words, consistency would represent an *empirical validation* of the meaningfulness of the answers to subjective questions. Similarly, results should be consistent with findings in other disciplines, as well as with our common sense. For example, the correlation found between subjective questions on health (self-reported health) and objective variables, such as ‘mortality’ or ‘absence of work for illness’ (Idler and Kasl, 1995), suggests that generally individuals are able to evaluate, understand, and ‘correctly’ report their health situation.

The literature on the determinants of subjective well-being (SWB) is very large and provides many interesting insights. Here, special attention is drawn to income and employment variables. In addition, variables such as health, children and noise are discussed. The determinants of well-being can be divided in two groups: namely, objective variables (e.g. income and age) and subjective variables (e.g. financial satisfaction and self-reported health). The objective variables are called *external factors* of SWB, while the subjective variables are related to *internal factors* (Diener and Lucas, 1999). Clearly, objective variables do not fully explain individual SWB, especially since the importance of personality on determining individual well-being and happiness can not be neglected. Objective socio-economic and demographic variables explain somewhere between 8 and 20% of an individual’s subjective well-being (see Kahneman et al., 1999). This finding has led to a slow shift in the psychology literature from studying external factors to focusing on internal factors. For economists, however, external factors, such as income or employment, are still very important. In other words, not only are the SWB levels and changes relevant but also the ‘resources’ and the ‘objective environment’ that partly determines SWB.

### **SWB and income**

The relationship between income and SWB has been one of the most discussed topics in the SWB literature. The main and most controversial issue has been the role of income in individual well-being. Many early studies on SWB claimed that income correlated

weakly with SWB. Furthermore, it was argued that in poor countries, or among poor people in richer countries, the correlation between income and life satisfaction was higher than for richer countries or people. This suggests that increases of income considerably enhance well-being until a certain threshold level, after which further increases of income do not improve individual well-being substantially. More recent research based on larger data sets supports this conclusion (Argyle, 1999; Diener et al., 1993).

Nevertheless, these results should not be interpreted to mean that income is totally irrelevant for well-being beyond certain income levels. Income allows people, in modern societies, to enjoy, for example, expensive leisure activities. This statement could be interpreted as being in contradiction with the aforementioned empirical findings. However, the following points should be borne in mind.

First, more important than income in absolute terms ('absolute income') is the subjective perception of income ('subjective income'). In other words, general satisfaction with life (SWB) depends on whether individuals perceive their income as adequate to satisfy their needs, where needs include not only food and shelter but also higher needs such as social acceptance or self-esteem (see Maslow, 1970). This argument is empirically sustained by the higher correlation found between SWB and 'subjective income' than between SWB and 'absolute income'. For example, Schyns (2000) found for the Russian Federation that 'income satisfaction' was more highly correlated with SWB than 'absolute income'. Similarly, Financial Satisfaction (FS) usually has the highest coefficient when regressing SWB on various DS (e.g. van Praag et al., 2000). This indicates that satisfaction with one's own financial situation is an essential part of SWB.

Second, one's own income compared with (or relative to) the income of other people has an influence on SWB. This reflects the fact that satisfaction with one's own income depends on the relative position of the individual in the society. According to Easterlin (1995, p.36): "... happiness or subjective well-being, varies directly with one's own income and inversely with the incomes of others". The idea that individuals compare their income with that of other people is clearly consistent with the social comparison models and the discrepancy theories in psychology (see, e.g., Michalos, 1985). In Russia, for example, the variable defined as 'my financial situation is much less than average,...',



much more than average' showed a much higher correlation with SWB than the family income itself <sup>2</sup>. An important question in this context is: What is the reference group of an individual (van der Sar et al., 1988)? Does it include people from the same neighborhood or with the same level of education? There has been some theoretical and empirical work on the importance of reference groups for individual welfare and well-being (see, e.g., Falk and Knell, 2000; van de Stadt et al., 1985; Woittiez and Kapteyn, 1998).

Third, individual income perception depends on one's own situation in the past. Easterlin (1995) calls this 'habit formation': changes in income are more important determinants of individuals' satisfaction with life than 'absolute income'. Nevertheless, individuals seem to adapt to increases of income by changing their expectations. This suggests that increases of income will increase satisfaction only temporarily. An example supporting this view is a study of lottery winners who report higher levels of satisfaction only for a short time after winning a lottery (Brickman et al., 1978). Similarly, Schyns (1999, 2000) found a small coefficient for the effect of changes in income on life satisfaction in Germany and the Russian Federation. In an extensive literature review, Diener and Biswas-Diener (1999) conclude that changes in income —contrary to expectations— not influence SWB, while average income does. A relevant question for economists is whether the adaptation phenomenon only relates to an income increase or also to a reduction. Frey and Stutzer (1999) found for Switzerland that increases in income with respect to the previous year had a very small effect on general satisfaction with life (SWB), while reductions in income had a significantly negative impact on the SWB. Adaptation theory, therefore, needs to be treated with some caution as the evidence is contradictory (see also Frederick and Loewenstein, 1999; Diener et al., 1997). The income adaptation evidence led Easterlin (2000) to draw a distinction between long-term and short-term utility. According to Easterlin, as income increases, aspirations change. In particular, increases of income shift the short-term utility curve to the right, giving rise to an almost 'flat' long term-utility. Earlier, van Praag (1971) had already found this result, which he refers to as *preference drift*.

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<sup>2</sup> The results of these regressions are available from the author.

The previous insights are relevant to the discussion of income growth and progress. The influence of income perceptions on SWB, taking into account relative income and adaptation to income increases, leads to the conclusion that equally distributed income growth does not necessarily improve individual SWB. Diener et al. (1999) and Oswald (1997) present some evidence of this for the USA and various European countries since the 1970s. Similar evidence has been found for Japan between 1958 and 1987 (Veenhoven, 1993). Nevertheless, this does not imply that income is unimportant for individual well-being. Moreover, while there is some evidence that economic growth does not increase SWB in the western countries, the opposite is not necessarily true, i.e. decreases in income might decrease individual SWB.

### **SWB and employment**

Having a job is positively correlated with subjective well-being, and being unemployed negatively (Clark and Oswald, 1994; Frey and Stutzer, 1999; Oswald, 1997; Winkelmann and Winkelmann, 1998; Woittiez and Theeuwes, 1998). Clark and Oswald (1994) found ‘unemployment’ to be the most relevant variable for mental distress, with higher coefficients than variables such as being divorced or a widower. This is consistent with suicide statistics, which indicate that being unemployed is the main cause of emotional distress (Oswald, 1997). Similarly, other studies have detected a high correlation between subjectively evaluated Job Satisfaction (a DS) and SWB (see a meta-analysis study by Tait et al., 1989). Clearly, it is not the same to be dissatisfied with one’s job as to be unemployed.

Unemployment has two impacts: first, it adversely affects the financial stability of the individual, and secondly, it is a source of emotional instability and reduction of self-esteem. Several studies have found that the ‘non-pecuniary’ costs of being unemployed are more important than the economic costs (see, for example, Oswald, 1997, for the UK; Winkelmann and Winkelmann, 1998, for Germany; and Frey and Stutzer, 1999, for Switzerland). This result suggests that economic policies aimed at reducing unemployment are more relevant for increasing SWB than welfare policies that focus on compensating unemployed individuals for a loss of income. Clark and Oswald (1994) and Clark (2000), however, find that the negative effects of being unemployed vary across

groups, being lowest for the young people, individuals living in areas with a high unemployment rate, and people who have been unemployed for a long time.

### **SWB and other economic, social, and demographic variables**

Next, several other variables relevant for SWB are discussed. While in early studies it was argued that increases in age reduced happiness, recent findings suggest that this is not a universal truth. Many studies find a negative correlation between age and SWB only until the middle of life (the 30s and 40s), after which point satisfaction increases with age. This is the well-known ‘age *U-shaped relationship*’ (see, for example, Clark and Oswald, 1994; Oswald, 1997; van Praag et al., 2000). Much of the evidence is based on either cross-sectional analysis or longitudinal studies. Since these do not correct for a generational effect, age and cohort effects can not be separated.

Gender differences are usually very small. Women are, in general, more frequently depressed and experience more negative emotions than men but are not consistently unhappier. Diener et al. (1999) explain this by suggesting that even if women experience negative emotions more often, they also experience more positive emotions, so that these balance out. The empirical evidence using SWB questions seems contradictory. Some studies find women to be happier and others men, but the difference tends to be small. Van Praag et al. (2000) find for Germany that women are in general more satisfied except with regard to leisure satisfaction.

Having a partner or being married contributes positively to life satisfaction (Argyle, 1999; Lee et al., 1991, Oswald, 1997). Love, partnership, and marriage have been found to be positively and highly correlated with subjective well-being, as well as with one’s health (Myres, 1999). It is not clear, however, which influence dominates: whether having a partner increases individual well-being, or whether being happy increases the probability of getting and maintaining a partner (Diener et al., 1997). Surprisingly perhaps, the number of children is, in general, found to have a negative, although small, impact on life satisfaction (Argyle, 1999; Clark and Oswald, 1994; Frey and Stutzer, 1999; van Praag et al., 2000).

Health correlates highly with SWB (see, e.g., Ferrer-i-Carbonell and van Praag, 2000). This correlation is generally lower when health is measured by objective variables

instead of by subjective or self-reported variables (Argyle, 1999). This reflects the importance of personality, which influences the subjective evaluation of one's own health situation (Diener and Lucas, 1999; Diener et al., 1999).

Some other characteristics of individuals correlate with SWB. Religion correlates positively with SWB (see, e.g., Ellison, 1991). Education is normally also found to have a positive though low correlation with SWB. It is, however, difficult to disentangle whether the correlation is due to a pure education effect or due to other factors that are correlated with higher education, such as having a higher 'social status' and having an 'exciting job' (Diener et al., 1999). The relationship between inflation and SWB is also found to be negative (see, e.g., Di Tella et al., 1999). Finally, direct democracy, i.e. the possibility to participate in a referendum, is found to correlate positively with SWB in a study for Switzerland (Frey and Stutzer, 2000a).

## **5. Some applications of subjectively measured welfare and well-being**

The empirical analysis of welfare and well-being allows economists and behavioral scientists to undertake a wide range of scientifically and politically relevant studies. In this section, four main areas of study are examined. First, subjective questions can be used to disentangle the determinants of welfare and well-being. In other words, the structure of individuals' welfare and well-being can be modeled and individual preferences can be studied (van Praag 1971; Frey and Stutzer, 1999). To link the structure of individual well-being to preferences and behavior, the underlying assumption is clearly that individual behavior is driven by the achievement of higher welfare or well-being. Traditionally, economists have not focused on the study of preferences and have left this to anthropologists, psychologists and sociologists. In Stigler's and Becker's words: "the economists continue to search for differences in prices or incomes to explain any differences or changes in behavior" (1977, p.76). In recent times, however, there has been an increased awareness of the importance of understanding preferences to disentangle economic behavior (see, e.g., Bowles, 1998; Bowles and Gintis, 2000). Subjective questions can be used for this aim as they provide many insights about individual preferences and behavior. For example, behavioral economists have long underlined the importance of the comparison effect, i.e. the behavioral attitude of comparing oneself

with other people (a *reference group*). By using subjective questions, the importance of the comparison effect can be assessed. In another example, Clark (2000) found for England that an individual's unemployment had a negative impact on subjective well-being, whereas unemployment in the region had a positive impact. This finding is relevant for economics as it may contribute to explanations of unemployment polarization and labor market hysteresis (Clark, 2000).

Second, the study of the determinants of welfare and well-being can be used to evaluate the impact of socio-economic policies on individual welfare and well-being (Frey and Stutzer, 1999; Diener and Biswas-Diener, 1999). On the basis of this, socio-economic policies can be evaluated and redesigned. For example, assessed relationships between children and well-being can inform policies for family support, or those between unemployment and individual well-being can help to design policies relating to unemployment benefits. Similarly, Oswald (1997) argues that the "economics of happiness" is relevant to traditional economics as it may be used to "test old ideas in new ways" (p. 1815). For instance, happiness reports can serve to test politically relevant ideas such as 'economic growth is good' or 'inflation is bad'. Also along these lines, SWB questions can shed light on the welfare impact of trade-off policies, such as inflation versus unemployment (DiTella et al., 2001).

Third, the study of subjective questions can be used to design distributional policies (Ng, 1996). Traditionally, distributional policies have been aimed at improving income distribution. Nevertheless, one can imagine that equality of well-being is a more desirable objective than equality of income. By means of subjective questions, the researcher can define poverty according to individual's own evaluations. The economic literature has focused mainly on defining and estimating poverty as the lack of economic means. Nevertheless, poverty could also be defined more broadly: for example, as the lack of well-being or as a certain relative income level. It follows that subjective poverty could be estimated by using financial (or income) subjective questions (*welfare poverty*) or by using subjective questions on well-being (*well-being poverty*) (see Goedhart et al., 1977). A comparison between welfare and well-being poverty has been made for the Russian Federation by Ferrer-i-Carbonell and van Praag (2001).

Fourth, studies of the determinants of welfare and well-being help us to understand existing trade-offs between income and other variables, such as employment, health, and children. With this information one can perform an empirical analysis of family equivalence scales or shadow prices for goods such as ‘being employed’, health, noise, and climate. Usually, the family equivalence scales are estimated by objective measures based on expert opinions: for example, the well-known Oxford Scale. Subjective family equivalence scales, however, are based on individuals’ answers to subjective questions about, for instance, evaluation of income or life satisfaction (see, e.g., Plug and van Praag, 1995). In standard economics, shadow prices are usually estimated using observed behavior, i.e. through individual preferences expressed in parallel or linked markets. For example, the shadow price of noise is usually estimated by its effect on housing or property values. The shadow price indicates the change of welfare followed by a change in the provision of a good. Therefore, the shadow price could also be estimated by means of subjective questions on welfare and well-being. For example, the decrease in well-being caused by a reduction of health satisfaction due to a chronic disease can be measured by means of subjective questions. Similarly, the necessary increase in income to ‘compensate’ for such a decrease in well-being can also be assessed (see Ferrer-i-Carbonell and van Praag, 2000; Groot and Maassen van den Brink, 2000). In a similar way, one can value a large range of changes in the provision of nonmarket ‘goods’, such as noise and climate. Empirical results have been obtained by Frijters and van Praag (1998) and van Praag (1988), for climate; by van Praag and Baarsma (2000), for noise; and by van Praag and Plug (1995), for children.

## **6. Conclusions**

This paper has provided arguments in favor of the use of subjective measures as a proxy to measure individuals’ welfare and well-being. Subjective measures are based on respondent’s answers to questions about the evaluation of their own life satisfaction or of satisfaction with domains of life, such as their financial situation, employment, and health. For a meaningful analysis of these subjective questions, one needs to assume that individuals are able to evaluate their own situation, and that responses among individuals are comparable. The first assumption is supported by the consistency found among the

empirical studies on SWB questions. The second assumption, with a long history in economics, is more controversial. Several economists have defended the possibility and the need to compare individuals on the basis of some objective welfare indicator.

The empirical analysis of SWB indicates that satisfaction with income is relevant for individual well-being. Satisfaction with income is, however, not fully proportional to income. Concretely, satisfaction with income is influenced by an individual's income development over time, as well as by his or her relative position in society, i.e. relative welfare. Employment status is one of the main causes of well-being. Unemployment not only has economic consequences but is also a cause of emotional distress. In empirical studies, the non-monetary consequences of unemployment have been found to greatly influence individual well-being. Similarly, variables such as health, age, living with a partner, education, and inflation have been found to influence welfare and well-being. Needless to say, personality traits and unobservable variables explain a major part of individual welfare and well-being. Nevertheless, these variables are either outside the control of policymakers or unknown, and thus of less interest for economists.

SWB questions are important to economists and behavioral scientists for various reasons. First, they can be used to examine the structure of individuals' welfare and well-being and thus assist in understanding individuals' preferences and in predicting behavior. Second, SWB questions allow the evaluation of many socio-economic policies. Similarly, relevant aspects, such as unemployment, can be evaluated by their effect on individual well-being. Third, measuring welfare and well-being contributes to the assessment of distributional problems, as well as to the understanding of who is, or is not, relatively well-off, and why. Fourth, understanding the structure of welfare and well-being sheds light on the potential trade-off between variables such as income, health and children.

## References

- Argyle, M., 1999. Causes and correlates of happiness. In: D. Kahneman, E. Diener, and N. Schwarz (eds.). *Well-Being: The Foundations of Hedonic Psychology*. Russell Sage Foundation, New York. Chapter 18.
- Arrow, K.J., 1950. A difficulty in the concept of social welfare. *Journal of Political Economy*, 58 (4): 328-346.
- Arrow, K.J., 1951. *Social Choice and Individual Values*. John Wiley and Dover, New York.
- Atkinson, A.B. and F. Bourguignon, 1982. The comparison of multi-dimensioned distributions of economic status. *Review of Economic Studies*, 49: 183-201.
- Bateman, I.J., I.H. Langford, A. Munro, C. Starmer, and R. Sugden, 2000, Estimating the four Hicksian measures for a public good: a contingent valuation investigation. *Land Economics*, 76(3): 355-373.
- Becker, G.S., 1973, A theory of marriage: Part I. *Journal of Political Economy*, 81(4): 813-46.
- Becker, G.S., 1974, A theory of marriage: Part II. *Journal of Political Economy*, 82(2): S11-S26.
- Becker, G.S., 1976, Altruism, egoism, and genetic fitness: economics and sociobiology. *Journal of Economic Literature*, 14: 817-826.
- Bentham, J., 1789. *An introduction to the principle of morals and legislation*. Reprinted by New York : Hafner Publishing, 1948.
- Black, C.R.D., 1987. Utility. In: J. Eatwell, M. Milgate and P. Newman (eds.). *The New Palgrave. Utility and Probability*. MacMillan Reference Books. pp. 295-302.
- Bowles, S., 1998. Endogenous preferences: the cultural consequences of markets and other economic institutions. *Journal of Economic Literature*, 36: 75-111.
- Bowles, S. and H. Gintis, 2000. Walrasian economic in retrospect. *Quarterly Journal of Economics*, 115(4): 1411-1439.
- Bradburn, N.M., 1969. *The structure of psychological well-being*. Aldine Publishing Company, Chicago.
- Brickman, P., D. Coates and R. Janoff-Bulman, 1978. Lottery winners and accident victims: Is happiness relative?, *Journal of Personality and Social Psychology*, 36(8): 917-927.
- Brouwer, R., I.H. Langford, I.J. Bateman and R.K. Turner, 1999. A meta-analysis of wetland contingent valuation studies. *Regional Environmental Change*, 1(1): 47-57.
- Cantril, H., 1965. *The Pattern of Human Concerns*. Rutgers University Press. New Brunswick.
- Clark, A.E., 1997. Job satisfaction and gender: Why are women so happy at work? *Labour Economics*, 4(4): 341-72.



- Clark, A.E., 1999. Are wages habit-forming? Evidence from micro data. *Journal of Economic Behavior and Organization*, 39( 2): 179-200.
- Clark, A.E., 2000. Unemployment and social norms: Psychological evidence from panel data. Paper presented at the Conference on “Measuring Welfare and Well-Being”, Tinbergen Institute and University of Amsterdam, Amsterdam, the Netherlands, August 2000.
- Clark, A.E. and A.J. Oswald, 1994. Unhappiness and unemployment. *Economic Journal*, 104 (424): 648-659.
- Clark, A.E. and A.J. Oswald, 1996. Satisfaction and comparison income. *Journal of Public Economics*, 61: 359-381.
- Cutler, D. and E. Richardson, 1997. Measuring the health of the U.S. population. *Brooking Papers: Microeconomics*, 1997: 217-271.
- Diener, E. and R. Biswas-Diener, 1999. Income and subjective well-being: Will money make us happy? Unpublished, Department of Psychology, University of Illinois.
- Diener, E. and R. Biswas-Diener, 2000. New Directions in Subjective Well-Being Research: The Cutting Edge. Mimeo University of Illinois.
- Diener, E. and R.E. Lucas, 1999. Personality and subjective well-being. In: Kahneman, D., Diener, E., and Schwarz (eds.). *Well-Being: The Foundations of Hedonic Psychology*. Russell Sage Foundation, New York. Chapter 11.
- Diener, E., E. Sandvik, L. Seidlitz, and M. Diener, 1993. The relationship between income and subjective well-being: relative or absolute?. *Social Indicators Research*, 28: 195-223.
- Diener, E., E.M Suh, R.E. Lucas and H.L. Smith, 1999. Subjective well-being: Three decades of progress. *Psychological Bulletin*, 125: 276-302.
- Diener, E., E.M Suh and S. Oishi, 1997. Recent findings on subjective well-being. *Indian Journal of Clinical Psychology*, 24: 25-41.
- Di Tella, R., R.J. MacCulloch and A.J. Oswald, 1999. The macroeconomics of happiness. ZEI Policy/Working Papers, B03-1999, Center for European Integration Studies, Bonn, Germany.
- DiTella, R., R.J. MacCulloch and A.J. Oswald, 2001. Preferences over inflation and unemployment: Evidence from surveys of happiness. *American Economic Review*, 91: 335 - 341.
- Donkers, B. and A. van Soest, 1999. Subjective measures of household preferences and financial decisions. *Journal of Economic Psychology*, 20(6): 613-642.
- Drakopoulos, S.A. and I. Theodossiou, 1997. Job satisfaction and target earnings. *Journal of Economic Psychology*, 18(6):693-704.

- Easterlin, R.A., 1974. Does economic growth improve the human lot? Some empirical evidence. In: P.A. David and M.W. Reder (eds.). *Nations and Households in Economic Growth. Essays in Honor of Moses*. Abramowitz. Academic Press, NY. pp. 89-125.
- Easterlin, R.A., 1995. Will Raising the Incomes of All Increase the Happiness of All? *Journal of Economic Behavior and Organization*, 27 (1): 35-47.
- Easterlin, R.A., 2000. The worldwide standard of living since 1800. *The Journal of Economic Perspectives*, 14: 7-26.
- Ellison, C.G., 1991. Religious involvement and subjective well-being. *Journal of Health and Social Behavior*, 32: 80-99.
- Falk, A. and M. Knell, 2000. Choosing the Joneses on the endogeneity of reference groups. Working Paper Series of the Institute for Empirical Research in Economics, University of Zurich, No 53. Switzerland.
- Ferrer-i-Carbonell, A. and B.M.S. van Praag, 2000. The subjective costs of health losses due to chronic diseases. An alternative model for monetary appraisal. Presented at the Ninth European Workshop of Econometrics and Health Economics, September, Amsterdam, the Netherlands.
- Ferrer-i-Carbonell, A. and B.M.S. van Praag, 2001. Poverty in the Russian Federation. University of Amsterdam, Amsterdam, the Netherlands. *The Journal of Happiness*, forthcoming.
- Frederick, S. and G. Loewenstein, 1999. Hedonic adaptation. In: Kahneman, D., Diener, E., and Schwarz (eds.). *Well-Being: The Foundations of Hedonic Psychology*. Russell Sage Foundation, New York. Chapter 16.
- Frey, B.S. and A. Stutzer, 1999. Measuring preferences by subjective well-being. *Journal of Institutional and Theoretical Economics*. 155(4): 755-778.
- Frey, B.S. and A. Stutzer, 2000a. Happiness, economy and institutions. *Economic Journal*, 110: 918-938.
- Frey, B.S. and A. Stutzer, 2000b. Happiness prospers in democracy. *Journal of Happiness Studies*, 1(1): 79-102.
- Frijters, P., 2000. Do individuals try to maximize general satisfaction? *Journal of Economic Psychology*, 21(3): 281-304.
- Frijters, P. and B.M.S.van Praag, 1998. The effects of climate on welfare and well-being in Russia. *Climatic Change*, 39: 61-81.
- Gibbard, A., 1996. Interpersonal comparisons: Preference, good, and the intrinsic reward of a life. In: Hamlin, A.P., 1996. *Ethics and Economics*. Edward Elgar Publishing Company, Cheltenham, UK. Vol. I, Chapter 18.

- Goedhart, Th., V. Halberstadt, A. Kapteyn and B.M.S. van Praag, 1977. The poverty line: concept and measurement. *Journal of Human Resources*, 12: 503-520.
- Groot, W., 2000. Adaptation and scale of reference bias in self-assessments of quality of life. *Journal of Health Economics*, 19: 403-420.
- Groot, W. and H. Maassen van den Brink, 2000. Sympathy and the Value of Health, working paper, Wageningen/Maastricht.
- Groot, W. and H. Maassen van den Brink, 1999. Job satisfaction and preference drift. *Economics Letters*, 63(3): 363-367.
- Hammond, P. J., 1976. Equity, Arrow's conditions and Rawl's difference principle, *Econometrica*, 44(4): 793-804.
- Hammond, P. J., 1996. Interpersonal comparisons of utility: Why and how they are and should be made. In: A.P. Hamlin, 1996. *Ethics and Economics*. Edward Elgar Publishing Company, Cheltenham, UK. Vol. I, Chapter 22.
- Harsanyi, J.C., 1987. Interpersonal utility comparisons. In: J. Eatwell, M. Milgate and P. Newman, (eds.). *The New Palgrave. Utility and Probability*. MacMillan Reference Books. pp. 128-133.
- Hartog, J., A. Ferrer-i-Carbonell, and N. Jonker, 2000. On a simple measure of risk aversion. Tinbergen Institute Discussion Papers, 00-074/3, the Netherlands.
- Idler, E.L. and S.V. Kasl, 1995. Self-ratings of health: Do they also predict change in functional ability? *Journal of Gerontology*, 50(6): 344-353.
- Jorgenson, D.W. 1990. Aggregate consumer behavior and the measurement of social welfare. *Econometrica*, 58(5): 1007-1040.
- Kahneman, D., E. Diener and N. Schwarz (eds.), 1999. *Foundations of Hedonic Psychology: Scientific Perspectives on Enjoyment and Suffering*. Russell Sage Foundation, NY.
- Kapteyn, A., 1994. The Measurement of Household Cost Functions: Revealed Preference versus Subjective Measures. *Journal of Population Economics*, 7(4): 333-350.
- Kerkhofs, M. and M. Lindeboom, 1995. Subjective health measures and state dependent reporting errors. *Health Economics*, 4: 221-235.
- Lee, G.R., K. Seccombe and C.L. Shehan, 1991. Marital status and personal happiness: An analysis of trend data. *Journal of Marriage and the Family*, 53: 839-844.
- Likert, R., 1932. A technique for the measurement of attitudes. *Archives of Psychology*, 140(5).
- Maslow, A.H., 1970. *Motivation and Personality*. Harper and Row Publishers, 2nd edition.
- Michalos, A.C., 1985. Multiple discrepancies theory. *Social Indicators Research*, 16: 347-413.

- Myres, D.G., 1999. Close relationships and quality of life. In: D. Kahneman, E. Diener and N. Schwarz (eds.). *Well-Being: The Foundations of Hedonic Psychology*. Russell Sage Foundation, New York. Chapter 19.
- Ng, Y-K., 1996. Happiness surveys: Some comparability issues and an exploratory survey based on just perceivable increments. *Social Indicators Research*, 38(1): 1-27.
- Ng, Y-K., 1997. A Case for Happiness, cardinalism, and interpersonal comparability. *The Economic Journal*, 107(445): 1848-1858.
- Oswald, A.J., 1997. Happiness and economic performance. *The Economic Journal*. 107(445): 1815-31.
- Pigou, A.C., 1920. *The Economics of Welfare*. Macmillan, London, U.K.
- Plug, E.J.S. and B.M.S. van Praag, 1995. Family equivalence scales with a narrow and broad welfare context. *Journal of Income Distribution*. 4: 171-186.
- Pollak, R.A. and T.J. Walles, 1979. Welfare comparisons and equivalence scales. *American Economic Review*, 62(2): 216-221.
- Pradhan, M and M. Ravallion, 2000. Measuring poverty using qualitative perceptions of consumption adequacy. *Review of Economics and Statistics*, 82(3): 462-471.
- Ravallion, M. and M. Lokshin, 1999. Subjective economic welfare, World Bank Policy Research WP n. 2106. Washington D.C.
- Ravallion, M. and M. Lokshin, 2000. Identifying welfare effects from subjective questions. Paper presented at the Conference on “Measuring Welfare and Well-Being”, Tinbergen Institute and University of Amsterdam, Amsterdam, the Netherlands, August 2000.
- Robbins, L., 1932. *An Essay on the Nature and Significance of Economic Science*. MacMillan, London.
- Robbins, L., 1938. Interpersonal comparisons of utility: A comment. *Economic Journal*, 48: 635-641.
- Sandvik, E., E. Diener and L. Seidlitz, 1993. Subjective well-being: The convergence and stability of self-report and non-self-report measures. *Journal of Personality*, 61, 317-342.
- Scitovsky, T., 1951. The state of welfare economics. *American Economic Review*, 41(3): 303-315.
- Schyns, P., 1999. The relationship between changes in income and life satisfaction in West Germany and the Russian Federation: Relative, absolute, or a combination of both? In: E. Diener (ed.). *Advances in Quality of Life Theory and Research*. Kluwer: Dordrecht.
- Schyns, P., 2000. Income and satisfaction in post communist Russia. *The Journal of Happiness Studies*, forthcoming.

- Sen, A.K., 1977. On weights and measures: Informational constraints on social welfare analysis. *Econometrica*, 45(7): 1539-1572.
- Sen, A.K., 1979. Interpersonal comparisons of welfare. In M. Boskin (ed.). *Economics and Human Welfare: Essays in Honor of Tibor Scitovsky*. Academic Press, New York.
- Sen, A.K., 1995. Rationality and social choice. *American Economic Review*, 85(1): 1-24.
- Sen, A.K., 1999. The possibility of social choice. *American Economic Review*, 89 (3): 349-378.
- Simon, J.L., 1974. Interpersonal welfare comparisons can be made – and used for redistribution decisions. *Kyklos*, 27(1): 63-98.
- Smith, V.K. and J.-C. Huang, 1995. Can markets value air quality? A meta-analysis of hedonic property values models. *Journal of Political Economy*, 103: 209-227.
- Stigler, G.J. and G.S. Becker, 1977. De gustibus non est disputandum. *American Economic Review*, 67: 76-90.
- Tait, M., M.Y. Padgett and T.T. Baldwin, 1989. Job satisfaction and life satisfaction: A reexamination of the strength of the relationship and gender effects as a function of the data of the study. *Journal of Applied Psychology*, 74: 502-507.
- Tinbergen, J., 1991. On the measurement of welfare. *Journal of Econometrics*, 50: 7-13.
- van der Sar, N.L., B.M.S. van Praag and S. Dubnoff, 1988. Evaluation questions and income utility. In: B.R. Munier (ed.). *Risk, Decision and Rationality*. D. Reidel Publishing Company.
- van de Stadt, H., A. Kapteyn, and S. van de Geer, 1985. The relativity of utility: Evidence from panel data. *Review of Economics and Statistics*, 67: 179-187.
- van Praag, B.M.S., 1971. The welfare function of income in Belgium: an empirical investigation. *European Economic Review*, 2: 337-369.
- van Praag, B.M.S., 1988. Climate equivalence scales —an application of a general method. *European Economic Review*, 2: 337-369.
- van Praag, B.M.S., 1991. Ordinal and cardinal utility: an integration of the two dimensions of the welfare concept. *Journal of Econometrics*, 50: 69-89.
- van Praag, B.M.S. and B.E. Baarsma, 2000. The shadow price of aircraft nuisance. Tinbergen Institute Discussion Papers, 00-004/3, the Netherlands.
- van Praag, B.M.S., P. Frijters and A. Ferrer-i-Carbonell, 2000. A structural model of well-being. Tinbergen Institute Discussion paper TI 2000-053/3, the Netherlands.
- van Praag, B.M.S. and E.J.S. Plug, 1995. New developments in the measurement of welfare and well-being. *The Ragnar Frisch Centennial*, Tinbergen Institute Discussion paper TI 1995-60, the Netherlands.

- Veenhoven, R., 1993. Happiness in nations: Subjective appreciation of life in 56 nations 1946-1992. *Studies in Sociale en Culturele Verandering*, Nr. 2. Erasmus University Rotterdam, the Netherlands.
- Veenhoven, R., 1995. World Database of Happiness. *Social Indicators Research*, 34: 299-313.
- Viscusi, W.K., 1993. The value of risks to life and health. *Journal of Economic Literature*, 31(4): 1912-1946.
- Wagner, G.G., R.V. Burkhauser and F. Behringer, 1993. The English language public use file of the German Socio-Economic Panel. *Journal of Human Resources*, 28(2): 429-433.
- Wilson, W., 1967. Correlates of avowed happiness. *Psychological Bulletin*, 67: 294-306.
- Winkelmann, L. and R. Winkelmann, 1998. Why are the unemployed so unhappy? Evidence from panel data. *Economica*, 65: 1-15.
- Woittiez, I. and A. Kapteyn, 1998. Social interactions and habit formation in a model of female labour supply. *Journal of Public Economics*, 70(2): 185-205.
- Wottiez, I. and J. Theeuwes, 1998. Well-Being and Labor Market Status. In: S.P. Jenkins, A. Kapteyn and B.M.S. van Praag (eds.). *The distribution of welfare and household production: International perspectives*. Cambridge University Press Cambridge, New York and Melbourne. pp. 211-230.