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WORKING PAPER

Measuring job quality and job satisfaction *

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Measuring job quality and job satisfaction

Erik Schokkaert, Luc Van Ootegem, Elsy Verhofstadt

Abstract

Job quality is a multi-dimensional concept that has become prominent on the agenda of policy-makers. There is no consensus about how to measure and how to monitor it. In this paper we compare often used objective and subjective indicators of job quality. We argue that objective indicators are 'too objective', as they neglect interindividual differences in preferences, while subjective job satisfaction is 'too subjective' as it also reflects differences in aspirations. We propose an alternative measure of job quality in terms of equivalent incomes that does respect individual preferences but rules out aspirations. We illustrate our approach with Flemish data on school-leavers (SONAR) using the information on the first job of the 1978 birth cohort. We compare the results for the equivalent income indicator with the results of objective and subjective indicators.

Key words: job quality, job satisfaction
JEL classification: J28, J80

1 Introduction

"Full employment" has always been one of the most prominent objectives of economic and social welfare policy. In recent decades, there has been a growing awareness that not only the number, but also the quality of jobs is important. In Europe, it is at the top of the policy agenda ever since the Lisbon, Nice and Stockholm summits (2000 and 2001). Monitoring "job quality" is not easy, however, and the specification of what constitutes an adequate measure of job quality is still in abeyance.

There is a large consensus, both in academic and in policy circles, that job quality is a multidimensional concept. As an example of the former, Clark (2005) shows that changes in income and hours of work are insufficient to describe job quality and that employees (in seven OECD countries) rate job security, interesting work and autonomy as essential dimensions of a good job. As an example of the latter, in 2001 a list of key indicators was included in the Employment Guidelines of the European Commission, identifying not less than ten main elements of quality in work (Davoine and Erhel, 2006). The multidimensional nature of the concept raises a huge informational challenge, as it is necessary to collect data on a (possibly wide) range of characteristics. More importantly, however, it also raises a difficult indexing problem. In some exceptional situations, the information on a vector of characteristics may seem sufficient to derive

a quality ranking of jobs. This will be the case if one job dominates another, i.e. if it scores better on all relevant dimensions. More generally, however, if there is no dominance, one will have to evaluate trade-offs, and therefore it is necessary to create an overall index, aggregating several dimensions of job quality. Two approaches to the indexing problem have been adopted in the recent past. The first constructs an *objective* summary index by applying a uniform set of weights to the different dimensions, where "uniform" means that the weights vector is the same for all jobs and individuals. The second assumes that *subjective* measures of job satisfaction offer a natural way to aggregate the different job dimensions taking into account interindividual differences in preferences.

The *objective* indicator approach starts from a set of job dimensions that are judged to be relevant by the analyst or by the policy-maker. Much of the policy oriented literature gets round the indexing problem by looking at the different dimensions separately, as such neglecting real existing trade-offs. If the purpose is to derive an overall index, the objective approach either uses statistical data reduction techniques, such as principal components or regression analysis (Davoine and Erhel, 2006; Kalleberg and Vaisey, 2005; Jencks et al., 1988), or applies a set of a priori weights that are chosen by the analyst. Equal weighting or simple averaging are most popular in policy oriented work (Heintz et al., 2005; Global Policy Network, 2006; Tangian, 2005, 2007). It is admitted that " the choice of equal weights is largely arbitrary, although being transparent, simple and in line with the literature which does not establish any clear 'hierarchy' between the different components of job quality" (European Commission, 2008, p164). The EU uses a 'quality of work' framework that is based on ten dimensions, but in order to assess general trends in 'quality of work', a synthetic indicator based on equal weighting is constructed. This synthetic indicator is comparable to the Job Quality Index (JQI) calculated by the European Trade Union (European Commission, 2008). The JQI applies equal weighting for the main dimensions but implements differential weights for the indicators within each dimension (Leschke and Watt, 2008). Eurofound announced that the JQI "will be calculated annually for individual EU Member States and for the EU27 as a whole" (Telljohann & Sbordone, 2008).

A priori weighting leads to measures which are relatively easy to compute and to interpret. However, it completely neglects the simple fact of life that different individuals have different ideas about the relative importance of different job characteristics. As Tangian (2005, p. 12) writes: "A young women with a small child may pay more attention to time factors, a middle-aged man may be most interested in career prospects, and a disabled worker may be more concerned with physical factors. Therefore, assigning a higher weight to career prospects we favor the middle-aged man and discriminate both the woman and the disabled worker. Higher weights of certain questions are advantageous for those who are most interested in them and disadvantageous for those who are not."[1] At this moment there is no scientific or social consensus about an ex-

[1] Tangian (2005) formulates the problem in a clear way. However, his "solution" is less satisfactory. He continues: "Thereby unequal question weights result in a factual inequality of individuals. Therefore, the problem of weighting questions is closely linked to the one

plicitly spelled-out objective theory of job quality, that would justify a set of a priori weights neglecting completely these interindividual differences in preferences. Yet it is clear that normative or conceptual questions ("what is a normatively attractive measure of job quality?") as such cannot be settled by data analysis. One needs a theoretical framework to interpret the data and summarize them in one single index.

A second approach is to use *subjective* job satisfaction as a one-dimensional proxy for job quality. It is adopted in a growing number of policy documents (e.g. Diaz-Serrano and Cabral Vieira, 2005; D'Addio et al., 2007; Eurofound, 2006; SVR, 2007) and academic papers (e.g. Green, 2006; Hamermesh, 2001; Leontaridi and Sloane, 2001; Levy-Garboua and Montmarquette, 2004; Ritter and Anker, 2002). This approach starts from the assumption "that people are able to balance out the various aspects of job characteristics to come up with an overall assessment of job quality." (Kalleberg & Vaisey, 2005, p. 434). If overall satisfaction with one's job is related in a meaningful way to satisfaction with the various dimensions of that job, it can act as an aggregator that takes into account the individual's own evaluations.

Yet it may be misleading to assume a one-to-one relationship between subjective job satisfaction and job quality. The work on the determinants of job satisfaction indicates the central role of 'adaptation', 'expectations' and 'relative deprivation' (the concept of a reference level to compare with) in explaining job satisfaction (Landy and Trumbo, 1976). One may argue that such differences in aspiration levels should not induce differences in measured job quality. Green and Tsitsianis (2005) cautiously say that when job satisfaction is rising (falling) "we could conclude that workers' well-being is rising (falling), *conditional on the assumption that their norms are changing little or not at all*" (p. 408, our italics). The same point is made by Hamermesh (2001), Levy-Garboua and Montmarquette (2004) and Munoz de Bustillo et al. (2005). Along the same lines, Brown et al. (2007) argue that policy evaluation with subjective job satisfaction measures may be highly misleading, as "many of those who do report high job satisfaction and good employment relations are, on objective grounds in low quality jobs, and express satisfaction only against a low benchmark level of norms and expectations" (Brown et al., 2007, p. 966).

It seems that we are facing a dilemma here. At one side, we have a series of objective indicators that implement a largely arbitrary weighting scheme neglecting individual preferences. These indicators are perhaps "too objective". At the other side, we have measures of subjective job satisfaction which do take into account individual preferences, but at the same time also reflect differences in expectations and in aspiration levels that do not have much to do with job

of weighting individuals. Since individual weights are usually assumed equal (= one voter one vote), regardless of education, experience, or intelligence, the question weights should be assumed equal as well. Any deviation from equal weights is a source of debate, and to avoid it equal weights are accepted whenever possible. In statistics it is also a tradition to accept the equal distribution (weights) by default, unless no other information is available." This is a strange reasoning. In this normative setting equal weighting is not less arbitrary than any unequal weighting scheme, as this would be to the advantage of those individuals that consider the various job dimensions to be equally relevant.

quality. These indicators are perhaps "too subjective". Is there a way out of this dilemma? In this paper we argue that there is. In section 2, we introduce a conceptual framework borrowed from the social choice literature, to get a better theoretical insight into the precise nature of the dilemma.[2] We will discuss the pros and the cons of both the objective indicator and the subjective satisfaction approaches and propose a possible third approach, which respects individual preferences but corrects for the effects of expectations and aspirations. In section 3 we present the Flemish dataset SONAR containing detailed information about the quality of the first job of individuals. Section 4 discusses the estimates of a job satisfaction equation estimated with these SONAR-data. In section 5, we then compute and compare the different measures of job quality that have been introduced in section 2. Section 6 concludes.

Two caveats are in order. First, the discussion on job satisfaction and job quality is closely related to the general debate on happiness and well-being. In fact, some consider job satisfaction as a proxy for workers' utility and thus for their well-being in general (e.g. Clark and Oswald, 1996; Frey and Stutzer, 2002). The objective approaches to job quality are more in line with the inspiration of alternative approaches to well-being like the functionings-capabilities approach of Sen (1985, 1992, 1999) and Nussbaum (2000, 2006).[3] In this paper, we focus on measuring job quality as such and we will not link explicitly our discussion to the broader setting of life satisfaction and well-being.[4]

Second, we focus on the question of deriving a normatively attractive measure of job quality, which can be useful for monitoring the consequences of different policies. Another strand of the literature focuses on job satisfaction as an explanatory factor for crucial aspects of labour market behaviour (Freeman, 1978). Clark (2001a) offers a non-exhaustive overview of research papers, showing that "happiness measures predict observable future behaviours or outcomes". More specifically, job satisfaction influences productivity, absenteeism and turnover (e.g. Hall, 1994), it has an effect on job search, job resignation or mobility in general (e.g. Clark 2001b, Delfgauw, 2007) and it goes together with higher motivation and stronger commitment (De Witte, 2001). Our critical analysis of subjective job satisfaction as a measure of job quality, does not in the least undermine the relevancy of these empirical findings. Nor do these empirical findings undermine the relevancy of the normative analysis in this paper.

[2] The relevant concepts are introduced and explained in a coherent and convincing way in Fleurbaey (2008).

[3] In fact, Nussbaum's theory of capabilities is one of the most ambitious attempts to build an "objective" theory of well-being that is available in the present literature.

[4] Such a broader analysis can be found in Schokkaert (2007) and Fleurbaey et al. (2009).

2 Satisfaction, preferences and job characteristics: a conceptual framework

We first introduce some relevant concepts and notation, and we then formalize a set of interesting requirements that a good measure of job quality arguably should satisfy. After a discussion of the logical relations (and conflicts) between these requirements we discuss the pros and cons of different specific measures of job quality. Finally, these different measures are illustrated for a linear specification of the job satisfaction equation that will be implemented empirically in the next sections.

2.1 Concepts and notation

Suppose that the job of individual i is characterized by a vector of objective job characteristics C_i. We will sometimes partition this vector as (Y_i, D_i), where Y_i is income (or wage) and D_i is a vector of other objective job characteristics (such as degree of autonomy or creativity). Individual i has a well-defined preference ordering R_i over these vectors (with indifference denoted by I_i and strict preference denoted by P_i). We assume that preferences are monotonic, i.e. $C_i \geqslant C_i'$ implies $C_i R_i C_i'$. Individual preferences reflect the relative importance of the job characteristics for the individual. Of course, different individuals may have different relative weighting schemes, i.e. different preferences. We parameterize these differences using a vector of conditioning personality characteristics Z, such that $R_i = R(Z_i)$. Therefore, two individuals with the same values for the personality characteristics Z also have identical preferences. Note that the preference ordering is a purely ordinal concept. Following standard microeconomics, it can be represented by a utility function U_i, such that $C_i R_i C_i' \Longleftrightarrow U_i(C_i) \geqslant U_i(C_i')$. Given the ordinal nature of preferences, all positive monotonic transformations of U_i are equally acceptable as a representation of the preference ordering R_i. Preferences determine the indifference curves in Figure 1.[5] These indifference curves show that the vector of job characteristics A is preferred by individual i to the vector of job characteristics B and that the opposite is true for individual j. However, at this stage we do not have sufficient information to compare the situation of both individuals, i.e. to derive an overall and interpersonally comparable measure of job quality.

The subjective job satisfaction expressed by individual i is denoted by S_i. We do accept that her overall subjective job assessment at a given point in time is consistent with her preferences. However, subjective job satisfaction will also be influenced by her aspirations (her reference levels). Denoting these by A_i, we write S_i as a function $S(C_i, R_i, A_i)$. Consistency with preferences *at given aspiration levels* can then be written as $C_i R_i C_i' \Longleftrightarrow S(C_i, R_i, A_i) \geqslant S(C_i', R_i, A_i)$. Comparing this expression with the definition of the utility function, it is clear

[5] We focus here on orderings of the bundles of job characteristics only. These preferences must be seen as conditional on the amounts of other (private and public) goods available to the individual. Separability assumptions are needed if we want the indifference map in Figure 1 to be independent of the amounts of these other commodities.

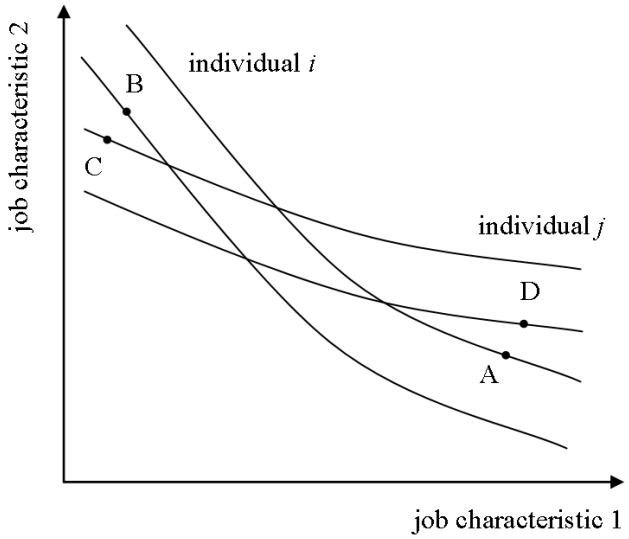

Figure 1: Individual preferences and job satisfaction

that subjective measures of job satisfaction solve the problem of comparing individual situations by imposing one common cardinalization of the utility function for all persons, i.e. by introducing an interpersonally comparable labeling of the indifference curves in Figure 1. Of course, as soon as we can attach evaluative "numbers" to the indifference curves, we can unambiguously rank the individuals. It becomes possible to compare the quality of job A with the quality of job B for individual i - and also to compare the quality of job A for individual i with the quality of that same job as evaluated by individual j. For our later discussion, it is essential to see that the specific cardinalization (the specific value of the subjective measure of job satisfaction) does depend on the aspiration levels A_i. Aspiration levels may be different for different individuals and, as for preferences, we parameterize these differences using a vector of personality characteristics π_i, such that $A_i = A(\pi_i)$. Two individuals with the same values for the personality characteristics π_i also have identical aspiration levels. Note that the vectors Z_i and π_i may partly be overlapping.[6] Differences in Z_i (and therefore R_i) lead to differences in the slopes of the indifference curves in Figure 1, differences in π_i (and therefore A_i) lead to differences in the cardinalization of satisfaction, i.e. in the labeling of the indifference curves.

In order to measure job quality, we consider global situations (C_i, R_i, A_i), or, equivalently, (C_i, Z_i, π_i). We denote job quality experienced by individual i

[6] In fact, in our empirical illustration the two vectors coincide. We will return to the resulting identification issue in section 4. In the theoretical analysis, however, it is essential to keep the crucial conceptual difference between Z and π.

by Q_i and we say that $Q(C_i, R_i, A_i) \geqslant Q(C_i', R_i', A_i')$, if the job quality implied by the situation (C_i, R_i, A_i) is at least as good as the job quality implied by the situation (C_i', R_i', A_i'). We have opted deliberately for this general formulation, because it allows us to compare different specific measures in a unifying conceptual framework.

2.2 Requirements for a good measure of job quality[7]

The difficulty of measuring job quality is closely related to the multidimensional nature of the concept. In this context it seems very natural to assume that the quality of job A cannot be lower than the quality of job B, if job A is at least as good on all dimensions than job B. In more formal terms, this dominance condition can be written as follows:

Condition 1 *Dominance. If* $C_i \geqslant C_j$, *then* $Q(C_i, R_i, A_i) \geqslant Q(C_j, R_j, A_j)$.

Condition 1 is only helpful in a limited set of job comparisons, as it will be rather exceptional that $C_i \geqslant C_j$. It will therefore only result in a partial ordering. The measures that we will introduce in the next subsection yield complete orderings, and imposing condition 1 then means that the complete ordering implied by the measure is an extension of the partial dominance ordering. At first sight, condition 1 may seem obvious. Indeed, how to convince individual j that his job is of better quality than the one of individual i, if it scores worse on all relevant dimensions? However, note carefully that condition 1 implies that all the information on interindividual differences in preferences and aspiration levels is neglected in the measure of job quality. In a moment, we will see that this has rather strong (and arguably undesirable) consequences.

This brings us to a second possible requirement. In a situation in which different individuals have different ideas about what is important in their job, i.e. have different preferences, it seems natural to require that a measure of job quality should be consistent with these preferences in a comparison of two job situations for a given individual. How to convince individual i that the quality of job B is higher than the quality of job A if she herself prefers job A over job B? Moreover, it is equally natural to extend this idea to a comparison of the job situations of two individuals with identical preferences and aspiration levels. If two individuals with exactly the same preferences and aspirations agree that job A is better than job B, should a measure of job quality then not follow this common ranking by the two individuals? We formalize this requirement as

[7] The conditions described in this section are the same as described in more general terms in Fleurbaey et al. (2009).

Condition 2 *Conditional respect for individual preferences.*

(a) If $C_i R_i C_i'$, *then* $Q(C_i, R_i, A_i) \geqslant Q(C_i', R_i, A_i)$.
(b) If $R_i = R_j = R$ *and* $A_i = A_j = A$, *then* $C_i R C_j \iff Q(C_i, R, A) \geqslant Q(C_j, R, A)$.

We mentioned already that imposing the dominance condition implies a complete disregard of interindividual differences in preferences - and therefore a complete disregard of the intuition behind condition 2. As a matter of fact, it has been proven that both conditions are incompatible.[8] This is easily seen from Figure 1. Denote the job quality of the vectors A-D with subscripts. Imposing both conditions 1 and 2 would then result in $Q_B > Q_C$ (dominance), $Q_C > Q_D$ (respect for preferences), $Q_D > Q_A$ (dominance) and $Q_A > Q_B$ (respect for preferences). The existence of a cycle shows that it is not possible to construct a measure of job quality satisfying at the same time the dominance condition and respecting individual preferences.

We have called condition 2 "conditional respect", as aspirations are kept constant. What if aspirations differ or change? Suppose that individual i at a certain point in time prefers job A (a creative job with a high wage) over job B (a boring job with a lower wage). As a result of changes in the economic environment (e.g. unemployment increases), she loses her job A but finds a new job B. Of course, even in this period of crisis, she still prefers a creative job with a high wage over a boring job with a lower wage. Yet, she has adapted her aspiration levels downwards - and she is quite satisfied that she could find job B. Indeed, in the light of the overall economic situation, her satisfaction with job B in a crisis period could even be higher than her satisfaction with job A in a period of full employment. Does this imply that the quality of (the boring low-wage) job B for individual i is higher than the quality of the (creative high-wage) job A? This conclusion would be quite misleading if we want to use our measure to monitor the success of employment policies in creating good jobs. Or consider two individuals with the same preferences: they both prefer the creative high-wage job A to the boring low-wage job B. However, the first individual comes from a deprived family and the second one is the daughter of a professor and a successful entrepreneur. The job expectations from these two individuals may be very different and the first individual may be more satisfied in job B (a big leap forward compared to his family) than the second individual in job A. Would this mean that the quality of job B for that first individual is higher than the quality of job A for the second individual? Remember that they both prefer A to B. The poor individual would feel even better-off in job A, the rich individual would feel even more terrible in job B. These examples suggest that not correcting for changes and/or differences in aspiration levels might in some circumstances lead to misleading conclusions. We therefore formulate a third requirement:

[8] The dominance condition was proposed by Sen (1985) to get at a partial ordering of bundles of functionings (or capabilities). Its incompatibility with (even minimal) respect for preferences has been proven and discussed in a series of papers by Brun and Tungodden (2004), Fleurbaey (2007) and Pattanaik and Xu (2007).

Condition 3 *Unconditional respect for individual preferences.*

(a) If $C_i R_i C_i'$*, then* $Q(C_i, R_i, A_i) \geqslant Q(C_i', R_i, A_i')$.
(b) If $R_i = R_j = R$*, then* $C_i R C_j \iff Q(C_i, R, A_i) \geqslant Q(C_j, R, A_j)$.

Condition 3 is stronger than condition 2, i.e. unconditional respect for individual preferences implies conditional respect for individual preferences, but not vice versa. This will be important for the evaluation of subjective job satisfaction as a measure of job quality. Since there is a conflict between conditions 1 and 2, and condition 3 implies condition 2, it is obviously also impossible to reconcile the dominance condition with unconditional respect for individual preferences. This tension will also be relevant for our comparison of different measures.

To solve the conflict, we may formulate a weaker version of condition 1:

Condition 4 *Subset dominance. Consider a subregion* T *of the space of job dimensions and assume that* $C_i, C_j \in T$*. If* $C_i \geqslant C_j$*, then* $Q(C_i, R_i, A_i) \geqslant Q(C_j, R_j, A_j)$.

We will see that there is no conflict between subset dominance and conditional respect for preferences. In fact, the combination of these two conditions leads to a preference-sensitive measure (that we will call "equivalent income") that also satisfies unconditional respect for preferences.

2.3 Comparing different measures

We are now well equipped to discuss and compare the pros and cons of the various measures of job quality that have been proposed in the literature. We first look at subjective job satisfaction, we then interpret the objective measures and we finally introduce a new preference-sensitive but aspiration-insensitive measure of job quality, that satisfies the condition of subset dominance.

2.3.1 Job satisfaction as an aggregative measure

The definition of subjective job satisfaction as a measure of job quality is straightforward:

Definition 5 *Subjective indicators.* $Q^S(C_i, R_i, A_i) = S(C_i, R_i, A_i)$.

We can now evaluate these subjective indicators in the light of the requirements that have been introduced in the previous subsection. First, subjective indicators do satisfy conditional respect for preferences if the job satisfaction measure is consistent with preferences. This is the main justification for their use. However, secondly, subjective job satisfaction does not satisfy unconditional respect for preferences, because it does depend on aspiration levels. As the example in the previous subsection has shown, if aspiration levels do change, it is possible to have at the same time $C_i R_i C_i'$ and yet $S(C_i, R_i, A_i) < S(C_i', R_i, A_i')$.

And, if their aspiration levels differ, two individuals i and j may both prefer job A over job B and yet the job satisfaction of the individual in job A may be lower than the job satisfaction of the individual in job B. As we described in the introduction, this issue has been discussed extensively in the literature and it was the main argument for Brown et al. (2007) to claim that subjective job satisfaction is a misleading measure for monitoring employment policies. Thirdly, and less well known in the literature, subjective indicators do not satisfy the dominance condition. As we have seen, the dominance condition is incompatible with respect for preferences. Moreover, because of changes or differences in the aspiration levels it is easily possible to have $C_i \geqslant C_i'$ and yet $S_i < S_i'$. Returning to Figure 1, the cardinal labeling of the indifference curves is influenced by the aspiration levels. If individual i has more ambitious aspirations, his subjective satisfaction with job B may be lower than the subjective job satisfaction of the less ambitious individual j in job C.

2.3.2 Objective indicators of job quality

Objective indicators impose a set of dimensional weights on statistical or a priori grounds, and hence they do not take into account (differences in) individual preferences at all. Although these indicators are usually not interpreted in terms of standard economic theory, they can easily be interpreted within our conceptual framework. Imposing weights implies imposing one specific reference preference ordering (one set of indifference curves in Figure 1) and a specific cardinalization of the utility function. Alternatively, one could say that objective indicators pick a reference individual (with specific reference values of R and A) and then evaluate jobs on the basis of the job satisfaction of that (arbitrarily chosen) reference individual. To give an example: equal weighting methods implicitly impose linear indifference curves with slope -1. Denoting the reference values by a superscript r, we define the objective indicators as

Definition 6 *Objective indicators.* $Q^{O,r}(C_i, R_i, A_i) = S(C_i, R^r, A^r)$.

We can easily check whether these measures satisfy our requirements. First, it is obvious that objective indicators simply ignore all information about individual preferences and therefore cannot satisfy conditional (and *a fortiori* unconditional) respect for preferences. Secondly, however, they do satisfy the dominance condition, as long as they reflect a monotonic reference preference ordering, i.e. implement positive weights for all the dimensions.

2.3.3 A new preference-sensitive measure: equivalent incomes

We can now reformulate in more formal terms the dilemma that was already sketched in the introduction. Objective indicators do satisfy the dominance condition, but ignore information about preferences and basically impose on everybody the view of one arbitrarily chosen reference individual. Subjective job satisfaction does respect preferences but is also contaminated by expectations and aspirations. Moreover, it does not satisfy dominance. Is there an attractive

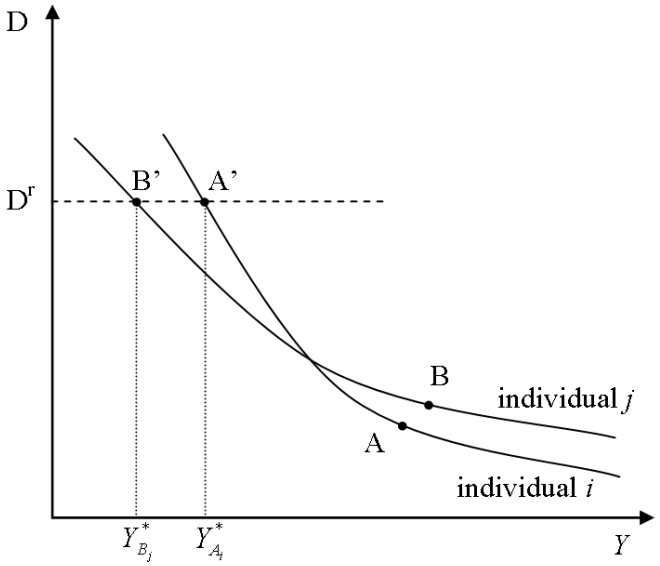

Figure 2: Equivalent incomes

solution in between these two extremes? Remember that it is pointless to look for a measure that would satisfy respect for preferences and dominance at the same time: these two requirements are incompatible. However, there is one (and only one) approach that satisfies (both conditional and unconditional) respect for preferences and *subset* dominance. This is the equivalence approach, proposed and defended in a series of publications by Fleurbaey (2007, 2008) and used for interpreting the subjective happiness-literature in Fleurbaey et al. (2009).[9]

The basic idea of the approach is illustrated in Figure 2, where we have income Y on the horizontal axis and another job characteristic D on the vertical axis. Suppose we want to compare the quality of job A for individual i with the quality of job B for individual j. We first pick a reference value D^r for D. Respect for preferences then implies that the quality for individual i of the job vector A' is equal to the quality of job vector A, since they are both on the same indifference curve. An analogous reasoning holds for jobs B and B' and individual j. Now, suppose that we can compare the job vectors A' and B' (differing only in income) on the basis of income. In that case the "equivalent incomes" Y^*_{Ai} and Y^*_{Bj} can be interpreted as an interpersonally comparable measure of job quality. In general terms, this measure is defined as follows:

Definition 7 *Equivalent income.* $Q^{EI,r}(C_i, R_i, A_i) = Y_i^*(C_i, R_i, A_i)$ *with* Y_i^* *implicitly defined by* $(Y_i, D_i)I_i(Y_i^*, D^r)$.

[9] It is closely related to the concept of money-metric utility, as described in Samuelson (1974), Deaton and Muellbauer (1980) and King (1983).

How reasonable is it to suppose that job vectors A' and B' can be compared on the basis of incomes only? Keeping to the two-dimensional example, is it sufficient that $Y_i > Y_j$ to draw the conclusion that $(Y_i, \overline{D})$ is better for individual i than $(Y_j, \overline{D})$ is for individual j for all possible values $\overline{D}$? This is not fully convincing. Suppose that $\overline{D}$ stands for a low value of D. Suppose also that individual i does not care very much about income but does care a lot about D (her marginal rate of substitution between D and Y is large), while the opposite is true for individual j. Could one then not argue that the quality of $(Y_i, \overline{D})$ for individual i is lower than that of $(Y_j, \overline{D})$ for individual j? A constructive way to think about the issue is to phrase the following normative question: is there a reference value D^r such that a comparison of the situations of two individuals can be based on a comparisons of their incomes only? In some cases, the question has an attractive answer. Suppose one takes for D^r the best possible value of D. Nobody in society has a job with a higher value. In that case it would seem that individual i cannot legitimately complain that she is worse off than j because she attaches more value to D. She has the best possible job along that dimension anyway. If D^r refers to the best possible value of D, one can argue that in a comparison of the job vectors (Y_i, D^r) and (Y_j, D^r) the only variable that should legitimately matter is income.[10]

Let us emphasize that it can be shown (for a formal proof, see e.g. Fleurbaey et al., 2009) that the equivalence approach is the *only* possible approach that satisfies respect for preferences and subset dominance. It does *not* satisfy the dominance condition: in the example of Figure 2, job B is dominating job A, but $Y^*_{Ai} > Y^*_{Bj}$. However, the equivalent income does satisfy subset dominance, with as the relevant subset the horizontal line through D^r.[11] Note also that equivalent income boils down to another cardinalization of the utility function. This cardinalization has the advantage that it satisfies independence of aspiration levels. Yet, this does come at a cost. Measured job quality will depend on the values chosen for D^r. As we described, the choice of the reference vector is not fully arbitrary and can be justified on normative grounds. The more convincing this normative reasoning, the more convincing is the equivalent income approach.

Table 1 summarizes our discussion of the characteristics of the three "families" of measures. In the next sections we will show that these insights are not only theoretically, but also empirically relevant.

[10] Fleurbaey (2005, 2006) has discussed the issue for income-health combinations.

[11] In fact, it can easily be seen that respect for preferences and subset dominance can only be reconciled if the "subset" reduces to a line. Indeed, if it were not a line, one could always construct a case of incompatibility as in Figure 1 (see, e.g., Fleurbaey et al., 2009).

Table 1. Characteristics of the different measures of job quality

	Subjective job satisfaction	Objective indicators	Equivalent income
Dominance	No	Yes	No
Subset dominance	No	Yes	Yes
Conditional respect for preferences	Yes	No	Yes
Unconditional respect for preferences	No	No	Yes

2.4 A linear illustration

The various theoretical concepts can easily be illustrated for a linear equation, that will also be used in our empirical work. Suppose we start from observations on overall job satisfaction S_i, which we assume to be consistent with preferences in the sense defined above. A first approach is then simply to equate job quality and job satisfaction, i.e. $Q_i^S = S_i$.

To introduce our other concepts, we specify the empirical relationship between job satisfaction, job characteristics, preferences and aspirations in the following way:

$$S_i = \alpha_0 + \alpha_1 Y_i + \alpha_2' D_i + \alpha_3' \pi_i + \alpha_4' Y_i Z_i + Z_i' \Lambda_5 D_i + \varepsilon_i \tag{1}$$

where ε_i is a disturbance and the α's and Λ_5 are coefficients to be estimated. Note that the marginal rate of substitution between Y_i and job characteristic D_{ik} is given by

$$MRS_i^{Y,D_k} = \frac{\alpha_{2k} + Z_i' \Lambda_{5k}}{\alpha_1 + \alpha_4' Z_i}, \tag{2}$$

where Λ_{5k} is the k-th column of the coefficients matrix Λ_5. This expression shows how differences (changes) in Z_i affect the slope of the indifference curves. The interaction coefficients α_4 and Λ_5 play a crucial role in this regard. Note also that differences (changes) in the aspiration parameters π_i only affect the cardinalization of subjective job satisfaction and not the marginal rates of substitution.

Objective indicators of job quality neglect differences in personal characteristics and basically pick one reference set of indifference curves and one reference set of aspiration levels.[12] Denoting these by the superscript r, we get

$$Q_i^{O,r}(C_i, R_i, A_i) = \alpha_0 + \alpha_1 Y_i + \alpha_2' D_i + \alpha_3' \pi^r + \alpha_4' Y_i Z^r + Z^{r\prime} \Lambda_5 D_i + \varepsilon^r \tag{3}$$

[12] Since these reference aspiration levels are kept constant in comparisons between jobs, and enter eq. (3) as a simple level shift, they have no influence on the relative ranking of the jobs.

Different choices of the reference characteristics will lead to different measures.[13]

Finally, we have our new preference-sensitive measure. Denoting the reference values for the dimensions as D^r, we compute the equivalent income indicator from the following equation

$$\alpha_0 + \alpha_1 Y_i^* + \alpha_2' D^r + \alpha_3' \pi_i + \alpha_4' Y_i^* Z_i + Z_i' \Lambda_5 D^r + \varepsilon_i =$$

$$\alpha_0 + \alpha_1 Y_i + \alpha_2' D_i + \alpha_3' \pi_i + \alpha_4' Y_i Z_i + Z_i' \Lambda_5 D_i + \varepsilon_i$$

resulting in

$$Q_i^{EI,r}(C_i, R_i, A_i) = Y_i + \frac{\alpha_2'(D_i - D^r) + Z_i' \Lambda_5 (D_i - D^r)}{\alpha_1 + \alpha_4' Z_i} \tag{4}$$

Note that the aspiration parameters (and the stochastic disturbance term) disappear from this equation (as they should). However, since the preference characteristics Z_i and the interaction coefficients α_4 and Λ_5 do appear in eq. (4), the equivalent income is preference-sensitive and takes into account preference differences.

3 Data

We use a survey database for Flanders (SONAR). This database has been created to study the transition from education to the labour market, which makes it exceptionally rich on labour market information for school leavers in their first working experiences. We work with the longitudinal data of the birth cohort 1978. The sample was randomly selected and trained interviewers performed the oral interviews at the interviewees' home address. The dataset is thus based on self-reported information of the respondents. We study the job quality of the first job, defined as the first paid employment after leaving the educational system. It is a job with tenure of at least one month and for at least one hour per day and one day per week. In the remainder we will talk about job satisfaction, although each time we mean satisfaction with the first job.

In the SONAR-questionnaire the workers were asked for their satisfaction with 12 aspects of their job and with the job as a whole. The response-scale varies from (1) 'very unsatisfied' to (5) 'very satisfied'. All individuals who have once started working thus had to give a retrospective evaluation of their job satisfaction at the beginning of their first job.[14] We use satisfaction with the

[13] The approach by Jencks et al. (1988) is closely related to eq. (3). They conducted a Survey of Job Characteristics, asking each worker to rate his or her job on a ratio scale in which an average job scores 100, regressed these scores on 48 job characteristics and used the coefficients to construct an Index of Job Desirability. The index incorporates 13 non-monetary job characteristics and some measures related to income. They themselves interpret their index as reflecting the preferences of an average worker. They also use their regression results to derive average values of the marginal rates of substitution in eq. (2).

[14] For some respondents the beginning of the first job is longer ago than for others. This difference could affect the recollection of the data. To control for the time span since the respondent started to work we include an extra variable in the model: the duration of 'recall

job as a whole in our analysis (one item measurement of 'global satisfaction', Spector, 1997). Respondents were fairly satisfied with their first labour market experience: almost 75% of the respondents were very or rather satisfied with their work as a whole. In the next section, we present the estimation results of a job satisfaction model where non-significant variables are left out. Here, we give a brief description of the included variables.

As characteristics of the first job we included the net monthly wage in full time equivalent[15] and the following dummy-variables: contract type, company size, learning new skills during the job and working in the education sector or not.[16] The dataset also contains a self-assessment by the worker of several characteristics of his job. The respondents were asked to evaluate 19 items on a 4-point scale, ranging from 'completely agree', 'rather agree', 'rather disagree', to 'completely disagree'. On the basis of a correlation analysis, we combined these 19 items into eight job characteristics, of which seven have a significant effect in the final model[17] :

- A physically demanding, dangerous and dirty job
- A challenging job that is worth the effort
- A job with a lot of time pressure
- A job with a lot of repetition
- A job in collaboration with others
- A job with results and possibilities to reveal capabilities
- A job with a lot of autonomy to decide

Several personality characteristics are included for the measurement of (differences in) preferences and aspiration levels. We included gender, educational level of the respondent and educational level of the mother.[18] We measured the educational level of the respondent by the number of successfully completed school years beyond the age of 12. The relevant information about the educational level of the mother is included in a dummy indicating whether the mother has a degree lower than higher secondary. Next to these rather 'traditional' conditioning variables, the dataset also allows to include some characteristics which are often unknown. A first such variable is the motivation to work. We include factor scores indicating to which degree the motivation to work results from the content of the job or from material aspects related to the job. We also have the respondents' answers on questions related to their locus of control (on a 4-point scale). We include a factor score for 'internal locus of control', indicating

bias'. This variable expresses the number of months that passed since the start of the first job (date of the interview minus starting date of the first job). This variable was not significant in our estimations and was therefore excluded from the final model presented in the next section.

[15] The respondents were asked about their net monthly wage, which we divided by the percentage of employment.

[16] We originally included 11 sector dummies (based on the NACE classification), but only the dummy for the education sector had a significant effect. Other job characteristics included in the analysis (but not in the final model): shift work, full-time or part-time work, whether or not receiving extra legal advantages and formal training during the first job.

[17] 'A mentally demanding job with plenty of responsibilities' was not significant.

[18] The number of children and the nationality of the grandmother (at the mother's side) were not significant.

whether the respondents believe that they themselves are responsible for their position and achievements in life. A last set of variables is related to search behaviour. We have information on the number of channels or organisations that are used and on the duration of the search period (i.e. the number of months between leaving education and starting in the first job).[19]

4 Estimating the job satisfaction equation

Because the dependent variable is measured on an ordinal five points-scale from low to high satisfaction we opted for an ordered logit model. We started from a specification of eq. (1) including all available job characteristics (Y and D) and personal characteristics (π and Z).As we consider all personal characteristics as potentially influencing aspirations as well as preferences, the vectors π and Z coincide in our application. We assume that the direct (level) effects capture differences in aspirations, and that the interaction effects with the job characteristics capture differences in preferences. Indeed, only the latter influence the shape of the indifference curves, i.e. the marginal rates of substitution between the job characteristics. Table 2 presents the estimation results of the final model where non-significant variables are left out.

Table 2. Ordered logit regression results of job satisfaction in the first job

Let us first look at the results for the *job characteristics*. As the literature on job satisfaction suggests (e.g. Furnham, 1997; Gazioglu & Tansel, 2006), net income has a positive and strong effect on job satisfaction. In line with the summary of Knoop & Schouteten (2006), we also find a strong impact of other job characteristics on job satisfaction. Having a challenging job that is worthwhile doing, a job with a lot of autonomy, a job with possibilities to reveal capabilities and a job in collaboration with others boosts job satisfaction. Having a physically demanding job, a job with a lot of time pressure or a repetitive job has a negative effect on job satisfaction. Working in a large company and learning new skills contribute to a higher job satisfaction while working in the education sector decreases satisfaction. Contrary to most of the literature (e.g. Kaiser, 2007 and D'Addio et al., 2007) we observe a positive effect of temporary employment. Young workers might think to have good perspectives when starting in temporary employment or they might care less about the insecurity of the contract.

Differences in *aspirations*, the direct effects of the personality characteristics, are mainly captured by educational attainment, gender and the motivation to

[19] Other conditioning variables included in the analysis (but not in the final model): pollster's impression of the respondent (factor score on how the pollsters perceive the respondents - energetic, active, calm, friendly, cheerful, open, optimistic and motivated to answer), the number of sacrifices respondent are willing to accept regarding work and membership of clubs.

work. Higher education reduces job satisfaction, in line with the hypothesis that it increases expectations (Verhofstadt et al., 2007). Our results are in line with the gender satisfaction paradox (women are more satisfied) found in other studies (eg Gazioglu & Tansel, 2006). This is remarkable for our sample of (young) people in their first job, since gender differences should disappear for young female workers if they have similar expectations as their male counterparts (Clark, 1997).

There are no significant interaction effects between gender and the job characteristics, meaning that men and women have the same *preferences* regarding their first job.[20] The same holds for the interactions between wage and all conditioning variables. Other interaction effects are significant, however, and point to the relevance of preference differences. A challenging job is preferred more when being higher educated and when the motivation to work is related to the content of the job. Being motivated by material aspects reduces the preference for a challenging job. The negative effect of a physically demanding job on job satisfaction is lower for those motivated by the content. Collaboration is less preferred by workers whose mother is lower educated and by workers motivated by the content. It is preferred more by respondents with an internal locus of control. The higher educated, those who had to search longer for their job or have an internal locus of control have less preference for a job with a lot of autonomy. Large companies in general create more job satisfaction, but they are not the place to be when you are more motivated by content.

5 Indicators of job quality

We describe first how we calculated with our dataset the different job quality concepts as presented in section 2. We then compare the results for the different indicators.

5.1 Calculation of the job quality indicators

The subjective indicator Q^S is simply given by reported job satisfaction. It satisfies conditional respect for individual preferences but is influenced by individual aspirations. In our sample the distribution of job satisfaction is as follows:

- Very unsatisfied: 4.3%
- Rather unsatisfied: 9.6%
- Neutral: 13.6%
- Rather satisfied: 48.9%
- Very satisfied: 23.6%

We have calculated four objective indicators (Q^O). These do not depend on individual aspirations but do not respect individual preferences either. The

[20] Of course, it is quite well possible that men and women develop different preferences with respect to their job when getting older.

first two mimic the dominant practice in policy circles and implement an equal weighting procedure. Our first objective indicator $Q^{0,EW1}$ is an approximation (making use of the available data) of the Job Quality Index (JQI, Leschke and Watt, 2008). To make it possible to sum the values for the different dimensions, we normalise them to obtain comparable figures between 0 and 1.[21] The objective indicator $Q^{0,EW1}$ is then a simple average of the following normalised dimensions:

- Net monthly wage in full time equivalents
- Non-standard forms of employment (average of shift work, temporary contracts and part-time work)
- Working time (average of time pressure and autonomy)
- A physically demanding, dangerous and dirty job (as proxy for working conditions)
- Learning new skills during first job
- Company size (as a proxy for collective interest representation and participation).

This approximation of the JQI includes job characteristics which do not have a significant effect on job satisfaction (see table 2). We therefore calculated a second equal weighting indicator ($Q^{0,EW2}$) that is also a simple average, but now integrating those job dimensions that appear to be significantly important for the explanation of job satisfaction.

Equal weighting is only one special case of objective indicators. As was argued before, they all can be interpreted as resulting from a specific choice of reference preferences.[22] Using an equal weighting scheme is then equivalent to assuming that all individuals have equal (linear) indifference curves with slope -1. Choosing specific reference values for the preference variables in eq. (3), we derive two other objective job quality indicators that implement differential weighting of the job characteristics. Since the specific choice of the reference preference structure may crucially influence the results, we evaluate jobs on the basis of the job satisfaction of two different reference individuals:

- $Q^{O,r1}$ - 'individual average'. As reference values we take the average values of Z and π in the sample. This indicator is closely related to the measure proposed by Jencks et al. (1988).
- $Q^{O,r2}$ - 'individual extreme'. Reference values are the average values for all Z and π-variables except for motivation to work where we take as reference the highest motivation from the content of work and the lowest motivation from material aspects. Motivation to work has significant interaction effects and thus a large impact on the preferences. Moreover, it lends itself to an intuitively attractive interpretation.

Finally, the equivalent income indicator $Q^{EI,r}$ (eq. (4)) respects individual preferences but does not depend on individual aspirations. For the reasons discussed in 2.3.3, we use as reference values (D^r) the characteristics of a perfect

[21] Normalised value = (value - minimum)/ (maximum - minimum). The minimum value is the value of the worst performer and the maximum is the value of the best performer.

[22] Recall from eq. (3) that the choice of reference values for the aspiration variables will not influence the quality ranking of the jobs.

job (being the minimum value of those job characteristics negatively contributing to job satisfaction and the maximum value of those characteristics positively contributing to job satisfaction).

5.2 Correlation between the different indicators

Table 3 presents the Spearman rank correlations between the different job quality indicators. This gives a first insight into their differences and similarities. The correlation between the subjective indicator Q^S and the equal weights indicator approximating the Job Quality Index $Q^{O,EW1}$ is by far the lowest. This is not surprising, since $Q^{O,EW1}$ is the only indicator which does not use any results of the satisfaction model to calculate job quality. The choice of the relevant job dimensions is policy driven (or 'perfectionist') or depends on the availability of data. The higher correlation with the second equal weights indicator $Q^{O,EW2}$ reflects the fact that for the latter measure the relevant job dimensions are chosen in a more 'participatory' way (i.e. based on the job satisfaction estimation). On the other hand, the correlation between both equal weighting indicators is rather high, due to the correlation between the underlying job characteristics. Picking more representative reference preferences (as in $Q^{O,r1}$) increases the correlation with the subjective indicator. However, the strong impact of the choice of the reference individual is illustrated when looking at $Q^{O,r2}$. Choosing an extreme preference pattern (highest motivation from content, lowest motivation from material aspects) decreases the correlation with subjective job satisfaction considerably.

The comparison of the four objective indicators shows that both the listing of the relevant dimensions and the weighting scheme used to aggregate them, have serious consequences for the definition of a 'good job'. In most cases, policy makers make use of the job characteristics that happen to be available and prefer an equal weighting scheme because it has the flavour of being 'neutral'. This assumption of neutrality is mistaken. Our empirical results show that a supposedly neutral scheme $Q^{O,EW1}$, with equal weights and a 'perfectionist' choice of relevant job dimensions, is even more correlated with the extreme motivation reference case $Q^{O,r2}$ (0.740) than with the average weights reference case $Q^{O,r1}$ (0.630). The same holds when the dimensions are chosen in a more participatory way (as in $Q^{O,EW2}$), but the difference becomes much less pronounced (0.922 versus 0.881).

Since the equivalent income indicator $Q^{EI,r}$ respects individual preference differences (while ruling out the effect of aspirations), it is not surprising that it is more highly correlated with the subjective indicator. However, it turns out to be very highly correlated (0.963) with the objective indicator with an average reference individual $Q^{O,r1}$. Remember that the differences between $Q^{O,r1}$ and $Q^{EI,r}$ do not only result from the respect for individual preferences in the latter, but are also sensitive to the choice of the reference levels for job characteristics in the equivalent income case (the best possible levels) and for preferences in the objective case (average values for the preference variables in $Q^{O,r1}$). The correlation between the equivalent income indicator and the alternative refer-

ence objective indicator $Q^{O,r2}$ is lower (0.789) because individual preferences are more similar to average preferences (as in $Q^{O,r1}$) than to the more extreme preferences used for the calculation of $Q^{O,r2}$. For analogous reasons, the correlation of the equivalent income method is much higher with $Q^{O,EW2}$ than with indicator $Q^{O,EW1}$.

Table 3. Correlations between the different job quality indicators

5.3 Comparing the indicators: characteristics of poorest and best jobs

We will now compare which kind of jobs are (and which type of workers get) better/worse (jobs) according to the different job quality indicators. To facilitate the comparison, we calculate standardised scores and present the average of these scores for different groups. This makes that the comparative tables presented in this section allow for a double comparison: differences between groups for one indicator and differences between indicators for one group. For categorical variables the groups are the different categories, for continuous variables we pick a 'low' and 'high' group. The 'low' group corresponds to (at least) the lowest 12.5% of the sample, while the 'high' group corresponds to (at least) the highest 12.5% of the sample. Table 4 provides the comparisons for the significant job characteristics, table 5 for the sector of employment and table 6 for some background characteristics. The results have to be interpreted cautiously, since we basically restrict ourselves to a series of bivariate analyses, but they nevertheless give revealing insights into the differences and similarities between the various job quality indicators. The general picture is in line with the correlation results presented in the previous section. The low correlation of the subjective indicator with the equal weighting methods (and especially with $Q^{O,EW1}$, which approximates the JQI) is reflected in large differences between these quality indicators. The high correlation between the objective indicator with average reference and the equivalent income indicator results in rather similar job quality indicators.

Table 4. Standardised scores of the different job quality indicators for jobs with different characteristics

Table 4 shows how specific "objective" job characteristics are reflected in the job quality indicators. All quality indicators basically agree that a 'low quality' job is a job with a low wage, which is physically demanding, not challenging and not involving collaboration with others, with a lot of time pressure and repetition, with little possibilities to reveal capabilities and little autonomy. Furthermore, it is a job in a smaller company, with a temporary contract and

with little learning of new skills. Yet, there are clear differences in emphasis between the different indicators. Differences in objective characteristics lead to a more pronounced differentiation in measured job quality for the more objective job quality indicators, that give them a relatively larger weight while cleaning for the effect of personal aspirations. This is especially true for the equal weighting methods. Of course, for the approximation of the JQI ($Q^{O,EW1}$), it only holds for the included dimensions. When average ($Q^{O,r1}$) or individual ($Q^{EI,r}$) preferences are taken into account, the dichotomy between the poorest and best quality jobs is influenced by the interaction effects (see table 2). When the interaction has the same sign as the main effect the difference between low and high groups (as expressed in $Q^{O,EW2}$) will be reinforced, but it will decrease when the effect of preferences goes in the opposite direction. The former is the case for challenging jobs and for jobs with results and possibilities to reveal capabilities. The latter is the case for jobs with heavy time pressure and for jobs in collaboration with others. Remember that the table only shows bivariate effects, the interpretation of which is not always self-evident.

Table 5. Standardised scores of the different job quality indicators for jobs in different sectors

The impact of the job characteristics on the indicators determines the analysis of job quality in different sectors (table 5).[23] The primary sector has jobs which are more physically demanding and repetitive, two 'negative' characteristics that decrease quality levels. The opposite holds for the finance sector: jobs are less physically demanding and entail more autonomy than on average, with both effects increasing measured job quality. The results for the health sector illustrate the difference between the equal weight indicator based on the JQI and the other indicators. Jobs that are relatively more challenging and with relatively more collaboration boost the quality scores for all indicators except for $Q^{O,EW1}$, since these two dimensions are not included. The same holds, but in the opposite direction, for the manufacturing sector where jobs are more physically demanding, more repetitive and less challenging than average jobs. But since the dimension 'challenging job' is not included in $Q^{O,EW1}$, we observe the negative job quality only in the other indicators. Jobs in the education sector are better than average with respect to all job characteristics (more challenging, more collaboration, more results, more autonomy, less physically demanding, less pressure of time, less repetitive) explaining the positive scores for all indicators (including the subjective indicator).[24] Especially interesting is the observation that the general picture of Table 5 shows a larger

[23] For the interpretation, we rely to some extent on the descriptive statistics concerning the mean of the different job characteristics in the different sectors. These data can be obtained form the authors on request, but they are not at all surprising.

[24] The negative coefficient for the education sector in table 2 indicates that, after controlling for all job characteristics, working in the education sector has a negative impact on job satisfaction. However, the strong positive influence of job characteristics in this sector makes that the bi-variate picture in table 5 is more rosy.

spread in job quality between the different sectors with the objective indicators than with Q^S and $Q^{EI,r}$, which both take into account interindividual differences in preferences. This is exactly what we would expect if workers to some extent select their job on the basis of their preferences.

Table 6. Standardised scores of the different job quality indicators for different personal characteristics

There is no significant gender difference in the reported subjective satisfaction score (table 6).[25] We observe that according to $Q^{O,EW1}$ women have on average lower quality jobs than men. This is because women are more prominent in non-standard employment, which is one of the six dimensions considered in the JQI. This gender difference reverses in the last three columns of table 6 because these indicators do not include part-time work (as this was not significant in the final satisfaction model) but do consider that women have much less physically demanding work than men.

People with a lower social background (lower educational level of the mother) are more often in more physically demanding and repetitive jobs and less often in challenging jobs with autonomy. The effect of considering individual preferences in the equivalent income indicator can be nicely illustrated here. When the educational level of the mother is lower, people are less negative towards time pressure and have less preference for collaboration (two interaction effects that are opposite to the main effect of the job characteristic, see table 2) and this results in a smaller quality difference for the equivalent income indicator.

The relevance of the choice between the different indicators is convincingly illustrated by the results for education. The estimates of the ordered logit model (table 2) show that higher educated workers are less satisfied because they expect more from their work. Both the objective and the equivalent income indicators correct for this impact of aspirations. Lower (higher) educated people are more often in jobs with bad (good) characteristics, which makes that the scores for the different objective indicators are considerably lower (higher) compared to those for subjective job satisfaction. Taking into account individual preferences (with the equivalent income indicator) yields results which are in between these two extremes. It corrects for differences in aspirations, but respects individual differences in preferences.

6 Conclusion

"More and better jobs" is one of the key objectives to make the EU "the most competitive and dynamic knowledge-driven economy by the year 2010". This implies that the measurement of job quality is an important question for the

[25] Note again that we are looking at bivariate relations here. The positive gender effect of table 2 indicates that, after controlling for all other characteristics, there is a positive impact of gender (women) on job satisfaction

purpose of policy. Much of the policy oriented literature describes and compares different job dimensions separately, recognizing the multidimensional nature of the concept but at the same time neglecting the difficult indexing problem. Two approaches have been used in the recent past for constructing one-dimensional indicators of job quality. The first is the objective indicator approach. It starts from a set of job dimensions that are judged to be relevant by the analyst or by the policy-maker and applies some weighting to these dimensions, either using statistical data reduction techniques or simply on the basis of an a priori reasoning. Equal weighting is predominantly used in policy oriented work, arguing that it does not establish "any clear 'hierarchy' between the different components of job quality" (European Commission, 2008, p. 164). Objective indicators (however weighted) neglect the fact that different individuals have different ideas about the relative importance of different job characteristics. The second approach uses subjective job satisfaction as a one-dimensional proxy for job quality. Yet this may be misleading since job satisfaction does not only reflect job characteristics but also individual expectations and aspirations.

As a possible way out of the dilemma between "too objective" and "too subjective" indicators, we propose the equivalent income indicator which respects individual preferences but corrects for the effects of expectations and aspirations. Moreover we show how more flexible objective indicators can be derived by making specific assumptions about reference preferences. We compare the theoretical properties of these different indicators with those of equal weighting procedures and of subjective satisfaction. For our empirical illustration, we use data for Flemish youngsters in their first job. We show that the presumed assumption of neutrality in equal weighting schemes is mistaken.

A first equal weighting indicator is an approximation of the Job Quality Index where the list of dimensions is fixed by the analyst. A second one chooses as the relevant job dimensions those that are significant in an estimated job satisfaction model. The more 'participatory' nature of the latter explains the higher correlation with the subjective indicator. Choosing more refined reference preferences further increases this correlation. The equivalent income indicator can be situated in between the objective and the subjective indicators.

It turns out that the listing of the relevant dimensions as well as the weighting scheme used to aggregate them, have serious consequences for the definition of a 'good job'. The general picture is that worse job characteristics produce lower job quality. Ignoring individual aspirations as well as preference differences, the equal weighting methods only take job characteristics into account. This is reflected in larger differences between 'low' and 'high' quality jobs. The position of the equivalent income indicator is clearly illustrated by comparing the job quality indicators in function of the education of the respondents. A higher educational level increases expectations and reduces reported job satisfaction. According to the subjective indicator, low and high educated people do not really differ in job quality. Objective as well as equivalent income indicators make the more (less) educated people better (worse) off. But the latter has the additional advantage of respecting the preference differences between the education levels such that job quality is situated in between levels which seem

'too subjective' or 'too objective'.

Equal weighting is definitely not a neutral approach for measuring job quality. Subjective job satisfaction is not the only alternative. There exist other attractive methods to respect individual preferences for jobs while cleaning the effect of aspirations.

REFERENCES

Brown, A., A. Charlwood, and C. Spencer D. Forde. 2007. Job quality and the economics of New Labour: a critical appraisal using subjective data. *Cambridge Journal of Economics* 31: 941-971.

Brun, B. and B. Tungodden. 2004. Non-welfaristic theories of justice: Is the "intersection approach" a solution to the indexing impasse? *Social Choice and Welfare* 22, no. 1: 49-60.

Clark, A. 1997. Job satisfaction and gender: why are women so happy at work? *Labour Economics* 4: 341-372.

Clark, A. 2001a. *Economic foundations of subjective well-being.* University of Orléans: Working Paper.

Clark, A. 2001b. What really matters in a job? Hedonic measurement using quit data. *Labour Economics* 8: 223-242.

Clark, A. 2005. Your money or your life: changing job quality in OECD countries. *British Journal of Industrial Relations* 43, no. 3: 377-400.

Clark, A. and A. Oswald. 1996. Satisfaction and comparison income. *Journal of Public Economics* 61, no. 3: 359-381.

D'Addio, A., T. Eriksson, and P. Frijters. 2007. An analysis of the determinants of job satisfaction when individuals' baseline satisfaction levels may differ. *Applied Economics* 39, no. 19: 2413-2423.

Davoine, L. and C. Erhel. 2006. *Monitoring employment quality in Europe: European employment strategy indicators and beyond.* CES: Document de Travail No. 66.

De Witte, H. 2001. Arbeidstevredenheid: een zinvol concept? *OverWerk* 4: 18-21.

Deaton, A. and J. Muellbauer. 1980. *Economics and consumer behaviour.* Cambridge:Cambridge University Press.

Delfgauw, J. 2007. The effect of job satisfaction on job search: not just whether, but also where. *Labour Economics* 14, no. 3: 299-317.

Diaz-Serrano, L. and J. Cabral Vieira. 2005. *Low pay, higher pay and job satisfaction within the European Union: empirical evidence from fourteen countries.* IZA: Discussion Paper 1558.

Eurofound. 2006. *Measuring job satisfaction in surveys.* ERM: Comparative Analytical Report.

European Commission. 2008. *Employment in Europe 2008.*

Fleurbaey, M. 2005. Health, wealth and fairness. *Journal of Public Economic Theory* 7, no. 2: 253-284.

Fleurbaey, M. 2006. Health, equity and social welfare. *Annales d'Economie et Statistique* 83-84: 21-60.

Fleurbaey, M. 2007. Social choice and the indexing dilemma. *Social Choice and Welfare* 29, no. 4: 633-648.

Fleurbaey, M. 2008. *Fairness, responsibility and welfare.* Oxford: Oxford University Press.

Fleurbaey, M., E. Schokkaert, and K. Decancq. 2009. *What good is happiness?* CORE: Discussion Paper 2009/17.

Freeman, R. 1978. Job satisfaction as an economic variable. *American Economic Review* 68, no. 2: 135-141.

Frey, B. and A. Stutzer. 2002. What can economists learn from happiness research? *Journal of Economic Literature* 40, no. 2: 402-435.

Furnham, A. 1997. *The psychology of behaviour at work.* The individual in the organization. Hove East Sussex: Psychology Press.

Gazioglu, S. and A. Tansel. 2006. Job satisfaction in Britain: individual and job related factors. *Applied Economics* 38: 1163-1171.

Global Policy Network. 2006. *Proposal for calculation of the Good Jobs Index (GJI) for all countries.* Mimeo.

Green, F. 2006. *Demanding work: the paradox of job quality in the affluent economy*: Princeton University Press.

Green, F. and N. Tsitsianis. 2005. An investigation of national trends in job satisfaction in Britain and Germany. *British Journal of Industrial Relations* 43, no. 3: 401-429.

Hall, R. 1994. *Sociology of work: perspectives, analysis and issues*: Pine Forge Press.

Hamermesh, D. 2001. The changing distribution of job satisfaction. *Journal of Human Resources* 36, no. 1: 1-30.

Heintz, J., J. Wicks-Lim, and R. Pollin. 2005. *Work environment index.* Technical Background Paper WP107: Political Economy Research Institute, University of Massachusets Amherst.

Jencks, C., L. Perman, and L. Rainwater. 1988. What is a good job? A new measure of labor market success. *American Journal of Sociology* 6: 1322-1357.

Kaiser, L.C. 2007. Gender-job satisfaction differences across Europe. *International Journal of Manpower* 28, no. 1: 75-94.

Kalleberg, A. and S. Vaisey. 2005. Pathways to a good job: perceived work quality among the machinists in North-America. *British Journal of Industrial Relations* 43, no. 3: 431-454.

King, M. 1983. Welfare analysis of tax reforms using household data. *Journal of Public Economics* 21: 183-214.

Knoop, F. and R. Schouteten. 2006. Arbeidstevredenheid als maat voor kwaliteit van de arbeid . *Tijdschrift voor Arbeidsvraagstukken* 22, no. 4.

Landy, F. and D. Trumbo. 1976. *Psychology of work behaviour*: Dorsey Press.

Leontaridi, R. and P. Sloane. 2001. *Measuring the quality of jobs: promotion prospects, low pay and job satisfaction.* Amsterdam: LoWER Working Paper No. 7.

Leschke, J. and A. Watt. 2008. *Putting a number on job quality? Constructing a European Job Quality Index*: ETUI-REHS WP 2008.03.

Levy-Garboua, L. and C. Montmarquette. 2004. Reported job satisfaction: what does it mean? *Journal of Socio-Economics* 33, no. 2: 135-151.

Munoz de Bustillo Llorente, R. and E. Fernandez Macias . 2005. Job satisfaction as an indicator of the quality of work. *Journal of Socio-Economics* 34: 656-673.

Nussbaum, M. 2000. *Women and human development: the capabilities approach.* Cambridge: Cambridge University Press.

Nussbaum, M. 2006. *Frontiers of justice: disability, nationality, species membership.* Cambridge, Mass.: Harvard University Press.

Pattanaik, P. and Y. Xu. 2007. Minimal relativism, dominance, and standard of living comparisons based on functionings. *Oxford Economic Papers* 59: 354-374.

Ritter, J. and R. Anker. 2002. Good jobs, bad jobs: worker's evaluations in five countries. *International Labour Review* 141, no. 4: 331-358.

Samuelson, P. 1974. Complementarity: an essay on the 40th anniversary of the Hicks-Allen revolution in demand theory. *Journal of Economic Literature* 12: 1255-1289.

Schokkaert, E. 2007. Capabilities and satisfaction with life. *Journal of Human Development* 8, no. 3: 415-430.

Sen, A. 1985. *Commodities and capabilities.* Amsterdam: North-Holland.

Sen, A. 1999. *Development as freedom.* New York: Knopf.

Sen, A. 1992. *Inequality re-examined.* Oxford: Clarendon Press.

Spector, P. 1997. *Job satisfaction. Application, assessment, causes, and consequences.* London: SAGE.

Tangian, A. 2005. *A composite indicator of working conditions in the EU-15 for policy monitoring and analytical purposes.* Hans Böckler Stifting, Düsseldorf: WSI Discussion Paper 135.

Tangian, A. 2007. *Is flexible work precarious? A study based on the 4th European Survey of working conditions 2005.* Hans Böckler Stifting, Düsseldorf: WSI Discussion Paper 135.

Telljohan, V. and F. Sbordone. 2008. *New European Job Quality Index to monitor job quality* (www.eurofound.europe.eu/ewco/2008/06/Eu0806019I.htm).

Verhofstadt, E., H. De Witte, and E. Omey. 2007. Higher educated workers: better jobs but less satisfied? *International Journal of Manpower* 28, no. 2: 135-151.

Table 2. Ordered logit regression results of job satisfaction in the first job

	Coeff.	Std. Err.
log of net monthly wage in FTE	0,427 **	0,186
physically demanding, dangerous and dirty job	-0,355 ***	0,064
job that is a challenge and that is worth the effort	0,844 ***	0,236
job with a lot of pressure of time	-0,320 ***	0,054
job with a lot of repetition	-0,164 ***	0,054
job in collaboration with others	0,269 ***	0,064
job with results and possibilities to reveal capabilities	0,293 ***	0,078
job with a lot of autonomy to decide	0,722 ***	0,229
company size: more than 50 employees	0,371 ***	0,088
temporary contract	0,209 **	0,093
learning new skills during the first job	0,339 ***	0,108
sector education	-0,514 ***	0,175
succesful school years (after being 12 years old)	-0,272 ***	0,073
women	0,258 ***	0,092
number of search channels	-0,036 **	0,016
motivation to work from material aspects	0,601 ***	0,139
education mother low X job with a lot of pressure of time	0,133 *	0,080
education mother low X job in collaboration with others	-0,151 **	0,063
search time X job that is a challenge / worth the effort	-0,021 **	0,009
search time X job with results and possibilities to reveal capabilities	0,028 ***	0,008
search time X job with a lot of autonomy to decide	-0,014 **	0,007
locus internal X job with a lot of repetition	-0,089 ***	0,034
locus internal X job in collaboration with others	0,154 ***	0,037
locus internal X job with a lot of autonomy to decide	-0,114 **	0,045
motivation to work from content x company size: more than 50 employees	-0,200 **	0,084
motivation to work from content X physically demanding, dangerous and dirty job	0,125 ***	0,046
motivation to work from content X job that is a challenge / worth the effort	0,139 ***	0,046
motivation to work from content X job in collaboration with others	-0,133 ***	0,041
motivation to work from material aspects X job that is a challenge / worth the effort	-0,172 ***	0,051
succesful school years X job that is a challenge / worth the effort	0,095 ***	0,028
succesful school years X job with a lot of autonomy to decide	-0,066 **	0,027

* significant at 10% level, ** significant at 5% level, *** significant at 1% level

Number of observations: 2226

Log likelihood = -2244.3959

Table 3: Spearman correlations between the different indicators

	Q^{S}	$Q^{O,EW1}$	$Q^{O,EW2}$	$Q^{O,r1}$	$Q^{O,r2}$	$Q^{EI,r}$
Q^{S}	1					
$Q^{O,EW1}$	0,386	1				
$Q^{O,EW2}$	0,563	0,867	1			
$Q^{O,r1}$	0,646	0,630	0,881	1		
$Q^{O,r2}$	0,532	0,740	0,922	0,834	1	
$Q^{EI,r}$	0,656	0,578	0,832	0,963	0,789	1

Note: all correlations are significant at 0.01 level

Table 4: Standardised scores of the different job quality indicators for jobs with different characteristics

	Q^{S}	$Q^{O,EW1}$	$Q^{O,EW2}$	$Q^{O,r1}$	$Q^{O,r2}$	$Q^{EI,r}$
Net monthly wage in FTE: low	*-0,099*	***-0,564***	***-0,483***	***-0,358***	***-0,460***	***-0,280***
Net monthly wage in FTE: high	*0,183*	***0,524***	***0,507***	***0,424***	***0,484***	***0,374***
Physically demanding, dangerous and dirty job: low	*0,105*	***0,388***	***0,411***	***0,293***	***0,582***	***0,223***
Physically demanding, dangerous and dirty job: high	*-0,404*	*-0,480*	***-0,732***	*-0,592*	***-1,135***	*-0,512*
Job that is a challenge and that is worth the effort: low	*-1,371*	***-1,047***	*-1,437*	***-1,774***	*-1,273*	***-1,744***
Job that is a challenge and that is worth the effort: high	*0,739*	***0,560***	***0,908***	***1,243***	***0,819***	***1,262***
Job with a lot of pressure of time: low	*0,067*	***0,240***	***0,343***	***0,203***	***0,343***	***0,215***
Job with a lot of pressure of time: high	*-0,234*	***-0,419***	***-0,484***	*-0,330*	***-0,419***	*-0,319*
Job with a lot of repetition: low	*0,510*	***0,591***	***0,854***	***0,841***	***0,681***	***0,810***
Job with a lot of repetition: high	*-0,656*	***-0,779***	***-1,008***	***-0,985***	***-0,796***	***-0,895***
Job in collaboration with others: low	*-0,616*	***-0,490***	***-1,110***	***-0,955***	***-1,587***	***-0,843***
Job in collaboration with others: high	*0,140*	***0,053***	***0,191***	***0,198***	***0,286***	***0,208***
Job with results and possibilities to reveal capabilities: low	*-1,381*	***-0,902***	*-1,458*	***-1,694***	*-1,332*	***-1,656***
Job with results and possibilities to reveal capabilities: high	*0,480*	***0,230***	***0,532***	***0,751***	***0,531***	***0,763***
Job with a lot of autonomy to decide: low	*-0,566*	***-0,714***	***-0,845***	***-0,796***	***-0,642****	***-0,753***
Job with a lot of autonomy to decide: high	*0,512*	***0,702***	***0,920***	***0,894***	***0,784***	***0,858***
Company size: less than 50 employees	*-0,055**	***-0,519***	***-0,327***	*-0,084*	***-0,358***	*-0,072*
Company size: more than 50 employees	*0,016**	***0,563***	***0,357***	***0,091***	***0,389***	***0,077***
Permanent contract	*0,061*	***0,270***	***0,112***	***0,113***	0,026	*0,077*
Temporary contract	*-0,093*	***-0,221***	*-0,095*	*-0,093*	**-0,022**	*-0,064*
Learning new skills during the first job: no	*-0,538*	***-1,116***	***-0,981***	***-0,781***	***-0,651***	***-0,717***
Learning new skills during the first job: yes	*0,187*	***0,397***	***0,349***	***0,279***	***0,232***	***0,252***

Bold: score for indicator significantly different (at 0.05) from Q^{S}
Italic: significant differences (at 0.05) between the groups for one indicator
* significance only at 0.1

Table 5: Standardised scores of the different job quality indicators for jobs in different sectors

	Q^{S}	$Q^{O,EW1}$	$Q^{O,EW2}$	$Q^{O,r1}$	$Q^{O,r2}$	$Q^{EI,r}$
NACE classification of economic activities						
Primary sector'	*0,051*	***-0,558***	***-0,476***	*-0,153*	***-0,593***	*-0,067*
'Manufacturing '	*-0,231*	***-0,065***	*-0,241*	***-0,367***	***-0,275***	*-0,284*
'Electricity, gas and water supply' or Construction	*0,136*	*0,182*	*0,022*	***0,018***	*-0,172*	*-0,021*
'Wholesale and retail trade; repair of motor vehicles, motorcycles and personal and household goods '	*-0,154*	***-0,350***	***-0,361***	***-0,315***	***-0,341***	***-0,302***
'Hotels and restaurants '	*-0,151*	***-0,830***	***-0,613***	***-0,382***	***-0,578***	***-0,359***
'Transport, storage and communication'	*0,066*	***0,213***	*0,041*	*-0,005*	*0,109*	*-0,014*
'Financial intermediation '	*-0,011*	***0,480***	***0,390***	***0,198***	***0,549***	***0,084****
'Real estate, renting and business activities '	*-0,006*	***0,195***	***0,130***	***0,121***	***0,225***	***0,065***
'Public administration and defence, compulsary social security'	*0,105*	***0,352***	***0,359***	***0,339***	***0,400***	***0,239***
'Education'	*0,425*	*0,429*	***0,780***	***0,763***	***0,536***	***0,749***
'Health and social work '	*0,246*	***0,034***	*0,263*	***0,380***	***0,332***	***0,355***

Bold: score for indicator significantly different (at 0.05) from Q^{S}
Italic: significant differences (at 0.05) between the groups for one indicator
* significance only at 0.1

Table 6: Standardised scores of the different job quality indicators for different personal characteristics

	Q^{S}	$Q^{O,EW1}$	$Q^{O,EW2}$	$Q^{O,r1}$	$Q^{O,r2}$	$Q^{EI,r}$
Men	-0,018	***0,100***	-0,006	*-0,040**	*-0,078*	*-0,038**
Women	0,018	***-0,100***	0,006	*0,040**	***0,078***	*0,038**
Education mother: primary or lower secondary	*-0,065*	***-0,179***	***-0,180***	***-0,157***	***-0,173***	***-0,014***
Education mother: higher secondary	*0,050*	*0,061*	*0,073*	*0,064*	*0,073*	*-0,017*
Education mother: tertiary	*0,073*	***0,295***	***0,270***	***0,236***	***0,265***	***0,137***
Succesful school years: max 5	-0,043	***-0,470***	***-0,518***	***-0,424***	***-0,557***	***-0,261***
Succesful school years: min 10	0,073	***0,467***	***0,445***	***0,360***	***0,443***	***0,246***

Bold: score for indicator significantly different (at 0.05) from Q^{S}
Italic: significant differences (at 0.05) between the groups for one indicator
* significance only at 0.1