

Satisfaction and quality of life

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Should GDP be replaced by a single measurement of well-being? Some people think so, arguing that an improvement in the quality of life is more important to people than the mere promotion of growth. Without going quite as far as this radical stance, increasing numbers of policymakers as well as the American Central Bank and the European Union feel that indicators of well-being should be built alongside GDP.

Quality of life covers several dimensions. Some of them are qualified as objective, such as material situation, physical health, emotional balance and social isolation, while others are more subjective, such as satisfaction with life. New longitudinal data provide a quantification of the concepts underlying well-being and a longer-term understanding of how the different dimensions of quality of life interact with each other. The one that people consider the most important is the weakness of social ties, ahead of health and psychosocial risks.

Knowledge of the importance of these different dimensions to each person may be helpful in building a single quality-of-life indicator. But it is debatable whether the publication of a single figure would be of interest, since this figure gives no information on the best economic policy measures intended to improve it. It is probably far better to know about the populations in difficulty, to pinpoint those that combine several causes of poor quality of life, and to propose targeted measures to increase their dynamic capabilities, as described by Sen, in order ultimately to improve their situation.

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Since the work carried out by the Leyden school in the 1970s, the use of subjective data has aroused a certain degree of interest among economists. The work of Kapteyn and van Herwaarden (1980), or van Praag (1991), for example, showed that subjective data on well-being could be used to measure perception of inequalities or to produce equivalence scales¹. Meanwhile in France, studies of the European panel revealed specific links between satisfaction, income and living standards (Lollivier, Verger, 1997).

More recently, subjective data have been used to assess the impact on well-being of variations in external variables (see Senik, 2005, for a review of the literature): cost of macroeconomic fluctuations (Di Tella *et al.*, 2001), non-pecuniary effect of unemployment on well-being (Clark and Oswald, 1994; Winkelmann and Winkelmann, 1998), effect of democratic institutions (Frey and Stutzer, 2000), or effect of income inequalities on well-being (Alesina *et al.*, 2001, Clark and Oswald, 1996; Senik, 2004). The measurement of poverty is of course the leading field in which subjective data are applied (Ravallion and Lokshin, 2001; Ferrer-i-Carbonell and van Praag, 2001).

Using subjective variables for measuring QoL is also one of the approaches recommended by the Commission on the Measurement of Economic Performance and Social Progress, chaired by Joseph Stiglitz (2009). In its preamble, the Commission alludes to the philosophical tradition that views individuals as the best judges of their own condition, and to links with the utilitarian approach in economics. As argued by Diener (1984), the Commission believes that subjective well-being is best understood as a phenomenon encompassing three separate aspects. The first approach relates to life satisfaction, *i.e.* a person's overall judgement about their life at a particular point in time and also the importance of the role played by affects, both positive and negative. Links between satisfaction and affect have to be considered in perspective. According to the Commission, the correlation at individual level between satisfaction and positive affects is generally put at 0.4 and is unlikely to go above 0.6 (Krueger *et al.*, 2008). For the OECD the correlation is even lower at between 0.2 and 0.3. The correlation among different indicators of negative affect, such as anger or sadness, is also low.

The second approach recommended by the Commission considers the notion of capabilities (Sen, 1987, 1993). With this approach, a person's life is seen as a combination of various "doings and beings" (functionings), and QoL depends on this person's freedom to choose among these capabilities. Some of these capabilities can be relatively basic, such as having enough to eat and escaping premature death. Others are more complex, such as having a sufficient level of education to be able to be actively involved in political life. The Commission lists eight dimensions of QoL that are connected with capabilities: material living standards, health, education, personal activities including work, political voice and governance, social connections and relationships, environmental conditions, economic and physical security, alongside perceived well-being. The Commission also stresses that one of the most promising aspects of research into subjective well-being is that it not only provides an interesting measure of the level of QoL but also gives a better understanding of what determines this QoL. It therefore highlights a topic we intend to develop here, defining the links between what are generally described as the objective determinants of QoL (health, education, family situation, etc.) and perceived well-being.

The third approach recommended by the Commission concerns fair allocations. In consumer theory, preferences are described by indifference sets which usually only depend on the consumption of goods and services. It is with this approach that the notion of "willingness to pay" can be calculated for the different goods and services being considered. However, determining this willingness can also be extended to other variables, especially QoL ones, as has already been done for health in some studies. At the end of this article, we intend to implement this recommendation by the Commission by taking individual preferences into account when devising a weighting system for different dimensions of QoL.

Policymakers taking a greater interest in QoL indicators

The subject of QoL is also cropping up in questions of government policy, where the

1. Where the "cost of a child" is defined as income equivalent to one extra child at constant utility.

intention now is to improve people's well-being rather than look solely at growth as measured by GDP. In 2008, the OECD launched a global project on measuring the progress of societies, where measuring the promotion of a better QoL for people is at the forefront. At the same time, still in 2008, when the European Council approved the European Economic Recovery Plan, it also acknowledged that the crisis should be an opportunity to guide the economy towards growth but with reduced carbon emissions, more efficient use of resources and more in line with the needs of society. In a speech in summer 2012, the Chairman of the US Federal Reserve said that economic indicators were not measuring well-being sufficiently. The European Commission for its part highlighted the need for indicators which would complement GDP by measuring inequalities, sustainability and well-being.

Several countries have already embarked along this path, with initiatives at the highest level. In 2010, David Cameron, the UK Prime Minister, announced the introduction of measures to gain an understanding of well-being through statistical surveys. In 2009, in Germany, deputies in the Bundestag set up a commission to widen the scope of economic indicators by measuring well-being and QoL.

What are the drivers of improving perceived well-being?

Regarding QoL, the political authorities are not able to act directly on people's level of satisfaction, as it is essentially an outcome (term used by the European Commission) of the state of the economy. However, they have a greater degree of latitude when it comes to influencing some or all of the drivers (term used by the European Commission) that constitute the other objective dimensions highlighted in the Stiglitz report.

Initial studies have shown that links can be drawn between objective QoL measured by indicators and perceived well-being, and thus the power of these drivers can be quantified. In France, Godefroy (2011) in particular has shown that the role of material living standards, just like health, is at least as important as that of income for people's perceived well-being. Amiel, Godefroy and Lollivier (2013) demonstrated that the introduction of objective QoL indicators into an econometric adjustment

pushed the role of income into the background. These national conjectures have been given further weight by studies currently being carried out by the OECD on a group of countries. They confirm that, leaving income to one side, the QoL indicators that are particularly important when considering perceived well-being are state of health, the fact of not being unemployed, and having social relationships, with only minor differences emerging between countries. Thus according to the OECD these attempts to measure subjective well-being in terms of different criteria can play an important part in informing decision-makers about what seems to contribute most to well-being: health, having a job, and social contacts, over and above income (Fleche, Smith, Sorza, 2011).

Nevertheless, one of the criticisms commonly levelled at data on subjective well-being is that they assume that people have the same preferences, or at least that variation in behaviour does not affect the links between satisfaction and the variables used to define it. If this were not the case, then there is a risk that interpersonal comparisons, taken as a cross-section, could be partly or entirely reduced to this variation in behaviour (Senik, 2005). This criticism is reinforced when one also considers QoL indicators, which, although they describe dimensions deemed to be objective, are built entirely or partly on self-reported responses (health, social connections, etc.). Even though studies have shown that in fact self-reporting gives a very good approximation of more objective measurements, especially concerning health (Bouvier, 2012), the suspicion of endogeneity remains as regards the influence that such variables can have on perceived well-being.

Using panel data can be a way to repel a large proportion of these criticisms. When the same individuals are followed over time, the hypothesis of preference comparability comes down to a simple assumption of stability over time. Using longitudinal data not only enables preference heterogeneity to be taken into account to a certain extent, but also allays suspicions of endogeneity that may be levelled at some explanatory variables. The originality of this article is twofold: we measure links between perceived well-being and QoL indicators over and above income, and take into account individual heterogeneity through longitudinal data.

A multi-theme survey of living standards

The survey *Enquête statistique sur les ressources et les conditions de vie (SRCV)* is the French component of the European survey *Statistics on Income and Living Conditions (EU-SILC)*. As well as providing information on people's individual characteristics and those of the household to which they belong, the survey covers household income and material problems (Box). For some indicators like quality of housing, financial difficulties and consumption restrictions, only one person in the household was asked the questions and they replied for the entire household.

In the article, the individual approach has been adopted. Any difficulties borne by the household have been transferred to every adult surveyed aged 16 or over. Thus unless there was some individual information to the contrary, these difficulties were distributed equally among the individuals. Since 2010, a five-question module has also been included in the French component of the survey, following the recommendations of the Stiglitz Report. Like the rest of the questionnaire, this module is administered face-to-face (*i.e.* by an interviewer) to all survey participants. These are assessment questions covering five broad areas of life and with the following

Box 1

SRCV DATA SOURCE

The SRCV survey (*Statistiques sur les ressources et les conditions de vie*) is the French component of the European SILC (*Statistics on income and living conditions*) survey coordinated by Eurostat with data collection and management in France carried out by INSEE. In the article, only the 2010 and 2011 data collections are used, given the subject studied. The SRCV is a panel survey using a rotating sample design. Every year part of the sample is retained for the following year. The panel rotates over a 9-year period, which means that each sub-sample is visited for 9 consecutive years. These sub-samples are independent from each other and are drawn from the population census.

Since 2010, a five-question module on perceived well-being has been included in the French section of the survey. It is administered face-to-face (*i.e.* by an interviewer) to all the adults participating in the survey (25,000 approx.). The questions ask for a subjective assessment of five broad areas of life with the following wording:

"On a scale from 0 (not at all satisfied) to 10 (very satisfied), rate your satisfaction with:

- your dwelling,
- your work (for persons in employment),
- your leisure activities,
- your relations with your immediate circle: family, friends and neighbours,
- your life at the present time."

These questions are asked at the end of the interview. A self-assessment question of the same type, on health, is asked every year in all the countries participating in the SILC survey.

We also administered a self-reporting module (*i.e.* respondents answer questions unassisted) on paper, entitled "Feelings, attitude and QoL" which covered

well-being to 1,600 households in 2010 and 2011 at a third interview. Questions covered subjective well-being, attitude to the future, love of risk, comparisons with others and short scenarios that the respondent was asked to assess in order to calibrate responses.

The survey combined two levels of questioning:

- Household level for incomes that could not be individualised, material deprivation, housing conditions in the broadest sense, including security in the neighbourhood, and the environment. In this instance a single member of the household responded on behalf of the entire household;
- Individual level for income that could be individualised, working conditions for those in work, health, satisfaction in various areas. In this instance, all members of the household aged 16 or over were questioned. As is done for other INSEE surveys, another household member (proxy) may reply in the place of an eligible individual when that person is not present on the day the data is collected. A proxy is not allowed for the satisfaction questions, however.

The designation of individual paths 2010-2011 involved assigning to every adult respondent aged 16 or over (in 2010) any difficulties borne by their entire household, difficulties which had been declared by the household respondent. Thus unless there was some individual information to the contrary on deprivations, the principle of equidistribution of these difficulties among the individuals was adopted. Finally, regarding income, given the time lag in the publication of this article, it was impossible to wait for the final result of the statistical match with the tax sources for 2010 and 2011. The income variable used here is therefore declarative; it is the disposable household income declared for the survey by the household respondent (from the Common core module for households, at the beginning of the questionnaire).

wording: on a scale of 0 (not at all satisfied) to 10 (very satisfied), indicate your satisfaction with 1) housing, 2) work, 3) leisure activities, 4) relationships with immediate circle, family, friends and neighbours, and 5) your life at the present time, which is the question on life satisfaction. All these are asked at the end of the individual questionnaire, in that order. A question of the same type, on health, is asked every year in all the countries participating in the EU-SILC survey.

Such a rich source of QoL variables is available in only a few other longitudinal databases. In the United States, the *Panel Study of Income Dynamics (PSID)* includes only questions on living standards and health, but not on the other dimensions of QoL, nor on life satisfaction. In Europe, the *British Household Panel Survey* contains many questions on most aspects of QoL, especially emotional balance, but does not ask questions on life satisfaction. Its successor, *Understanding*

Society, addresses this shortcoming² and adds many more QoL variables that cover almost all aspects highlighted in the Stiglitz report much more thoroughly than the French panel *SRCV*. This new panel is very recent, however, and has not yet given rise to further studies like those presented here. In Germany, the *German Socio-Economic Panel (GSOEP)* includes QoL variables that are fairly similar to those in the *SRCV*, as well as a general question on satisfaction. However, further studies into satisfaction have not focused on the viewpoints recommended in Stiglitz. They have concentrated on connections between satisfaction and income, following the example of standard academic papers. Lastly, an older panel, *SHARE (Survey of Health, Ageing and Retirement in Europe)* also contains many variables which examine most dimensions of

2. However, the life satisfaction variable is not measured on a scale of 0 to 10 unlike the French panel and as recommended by the OECD.

Box

QUALITY OF LIFE AND THE EASTERLIN PARADOX

Is taking QoL variables into account a way towards a better understanding of the Easterlin paradox (1974)? According to Easterlin, the paradox lay in the fact that the average well-being of a population does not seem to increase with its level of wealth, when analysis of individual data clearly shows a correlation between well-being and income. The usual way of resolving the paradox is to consider that when individuals determine their well-being the income they declare tends to be compared to that of a reference group rather than to an absolute income level. This is the route taken by Clark and Senik (2010, 2012), for example, when they show that satisfaction is better explained in terms of position on the local income scale than on a global scale.

Here we put forward a different explanation from that involving only relative income. Adjustments made in the study show that with individual data, the role played by income in achieving satisfaction fades as soon as QoL indicators are brought in as explanatory variables. This result is not surprising, in that income was never believed to affect well-being directly, but more through the living standards that it makes possible. It is especially unsurprising that by taking material difficulties into account this tends to reduce the influence of income.

On the other hand, other QoL indicators that are among the most important in relation to satisfaction, such as social connections, or even physical health, are less directly linked to commodity consumption.

We know that the affluent categories are in a better situation with regard to these indicators than the less well-off. The local position on the social scale is therefore positively correlated to these indicators as it is to income. One explanation suggested in the study is that in the usual cross section studies of satisfaction, income appears to be just as much a proxy for this position on the social ladder as an indicator of purchasing power would be. From cross section studies, relative income tends to be more a marker for this position than an indicator of a possible aversion to inequality.

Similar studies are required in other countries in order to judge the validity of this explanation. It will probably be necessary to add extra indicators to individual data for factors that can affect people's satisfaction (culture, spirituality, etc.), or to define some indicators for a very high level of QoL, since those in the Stiglitz report describe mainly deprivations. These indicators could reduce even further the direct role of income at the very top of the distribution. Lastly, to be even more conceptually conclusive, a model of individual behaviour is needed which will include an income constraint and where arbitration will be possible to purchase goods that will make QoL attainable. The usual representation of the consumer as a utility function is not sufficient, however, since as is the case here, intertemporal choices must be made in an uncertain environment, with preferences whose stability over time cannot be taken for granted (Arrondel, Masson, Verger, 2005).

QoL, such as health, declared and objective, mental and physical, cognitive capacities, social life and confidence, housing conditions, income, life satisfaction and work satisfaction. However, since it is a survey observing the ageing process, the sample is made up only of people aged 50 and over.

In the *SRCV* panel, 21,186 adults completed the individual questionnaire in 2010 and 22,288 in 2011, the dates of the two surveys containing satisfaction variables that were available in the summer of 2012. Both samples were representative of the population, and differences were minimal in terms of sociodemographic composition (see Table 1). Among those interviewed, 14,967 had answered a satisfaction question in 2010 and 15,406 in 2011. These reduced numbers can be explained by the fact that using a proxy was not allowed for questions on individual perceptions. Compared with respondents to the individual questionnaire, those answering the satisfaction question were a little older, by about 3 years, and the proportion of men had decreased from 48 % to 42 %. The proportion of students decreased from 9 % to 4 %, while that of retired people increased by 5 percentage points. The proportion of people living in a relationship was very similar, but the proportion of people without children, either biological or adopted throughout their lifetime, and whether living at home or not, fell from 32 % to 28 %. The education profile was the same, as was size of agglomeration³. Income per consumption unit was also similar in both samples⁴.

In all, 10,897 adults answered the question on satisfaction at two consecutive interviews in 2010 and 2011. This figure represents a reduction in relation to the almost 15,000 respondents in each individual year, and this is due partly to the fact that the panel is renewed every year. The incoming and outgoing ninths cannot therefore be part of the core sample, which to a great extent accounts for the reduced size of the sample. The rest is due to the nonresponse rate that affected the other seven ninths. The core sample is a little more than a year older than the sample of those who answered the satisfaction question in one given year. The proportion of men dropped again by one point to 41 %. The proportion living in a couple was a little higher and those without children dropped by a further two points. The composition of the survey by activity changed little, despite another drop by one point in the number of students. Once again, education and size of agglomeration

profiles changed very little as a result of the reduction in scope.

QoL indicators more often low for the least well-off

The seven dimensions of QoL used here are those recommended in the Stiglitz report, with the exception of education, which requires specialist surveys using a complex protocol to measure literacy or numeracy, and political voice and governance. In addition, we have divided insecurity into two separate dimensions, one relating to economic security and the other to physical insecurity, as the socio-demographic profiles of disadvantaged people are different in each one (Amiel *et al.*, 2012 and 2013). Lastly, as there are no data on domestic activities, the personal activities dimension is limited to work (psychosocial risks). To construct one indicator per dimension, the survey provided questions that could be turned into a binary deprivation item, such as “not able to go away on holiday”, or “lack of cleanliness in area around the dwelling”. We considered that the difficulty in the underlying (non-observable) dimension was all the greater when basic difficulties or deprivations tended to accumulate there. The aggregation method used is traditional and simple, consisting of adding together the items for each dimension to get a score. The advantage of these scores is that they eliminate shortcomings (due to data collection or related to individual variations in preference). A synthetic binary indicator of poor QoL in the dimension is then constructed from the score, based on the principle that above a certain number of basic difficulties the person is in an unfavourable situation⁵. The number of basic difficulties to use for each dimension was a matter for arbitration, but we generally tried to set them so that 10 % of the population accumulated the most difficulties. For some dimensions, those that have been least explored by official statistics, we have very few questions,

3. In the summer of 2012, we had only a provisional coding for education for the 2011 survey, which is not shown in Table 1. In the longitudinal estimates, education figures for 2010 were used for both years.

4. For reasons of availability, we used a synthetic question on monthly income, rather than the income provided by government sources.

5. Using scores rather than indicators in the various adjustments does not modify the results qualitatively, however it does mean they are more complicated to read since the number of items varies considerably according to the dimensions. Indicators are commonly used in this type of analysis (non-income poverty, illiteracy, etc.).

and thus when constructing the study some adaptations were necessary. Nevertheless, the socio-demographics of the QoL indicators were fairly close to what had been obtained from the multimode survey (internet and paper) on QoL, which included more questions to describe the dimensions (Amiel *et al.*, 2012).

Material living standards were gauged through four groups of basic difficulties: budgetary constraints (*e.g.* inability to cope with current expenditure without a bank overdraft or paying more than one third of total income for housing), late payments (*e.g.* inability to pay electricity bills on time), consumption restrictions (*e.g.* inability to afford basic consumption items such

as furniture or clothes), and lastly housing difficulties (*e.g.* lack of basic amenities or adequate space). A person is considered to be in difficulty if they combine at least 8 of these 27 difficulties, which was the case of 12 % of adults in 2011. Material difficulties are seen more often in the unemployed and in people aged between 25 and 44⁶. They are less common in people living in a couple, but having one child or more than three tends to increase them. Difficulties are more frequent in the largest agglomerations.

6. The profiles of people in difficulty are described on the basis of econometric models (not reported in the article), and are thus conditioned by other sociodemographic variables. They may differ, but in general only marginally, from the raw, more visual profiles provided in the graphs.

Table 1
Sociodemographic composition of samples

	All		Respondents to life-satisfaction question		Balanced sample* in 2010
	2010	2011	2010	2011	
Men	48	48	42	42	41
Average age	48	48	51	51	52
Main work situation					
In employment	49	50	48	49	49
Student	9	9	4	4	3
Unemployed	7	6	7	6	6
Inactive (incl. retired)	35	35	40	41	42
Education					
No diploma or CEP (elementary school)	29	-	30	-	29
CAP, BEP, Brevet (middle school)	32	-	30	-	30
BTS, Bac, Bac + 2 (high school, basic higher ed.)	26	-	26	-	27
Higher education	13	-	14	-	14
Living in a couple	65	63	66	66	68
No children (biological or adopted during entire lifetime, sharing home or not)	32	32	28	27	25
Size of urban unit in 1999					
Rural municipality	26	26	25	26	26
Urban unit < 10,000 inhabitants	12	11	12	11	12
Urban unit 10,000 - 199,999 inhabitants	18	18	19	19	18
Urban unit 200,000 - 1,999,999 inhabitants	28	28	29	29	29
Greater Paris	16	15	15	15	15
Median of equivalent income	1,470	1,480	1,470	1,500	1,480
Size of sample	21,186	22,288	14,967	15,406	10,897
* individuals who answered twice to the life-satisfaction question.					

How to read this chart: the survey sample was made up of 48 % men both in 2010 and 2011. Of those who answered the question on satisfaction, 42 % were men. Of those who answered the question on satisfaction in 2010 and 2011, 41 % were men.

Area: Metropolitan France.

Source: SRCV 2010, 2011. Cross section weighting.

As is logical, they decrease sharply as equivalent income increases (Graphs I).

Psychosocial risks at work are measured for those in employment through nine basic indicators⁷. Some describe conditions that can affect psychological well-being: arguments with customers or difficulties with colleagues, overwork, difficulty achieving the work-life balance, not being able to make full use of one's skills, feeling that one's work is not properly appreciated, lack of opportunities for promotion. Others bear the traces of physical hardship: exposure to health risks, unusual hours. Although there is not enough ad hoc data available for these indicators to cover all six of the areas highlighted by the expert panel on monitoring psychosocial risks at work (*Rapport du Collège d'expertise*, 2011), three areas are covered: work intensity, emotional demands and poor quality of social relations at work. A person is considered to be in difficulty if they combine at least three of these difficulties. This criterion was met by 17 % of

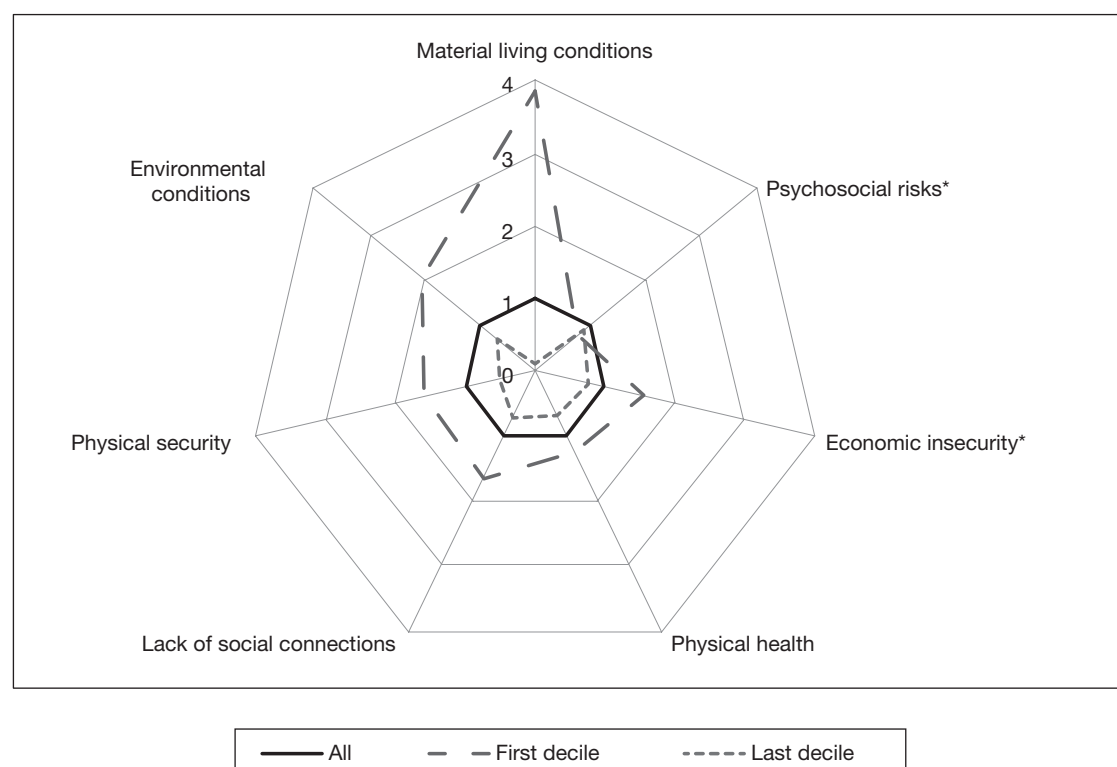
adults in employment in 2011. The indicator is 0 for those who are not in active employment and for the unemployed. Psychosocial risks are less common in men and in the under-25s, and also in people living in a couple. The existence of children has no influence. In the survey, risks increase with level of education. They are less mainly for the last two equivalent income deciles. Place of residence has no effect.

Economic uncertainty with regard to the future may be a source of concern and anxiety and have an impact on QoL by creating insecurity. For example, while unemployment may have a negative impact on QoL, the perceived risk of becoming unemployed can certainly also lower it. We can also consider the risks associated with uncertainties over one's family situation, for example the possibility of partners splitting up, which as we know can exacerbate financial

7. In the radar chart shown in Graph 1, the indicator corresponding to this dimension is calculated only for the field of persons in employment.

Graph I
Quality of life dimensions

a) According to equivalent income



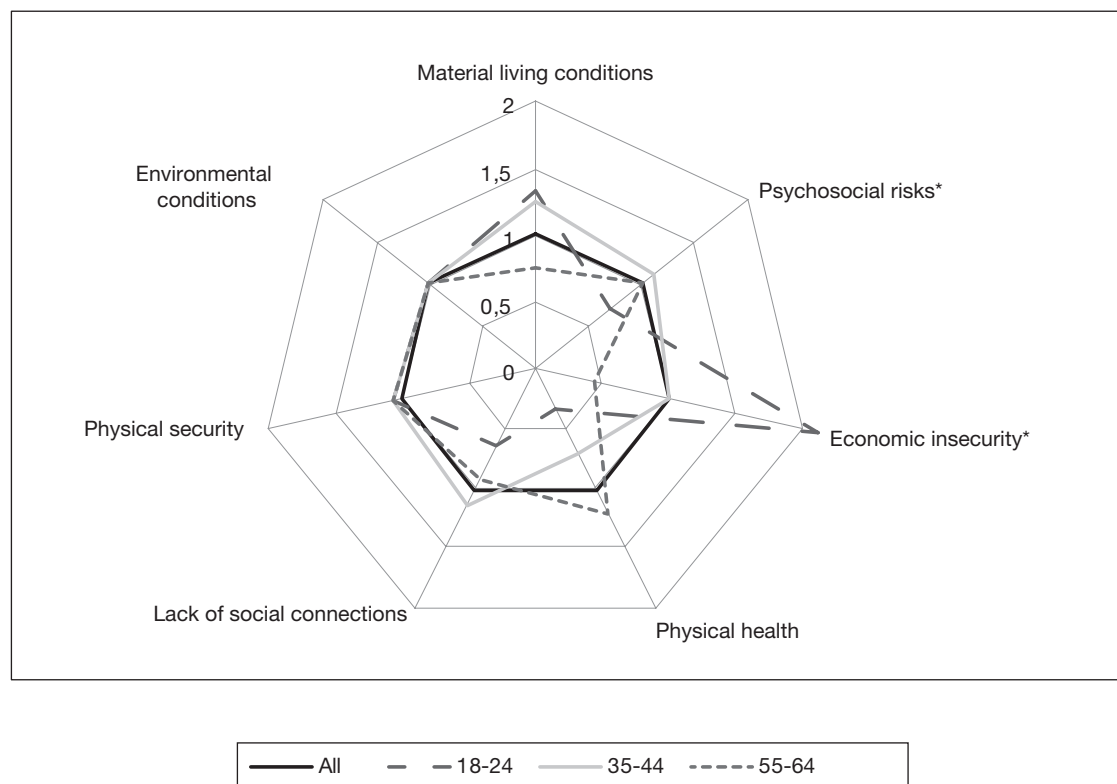
Note: when people are ordered according to equivalent income, deciles divide them into ten equal groups. A person in the first decile is part of the 10 % of people with the lowest equivalent income.

problems. Unfortunately, we had only two economic insecurity indicators in the survey: being unemployed, and, for those in employment, the

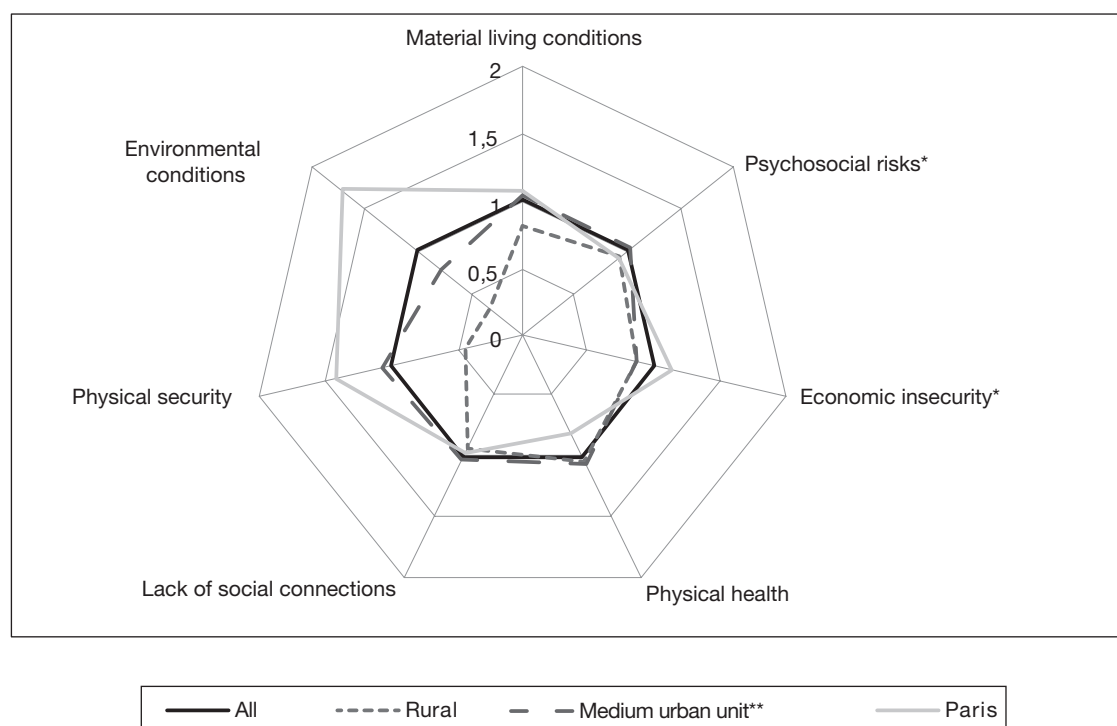
reported risk of leaving their job in the near future (risk of redundancy, resignation, or end of non-renewable contract). This last option

Graph I (suite)

b) According to age



c) According to degree of urbanisation



concerned 9 % of adults in employment in 2011.⁸ The indicator is 0 for inactive persons. As for the psychosocial risks, economic insecurity for those in employment is lower for men and decreases with age. Living in a couple, education or place of residence do not play a part. On the other hand, children represent less risk, as does being within the last four equivalent income deciles.

Four basic difficulties are used to describe the physical health dimension: chronic health problems, limitations in daily activities due to health problems, refusal to see a dentist and refusal to see a doctor in the past year. In 2011, 24 % of people accumulated two or more of these health difficulties. Problems with physical health or failure to seek medical care were the same irrespective of gender. They

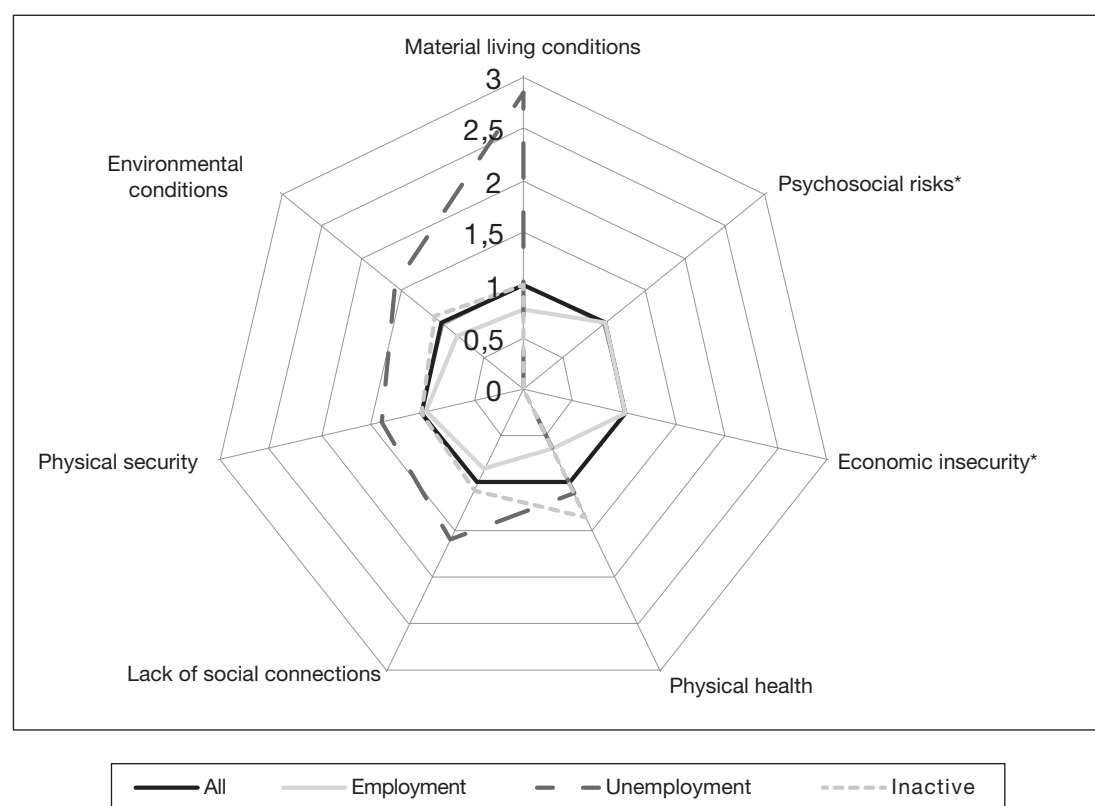
were more common in the unemployed and the inactive, but less frequent among those living in a couple. They increase with age but decrease with level of education and equivalent income. Place of residence and children have no effect on the indicator.

Although the quality of social connections is a key dimension of QoL, measuring them is difficult and to date this has not been well documented. In the survey, we had only one question to describe this. A person was considered to be in difficulty if their satisfaction rating for relationships with immediate circle, friends, family and neighbours was between

8. It is this last indicator calculated in the field of persons in employment that is shown in Graph I.

Graph I (suite)

d) According to labour market situation



Lecture : le graphique du haut porte sur la qualité de vie moyenne selon le revenu. Chaque rayon représente une des dimensions de la qualité de vie. Plus on s'écarte du centre sur ce rayon, plus on a de difficultés dans la dimension considérée. Les données sont normalisées (la moyenne est à 1). Par exemple (graphique du haut selon le revenu par unité de consommation), les personnes du premier décile de revenu par unité de consommation sont 3,8 fois plus en difficulté que la moyenne des personnes en matière de conditions de vie matérielles.

Champ : France métropolitaine.

Source : SRCV 2011.

* Champ des personnes en emploi.

** entre 10 000 et 100 000 habitants.

0 and 6 (14 % of respondents in 2011)⁹; The quality of social connections was poorer for men, the unemployed and the inactive. This improved for the under-25s, but deteriorated between 35 and 54. Living in a couple or having a level of education at least equivalent to the Baccalaureate high school diploma is synonymous with a better quality of social connections. Social connections become more satisfying as equivalent income increases, but living in the biggest cities tends to go hand in hand with a poorer quality. Curiously, the number of children has no influence. Even with only a single question and based on self-assessment, the profile of those with poor social connections is fairly consistent with what we get from more in-depth interviews from other sources: living in a couple, being young or having a better equivalent income can all promote social connections, just as education can promote professional contacts (Duée, 2010; Albouy *et al.*, 2010).

Physical security is also perceived through a single indicator relating to neighbourhood delinquency, violence and vandalism. 14 % of respondents said that they had witnessed this around them in 2011. Physical security is worse among the unemployed and in the largest conurbations. However, it is better from age 75 onwards, for those living in a couple, or for those whose level of education is at least the Baccalaureate. It is positively correlated with income level. The effect of the number of children varies. These results too are consistent with those from sources focusing more specifically on victimisation, with risks that decrease in relation to age, income and living in a couple, and increase in the large conurbations, especially in sensitive urban zones (ZUS) (Albouy *et al.*, 2010; Boé, Rizk, 2006; Le Jeannic, 2006).

Lastly, two indicators were used to describe environmental conditions: pollution to which people say they are exposed and the cleanliness of their neighbourhood. 3 % of adults said they experience these two difficulties in 2011. The under-25s and the over-75s have a better perception of the quality of their environment, as do those with a level of education of at least the Baccalaureate, or people with two or three children. The quality of the environment improves with income level. However, it deteriorates in the Paris metropolitan area. With a much more comprehensive questionnaire, the QoL survey also highlighted the role of income, age and degree of urbanisation

on the quality of the environment (Amiel *et al.*, 2012).

Life satisfaction linked more to QoL indicators than to income

We made three adjustments to each of the 2010 and 2011 cross section surveys, and also to the balanced sample, to ensure that the effect of the explanatory variables was the same in all three situations. As a result, comparing 2010 and 2011 showed that the coefficients associated with the explanatory variables were stable over time (Table 2). In the same way, the adjustment to the balanced sample was similar, apart from a few minor details, which confirms that choosing a sample that consisted of only those present on the two dates did not lead to any notable selection bias in calculating the estimators. In the adjustments, the QoL indicators were introduced in the form of a binary variable as described above.

The estimates confirm and complement earlier studies carried out on the same database for 2010 alone (Godefroy, 2011). First, we observe a strong negative impact on declared satisfaction of weak quality of social connections and we should perhaps look at the pre-eminence of this correlation. This dimension is covered by only one question where social connections are self-assessed and this question is positioned in the questionnaire very close to the one on satisfaction in general. However, we have already noted that the profiles of those who report a poor quality of social connections are similar to profiles obtained through more in-depth questioning. In addition, this strong correlation with satisfaction in general can be found in other studies which use a richer body of data to describe this dimension, in France, with the QoL survey (Amiel *et al.*, 2013), and in many other countries, as shown in the work done by the OECD (Fleche *et al.*, 2011). There is therefore every reason to believe that the influence seen here is not simply an artefact linked with the source. Next come poor material living conditions, physical health problems, psychosocial risks at work for those in employment or the impact of unemployment for active persons with no employment. Economic insecurity, the poor quality of the environment and

9. There is also a satisfaction question relating to leisure activities but which we do not use here. Some leisure activities involve regular contact with others (e.g. playing a team sport or becoming involved in an association), but this is not always the case (individual sport, television, reading, etc.).

physical insecurity play a lesser, but nevertheless significant role in a sample of this size. The poor quality of the environment has a slightly lower effect in the balanced sample than in the cross-sections.

Satisfaction is at its highest level in the youngest respondents, and then levels off, and subsequently drops after 75. The amplitude is slightly lower in the balanced sample, perhaps because of the smaller proportion of students

Table 2
Satisfaction in cross-section survey of 2010, 2011 and balanced sample

	Cross-section 2010		Cross-section 2011		Balanced sample	
	Estimator	Wald	Estimator	Wald	Estimator	Wald
Threshold 1	- 1.58	345.6	- 1.68	440.3	- 1.71	559.2
Threshold 2	- 0.59	49.8	- 0.61	60.3	- 0.66	86.9
Threshold 3	0.86	106.8	0.88	126.8	0.84	138.9
Threshold 4	1.86	480.7	1.92	583.2	1.86	673.4
Threshold 5	2.57	889.5	2.65	1060.1	2.59	1257.0
Threshold 6	3.72	1680.8	3.87	1996.0	3.79	2408.7
Threshold 7	4.32	2080.2	4.53	2449.5	4.43	2986.2
Threshold 8	4.99	2418.4	5.18	2739.1	5.08	3408.6
Threshold 9	5.69	2535.0	5.99	2724.9	5.85	3508.5
Threshold 10	6.09	2459.4	6.41	2536.0	6.22	3359.6
Time dummy					- 0.03	1.1
QoL indicators						
Material difficulties	- 1.04	370.9	- 1.08	420.5	- 1.1	573.8
Psychosocial risks	- 0.46	91.2	- 0.58	147.9	- 0.56	190.6
Economic insecurity	- 0.31	19.6	- 0.26	15.5	- 0.28	23.5
Health difficulties	- 0.71	387.6	- 0.75	449.4	- 0.71	567.3
Poor social connections	- 1.61	1218.8	- 1.76	1470.5	- 1.68	1890.4
Physical insecurity	- 0.19	19.6	- 0.15	12.5	- 0.19	26.7
Difficulties linked with environment	- 0.22	7.1	- 0.25	8.6	- 0.33	20.1
Sociodemographic descriptors						
Male	- 0.02	0.6	- 0.03	0.8	- 0.06	5.0
Unemployed	- 0.81	144.7	- 0.65	89.3	- 0.66	127.1
Inactive	- 0.09	3.7	0.01	0.0	- 0.03	0.4
Age						
18-24	0.41	28.6	0.53	48.1	0.34	20.7
25-34	<i>Ref</i>		<i>Ref</i>		<i>Ref</i>	
35-44	- 0.19	11.5	- 0.14	6.5	- 0.16	12.2
45-54	- 0.29	26.1	- 0.24	17.9	- 0.26	29.1
55-64	- 0.22	12.9	- 0.21	12.2	- 0.2	14.9
65-74	- 0.21	8.5	- 0.28	15.3	- 0.28	21.3
75-84	- 0.43	29.0	- 0.43	30.4	- 0.4	35.0
85-99	- 0.67	34.0	- 0.38	11.6	- 0.44	21.5
Living in a couple	0.54	223.5	0.45	166.9	0.49	269.3
Education						
No diploma or CEP (elementary school)	<i>Ref</i>		<i>Ref</i>		<i>Ref</i>	
CAP, BEP, Brevet (middle school)	- 0.1	6.2	- 0.04	1.0	- 0.07	4.1
BTS, Bac, Bac + 2 (high school, basic higher ed.)	- 0.2	18.9	- 0.13	9.1	- 0.14	13.3
Higher education	- 0.24	18.1	- 0.13	6.0	- 0.13	8.2 →

in the selection of respondents. Satisfaction is a little lower in the Paris metropolitan area, and much higher among those living in a couple. Having children has little effect, but any effect would tend to be negative. Conditional on other variables, those with the lowest level of educational attainment are on the whole more satisfied. Being a man or a woman has no influence in the cross-sections. In the balanced sample, however, men report a lesser degree of satisfaction. Once again this is probably linked with nonresponse, specifically by men, which has already been observed and which may be linked with the fact that the men who did not respond over two consecutive years were more satisfied when first interviewed.

Lastly, the role of income is negative in the first three deciles, and positive in the last three. The negative impact in the first decile is particularly marked. This first decile corresponds approximately to those in a situation of income poverty. However, the role of income is much weaker when compared with an estimate where the QoL indicators do not appear: the gap between values for the coefficients of the extreme deciles would then be 1.4 compared with 0.7 here. This lesser amplitude is not so surprising, and in no way denies the importance of income. It simply means that income is not in itself a source of utility, and its impact relates only to consumption of the items it enables us to buy.

Table 2 (suite)

	Cross-section 2010		Cross-section 2011		Balanced sample	
	Estimator	Wald	Estimator	Wald	Estimator	Wald
Size of urban unit in 1999						
<i>Rural municipality</i>	<i>Ref</i>		<i>Ref</i>		<i>Ref</i>	
Urban unit < 10,000 inhabitants	0	0.0	- 0.03	0.4	- 0.03	0.5
Urban unit 10,000 - 199,999 inhabitants	0.02	0.2	- 0.04	0.8	0.03	0.6
Urban unit 200,000 - 1,999,999 inhabitants	- 0.02	0.3	0.01	0.1	0.03	0.8
Greater Paris	- 0.13	6.5	- 0.15	8.7	- 0.1	5.8
Number of children, biological or adopted during entire lifetime						
<i>None</i>	<i>Ref</i>		<i>Ref</i>		<i>Ref</i>	
1	- 0.13	6.2	- 0.15	8.3	- 0.13	10.0
2	- 0.08	2.9	- 0.07	2.5	- 0.11	7.2
3	- 0.04	0.6	0.02	0.1	- 0.03	0.3
4 or more	- 0.07	1.1	0.03	0.3	- 0.01	0.0
Equivalent income decile						
Decile 1	- 0.41	30.8	- 0.41	28.4	- 0.35	29.1
Decile 2	- 0.08	1.4	- 0.27	14.3	- 0.13	4.6
Decile 3	- 0.14	4.1	- 0.18	6.7	- 0.07	1.6
Decile 4	- 0.04	0.3	- 0.03	0.3	0	0.0
<i>Decile 5</i>	<i>Ref</i>		<i>Ref</i>		<i>Ref</i>	
Decile 6	0.02	0.1	0	0.0	0.06	1.2
Decile 7	0.16	5.1	0.06	0.7	0.16	7.7
Decile 8	0.16	5.6	0.12	3.2	0.21	13.9
Decile 9	0.27	16.7	0.21	10.4	0.3	30.6
Decile 10	0.35	25.8	0.34	24.5	0.38	44.1
Non response	0.13	3.7	0.02	0.1	0.16	7.5
- 2 Log Likelihood	53929.1		54598.3		77469.3	
N	14,938		15,389		21,762	

How to read this chart: with a coefficient of - 1.61 in 2010, weakness of social connections is the QoL dimension that contributes most negatively to people's declared satisfaction.

Estimate using an ordinate logit polytomic mode.

Significance threshold for Wald test at 95 %: 3.84; at 99 %: 6.64.

Area: Metropolitan France.

Source: SRCV 2010, 2011.

The improvement in the predictive capacities of the satisfaction estimation model is the result of the introduction of QoL variables, and this can be appreciated by examining the proportion of concordant pairs. For a given individual, a pair is concordant if the estimator of the latent variable (all else being equal), *i.e.* the prediction from the model, results in the same level of satisfaction (between 0 and 10) as the observed variable. For 2010, a model that brings in variables outside the income deciles and QoL indicators gives 58.5 % of concordant pairs. By taking into account only the income deciles this proportion increases to 61.1 %, barely three percentage points higher, whereas taking into account only the QoL indicators gives a proportion of 67.2 % which is almost nine points more. The complete model with QoL and income indicators brings the proportion up to 67.9 %. Thus, introducing income in the presence of the QoL indicators gives a gain of only 0.7 points, and hence barely improves the explanatory power of the model. This certainly confirms the result whereby taking QoL variables into account reduced the explanatory power of income.

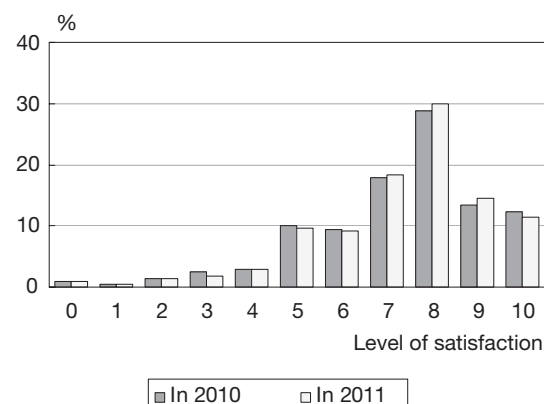
QoL indicators influence both high and low satisfaction levels

As satisfaction is measured on a scale of 0 to 10 (Graph II), it will be useful to see whether the explanatory variables have the same effect across the entire scale. Earlier studies have shown that variables such as relative income

can indeed have different effects, depending on the level of well-being (Budria, 2012). Here we have adopted a slightly different procedure by examining separately the effect of the explanatory variables on low satisfaction (5 or less) and high satisfaction (at least 9). The adjustments confirm that despite some nuances, the effects observed are similar overall, especially for the prominent role played by the QoL indicators. This was not necessarily going to be the case as the QoL indicators were designed more as indicators of poor QoL, and thus thought to be better suited to showing situations where satisfaction levels are low rather than high. As has been seen from other sources, the poor quality of social connections has a very important role to play for both high and low satisfaction levels (Tables 2a and 2b). Poor living standards, on the other hand, are correlated with satisfaction rather than being negatively correlated with high satisfaction. This asymmetry had already been observed in the QoL survey (Amiel *et al.*, 2013). The other QoL indicators act in the same way for high and low satisfaction levels. Given the results of the QoL survey, we would nevertheless have expected psychosocial risks at work to play more of a role in the low levels of satisfaction, but this was not the case. This difference can perhaps be put down to the sets of variables used in the two surveys. The QoL survey was able to take advantage of the work of the panel of experts, headed by Michel Gollac, and used a more complete and perhaps more discriminating set of variables than the *SRCV* (the indicators were added to the *SRCV*

Graph II

Overall life-satisfaction



How to read this chart: in answer to the question "On a scale of 0 (not at all satisfied) to 10 (very satisfied), rate your satisfaction concerning your life at the present time", 18 % of people questioned in 2011 gave a satisfaction level of 7.
Area: Metropolitan France.
Source: SRCV 2010, 2011.

Table 2a

High satisfaction in cross-section survey of 2010, 2011 and balanced sample

	Cross-section 2010		Cross-section 2011		Balanced sample	
	Estimator	Wald	Estimator	Wald	Estimator	Wald
Constant	- 0.62	32.3	- 0.57	31.7	- 0.65	48.8
Time dummy					- 0.06	3.2
QoL indicators						
Material difficulties	- 0.63	47.8	- 0.78	75.1	- 0.77	91.6
Psychosocial risks	- 0.55	62.8	- 0.59	73.7	- 0.59	103.5
Economic insecurity	- 0.26	6.7	- 0.14	2.3	- 0.2	6.0
Health difficulties	- 0.6	133.8	- 0.6	139.4	- 0.58	183.8
Poor social connections	- 1.57	273.0	- 1.61	283.9	- 1.62	391.5
Physical insecurity	- 0.22	12.9	- 0.2	11.1	- 0.21	16.2
Difficulties linked with environment	- 0.21	2.5	- 0.21	2.4	- 0.18	2.6
Sociodemographic descriptors						
Male	- 0.04	0.9	- 0.07	3.0	- 0.1	8.4
Unemployed	- 0.36	13.0	- 0.16	2.6	- 0.15	3.3
Inactive	0.08	1.6	0.09	1.9	0.1	3.7
Age						
18-24	0.24	5.9	0.41	18.4	0.15	2.5
25-34	<i>Ref</i>		<i>Ref</i>		<i>Ref</i>	
35-44	- 0.18	6.3	- 0.06	0.8	- 0.17	7.7
45-54	- 0.27	13.3	- 0.15	3.9	- 0.25	16.3
55-64	- 0.33	17.0	- 0.17	4.8	- 0.27	15.8
65-74	- 0.37	14.7	- 0.29	9.0	- 0.39	22.9
75-84	- 0.55	26.4	- 0.43	16.5	- 0.48	28.7
85-99	- 0.61	13.7	- 0.35	5.0	- 0.45	11.5
Living in a couple	0.49	91.8	0.41	69.9	0.45	114.8
Education						
No diploma or CEP (elementary school)	<i>Ref</i>		<i>Ref</i>		<i>Ref</i>	
CAP, BEP, Brevet (middle school)	- 0.13	5.5	- 0.13	7.0	- 0.11	6.1
BTS, Bac, Bac + 2 (high school, basic higher ed.)	- 0.31	24.8	- 0.28	26.6	- 0.27	25.8
Higher education	- 0.29	15.3	- 0.25	14.4	- 0.19	9.9
Size of urban unit in 1999						
Rural municipality	<i>Ref</i>		<i>Ref</i>		<i>Ref</i>	
Urban unit < 10,000 inhabitants	- 0.05	0.6	- 0.04	0.4	- 0.06	1.2
Urban unit 10,000 - 199,999 inhabitants	0.07	1.3	- 0.01	0.0	0.08	2.9
Urban unit 200,000 - 1,999,999 inhabitants	0.02	0.2	0	0.0	0.08	3.3
Greater Paris	- 0.19	7.8	- 0.19	8.2	- 0.12	4.4
Number of children, biological or adopted during entire lifetime						
None	<i>Ref</i>		<i>Ref</i>		<i>Ref</i>	
1	- 0.07	1.2	- 0.12	3.2	- 0.08	1.9
2	- 0.07	1.3	- 0.14	5.1	- 0.11	4.2
3	0.03	0.1	0.01	0.0	0.02	0.1
4 or more	0.02	0.1	0.02	0.0	0.02	0.1
Equivalent income decile						
Decile 1	- 0.3	7.4	- 0.27	5.8	- 0.22	5.2
Decile 2	0.05	0.3	- 0.21	4.6	0	0.0
Decile 3	- 0.04	0.2	- 0.11	1.5	0.04	0.2 →

questionnaire in 2008 before the expert panel was formed). On the positive side is the fact that one or other of the sets of variables highlights the importance of psychosocial risks at work when trying to understand well-being, whereas in the past this subject had not been much discussed in official statistics. It is to be hoped that following the recommendations of the expert panel, studies carried out after data collection for the next working conditions survey will improve our statistical knowledge of this important QoL dimension.

A few more differences emerge from the two adjustments to the upper and lower satisfaction levels, even though the overall vision is very similar. Being unemployed, out of employment, or in a state of economic insecurity has more effect on a low satisfaction level. Being under 25 combined with a very low level of satisfaction is more unlikely. Education or place of residence do not affect low satisfaction levels, while the number of children does not affect high satisfaction levels. The influence of equivalent income is fairly similar in both cases.

The advantage of panel data over cross-section data

Having longitudinal data available releases us from a number of the limitations associated with cross-section surveys. The first of these concerns preference comparability. In microeconomic theory, preferences are only represented

according to a preorder¹⁰, thus utility functions are only defined to the nearest increasing function. Some publications in Public Economics are nevertheless based on restrictive assumptions which allow interindividual comparability of preferences, like those which lead to the construction of collective utility functions. At a different point in the literature, the construction of equivalence scales requires an identifying constraint to be introduced because of this very impossibility of making interindividual comparisons involving preferences.

By using panel data, we are to a large extent freed from this constraint and the same individuals can be monitored over time. A variation in satisfaction after a change has been made to the explanatory variables can no longer reflect a heterogeneity of preferences, unless we assume that one person's preferences have changed two years running. In the literature however, the assumption of preference stability in the same individuals over time is accepted more or less systematically: thus studies that assess public policy measures are based on the principle that the fact of benefiting from a measure does not alter a given individual's behaviour.

The second limitation of cross-section data is linked with the use of QoL indicators where self-assessment is used. Even though some

10. The consumer is only able to determine whether one set of goods is preferred over another. He cannot quantify the strength of this preference.

Table 2a (suite)

	Cross-section 2010		Cross-section 2011		Balanced sample	
	Estimator	Wald	Estimator	Wald	Estimator	Wald
Decile 4	0.07	0.5	- 0.07	0.6	0.08	1.1
Decile 5	Ref		Ref		Ref	
Decile 6	0.06	0.5	- 0.03	0.1	0.09	1.5
Decile 7	0.18	4.1	0.05	0.3	0.18	6.1
Decile 8	0.24	7.5	0.07	0.7	0.2	7.4
Decile 9	0.29	11.4	0.19	4.8	0.29	16.2
Decile 10	0.42	21.9	0.38	19.5	0.41	30.5
Non response	0.17	3.6	0.13	2.1	0.21	7.2
- 2 Log likelihood	16052.4		16497.2		23250.1	
N	14,938		15,539		21,762	

How to read this chart: with a coefficient of - 1.57 in 2010, weakness of social connections is the QoL dimension that most reduces the probability that a person will declare a high satisfaction level.

Estimate using a dichotomous logit model.

Significance threshold for Wald test at 95 %: 3.84; at 99 %: 6.64.

Area: Metropolitan France.

Source: SRCV 2010, 2011.

Table 2b
Low satisfaction in cross-section survey of 2010, 2011 and balanced sample

	Cross-section 2010		Cross-section 2011		Balanced sample	
	Estimator	Wald	Estimator		Estimator	Wald
Constant	- 2.94	380.2	- 3	416.1	- 2.94	507.0
Time dummy					- 0.02	0.1
QoL indicators						
Material difficulties	1.07	221.1	1.04	207.3	1.04	287.9
Psychosocial risks	0.63	52.6	0.82	97.4	0.79	122.5
Economic insecurity	0.43	12.9	0.46	17.1	0.43	18.7
Health difficulties	0.75	188.0	0.85	247.6	0.79	297.0
Poor social connections	1.62	739.6	1.78	911.4	1.69	1163.5
Physical insecurity	0.18	6.8	0.19	7.6	0.24	17.0
Difficulties linked with environment	0.35	7.9	0.3	5.4	0.42	15.5
Sociodemographic descriptors						
Male	0.08	2.3	0.02	0.1	0.07	2.2
Unemployed	1.28	159.7	1.18	128.5	1.18	179.2
Inactive	0.45	27.4	0.34	15.6	0.37	25.3
Age						
18-24	- 0.65	18.5	- 0.9	30.8	- 0.52	11.6
25-34	<i>Ref</i>		<i>Ref</i>		<i>Ref</i>	
35-44	0.25	5.7	0.15	2.0	0.12	1.8
45-54	0.39	14.1	0.33	10.0	0.28	10.0
55-64	0.23	4.4	0.26	5.5	0.17	3.4
65-74	0.23	3.3	0.22	2.9	0.24	4.9
75-84	0.53	15.9	0.54	16.6	0.52	20.6
85-99	0.92	28.7	0.52	8.9	0.63	18.0
Living in a couple	- 0.59	104.6	- 0.47	66.3	- 0.5	105.9
Education						
<i>No diploma or CEP (elementary school)</i>	<i>Ref</i>		<i>Ref</i>		<i>Ref</i>	
CAP, BEP, Brevet (middle school)	0.12	3.3	- 0.05	0.6	0.08	2.0
BTS, Bac, Bac + 2 (high school, basic higher ed.)	0.03	0.2	- 0.21	6.9	- 0.05	0.6
Higher education	- 0.07	0.5	- 0.3	8.1	- 0.18	4.1
Size of urban unit in 1999						
<i>Rural municipality</i>	<i>Ref</i>		<i>Ref</i>		<i>Ref</i>	
Urban unit < 10,000 inhabitants	- 0.06	0.5	0.1	1.4	0.03	0.2
Urban unit 10,000 - 199,999 inhabitants	- 0.01	0.0	0.01	0.0	- 0.03	0.2
Urban unit 200,000 - 1,999,999 inhabitants	0.05	0.6	- 0.11	2.3	- 0.04	0.4
Greater Paris	0.02	0.0	0.01	0.0	- 0.02	0.1
Number of children, biological or adopted during entire lifetime						
<i>None</i>	<i>Ref</i>		<i>Ref</i>		<i>Ref</i>	
1	0.31	11.9	0.25	8.3	0.28	14.6
2	0.14	2.8	0.17	3.9	0.17	5.6
3	0.2	4.6	0.14	2.3	0.17	4.7
4 or more	0.22	4.7	0.08	0.6	0.13	2.5 →

studies suggest that self-assessment provides a good approximation of a more objective measurement, the objection remains that individuals do not use response scales in the same way. With longitudinal data, this criticism recedes, as it does for the satisfaction measurement, because the same person is self-assessing on both dates, and therefore considers that his own QoL has improved or deteriorated.

Temporal variability for satisfaction and QoL indicators

Even for the same individuals, the feeling of satisfaction observed in longitudinal data shows considerable temporal variability. Out of 100 people with low satisfaction in 2010, only 40 were still in this situation the following year. This proportion is only slightly higher for the high levels of satisfaction, where 57 % were still in this category in 2011. The largest category, with people who declared their satisfaction level to be 7 or 8 in 2010, and which represents 48 % of those present on the two dates, fluctuates a little less, with 64 % still there in 2011.

QoL indicators too can be subject to considerable variability. The most volatile are economic

insecurity and difficulties associated with the environment, with only a third of those who were concerned in 2010 still being there in 2011. This result has to be looked at in context as these figures were described fairly briefly in the survey and have not been analysed in as much depth as some of the others to produce a series of robust items to be used in an interview. These are also the least common difficulties, concerning only about 5% of the population in one year. Physical insecurity and poor social connections were more persistent with about 45 % of those concerned in 2010 who were still there in 2011. The proportion is a little higher again, at 55 %, for psychosocial risks. The maximum, at around 70 %, was for material difficulties and physical health. This strong temporal variability in the different variables should not be surprising. It can often be seen in longitudinal sources, as for instance in income (Lollivier and Verger, 2005). While it may be due in part to errors in measurement, it is nevertheless no less useful in terms of providing relevant information in an economic analysis of transitions¹¹.

11. Especially if we acknowledge, as is the case in this study, that depending on any individual effects, errors, whether of measurement or not, are not correlated to those variables that are used as explanatory.

Table 2b (suite)

	Cross-section 2010		Cross-section 2011		Balanced sample	
	Estimator	Wald	Estimator		Estimator	Wald
Equivalent income decile						
Decile 1	0.56	24.9	0.56	21.8	0.49	24.7
Decile 2	0.2	3.2	0.37	10.5	0.25	7.3
Decile 3	0.14	1.5	0.42	13.7	0.23	6.4
Decile 4	0.27	5.9	0.11	0.8	0.17	3.4
Decile 5	Ref		Ref		Ref	
Decile 6	- 0.02	0.0	- 0.06	0.3	- 0.05	0.2
Decile 7	- 0.36	7.7	0	0.0	- 0.26	6.2
Decile 8	- 0.31	6.1	- 0.18	1.9	- 0.35	10.8
Decile 9	- 0.52	16.4	- 0.23	3.2	- 0.39	13.6
Decile 10	- 0.47	12.2	- 0.3	4.9	- 0.51	19.7
Non response	- 0.06	0.2	0.17	1.9	- 0.03	0.1
- 2 Log likelihood	10410.7		10380.9		14754.5	
N	14,938		15,539		21,762	

How to read this chart: with a coefficient of 1.62 in 2010, weakness of social connections is the QoL dimension that most increases the probability that a person will declare a low satisfaction level.

Estimate using a dichotomous logit model.

Significance threshold for Wald test at 95 %: 3.84; at 99 %: 6.64.

Area: Metropolitan France.

Source: SRCV 2010, 2011.

Specific models to estimate the effects of variables in longitudinal data

The first way to exploit panel data is to re-estimate the pooled model relaxing the assumption that the variables describing QoL are exogenous. The heterogeneity in behaviours is then likely to introduce biases in the estimation of the apparent links between the QoL variables and satisfaction. The usual way to proceed is to admit that the individual heterogeneity derives from an unobserved individual factor that is stable over time (Appendix available in the French version). The possible endogeneity of the explanatory variables is then subject to this individual effect, so that in the associated model, the explanatory variables are assumed to be strictly exogenous. This individual effect can be described non-parametrically, in which case it takes the form of a fixed effect. With conditional *logit* models it is simple to carry out estimates in the case of dichotomous dependent variables. The individual effect can also be modelled more parametrically, by forcing the correlation between explanatory variables and individual effects to adopt a parametric form, usually linear, and adding a non-correlated hazard, usually Gaussian, as for example for the augmented *probit* model. Two types of modelling will be used to adjust the dichotomous models relating to high and low satisfaction levels, but only the second will be used for the polytomic models that can define satisfaction with eleven values. As we have only two points, it will be sufficient to estimate only static models, i.e. without a lagged dependent variable. In any case, the literature on estimating dynamic qualitative models is not yet entirely complete, especially concerning the best way to process the endogeneity of the initial situation.

Impact of QoL indicators that persist in longitudinal data

Concerning the two dichotomous variables for high or low satisfaction, we therefore have two ways of estimating, conditional *logit* and augmented *probit*. Estimating using the conditional *logit* model is semi-parametric: each individual effect is a parameter to be estimated, or if not, to be removed, while maximising the criterion. With this large number of incidental parameters, we have fewer degrees of freedom than in a parametric model for estimating parameters of interest, and we therefore expect that they will be estimated

with less precision, but with more robustness than in a more parametric model such as the augmented *probit*. This is indeed what we see, but these differences do not call into question the main conclusions.

The first of these is that for the most part, QoL indicators remain the most significant explanatory factors in longitudinal estimates, along the same lines as for the cross-section models (Tables 3a and 3b). Sociodemographic descriptors, on the other hand, become barely significant or not significant at all. If we look at high levels of satisfaction, the weakness of social connections, then material difficulties and psychosocial risks are the QoL indicators that act most negatively, ahead of physical health, which is a little behind in relation to the adjustment in the cross-section. Physical insecurity is no longer significant in the conditional *logit* model, although it remains so in the augmented *probit* model. Economic insecurity is significant in neither of the models, nor is the fact of being unemployed, while problems linked with the environment remain non-significant, as in the cross-section. Living in a couple retains its explanatory power. The age effect disappears in the longitudinal estimate. However, given that people are monitored for only two years, interpretation of the data is a delicate matter. In an instantaneous cross-section, it is not possible to unpick from the age effect what are the respective influences of ageing and of belonging to a given generation. In theory, using the longitudinal data it is possible to follow cohorts and thus compare two generations at the same age. In the longitudinal estimate, being born in a given year is then a constant for the person, and therefore included in the individual effect. By estimating the age effect it is then possible to measure only the impact of ageing. However, a longer panel is needed than the two years available here if we are to draw conclusions on the pre-eminence of the generation effect over that of ageing. Income and geographical location are no longer significant. However, once again, it is important not to misjudge the role that income plays in satisfaction. What we show here is that for a given QoL, the effect of a variation in income is not significant, i.e. adjustment of high satisfaction to income does not happen immediately. It is necessary to be all the more cautious in the interpretation given that once again the panel is limited with only two dates available, and thus lagged causalities cannot be revealed whereas some of these may take

Table 3a
High satisfaction, longitudinal estimates

	Conditional Logit		Augmented Probit	
	Estimator	Wald	Estimator	Wald
Constant			- 0.32	22.0
Time dummy	- 0.11	6.1	- 0.07	17.0
QoL indicators				
Material difficulties	- 0.67	10.4	- 0.35	53.8
Psychosocial risks	- 0.52	14.1	- 0.32	80.1
Economic insecurity	0.00	0.0	- 0.10	3.3
Health difficulties	- 0.29	7.3	- 0.30	113.6
Poor social connections	- 1.26	59.6	- 0.76	309.6
Physical insecurity	- 0.14	1.4	- 0.10	12.6
Difficulties linked with environment	0.04	0.0	- 0.09	1.9
Sociodemographic descriptors				
Male			- 0.06	5.5
Unemployed	0.01	0.0	- 0.06	0.4
Inactive	- 0.04	0.0	- 0.08	0.8
Age				
18-24	- 0.04	0.0	0.05	0.5
25-34	<i>Ref</i>		<i>Ref</i>	
35-44	- 0.68	3.0	- 0.06	0.8
45-54	- 0.62	1.5	- 0.01	0.0
55-64	- 0.69	1.2	- 0.01	0.0
65-74	- 0.69	1.0	- 0.03	0.0
75-84	- 1.00	1.5	0.01	0.0
85-99	0.37	0.1	0.06	0.1
Living in a couple	0.56	8.2	0.20	7.7
Education				
No diploma or CEP (elementary school)			<i>Ref</i>	
CAP, BEP, Brevet (middle school)			- 0.08	5.7
BTS, Bac, Bac + 2 (high school, basic higher ed.)			- 0.18	19.9
Higher education			- 0.14	10.3
Size of urban unit in 1999				
Rural municipality	<i>Ref</i>		<i>Ref</i>	
Urban unit < 10,000 inhabitants	- 0.64	1.3	- 0.26	1.2
Urban unit 10,000 - 199,999 inhabitants	- 0.36	0.5	- 0.16	0.9
Urban unit 200,000 - 1,999,999 inhabitants	0.20	0.2	0.07	0.1
Greater Paris	- 0.68	0.8	- 0.26	1.0
Number of children, biological or adopted during entire lifetime				
None	<i>Ref</i>		<i>Ref</i>	
1	0.11	0.0	0.05	0.1
2	- 0.32	0.2	- 0.17	0.7
3 or more	0.69	0.4	0.45	1.3 →

Table 3a (suite)

	Conditional Logit		Augmented Probit	
	Estimator	Wald	Estimator	Wald
Equivalent income decile				
Decile 1	- 0.23	0.9	- 0.12	1.8
Decile 2	0.06	0.1	0.04	0.2
Decile 3	0.05	0.1	0.03	0.1
Decile 4	- 0.10	0.4	- 0.02	0.1
Decile 5	<i>Ref</i>		<i>Ref</i>	
Decile 6	0.01	0.0	0.01	0.0
Decile 7	0.12	0.4	0.06	1.0
Decile 8	0.16	0.6	0.08	1.1
Decile 9	- 0.06	0.1	- 0.01	0.0
Decile 10	0.23	0.7	0.11	1.7
Non response	0.34	2.8	0.14	3.6
- 2 Log likelihood	3162.7		23112.6	
N	2,394 (individuals who changed state)		21,762	

How to read this chart: on longitudinal data, economic insecurity no longer affects the fact of declaring a high satisfaction level.

Significance threshold for Wald test at 95 %: 3.84; at 99 %: 6.64.

Area: Metropolitan France.

Source: SRCV 2010, 2011.

Table 3b
Low satisfaction, longitudinal estimates

	Conditional Logit		Augmented Probit	
	Estimator	Wald	Estimator	Wald
Constant			- 1.67	308.5
Time dummy	- 0.02	0.1	0.04	5.0
QoL indicators				
Material difficulties	0.44	8.1	0.51	152.3
Psychosocial risks	0.73	18.5	0.40	90.8
Economic insecurity	0.37	2.8	0.21	17.7
Health difficulties	0.39	10.9	0.43	251.4
Poor social connections	1.30	124.5	0.92	1050.7
Physical insecurity	0.21	2.4	0.11	12.0
Difficulties linked with environment	0.18	0.6	0.21	11.1
Sociodemographic descriptors				
Male			0.04	1.8
Unemployed	1.08	15.6	0.55	26.6
Inactive	- 0.05	0.0	0.03	0.1
Age				
18-24	- 0.10	0.0	- 0.32	9.5
25-34	<i>Ref</i>		<i>Ref</i>	
35-44	1.12	3.5	0.00	0.0
45-54	1.12	2.4	0.03	0.0
55-64	0.85	1.0	0.06	0.2
65-74	1.01	1.2	0.15	0.8
75-84	1.82	2.8	0.32	2.5
85-99	1.88	2.5	0.39	3.3 →

some time to become apparent (Lollivier and Verger, 2005). Finally, the number of children remains non-significant.

Observations are not too different concerning low satisfaction levels. The most significant

QoL indicators in the cross-section, social connections, material difficulties, psychosocial risks and physical health, remain significant in both models. Economic and physical security and problems with the environment remain significant in the augmented *probit*

Table 3b (suite)

	Conditional Logit		Augmented Probit	
	Estimator	Wald	Estimator	Wald
Living as a couple	- 0.38	3.4	- 0.17	3.6
Education				
<i>No diploma or CEP (elementary school)</i>			<i>Ref</i>	
CAP, BEP, Brevet (middle school)			0.04	1.6
BTS, Bac, Bac + 2 (high school, basic higher ed.)			- 0.01	0.1
Higher education			- 0.06	1.3
Size of urban unit in 1999				
<i>Rural municipality</i>	<i>Ref</i>		<i>Ref</i>	
Urban unit < 10,000 inhabitants	0.77	0.6	0.13	0.3
Urban unit 10,000 - 199,999 inhabitants	- 1.27	2.9	- 0.61	4.4
Urban unit 200,000 - 1,999,999 inhabitants	- 0.41	0.5	- 0.26	0.9
Greater Paris	- 0.08	0.0	0.08	0.0
Number of children, biological or adopted during entire lifetime				
<i>None</i>	<i>Ref</i>		<i>Ref</i>	
1	- 0.65	0.9	- 0.08	0.1
2	1.20	0.9	0.54	2.0
3 or more	1.36	0.7	0.73	2.2
Equivalent income decile				
Decile 1	0.77	9.1	0.29	7.1
Decile 2	- 0.02	0.0	- 0.02	0.1
Decile 3	0.10	0.2	0.04	0.2
Decile 4	0.39	4.0	0.13	2.6
<i>Decile 5</i>	<i>Ref</i>		<i>Ref</i>	
Decile 6	0.17	0.7	0.09	1.2
Decile 7	- 0.02	0.0	0.01	0.0
Decile 8	- 0.08	0.1	- 0.02	0.0
Decile 9	0.18	0.3	0.04	0.1
Decile 10	0.22	0.3	0.09	0.4
Non response	0.36	1.8	0.07	0.5
- 2 Log likelihood	2016.4		14595.7	
N	1,649 (individuals who changed state)		21,762	

How to read this chart: on longitudinal data, the number of children no longer affects the fact of declaring a low satisfaction level. Significance threshold for Wald test at 95 %: 3.84; at 99 %: 6.64. Area: Metropolitan France. Source: SRCV 2010, 2011.

model, but not in the conditional *logit* model, where their influence remains lower than that of the other QoL indicators. Being unemployed increases the risk of low satisfaction in both panel estimates, as in the cross-section, but being without employment no longer has the same effect as living in a couple. Being aged under 25 protects against low satisfaction in the augmented *probit* model, but the other effects noted in the cross-section, especially for the older age groups, are, according to the models, generational effects. In the longitudinal data, only the fact of belonging to the first income decile increases the risks of low satisfaction

levels. The number of children no longer has an effect, nor does geographic location.

Concerning the eleven-position satisfaction variable, we had only the augmented *probit* model, but we have seen that it gives fairly similar results to an individual fixed effects model. We checked once again that the QoL indicators were major determinants in terms of satisfaction: social connections far ahead of material difficulties, then physical health and psychosocial risks for people in employment and unemployment for those in the active population without work (Table 4). Next come problems associated with

Table 4
Satisfaction, longitudinal estimate using augmented *probit* model

	Estimator	Wald
Threshold 1	- 0.97	312.2
Threshold 2	- 0.38	51.0
Threshold 3	0.53	100.7
Threshold 4	1.14	487.1
Threshold 5	1.55	854.0
Threshold 6	2.19	1670.9
Threshold 7	2.52	2043.3
Threshold 8	2.83	2093.2
Threshold 9	3.19	2190.6
Threshold 10	3.35	2324.2
Time dummy	- 0.07	33.3
QoL indicators		
Material difficulties *	- 0.52	284.7
Psychosocial risks *	- 0.30	201.8
Economic insecurity	- 0.13	14.2
Health difficulties *	- 0.36	322.8
Poor social connections	- 0.84	1212.8
Physical insecurity *	- 0.08	19.2
Difficulties linked with environment *	- 0.13	9.9
Sociodemographic descriptors		
Male *	- 0.03	2.6
Unemployed *	- 0.30	19.5
Inactive	- 0.05	0.7
Age		
18-24	0.20	13.9
25-34	Ref	
35-44	- 0.05	0.8
45-54	- 0.07	0.8
55-64	- 0.05	0.4
65-74	- 0.14	2.1
75-84	- 0.17	2.4
85-99	- 0.18	2.1



physical or economic security and the environment, which are significant with the augmented *probit* model, but we have seen that they cease to be so with a less parametric modelling of individual effects. Being under 25 increases

satisfaction, while the other effects associated with age in the cross-section are more generational effects. Also, living in a couple increased satisfaction with a given QoL. Among the other variables, only the fact of belonging to the first

Table 4 (suite)

	Estimator	Wald
Living in a couple *	0.15	11.0
Education		
<i>No diploma or CEP (elementary school)</i>	<i>Ref</i>	
CAP, BEP, Brevet (middle school)	- 0.04	2.9
BTS, Bac, Bac + 2 (high school, basic higher ed.)	- 0.10	13.2
Higher education	- 0.10	8.9
Size of urban unit in 1999		
<i>Rural municipality</i>	<i>Ref</i>	
Urban unit < 10,000 inhabitants	- 0.12	0.6
Urban unit 10,000 - 199,999 inhabitants	0.05	0.1
Urban unit 200,000 - 1,999,999 inhabitants	0.02	0.0
Greater Paris	- 0.52	6.8
Number of children, biological or adopted during entire lifetime		
<i>None</i>	<i>Ref</i>	
1	0.14	1.3
2	- 0.18	0.8
3 or more	0.08	0.1
Equivalent income decile		
Decile 1 *	- 0.20	7.5
Decile 2	0.02	0.1
Decile 3	- 0.03	0.2
Decile 4 *	- 0.07	3.3
<i>Decile 5</i>	<i>Ref</i>	
Decile 6	- 0.04	1.0
Decile 7	0.01	0.0
Decile 8	0.00	0.0
Decile 9	0.00	0.0
Decile 10	0.04	0.6
Non response	- 0.01	0.0
- 2 Log likelihood	77389.5	
N	21,762	

How to read this chart: on longitudinal data, declaring a high income does not have an effect (for given QoL indicators) on the satisfaction declared.

Significance threshold for Wald test at 95 %: 3.84; at 99 %: 6.64.

Variables marked with an asterisk (*) are those which appear significant in a within estimator, when considering the 11-position satisfaction variable as quantitative, probably improperly.

Area: Metropolitan France.

Source: SRCV 2010, 2011.

decile, and living in the Paris metropolitan area, have a negative effect¹².

Overall, taking individual heterogeneity into account reduces but does not jeopardise the influence that QoL can have on people's reported satisfaction levels. Yet this does not mean that there is no preference heterogeneity or that it is orthogonal to the phenomenon studied when we limit ourselves to examining instantaneous cross-section data. One method that is moderately persuasive but still useful for arguing this point is to examine the variables used to augment the *probit* model, which are assumed to represent the parametric correlation between the individual effect and the explanatory variables. This suggests that people with poor social connections, or who experience material difficulties or physical health problems, would have a persistent tendency to reply more negatively to the question on satisfaction, independently of any changes in these variables in the short term.

Individual change in satisfaction very closely linked to a change in QoL

The other way to use data is to see whether people whose satisfaction level varies are also those who have experienced changes in their QoL. To do this, we have produced two dichotomous variables, depending on whether the person has gone up or down two or more steps on the satisfaction scale. Each variable is explained in a regression by input or output dummy variables for difficulty with QoL, or certain demographic situations. We are trying to explain at individual level the variation in satisfaction as a function of variation in QoL¹³. In doing so, we control for preference heterogeneity, since the different changes refer to the same individuals.

As regards QoL indicators, the estimates confirm the previous results, in that there is at least a statistical causality between QoL and satisfaction (Table 5). They also provide some precision on the way this influence acts.

Social links emerge once again as the variable that is most in tune with satisfaction: an improvement results in both the probability of a greater increase in satisfaction and the probability of a smaller decrease. And to balance this, a deterioration in social connections reduces the likelihood of an increase in satisfaction and heightens the probability of a drop. For the other QoL variables, excluding quality of the environment, the effects are less systematic and only

positive correlations appear: an improvement in the indicator results in more satisfaction, except for physical insecurity, but no less dissatisfaction; and a deterioration in the indicator goes hand in hand with more dissatisfaction, except for economic insecurity, but no less satisfaction. For quality of the environment, the effects are even less clear because only one single possibility out of the four can occur: a deterioration leads to a drop in satisfaction. These effects, where the perimeter is shrinking, are certainly consistent with the hierarchy of correlations observed previously between satisfaction and QoL indicators, and they explain how some, such as social connections, can have more influence than others, such as the environment, for instance.

Estimates for sociodemographic variables also confirm previous results: coming out of unemployment has a positive impact on increased satisfaction whereas becoming unemployed tends to reduce it. Forming a couple acts positively to increase satisfaction. Conversely, no longer being in a couple does not have a negative effect, but nor does it have a positive one. The same happens when there is a variation in income per consumption unit: an increase in income of at least one decile affects the increase in satisfaction, whereas a drop in income reduces satisfaction but this is only just significant.

Is it possible to construct a single well-being indicator by weighting each dimension of QoL according to the satisfaction they procure?

One question asked in the Stiglitz report, and which has given rise to some discussion, is whether it is possible to construct a composite QoL indicator from the indicators relating to the different dimensions. The problem is posed as follows: the items that describe the dimensions of QoL are assumed to be relatively homogeneous within the dimension. This can be proved statistically, either by carrying out homogeneity tests that are intrinsic to the different variables,

12. We only comment here on the corrected effects of variable endogeneity which change over time. Thus in the estimate, and given the data, education is common to both years, and hence is part of the individual effect. To correct any possible endogeneity in education, it would be necessary to use an instrumentation technique similar to those used in the cross-section.

13. This is based on a method that consists of estimating a first difference model with quantitative variables. It is not often used in empirical studies. One reason is probably that most of these studies relate to the estimation of dichotomous models. With two dates and binary dependent variables, the method is equivalent to that of the conditional logit model.

or by checking that they are targeting the same populations (Amiel *et al.*, 2012). It is then legitimate to produce a synthetic indicator which sums up the dimension based on the different items that describe it.

The situation is radically different if we are talking about aggregating the dimensions one with another. We know that they are varied and an

aggregation would involve bringing together elements of a different nature. This would then be a composite rather than a synthetic indicator. A further difficulty derives from the fact that it is not essential to weight the dimensions beforehand: why should the same weighting be set for each dimension, or if not, what weight should be set? For these reasons a number of authors believe that calculating a composite

Table 5
Variation in satisfaction (rise or fall of two values or more) depending on the variations in explanatory variables between 2010 and 2011

	Increase in well-being		Decline in well-being	
	Estimator	Wald	Estimator	Wald
Constant	- 2.01	229.0	- 1.85	210.9
QoL indicators				
Entering unemployment	0.01	0.0	0.73	13.7
Leaving unemployment	0.75	18.3	- 0.28	1.7
Forming a couple	0.82	24.6	- 0.03	0.0
Separating	0.01	0.0	0.24	2.9
Increase in equivalent income by at least one decile	0.25	13.1	0.01	0.0
Drop in equivalent income by at least one decile	0.07	0.9	0.13	3.8
Entering material difficulties	0.01	0.0	0.58	22.0
Coming out of material difficulties	0.94	61.2	- 0.03	0.0
"Entering" psychosocial risks	- 0.27	3.5	0.38	10.5
"Leaving" psychosocial risks	0.29	5.8	- 0.07	0.2
Entering economic insecurity	0.03	0.0	0.09	0.3
Leaving economic insecurity	0.33	4.2	- 0.22	1.5
Entering health difficulties	- 0.11	1.1	0.40	21.7
Leaving health difficulties	0.29	9.0	0.13	1.8
Deterioration in social connections	- 0.49	14.2	1.13	187.5
Improvement in social connections	1.03	142.1	- 0.41	10.4
Entering physical insecurity	- 0.06	0.2	0.22	4.5
Leaving physical insecurity	0.03	0.1	- 0.10	0.8
Deterioration of the environment	- 0.11	0.2	0.37	4.2
Improvement in the environment	0.13	0.5	0.10	0.3
Residential mobility				
Moving to a rural municipality	0.84	0.8	1.48	2.4
Moving to an urban unit < 10,000 inhab.	0.58	0.3	1.82	3.0
Moving to an urban unit with 10,000 to 99,999 inhabitants	0.11	0.0	1.83	3.3
Moving to an urban unit with 100,000 to 1,999,999 inhabitants	0.85	0.8	0.67	0.4
Moving to Paris	- 0.45	0.1	1.79	2.5
Leaving rural municipality	- 0.18	0.0	- 1.87	3.3
Leaving an urban unit < 10,000 inhab.	0.23	0.1	- 13.50	0.0
Leaving an urban unit with 10,000 to 99,999 inhabitants	- 0.46	0.2	- 1.03	1.0
Leaving an urban unit with 100,000 to 1,999,999 inhabitants	0.30	0.1	- 1.64	2.8
Leaving Paris	0.09	0.0	- 1.91	3.0 →

QoL indicator cannot legitimately be done (report by the Collège franco-allemand, 2010; report by the European working group on quality of life, 2011).

Others suggest that it is up to everyone to set their own weighting. This is the solution adopted by the OECD in their “*How’s life?*” programme, where they invite people to aggregate indicators for themselves on the website, applying the weightings of their choice to the different dimensions. This is certainly a good way to proceed, by setting weights according to the importance that each person places on each dimension.

With this objective in mind, we should also consider the third approach to QoL recommended by the Stiglitz Commission on the economics of well-being and fair allocations, which was to take individual preferences into account when weighting the different QoL dimensions. Thus we could have each dimension weighted according to its social desirability when constructing a composite QoL indicator, so that a dimension which people judge to be totally useless is given a low weighting compared with a dimension considered to be very important. This approach has indeed been implemented recently in a similar context to aggregate different dimensions

Table 5 (suite)

	Increase in well-being		Decline in well-being	
	Estimator	Wald	Estimator	Wald
Sociodemographic descriptors				
Male	- 0.01	0.0	- 0.02	0.1
Inactive	0.14	2.7	0.19	4.9
Age in 2010				
18-24	0.04	0.0	- 0.08	0.2
25-34	<i>Ref</i>		<i>Ref</i>	
35-44	0.06	0.3	- 0.02	0.0
45-54	0.04	0.1	- 0.10	0.9
55-64	- 0.04	0.1	- 0.12	1.1
65-74	- 0.17	1.4	- 0.17	1.5
75-84	0.08	0.3	- 0.04	0.1
85-99	0.39	3.6	0.22	1.2
Education in 2010				
No diploma or CEP (elementary school)	<i>Ref</i>		<i>Ref</i>	
CAP, BEP, Brevet (middle school)	- 0.15	4.0	- 0.17	5.6
BTS, Bac, Bac + 2 (high school, basic higher ed.)	- 0.50	31.8	- 0.40	22.1
Higher education	- 0.65	37.5	- 0.56	30.1
Number of children, biological or adopted during entire lifetime in 2010				
None	<i>Ref</i>		<i>Ref</i>	
1	0.03	0.1	0.24	6.7
2	0.09	1.0	0.02	0.0
3	0.11	1.1	0.03	0.1
4 or more	0.17	2.1	0.11	1.0
- 2 Log likelihood	8611.8		9012.6	
N	10,897		10,897	

How to read this chart: forming a couple increases satisfaction, but separating does not decrease it.

Estimates using dichotomous logit models.

Significance threshold for Wald test at 95 %: 3.84; at 99 %: 6.64.

Area: Metropolitan France.

Source: SRCV 2010, 2011.

of poverty into a single indicator (Decancq, Fleubaey, Maniquet, 2012). Each variable representing a dimension of poverty was the subject of an adjustment where satisfaction emerges as a dependent variable. Variables retracing the different dimensions are then aggregated by means of their coefficients in the regression.

Here we use the same idea, but the way we calculate the weightings of the different dimensions of QoL is less sophisticated than that used by Decancq, Fleubaey and Maniquet.

Each weighting corresponds to the regression coefficient for QoL satisfaction across longitudinal data (and can be interpreted as marginal social desirability). Compared with a simple unweighted summation, there are some features that are reinforced, while others are modified (Table 6). With both weighting systems, the “composite” QoL of the low income group is lower than that of the high income group, but the gap is greater with the weighted indicator. This is fairly logical since the dimensions of QoL that are most sensitive to income, *i.e.* social connections and material conditions, are

Table 6
Composite QoL indicator, non-weighted and weighted by desirabilities of different dimensions

	Non-weighted indicator	Weighted indicator
Sex		
Women	0.22	0.23
Men	0.19	0.21
Main work situation		
In employment	0.22	0.21
Student	0.12	0.18
Unemployed	0.32	0.44
Inactive	0.29	0.35
Retired	0.16	0.17
Age		
< 24	0.21	0.24
25-34	0.23	0.23
35-44	0.24	0.26
45-54	0.25	0.26
55-64	0.20	0.21
65-74	0.15	0.17
75-84	0.18	0.17
> 84	0.22	0.19
Living in a couple		
Yes	0.18	0.19
No	0.27	0.29
Education		
No diploma or CEP (elementary school)	0.25	0.28
CAP, BEP, Brevet (middle school)	0.22	0.24
BTS, Bac, Bac + 2 (high school, basic higher ed.)	0.19	0.19
Higher education	0.17	0.15
Size of urban unit in 1999		
Rural municipality	0.17	0.20
Urban unit < 10,000 inhabitants	0.16	0.19
Urban unit 10,000 - 199,999 inhabitants	0.22	0.23
Urban unit 200,000 - 1,999,999 inhabitants	0.26	0.25
Greater Paris	0.23	0.21 →

weighted more heavily than in a simple average. In the same way, the unemployed and the inactive also see their unfavourable situation deteriorating. The age profile differs rather more significantly. When weightings are the same, the under-25s have an average QoL, while for those aged 85 or over it is below average. With the weightings from the regression, the under-25s are now in a situation that is very much worse than the average whereas the 85s or over are far better than average. For the former this is due to poor material conditions, and for the latter to good material conditions, and a lower weighting for physical health. Lastly, differences according to place of residence are considerably smaller, due to the fact that many of the QoL dimensions that affect this criterion most, such as the environment or insecurity, are of less importance as factors to account for satisfaction.

Can we hope to construct a well-being indicator?

As this study and the work on the QoL survey (Amiel, Godefroy, Lollivier, 2012) have shown, it is possible to use individual data to produce QoL indicators for all the dimensions recommended in the Stiglitz report. And these indicators have good statistical properties in terms of homogeneity. Incidentally, the report gives prominence to material aspects and social cohesion but is much less forthcoming on more spiritual or artistic dimensions which could also possibly influence people's QoL.

This study shows that ahead of material difficulties, it is the quality of social connections which mainly influences the satisfaction described by the people interviewed. Next come health difficulties, workplace difficulties, or unemployment for those looking for a job, followed by problems of physical or economic insecurity, and questions linked with the environment, although the last three items were less significant, at least with the sample size in the *SCRV*.

We now wonder whether, based on this information on QoL and people's satisfaction levels, it is conceivable to construct a single well-being indicator. This question may seem to be purely symbolic (do we want to dislodge GDP?), or it may be a modest attempt to meet a need for communication. The answer is not straightforward. First of all, it would seem that the answer to the satisfaction question cannot be used as a single indicator for well-being. Its subjective qualities have been criticised, not to mention the interpersonal problems of comparability between preferences and the difficulties in aggregating data which are inherent to this type of production.

A better candidate would probably be a composite QoL indicator which draws inspiration from the construction method described previously and which would introduce weightings that could be interpreted as factors of social desirability. We could then design a tool aimed at the general public, similar to the price index simulators used at present. The indicator would be

Table 6 (suite)

	Non-weighted indicator	Weighted indicator
Equivalent income		
Decile 1 *	0.45	0.55
Decile 2	0.34	0.40
Decile 3	0.28	0.33
Decile 4 *	0.25	0.25
Decile 5	0.19	0.20
Decile 6	0.20	0.18
Decile 7	0.19	0.16
Decile 8	0.16	0.14
Decile 9	0.13	0.12
Decile 10	0.11	0.11
All	0.21	0.22

How to read this chart: if the QoL indicators are weighted according to the satisfaction that they procure, the low income group has a lower QoL than if they were simply added.

Area: Metropolitan France.

Source: *SCRV* 2010; calculations by authors.

supplied with weightings that had been calculated, but the user could adjust these weightings according to his own criteria. This is similar to the system used by the OECD on its website (*Create Your Better Life Index*), apart from the fact that the weightings would be initialised.

To conclude, there is a degree of ambivalence as to the usefulness of a composite indicator. On the one hand, it is easier to provide information on changes to a single indicator than to a dashboard. In the same vein, QoL may be multidimensional, but it should nevertheless be treated as a coherent whole and it should also be monitored over

time as a whole. Separating out the dimensions one from another would result in some being held up to the spotlight while others were ignored, whether intentionally or not. On the other hand, for government decision-makers and analysts, the composite indicator is of little interest, because it is far preferable to know the dimensions in which action would be most useful, when this is possible. Lastly, in operational terms, it is also desirable to know the profiles of the sections of the population who are most disadvantaged in the different criteria so that public action can be targeted in the most efficient way, which would not be possible with a single indicator. □

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