A web survey analysis of subjective well-being

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Abstract

Purpose – The purpose of this paper is to explore the role of work conditions and job characteristics with respect to three subjective well-being (SWB) indicators: life satisfaction, job satisfaction and satisfaction with work-life balance. From a methodological point of view, the paper shows how social sciences can benefit from the use of voluntary web survey data.

Design/methodology/approach – The paper makes use of a large sample of individual data obtained from voluntary web surveys collected as part of the WageIndicator project. The sample includes extensive information on the quality of working conditions together with different well-being indicators. The propensity score adjustment weights are used to improve the sample performance.

Findings – The results shed light on the importance of certain job characteristics not only in determining job satisfaction, but also in other SWB domains. The findings support the theory of spillover perspectives, according to which satisfaction in one domain affects other domains.

Research limitations/implications – As a voluntary web-survey, WageIndicator is affected by selection bias. The validity of the sample can be improved by weighting, but this adjustment should be made and tested on a country-by-country basis.

Originality/value – The paper provides analysis of the quality of a web survey not commonly used in happiness research. The subsequent presentation of the effects of working conditions on several satisfaction domains represents a contribution to the literature.

Keywords Working conditions, Subjective well-being, Quality of work, Web-surveys

Paper type Research paper

1. Introduction

The aim of this paper is to assess the role of work conditions and job characteristics with respect to three subjective well-being (SWB) indicators: life satisfaction, job satisfaction and satisfaction with work-life balance. According to Frey and Stutzer (2010), research into SWB should remain open to constructing different indicators for different aspects of life. This paper emphasizes the role of work-related characteristics as a specific and very important aspect of life. We argue that in developed countries

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employed individuals spend on average one-third of their time each day at the workplace, so the quality of their working life can have an impact on the various domains of SWB. Existing empirical research in this area relies on traditional surveys, which are limited in scope. This paper offers an alternative, by making use of a large sample of individual data collected as part of the WageIndicator project. The data are obtained from a voluntary web survey[1] and includes extensive information on the quality of working conditions, together with several SWB indicators. This paper explores the sample to analyze how important an aspect of life work conditions are.

The second contribution this paper makes is methodological. WageIndicator data are obtained from voluntarily completed online questionnaires. The sample is calibrated with propensity score adjustment (PSA) weights and its quality is tested in comparison with a probabilistic survey. We show that both samples deliver remarkably comparable conclusions. The robustness of these findings is further discussed in comparison with the existing literature. This paper is an explorative study that uses Spanish data from the WageIndicator project to study SWB. We hope to encourage the use of WageIndicator survey in academic research for further exploration of the characteristics of the labor market in relation to individual conditions. The paper's innovation and contribution to the literature is its analysis of the quality of a web survey that has not been used commonly in happiness research so far, and its presentation of the effects of working conditions on several satisfaction domains.

The paper proceeds as follows: in Section 2 we discuss the advantages and disadvantages of web data. Section 3 presents previous findings from SWB literature, focussing in particular on the role of working conditions. In Section 4 we present the data qualities. In Section 5 we explore the role of individual characteristics and the quality of working conditions in the different domains of SWB. Section 6 concludes.

2. The advantages and disadvantages of web-survey data

Internet activity generates a lot of information. Reips (2006) distinguishes four methods of web data collection: non-reactive web data; web-based experimenting; web-based testing; and web-surveying. The strengths and weaknesses of web surveys are discussed; arguments in favor of web data emphasize its cost benefits, the speed of data collection in large quantities and in real time, the flexibility of questionnaire design, and the potential to reach respondents across national borders, enabling multi-country, multilingual, and quasi-global homogenized surveys (De Leeuw, 2008). Voluntary web surveys are a specific type of web survey which entail particular problems and sources of error (Couper, 2000): respondents voluntarily self-select themselves to participate in the survey (sampling error), the sample does not reach respondents who are without access to the internet (coverage error), and the sample only includes people who are willing or able to complete the survey (non-response error). This sample bias constitutes a major problem for the usage of such data and, according to survey methodology, two approaches can be implemented to minimize the sources of error. First, the sample bias can be improved by applying "design-based" approaches, which may include, among other measures, running a parallel survey targeted at groups that are likely underrepresented in the sample, media and targeting campaigns, or providing internet access to those individuals without it. Second, the "model-based" approach attempts to correct the bias of voluntary web surveys by applying weighting techniques. In this paper we follow the model-based approach[2] using a representative sample to study the bias and the national Labor Force Surveys to calibrate the sample

using PSA weights. This technique has been debated in the existing literature for its performance and the ability to remove bias (e.g. Lee and Valliant, 2009; Schonlau *et al.*, 2009; Pedraza *et al.*, 2010; Steinmetz *et al.*, 2014a).

Samples obtained from voluntary web surveys are, to a certain extent, comparable to the non-reactive data generated by internet activity. The collection method does not use a sampling frame in either case, so the usability of the data in the social sciences is limited due to uncertainty about the external validity of the findings. Researchers have, however shown that non-reactive web data can be used to describe socioeconomic processes, such as health worsening during the economic downturn (Askitas and Zimmermann, 2015), unemployment developments (Askitas and Zimmermann, 2009), or automobile sales (Choi and Varian, 2012). Similarly, data about internet diffusion and internet usage are used to show that technology has contributed to greater efficiency in marriage matching (Bellou, 2014).

Common procedure when evaluating voluntary web surveys also includes benchmarking the data (Yeager *et al.*, 2011), either with information from other sources (Pedraza *et al.*, 2010), or by demonstrating their ability to empirically corroborate theoretical models (Muñoz de Bustillo and de Pedraza, 2010). Compared to non-reactive data, voluntary web surveys include richer information about respondents, which may be used in a multivariate analysis (Couper, 2013). In Section 5 we show the comparison of the WageIndicator sample and probabilistic samples, and discuss findings from analysis with existing literature.

3. An overview of SWB literature

Research into subjectively reported measures has received reasonable attention over the last two decades. Kahneman and Krueger (2006) demonstrated that the validity of SWB data can be assessed, in part, by identifying their correlations with other characteristics of individuals. Many studies conclude that although subject to many caveats, SWB measures complement traditional welfare analyses and their findings can be taken into consideration when formulating economic policy (Layard, 2005).

The academic literature on SWB has studied the impact of various individual characteristics such as gender (Clark, 1997; Graham and Chattopadhyay, 2013; Stevenson and Wolfers, 2009), age (Clark *et al.*, 1996; Blanchflower and Oswald, 2008), education (Cuñado and de Gracia, 2012), marital status (Gardner and Oswald, 2006; Stutzer and Frey, 2006) and children (Angeles, 2010). It has been found that SWB correlates with macro-economic factors (Di Tella *et al.*, 2001), and recent studies document the impact of migration on SWB (Betz and Simpson, 2013; Longhi, 2014).

Standard face-to-face surveys are limited in terms of the number of observations per country, and therefore researchers typically perform SWB analysis by pooling the observations from several countries in order to obtain a robust estimate[3]. Oswald (2002) explores the relationship between quality of work and SWB by using pooled Eurobarometer surveys from 1996. He demonstrates the positive impact of some important job characteristics on job satisfaction, such as supervisory role, employment in the public sector, job security, and short traveling time to work. These findings are confirmed by Drobnic *et al.* (2010), who study the link between job characteristics and overall level of life satisfaction using the 2003 European Quality of Life Survey, and discover that the impact of working conditions on life satisfaction is stronger in Southern and Eastern European countries compared with Western European countries. Job insecurity, work commuting, long working-hours and a boring job are identified as major negative factors to life satisfaction. By contrast, jobs involving greater

autonomy, more supervisory roles, and well-paid positions deliver higher satisfaction to workers. The estimates from separate country regressions, however, show low statistical power to corroborate the general findings, mainly due to their small sample size. Clark (2001) observes that workers cite job security as the most important aspect of a job followed by pay, the work itself, and the use of initiative. These same aspects are also identified as correlating the most strongly with reported job satisfaction. Origo and Pagani (2009) use the 2001 Eurobarometer surveys to show that in European countries what matters for job satisfaction is not the type of contract, but the workers' perceived job security.

Psychology journals have demonstrated a strong link between work-life balance and job satisfaction. There is a negative relationship between long work hours and satisfaction with work-life balance (Valcour, 2007) and this effect is stronger among more dissatisfied workers (McNamara *et al.*, 2013). Findings from meta-analyses confirm that family satisfaction is explained by work-related variables and that job satisfaction is explained by family variables (Ford *et al.*, 2007).

In our analysis we demonstrate that web survey data can replicate the findings obtained in representative population surveys. The Spanish population has been closely studied using ECTV samples[4] (e.g. Alvarez and Sinde-Cantorna, 2014; Garcia-Serrano, 2009; Gamero, 2007, 2009; Namkee, 2007). Their findings are consistent with previous research showing that job insecurity, long working hours, commuting, inadequate wages and over-qualification are negatively correlated with life satisfaction and job satisfaction. Estimates based on contract type and work in the public sector are not confirmed as significant, possibly because the influence of these factors is indirect through other work attributes. Namkee (2007) evaluates the role work flexibility, work independence, trust in superiors, and a pleasant and low-stress work environment have in influencing satisfaction, and concludes that the combined effect of these intangible job characteristics on life satisfaction is several times larger than that of doubling an individual's wage.

In general, the empirical evidence on SWB confirms that the quality of working conditions is important. In the following sections, we contribute to the literature by testing whether the above findings can be corroborated with the sample obtained from the voluntary web survey.

4. Data and summary statistics

In our analysis we use samples from two sources. The first source is a web survey posted at www.tusalario.es – the Spanish web site of the WageIndicator project. Detailed information about the WageIndicator project, the web survey's characteristics, the questionnaire and a description of variables can be found in Tijdens *et al.* (2010). Second, we make use of the European Social Survey (ESS), which interviews all respondents on a face-to-face basis and is representative of the Spanish population. Both databases include information about individual and household characteristics, work conditions and SWB. The desirable time coverage and representativeness makes the ESS a suitable data set to compare with the WageIndicator sample. ESS is commonly used to study life satisfaction in the European context (e.g. Caporale, *et al.*, 2009; Betz and Simpson, 2013) as well as in Spain (e.g. Cuñado and de Gracia, 2012).

The samples are limited to employed individuals aged between 15 and 64 years and to complete observations collected between 2005 and 2011. The advantage of the WageIndicator sample is that it is collected in substantially larger numbers than ESS (in total there are 3,445 observations in the ESS and 20,095 in the WageIndicator sample).

4.1 The representativeness of the sample

The online samples include information collected from voluntarily submitted questionnaires and therefore their representativeness must be tested. Pedraza *et al.* (2010) explore the Spanish WageIndicator sample and calculate PSA weights to adjust the sample. We follow their approach and calculate weights based on the sample of employed individuals, distinguished by gender, age, education and 17 regions using Spanish Labor Force Surveys. Table AI shows the sample characteristics of the ESS and WageIndicator samples. Column 2 presents the WageIndicator sample after implementing the PSA weights, and Column 3 shows the statistics of the WageIndicator sample without weights. If the ESS sample is taken to be representative of the Spanish population, then younger and more highly educated participants are overrepresented in the WageIndicator sample. It is unsurprising that younger and more educated web-visitors are more prone to complete online questionnaires, and some discrepancies between the WageIndicator and ESS samples can be attributed to lower Internet accessibility among older and less educated groups. The application of the PSA weights is effective in moving the estimated mean of the WageIndicator sample closer to that of the whole population. Several sample characteristics, such as the share of females or the share of foreign-born workers, are very similar in both samples. By contrast, self-employed workers are largely underrepresented in the WageIndicator sample. Comparison of the two data sets further reveals that respondents in the WageIndicator sample report substantially lower life satisfaction levels. While the sample characteristics of WageIndicator differ from the ESS in several ways, the lower reported levels of life satisfaction in the WageIndicator sample could be caused by factors other than the sample composition [5]. In the next section, we contrast the WageIndicator sample with the ESS in the life satisfaction regression framework.

5. Estimation and results

In our analysis, we follow SWB literature as regards dependent variable definition, model specifications and estimation methodologies. Because the dependent variable is an ordinal response variable, an ordered logit model is the most appropriate estimation technique. The OLS method is, however commonly used (for the benefit of coefficient interpretation) and literature confirms that treating the aggregated answers as continuous variables leads to the same conclusions (e.g. Ferrer-i-Carbonell and Frijters, 2004). The results from the analysis cannot be interpreted in a causal way because these data sets do not follow the same individuals each year, and therefore the analysis does not correct for unobserved individual effects.

5.1 Comparisons of the WageIndicator and ESS samples

We use the OLS estimation method and include generally accepted determinants of SWB that are available in both surveys[6]. Table AII presents our estimates for the ESS sample (Column 1), for the WageIndicator sample with weights (Column 2) and for the WageIndicator sample without weights (Column 3). The estimates are consistent with the findings presented in the literature (e.g. Frey and Stutzer, 2002). The important factors for SWB are health, marital status, age, and income, all of which are identified as having a significant relationship, with the expected sign, in both samples. Income is a prominent variable in life satisfaction models, however the measure of income is not compatible between the two surveys, and therefore its marginal effects cannot be

compared[7]. We identify a particularly strong impact from health variables, with decreased health status leading to a sharp drop in well-being. The estimates from the WageIndicator sample exhibit very similar patterns to the estimates from the ESS sample. Furthermore, the coefficients from the WageIndicator sample with the PSA weights applied are closer to those obtained from the ESS data. Even so, a few differences are observed between the ESS and WageIndicator samples: for example, the estimate on dummy variables for divorced individuals delivers different conclusions for the two samples. The estimated coefficients relating to permanent contracts are positive in both samples, although for the WageIndicator adjusted sample the standard error is larger and the estimate is not significant. The variable indicating long working hours is imprecisely estimated in the ESS sample, probably due to the high share of workers working long hours (see Table AI). Long working hours are identified as having a negative and highly significant effect in the WageIndicator sample. In our subsequent analysis, we will rely on the WageIndicator sample with PSA weights, as it delivers estimated parameters closer to those obtained from the representative sample.

5.2 Estimates from web surveys

The analysis focusses on three areas. First, we compare the estimates to the findings generally accepted in the literature. Second, we discuss the stability of baseline estimates for the inclusion of variables indicating the quality of work. Third, we demonstrate the importance of working conditions in the three domains of SWB (see Table AIV for details of the variables). The remainder of this section discusses the findings presented in Table AIII.

Gender. Recent literature provides robust evidence that women are more satisfied than men, but the difference has diminished substantially over recent years (Graham and Chattopadhyay, 2013; Stevenson and Wolfers, 2009). Women are also observed to have higher job satisfaction than men, despite women's jobs being worse by most objective standards. Clark (1997) argues that women are more satisfied with their jobs because their expectations are lower, and he shows that this satisfaction differential disappears among the young, the more highly educated, and in male-dominated workplaces. Studies of the Spanish population find that Spanish women are more satisfied with their jobs (e.g. Gamero, 2007, 2009), and our analysis confirms this finding. Furthermore, it is reasonable to expect that ability to combine work and family varies between men and women, given their traditionally different family responsibilities. Our results confirm that women are significantly less satisfied with their work-life balance than men.

Education. The relationship between education and SWB is ambiguous; some studies find that it is positive (e.g. Di Tella *et al.*, 2001; Diener *et al.*, 1999) and others find it negative (e.g. Clark, 1997; Caporale *et al.*, 2009). A possible explanation for this latter result is that education raises aspirations that are subsequently not fulfilled, in part because highly educated workers have a higher probability of skill mismatch in the labor market. Cuñado and de Gracia (2012) use the Spanish ESS sample to show that coefficients for education variables become insignificant in the life satisfaction equation when the financial situation (proxy for income) is controlled. These results suggest that the effect of education on SWB is mediated via income. In our analysis, education is identified as having a positive impact on job satisfaction, while it is not confirmed as being significant in other domains.

Marital status. There are a number of studies showing positive relationship between marriage and SWB (e.g. Diener *et al.*, 1999). According to Becker (1981), married individuals enjoy the benefits of household production and labor division. Sociologists and psychologists emphasize the increased emotional support and relational gratification (Stutzer and Frey, 2006). Our analysis supports these arguments since the variables describing married and cohabiting individuals display a positive association with life satisfaction, and their magnitudes do not change significantly when working conditions are accounted for. The evidence indicates that people living as couples are often happier. Gardner and Oswald (2006) provide longitudinal evidence that divorce produces a rise in well-being. We obtain a positive coefficient for the divorce variable in life satisfaction, which corroborates this finding. In the WageIndicator sample, marital status is not identified as having any association with job satisfaction, but marriage displays a positive correlation with work-life balance satisfaction.

Age. The U-shape relationship of life satisfaction and age is a robust finding in the literature (Blanchflower and Oswald, 2008). The WageIndicator sample demonstrates that younger and older people are generally more satisfied with life, while people in their mid-40s report the lowest levels of life satisfaction. This pattern is preserved in the augmented model, although minimum life satisfaction is observed at a slightly higher age, which indicates that older workers are employed in occupations with potentially better working conditions. Clark *et al.* (1996) provide evidence of a U-shape relationship between age and job satisfaction, and point to the role of non-job factors in this relationship. Our analysis shows that young workers record low levels of job satisfaction and that workers in the 45-54 age group exhibit higher levels of job satisfaction. Interestingly, estimates imply that, *ceteris paribus*, older workers also report higher levels of satisfaction with work-life balance. We conclude that a non-linear pattern (resembling U-shape) of satisfaction scores with age is present across all domains.

Health status. Individual health status is ranked as one of the most valued aspects in people's lives (OECD, 2012). Results from the literature confirm that a robust relationship exists between health and SWB (e.g. Betz and Simpson, 2013; Caporale *et al.*, 2009). The correlation between self-reported individual health status and satisfaction levels in WageIndicator sample is very strong in all domains of SWB. The magnitude of the health coefficients changes only slightly in the augmented models, which corroborates the importance of good health for personal well-being.

National origin. Empirical evidence is not conclusive on whether migrants who move to new places in search of a better life can indeed achieve that. They may have false expectations about their future achievement, or their aspirations may change as their reference group changes. Otrachshenko and Popova (2014) observe a stronger intention to migrate among people with lower levels of satisfaction. This would point to the selection of migrants with low satisfaction scores. Our analysis, however, finds that foreign-born individuals experience higher life satisfaction in comparison with natives. This positive effect does not translate to other domains of satisfaction, however. Gamero (2010) finds lower job satisfaction scores among the migrant population in Spain, but this gap is fully explained by the differences in their job characteristics.

Income and wealth. Personal income and wealth are essential components of individual well-being. Life satisfaction increases with income, which is a fundamental finding in the literature (e.g. Caporale *et al.*, 2009; Frey and Stutzer, 2002). Jobs with higher pay often come with better conditions, so the decline in the coefficient on income is reasonable when work-related variables are included in the model. Importantly,

the negative coefficient for personal income in the augmented model implies lower satisfaction with work-life balance among high-income workers. Home ownership is used as a proxy for wealth in the regressions. As expected, this variable exhibits a strong positive correlation to SWB.

Occupational prestige. Occupational prestige is measured as an index with 0 being the lowest possible score and 100 being the highest, which records the perceived prestige (or admiration) of each occupation in the society (for more details see Ganzeboom and Treiman, 2003). A robust and positive relationship between prestige and job satisfaction indicates that having a role that is respected in society serves as an additional benefit to the worker. This effect, however, does not spill over into other satisfaction domains.

Self-employment. The literature has found that the self-employed exhibit higher levels of job satisfaction than employees (e.g. Millan *et al.*, 2013), and that this effect is a result of the flexibility and autonomy that self-employment allows (Alvarez and Sinde-Cantorna, 2014). The Spanish labor market is generally characterized by a high percentage of self-employed workers (16 percent in 2011), however this group is underrepresented in the WageIndicator sample (the share is below 1 percent). Estimates obtained from our analysis are in line with the literature: the self-employed are identified as reporting higher levels of satisfaction with their job than employed workers. This relationship is not confirmed in the other SWB domains.

Family arrangements. We have already demonstrated that marital status is correlated with SWB. Further to this, we included variables describing family situation (whether children younger than six years of age, or older than six years of age live in the respondent's household) and household commitments (the role of the breadwinner). Our estimates confirm a negative association between life satisfaction and the presence of older children, while satisfaction with work-life balance shows a negative association with the presence of young children. The controls used in the literature for children take various formats (e.g. total number of children, children by age category, etc.) and also there is substantial ambiguity surrounding the direction of the effect, because evidence based on cross-section analysis differs from findings obtained through fixed effects analysis. Angeles (2010) estimates a negative correlation between life satisfaction and children, using a pooled observation from a British household panel survey. However, when he applies a fixed effects regression, the effects become closer to zero, and Angeles identifies positive effects for married couples.

The breadwinner – the person supporting the family with his or her earnings – typically bears the greatest amount of responsibility, but also has greater difficulty balancing family life with work. In our analysis, the breadwinner variable captures a negative association with life satisfaction and satisfaction with work-life balance, which is as expected.

The variable indicating that the respondent lives with their parents may reflect difficulty among young people with providing their housing, even though the presence of their parents may also benefit them. It is difficult to conclude which effect prevails, also especially as the estimates imply no association with SWB. The most important finding in this area is that none of the variables referring to family arrangements are correlated with job satisfaction (note that we obtained the same outcome for marital status).

5.3 The role of working conditions

In this section, we explore the relationship between quality of work and worker satisfaction in different domains. The characteristics of a good job are determined by their reflection in SWB measurements. We explore a wide spectrum of indicators, such as type of contract, supervisory position, union membership, working time schedule, job qualification, work commuting, on-the-job search, job security and employment prospects. As expected, the inclusion of working conditions substantially improves the explanatory power of the models and the R^2 increases the most in the job satisfaction model.

Type of contract. The Spanish labor market is characterized by a large share of workers employed on fixed-term contracts, which are considered to be of lower quality (often characterized by no severance pay, low benefits, fewer possibilities for on-the-job training and higher turnover). Ferrer-i-Carbonell and van Praag (2006) argue that in Spain fixed term contracts are slow to transform into permanent contracts, and demonstrate that Spanish workers with permanent contracts report higher levels of job satisfaction. Our estimates imply a negative correlation between permanent contracts and job satisfaction. One explanation for this is that the positive effect on satisfaction is delivered through other channels made available by permanent contracts, such as higher pay, better job prospects, supervisory positions, recognition at work and regular working hours[8].

Being a supervisor. Supervisory positions are a step above the average employee and are associated with higher pay, but also a higher degree of responsibility. Our estimates imply that holding a supervisory position has no association with life satisfaction, but has a positive effect on job satisfaction (this was also found by Gamero, 2007). Our estimates also imply that workers in supervisory positions report lower satisfaction with their work-life balance.

Working schedules. Irregular working schedules and long working hours have a negative impact on the SWB of workers and reduce their level of job satisfaction (Clark, 2001; Namkee, 2007). Drobnic *et al.* (2010) include working hours in quadratic form in their life satisfaction regression and find that the point of inflection is around 41 hours per week. In our analysis, working more than 40 hours a week or having an irregular working schedule both display a negative association with all three well-being domains. Work in the evenings or at weekends substantially decreases satisfaction with work-life balance.

Over-qualification. Over-qualification (also called over-education) refers to the situation when a worker's skills are beyond those required for their job. The literature documents that skill mismatches impose significant wage penalties and result in lower levels of job satisfaction (e.g. Badillo-Amador and Vila, 2013; Namkee, 2007). On average, one-third of the workers in the sample report that they are over-qualified for their job, while 6 percent of the workers report under-qualification. We estimate a negative impact from over-qualification on a worker's life and job satisfaction. This may be because workers describing themselves as over-qualified may have invested in education but have subsequently failed to receive the expected return or aspired status in their company. In addition, these workers may be evaluating their status in relation to their counterparts who have the same qualifications but are in better positions. The negative effect of job mismatch does not translate, however, to the worker's satisfaction with work-life balance.

Labor union membership. The activities people perform in order to contribute to the functioning of society enhance their individual well-being (OECD, 2012). The literature,

on the other hand, suggests that the decision to join a trade union is a consequence of low job security and job dissatisfaction; hence union membership shows a negative correlation with job satisfaction (e.g. Clark, 2001). Our analysis identifies union affiliation with both a positive effect on life satisfaction, corresponding to the importance of civic engagement, and a negative effect corresponding to job dissatisfaction.

Work commuting. Workers commute longer distances to work when it is financially rewarding to do so, or because of additional welfare gained from a pleasant living environment. The literature documents a significant negative effect on SWB caused by long commutes (e.g. Drobnic *et al.*, 2010; Gamero, 2009; Namkee, 2007). Our estimates imply that life satisfaction and satisfaction with work-life balance are both negatively affected by long commutes. This supports the theory that workers are likely to agree with commuting in order to improve their situation in the labor market, but largely underestimate the negative effects of commuting in other domains.

On-the-job search, job insecurity and future career prospects. Results from the literature demonstrate that employment stability is desirable for workers, and significantly affects their SWB (e.g. Clark, 2001; Drobnic *et al.*, 2010; Origo and Pagani, 2009). In our model, we include variables indicating on-the-job searches, job insecurity and good career prospects to demonstrate that employment stability is positively related to SWB levels. Estimates from the WageIndicator sample imply that workers employed in jobs with less security are less satisfied in all three satisfaction domains. Similarly, individuals who are looking for another job while they have a job indicate disappointment with their current employment situation, and this too corresponds to lower SWB levels in all domains. In contrast, good career development opportunities in one's current place of work a positive effect. These findings illustrate that favorable job prospects are very important determinants of satisfaction with work-life balance.

The impact of past unemployment. It has not only been found that unemployed individuals feel frustrated, rejected, and left out (e.g. Frey and Stutzer, 2002), but also that past unemployment negatively affects SWB (e.g. Clark *et al.*, 2001; Gamero, 2009). We test this hypothesis by including a variable that identifies workers who have experienced a long-term spell of unemployment in the past. The estimated coefficients are not significant at the conventional level for life satisfaction or job satisfaction, but the stigma of past unemployment persists in satisfaction with work-life balance.

6. Conclusions and discussion

This paper contributes to the literature from two different perspectives: the validity of web survey data, and the role of job quality for SWB. In our analysis we have identified several aspects of work characteristics that are particularly salient in the three different domains of SWB – overall satisfaction with life, job satisfaction, and satisfaction with work-life balance (the combination of family life and work). In general, our findings support the theory of spillover perspectives (Georgellis and Lange, 2012), according to which satisfaction in one domain (work) affects satisfaction in other domains (life and family). Our analysis leads to several important conclusions:

(1) Jobs with higher pay are often characterized by better working conditions. We show that the positive impact of personal income is largely diminished (although not entirely) when job-related variables are entered to the model. High-income earners are however generally less satisfied with work-life balance.

(2) Self-reported health appears to have the most important influence on SWB, with those in very bad health reporting by far the lowest levels of SWB. This result is robust to the inclusion of working conditions in the analysis.

(3) Our findings confirm a strong link between job insecurity and low well-being. Workers who deem that they will lose their job next year report lower satisfaction with life, with their job, and with their work-life balance.

(4) Conversely, good career development opportunities and job stability are positively correlated with satisfaction scores in all three domains.

(5) Our analysis suggests that certain job characteristics and working conditions, such as long working hours, irregular working schedules and long work commutes have strong detrimental effects on overall worker life quality. These findings confirm that workers largely underestimate the negative effects of commuting on the quality of their life when making decisions about commuting.

(6) Job characteristics such as occupation prestige and a proper skill match have a positive effect on life satisfaction and job satisfaction, but do not affect satisfaction with work-life balance.

(7) Past unemployment experience has a negative effect on satisfaction with work-life balance.

In the current context of globalization and constant technological change, social scientists should employ data generated on the internet in their analysis in order to benefit from the good quality of this type of data, and its ability to reflect socioeconomic processes. Although web survey data do also have drawbacks, these can be treated in tailored case-by-case approaches. In this paper, the findings obtained from a web survey sample are found to be very comparable to estimates obtained from a probabilistic sample, and consistent with the existing literature. We calibrate the web data sample with PSA weights to reduce its bias, and this also brings the estimated parameters closer to estimates from the reference sample. However, the application of PSA cannot be done universally, as is debated in the literature (Steinmetz *et al.*, 2014a). More explorations and cases studies like this one would contribute to the discussion on web data quality and data reliability for empirical research and statistical inference. The WageIndicator project opens diverse research opportunities both from the perspective of web survey methodology and in terms of exploring the survey content. As many non-reactive data are generated on the web, future research will very likely focus on the intersections and synergies between different types of web data that should be further explored to improve web data quality and knowledge. This can be facilitated through the existing multidisciplinary networking processes that are already proving efficient in providing methodological solutions to problems related to web data (Steinmetz *et al.*, 2014b).

Notes

1. We refer to the voluntary web surveys data when samples are obtained from questionnaires posted on internet and answered by web-visitors voluntarily and to the probabilistic sample or traditional survey when participants are randomly selected according to a sample frame.
2. The Spanish web site www.tusalario.es was promoted at its creation through trade unions, media releases and particularly via search engine optimization, practices suggested by the design-based approach. Key words such as “compara tu salario” and “comparar salario” appear on the first Google search page.

3. Only a few countries organize household panel surveys in large numbers that are suitable for studying life-satisfaction determinants (e.g. Germany, the Netherlands, the UK, Australia and the USA). International evidence often relies on the European Social Survey, the European Quality of Life Survey, Eurobarometer and the World Values Surveys.
4. In 1999, the Spanish Ministry of Labor and Social Affairs initiated the Quality of Working Life Survey (ECTV). It was an annual representative survey of Spanish workers, which collected information about labor relations and quality of life in the workplace. The survey did not follow respondents over time and data collection was officially terminated in 2010.
5. De Leeuw (2008) suggests that information provided in self-administered questionnaires is more reliable than that obtained in interviewer-assisted surveys, especially when questions intrude on sensitive or private matters.
6. The subjective well-being is determined in both surveys by the question, "All things considered, how satisfied are you with your life as a whole nowadays?" Possible answers range from 1 to 10 where 1 stands for "Not satisfied at all" and 10 "completely satisfied". The scale in the ESS ranges from 0 to 10, and therefore zeros are replaced with ones (0.6 percent of the cases).
7. ESS includes information on net monthly household income banded into eleven categories. We include log income calculated using the mid-point of each income bracket (the same approach is adopted in Betz and Simpson, 2013). The WI sample includes information on individual gross monthly income.
8. See Table AII: the coefficient relating to permanent contracts is significant and has positive sign when other working conditions are not controlled.

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Appendix

	ESS (1)		WI with PSA (2)	WI (3)	
	Mean	SD	Mean	Mean	SD
Satisfaction with life	*7.36*	1.76	*6.77*	*6.79*	1.80
Female	*0.48*	0.50	*0.40*	*0.44*	0.50
Edu: primary	*0.51*	0.50	*0.43*	*0.21*	0.40
Edu: secondary	*0.26*	0.44	*0.24*	*0.25*	0.43
Edu: tertiary	*0.23*	0.42	*0.33*	*0.54*	0.50
Single	*0.31*	0.46	*0.38*	*0.53*	0.50
Married	*0.61*	0.49	*0.55*	*0.42*	0.49
Divorced	*0.07*	0.25	*0.06*	*0.04*	0.20
Widowed	*0.02*	0.13	*0.01*	*0.00*	0.06
Age 18-24	*0.10*	0.30	*0.11*	*0.08*	0.27
Age 25-34	*0.25*	0.43	*0.25*	*0.53*	0.50
Age 35-44	*0.28*	0.45	*0.28*	*0.27*	0.45
Age 45-54	*0.23*	0.42	*0.25*	*0.10*	0.31
Age 55-64	*0.15*	0.35	*0.11*	*0.02*	0.13
Health: excellent	*0.20*	0.40	*0.31*	*0.28*	0.45
Health: good	*0.51*	0.50	*0.29*	*0.33*	0.47
Health: poor	*0.24*	0.43	*0.23*	*0.24*	0.42
Health: very poor	*0.06*	0.23	*0.16*	*0.15*	0.35
Foreign-born	*0.07*	0.25	*0.06*	*0.07*	0.26
Self-employed	*0.15*	0.36	*0.00*	*0.01*	0.07
Log income	*7.45*	0.58	*7.32*	*7.37*	0.58
Permanent contract	*0.54*	0.50	*0.78*	*0.77*	0.42
Working hours > 40	*0.39*	0.49	*0.16*	*0.13*	0.34

Notes: Samples are limited to employed individuals 18-65 years old. WageIndicator with PSA in Column 2 presents the WageIndicator sample after implementing propensity score adjustment weights. In the ESS, information on net monthly income at the household level is calculated using the mid-point of each income bracket. The WageIndicator data includes information about individual gross monthly income

Sources: The European Social Survey (ESS) 2005-2011, Wage Indicator (WageIndicator) 2005-2011

Table AI.
Descriptive statistics

	ESS (1)	WI with PSA (2)	WI (3)
Female	0.076	0.049	0.042*
	(0.060)	(0.054)	(0.025)
Edu: secondary	−0.137*	−0.042	0.059*
	(0.073)	(0.061)	(0.035)
Edu: tertiary	−0.047	0.045	0.139***
	(0.080)	(0.056)	(0.033)
Married	0.527***	0.473***	0.474***
	(0.079)	(0.056)	(0.028)
Divorced	−0.275**	0.182	0.11*
	(0.135)	(0.118)	(0.063)
Widowed	−0.363	0.141	−0.07
	(0.234)	(0.345)	(0.204)
Age 15-24	Ref.	Ref.	Ref.
Age 25-34	−0.248**	−0.228***	−0.168***
	(0.115)	(0.080)	(0.047)
Age 35-44	−0.455***	−0.433***	−0.457***
	(0.125)	(0.092)	(0.053)
Age 45-54	−0.551***	−0.462***	−0.42***
	(0.133)	(0.110)	(0.063)
Age 55-64	−0.359**	−0.198	−0.196*
	(0.144)	(0.162)	(0.102)
Health excellent	Ref.	Ref.	Ref.
Health good	−0.343***	−0.498***	−0.509***
	(0.077)	(0.056)	(0.030)
Health poor	−0.731***	−1.124***	−1.109***
	(0.091)	(0.065)	(0.033)
Health very poor	−1.311***	−1.769***	−1.785***
	(0.143)	(0.089)	(0.038)
Foreign-born	−0.029	0.08	0.062
	(0.116)	(0.083)	(0.046)
Self-employed	0.207**	−0.064	0.127
	(0.095)	(0.318)	(0.170)
Log income	0.347***	0.275***	0.316***
	(0.056)	(0.056)	(0.024)
Permanent contract	0.353***	0.045	0.048*
	(0.070)	(0.057)	(0.030)
Works > 40hrs	−0.031	−0.292***	−0.263***
	(0.061)	(0.074)	(0.035)
Constant	4.997***	5.261***	4.902***
	(0.441)	(0.397)	(0.172)
R^2	0.101	0.14	0.152
n	3,445	20,095	20,095

Notes: The dependent variable is life satisfaction. OLS estimates are presented with standard errors in parenthesis. See also notes to Table AI. All models include regional and year fixed effects. *,**, ***Significante at the 10, 5, and 1 percent levels, respectively

Sources: The European Social Survey (ESS) 2005-2011, Wage Indicator (WageIndicator) 2005-2011

Table AII. Life satisfaction equations: a comparison of the ESS and WageIndicator surveys

	Satisfaction with life		Satisfaction with job		Satisfaction with work and family	
	(1)	(2)	(3)	(4)	(5)	(6)
Female	0.018	0.035	0.038	0.07**	−0.167***	−0.184***
	0.055	0.053	0.037	0.033	0.036	0.034
Edu: primary	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Edu: secondary	−0.052	0.004	−0.014	0.072*	0.025	0.005
	0.062	0.062	0.042	0.039	0.04	0.04
Edu: tertiary	0.005	0.083	0.024	0.13***	0.057	0.037
	0.06	0.066	0.041	0.04	0.041	0.042
Single	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Married	0.531***	0.536***	0	0	0.084	0.102*
	0.09	0.085	0.06	0.054	0.059	0.057
Living with partner	0.347***	0.387***	−0.057	−0.01	−0.021	0.002
	0.082	0.079	0.057	0.049	0.056	0.054
Divorced	0.358***	0.398***	0.062	0.093	0.019	0.055
	0.135	0.131	0.086	0.078	0.084	0.08
Widowed	0.289	0.253	0.177	0.113	0.326*	0.338**
	0.373	0.362	0.262	0.235	0.174	0.162
Age 15-24	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Age 25-34	−0.267***	−0.219***	−0.127**	−0.015	−0.096	−0.082
	0.082	0.079	0.06	0.048	0.059	0.054
Age 35-44	−0.449***	−0.395***	−0.12*	0.021	−0.029	−0.04
	0.096	0.093	0.068	0.057	0.067	0.064
Age 45-54	−0.44***	−0.432***	−0.007	0.114*	0.222***	0.158**
	0.114	0.113	0.079	0.068	0.078	0.076
Age 55-64	−0.213	−0.189	−0.065	0.024	0.334***	0.258**
	0.165	0.157	0.117	0.109	0.103	0.105
Health excellent	Ref.	Ref.	Ref.	Ref.	Ref.	Ref.
Health good	−0.498***	−0.523***	−0.091**	−0.118***	−0.402***	−0.403***
	0.056	0.054	0.041	0.037	0.039	0.037
Health poor	−1.118***	−1.073***	−0.386***	−0.343***	−0.72***	−0.66***
	0.065	0.062	0.045	0.041	0.044	0.042
Health very poor	−1.745***	−1.641***	−0.816***	−0.713***	−1.235***	−1.147***
	0.09	0.087	0.056	0.054	0.056	0.056
Foreign-born	0.147*	0.191**	0.044	0.046	−0.032	0.054
	0.085	0.083	0.068	0.063	0.057	0.057
Self-employed	−0.133	−0.079	0.594***	0.338*	−0.122	−0.237
	0.32	0.342	0.154	0.194	0.187	0.214
Occupation prestige	0.006***	0.003	0.008***	0.004***	0.001	0
	0.002	0.002	0.001	0.001	0.001	0.001
Log personal income	0.248***	0.127**	0.264***	0.085**	−0.035	−0.068*
	0.058	0.059	0.038	0.037	0.036	0.037
Main household earner	−0.12**	−0.123**	0.023	0.02	−0.087**	−0.062*
	0.058	0.055	0.04	0.035	0.036	0.034
Lives with child aged 0-5y	0.071	0.047	0.025	0.02	−0.089**	−0.113***
	0.056	0.055	0.046	0.041	0.04	0.04
Lives with child aged 6-17y	−0.107	−0.123*	0.013	−0.019	−0.037	−0.05
	0.069	0.065	0.045	0.04	0.046	0.044
House owner	0.319***	0.289***	0.079*	0.056	0.18***	0.151***
	0.065	0.061	0.043	0.038	0.04	0.039
Lives with parents	−0.116	−0.072	0.008	0.032	−0.085	−0.04

Table AIII.
Satisfaction equations: factors determining job quality

(*continued*)

	Satisfaction with life		Satisfaction with job		Satisfaction with work and family	
	(1)	(2)	(3)	(4)	(5)	(6)
	0.079	0.076	0.052	0.046	0.054	0.053
Permanent contract		−0.041		−0.159***		−0.054
		0.055		0.035		0.038
Supervisory position		0.011		0.084**		−0.087**
		0.053		0.034		0.035
Over-qualified for job		−0.247***		−0.263***		−0.033
		0.053		0.032		0.034
Member of trade union		0.114**		−0.061*		−0.029
		0.057		0.036		0.038
Working hours > 40		−0.246***		−0.095**		−0.264***
		0.07		0.044		0.045
Works in night		−0.1**		−0.053		−0.321***
		0.051		0.034		0.034
Works on weekend		−0.08		−0.077**		−0.3***
		0.06		0.038		0.042
Work: commutes 15-45 min		−0.091*		−0.007		−0.174***
		0.05		0.032		0.034
Work: commutes > 45		−0.156*		0.012		−0.364***
		0.08		0.052		0.054
Looking for another job		−0.375***		−0.723***		−0.279***
		0.056		0.034		0.035
Good career opportunities		0.626***		0.744***		0.288***
		0.055		0.037		0.039
Job is insecure		−0.475***		−0.347***		−0.102*
		0.088		0.053		0.057
Past unempl. Experience		−0.059		−0.069		−0.111**
		0.081		0.048		0.055
Constant	5.042***	6.326***	0.953***	2.63***	3.713***	4.648***
	0.419	0.426	0.28	0.268	0.25	0.26
R^2	0.149	0.197	0.102	0.261	0.148	0.215
n	20,095	20,095	20,095	20,095	20,095	20,095

Notes: OLS estimates are presented. Samples are limited to employed individuals 15-65 years old. All models include regional and year fixed effects. *,**,***Significant at the 10, 5, and 1 percent levels, respectively

Source: WageIndicator 2005-2011

Table AIII.

Table AIV. Variable definition in the WageIndicator sample

Variable name	Definition	Mean
Life satisfaction	Satisfaction with life as-a-whole is measured on an ordinal 10-point scale	6.79
Job satisfaction	Measured on an ordinal 5-point scale from "highly dissatisfied" (1) to "highly satisfied" (5)	3.06
Satisfaction with work-life balance	Measured on an ordinal 5-point scale from "highly dissatisfied" (1) to "highly satisfied" (5)	3.10
Female	Female = 1, male = 0	0.44
Edu: primary	(ISCED 0-2) = 1, otherwise = 0	0.21
Edu: secondary	(ISCED 3-4) = 1, otherwise = 0	0.25
Edu: tertiary	(ISCED 5-6) = 1, otherwise = 0	0.54
Single	Never married and not living with a partner = 1, otherwise = 0	0.34
Married	Married = 1, otherwise = 0	0.42
Living with partner	Never married and living with a partner = 1, otherwise = 0	0.19
Divorced	Divorced = 1, otherwise = 0	0.04
Widowed	Widowed = 1, otherwise = 0	0.00
Age 15-24	Age of respondent 15-24 = 1, otherwise = 0	0.08
Age 25-34	Age of respondent 25-34 = 1, otherwise = 0	0.53
Age 35-44	Age of respondent 35-44 = 1, otherwise = 0	0.27
Age 45-54	Age of respondent 45-54 = 1, otherwise = 0	0.10
Age 55-64	Age of respondent 55-64 = 1, otherwise = 0	0.02
Health	Satisfaction with health is measured on an ordinal 4-point scale from "highly dissatisfied" (1) to "highly satisfied" (4)	2.75
Foreign-born	Respondent not born in Spain = 1, otherwise = 0	0.07
Self-employed	Respondent is self-employed = 1, otherwise = 0	0.01
Occupation prestige	Measured from 0 (lowest) to 100 (highest). The conversion into ISCO categories is created by Ganzeboom and Treiman (2003)	45.81
Personal income	Logarithm of gross monthly income in EUR	7.37
Child 0-5 years	Child younger than 6 years in the household = 1, otherwise = 0	0.16
Child 6-17 years	Child older than 5 years in the household = 1, otherwise = 0	0.17
House owner	House is owned = 1, otherwise = 0	0.72

(*continued*)

Variable name	Definition	Mean
Main household earner	Repondent contributes most to household income and not single = 1, otherwise = 0	0.42
Living with parents	Respondent lives with parents = 1, otherwise = 0	0.24
Permanent contract	Respondent has permanent employment contract = 1, otherwise = 0	0.77
Supervisor	Respondent has supervisory position = 1, otherwise = 0	0.37
Over-qualified for job	Respondent is overqualified for the job = 1, otherwise = 0	0.33
Member of trade union	Member of a trade union = 1, otherwise = 0	0.25
Working hours > 40	The contractual hours for a worker are larger than 40 hours per week = 1, otherwise = 0	0.13
Works in night	Respondent works regularly in the evenings = 1, otherwise = 0	0.66
Work on weekend	Respondent works regularly on Saturdays or Sundays = 1, otherwise = 0	0.21
Work commutes 0-15 min	Commuting 0-15 minutes one way = 1, otherwise = 0	0.35
Work commutes 15-45 min	Commuting 15-45m one way = 1, otherwise = 0	0.49
Work commutes > 45 min	Commuting more than 45 min one way = 1, otherwise = 0	0.16
On-the-job search	Has been looking for another job in past 4 weeks = 1, otherwise = 0	0.29
Good career opportunities	Has good career opportunities = 1, otherwise = 0	0.25
Job is insecure	Worker will lose job next year = 1, otherwise = 0	0.12
Past unempl. experience	Searched for a first job longer than one year = 1, otherwise = 0	0.11

Table AIV.

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1. Nikolaos Askitas, Klaus F. Zimmermann. 2015. The internet as a data source for advancement in social sciences. *International Journal of Manpower* **36**:1, 2-12. [Abstract] [Full Text] [PDF]