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Analysis

Workplace environmental conditions and life satisfaction in Spain

Inmaculada García-Mainar [a], Víctor M. Montuenga [a,*], María Navarro-Paniagua [b]

[a] University of Zaragoza, Economic Analysis, Gran Vía 2, 50005 Zaragoza, Spain
[b] Lancaster University Management School, Lancaster University, LA1 4YX, UK

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ABSTRACT

This paper expands the research on subjective well-being and outdoor environmental conditions by considering environmental conditions indoors. Specifically, we examine the impact on life satisfaction of self-perceived levels of air and noise pollution in the workplace. We provide a monetary valuation of these environmental conditions, using the life-satisfaction approach. Our results demonstrate that poor air quality and high noise levels in the workplace markedly diminish life satisfaction. This holds even after we control for potential endogeneity arising from simultaneity of self-perceived workplace environmental variables and life satisfaction, by employing an instrumental variable strategy.

1. Introduction

It is well established that several factors, in addition to income, influence subjective well-being (SWB hereafter), including unemployment and inflation (Clark and Oswald, 1994; Di Tella et al., 2001; Oswald, 1997), health (Blanchflower and Oswald, 2008), and education (Cuñado and Pérez-Gracia, 2012), along with individual variables such as age, gender, and marital and occupational status (see Dolan et al., 2008, for a survey). In this context, some research has focused on the potential effects of environmental conditions on well-being, analysing the relationship between SWB and air pollution (see Welsch, 2009 and Welsch and Kühling, 2009, for recent surveys). The consideration of variables affecting quality of life, such as pollution, complements the link between income and SWB (Ferrer-i-Carbonell and Gowdy, 2007).

While many studies have focused on the effect of outdoor environmental conditions, there is relatively little research on how well-being is related to environmental conditions indoors, i.e. at home or at the workplace. This line of research appears to have been restricted, so far, to studies of the relationship between individual characteristics, and health and safety, without considering the broader determinants of well-being. Particularly in developed countries, individuals spend a large part of their time indoors, so that conditions at home and at the workplace are of significance in determining general well-being and life satisfaction. In their survey of buildings and the environment, Frontzak and Wargocki (2011) conclude that, when indoor environmental conditions can be controlled by employees, satisfaction improves. In that paper, conditions of thermal, visual, and acoustic comfort, as well as of air ventilation, are shown to be important factors in shaping satisfaction at the workplace, and life satisfaction in general. One study that considers whether pollution, grime, or other environmental problems at home influence life satisfaction – without taking outdoor environmental conditions into account – is that of Ferrer-i-Carbonell and Gowdy (2007). We believe that considering both outdoor and indoor conditions is a promising approach. For instance, airport noise may seriously erode the well-being of individuals living close to airports, even if they are working in an otherwise comfortable and pleasant environment. By contrast, a bar-tender may live in a quiet and clean neighbourhood, but spend more than a third of the time in a noisy workplace, with this having consequences on SWB.

The major contribution of our paper is that we combine two strands of research: the one that considers the association between environmental quality, climate, and SWB measures, and the literature relating employee perceptions of the work environment to well-being and life satisfaction. To our knowledge, this approach has not been addressed empirically so far. To that end, this paper expands the research on SWB and outdoor environmental conditions by considering environmental conditions indoors. Specifically, we examine the impact of self-perceived levels of air and noise pollution in the workplace. Since these variables are, by definition, subjective, we address the fact that they may be influenced by individual SWB, and that unobserved individual characteristics may also have discernible effects. Simultaneity and omitted variables generate a problem of potential endogeneity that can lead to biases in our estimates of these effects on SWB, which we deal with by employing an instrumental variable strategy, which constitutes our second major contribution. Specifically, we use a

* Corresponding author.
E-mail addresses: igarcia@unizar.es (I. García-Mainar), vimontue@unizar.es (V.M. Montuenga), m.navarropaniagua@lancaster.ac.uk (M. Navarro-Paniagua).

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regional noise prevention reform, enacted in 2009, as a source of exogenous variation in perceived noise levels, to take into account potential endogeneity.

A final contribution of our paper is that, by following the life satisfaction approach, we are able to provide a monetary value of environmental quality, both at the overall and the workplace level. Reported SWB can be considered as the empirical approximation of individual welfare, thus the regressions of SWB measures of income, environmental conditions, and other characteristics are the basis for our evaluation of public good in welfare terms. On its own, the estimated coefficients for the environmental good offer a direct value in terms of SWB, but they can also be used to calculate the implicit willingness-to-pay; that is, the increase in income that an individual would need to receive to compensate for a given loss in environmental quality (see Frey et al., 2010, for a comprehensive review of the life-satisfaction approach).

The joint consideration of indoor and outdoor conditions may provide substantial and robust implications for policy-oriented measures, at the aggregate national level, in the belief that environmental conditions influence the present and future SWB (Ferreira et al., 2013; Welsch, 2009); and at the firm or workplace level, since an evaluation of working conditions can be of help in the adequate design of HR-management strategies, and in stimulating productivity. In this context, it is important to examine the determinants of SWB, especially those that come under regulation, since there exist a number of EU Directives limiting the concentration of pollutants, while others establish the minimum requirements for occupational health and safety in the workplace (noise, visibility, etc.).[1]

In the case of Spain, we have a rich dataset of subjective information. We use the Quality of Working Life Survey (*Encuesta de Calidad de Vida en el Trabajo*, ECVT hereafter), which is an appropriate dataset for studying life satisfaction in Spain. We match various measures obtained from national statistics to account for air pollution, climate, and other regional variables, including objective measures of air quality and subjective assessments of the workplace environment. Our results show that the perception of noise nuisance and poor ventilation in the workplace markedly diminish life satisfaction. This holds even after simultaneity and unobserved heterogeneity are taken into account. The IV point-estimates are shown to be quite different from non-instrumented estimates, revealing the existence of endogeneity problems and the importance of controlling for them.

The remainder of the paper is structured as follows. Section 2 briefly surveys the existing literature on well-being and environmental conditions. Section 3 describes the dataset. Section 4 discusses our empirical model of life satisfaction, outdoor air quality and indoor self-perception of workplace environmental conditions. Section 5 presents the results and Section 6 our conclusions.

2. Literature Review

Easterlin's (1974) claim that well-being does not depend exclusively on income has led researchers to consider a wide range of factors that may affect SWB, such as a concern for outdoor environmental conditions, a topic which has gained popularity in recent years.[2] One of the first studies on the topic, Frijters and van Praag (1998), analyses the impact of changes in climate variables on individual well-being in Russia, but the bulk of the research has been concerned with air quality and pollution.[3] The typical finding is that indicators of air pollution (PM_{10}, SO_2, and CO_2) are negatively correlated with measures of SWB. At the cross-country level, studies such as Welsch (2002, 2003, 2006, 2007) and Menz and Welsch (2010) use aggregate data from the World Database of Happiness, finding a negative relationship between national average happiness and certain pollution indicators. Welsch (2002, 2007) uses cross-sectional data for 54 countries, while the other studies focus on a smaller panel of OECD countries. With the same database, Rehdanz and Maddison (2005) explain differences in self-reported levels of happiness using climate variables (temperature and precipitation), finding that higher mean temperatures in the colder months increase happiness, while higher mean temperatures in the hotter months decrease happiness, with precipitation not being a significant factor. Also from an international perspective, but using individual level data, Di Tella and MacCulloch (2008), Luechinger (2010) and Ferreira et al. (2013) find that air pollution decreases life satisfaction.

Other papers use more spatially-disaggregated pollution data, along with individual-based measures of SWB concentrating on just one country or area: Cuñado and Pérez-Gracia (2013) for Spain, Brereton et al. (2008) and Ferreira et al. (2006) for Ireland, Ferrer-i-Carbonell and Gowdy (2007) for the UK, Levinson (2012) for the US, Luechinger (2009) and Rehdanz and Maddison (2008) for Germany, and MacKerron and Mourato (2009) for the London area. The finding is similar to that of the studies that use aggregated data; degradation in air quality is associated with lower SWB. Van Praag and Baarsma (2005) and Rehdanz and Maddison (2008) are the only studies that address noise pollution in their analyses. The latter use individual-level data from the German socio-economic panel (GSOEP) to study the link between perceived levels of noise and air pollution in a given residential area, and self-reported happiness. Estimating their model via ordered probit techniques, their findings suggest that high noise levels and poor air quality diminish SWB. Additionally, by applying the hedonic model that values environmental conditions, they find that differences in the perceived levels of these environmental conditions are not capitalised into housing prices. MacKerron and Mourato (2009) analyse the connections between the self-reported happiness of a non-representative sample of Londoners and environmental conditions, using both perceived and measured data on London's air quality, at a very high spatial resolution. Their ordinary least squares (OLS) results suggest that happiness is negatively correlated with both subjective and objective measures of air pollution. Ferrer-i-Carbonell and Gowdy (2007) study the effect of environmental awareness on individual well-being, with data from the British Household Panel Survey. Their ordered probit estimates show that environmental concerns affect happiness, even after controlling for personality traits.

Several studies use the life satisfaction approach to provide monetary valuation of the environmental public good. This approach allows for the computation of relative value between two different characteristics, expressed in unit terms. Ferreira and Moro (2010), Welsch (2007, 2009) and Welsch and Kühling (2009) describe and compare the standard methods of environmental valuation, including the life-satisfaction approach, which has been used in empirical studies (Cuñado and Pérez-Gracia, 2013; Levinson, 2012; Luechinger, 2009; Menz and Welsch, 2010; Welsch, 2002, 2007).[4] Levinson (2012) finds that happiness in the US is related to air quality and weather indicators at the time and place of the survey. Using the life satisfaction approach, the author computes respondents' implicit willingness to pay for improved air quality. Luechinger (2009) combines individual information in panel

[1] http://ec.europa.eu/environment/air/quality/legislation/existing_leg.htm and http://ec.europa.eu/environment/noise/home.htm for the former, and https://osha.europa.eu/en/legislation/index_html for the latter.

[2] Recent surveys of the relationship between economic factors and SWB are Bruni and Porta (2007), Di Tella and MacCulloch (2006), Frey and Stutzer (2002) and MacKerron (2012). Other studies explicitly consider environmental conditions affecting SWB (Di Tella and MacCulloch, 2008; Ferrer-i-Carbonell, 2013). Surveys exclusively devoted to reviewing the literature on the relationship between environmental conditions and SWB are Welsch (2009), Welsch and Kühling (2009) and Welsch and Ferreira (2014).

[3] There are also several studies relating SWB to other factors, such as climate or weather (Brereton et al., 2008; Murray et al., 2013; Rehdanz and Maddison, 2005), noise (van Praag and Baarsma, 2005) and natural hazards (Carrol et al., 2009; Luechinger and Raschky, 2009).

[4] The life satisfaction approach has also been used for monetary valuation of airport noise (van Praag and Baarsma, 2005) and climate change (Murray et al., 2013; Rehdanz and Maddison, 2005).