Habitat International 68 (2017) 84–98

Contents lists available at ScienceDirect

Habitat International

journal homepage: www.elsevier.com/locate/habitatint

The heterogeneous level of life quality across Chilean regions☆

Patricio Aroca [a, *], Pablo A. Gonzalez [b], Rocio Valdebenito [a]

[a] CEPR, Universidad Adolfo Ibañez, Avda. Padre Alberto Hurtado # 750, of. 207-C, Viña del Mar, Chile
[b] CSP and CEA, DII, FCFM, Universidad de Chile, Beauchef # 850, Santiago, Chile

ARTICLE INFO

Article history:
Received 11 September 2016
Received in revised form
9 June 2017
Accepted 21 June 2017
Available online 3 July 2017

Keywords:
Regional quality of life
Chile
Regional development
Quality of live index
Subjective index
Subjective quality of life
Regional subjective index

ABSTRACT

This paper integrates the empirical literature attempting to measure quality of life with different philosophical, economic and psychological approaches that shed some light on the contours of the concept. On this basis, we suggest quality of life is composed of multiple dimensions of value that are not reducible to a single teleological measure as proposed by utilitarianism and modern economics. A quality of life index must integrate subjective and objective indicators, measures of environmental quality and inequality, individual and collective wellbeing and material and non-materials aspects. We applied this framework to the regions of a rapidly growing economy, Chile, and despite the data limitations, the paper adds dimensions that have not been explicitly considered in previous work. Using a large set of indicators based mostly on micro-data, ten factors characterizing different dimensions of life are built from 27 indicators that represent: material and subjective individual wellbeing, collective good and subjective social welfare, environmental quality and resource inequality across the Chilean regions. The behavior of the factors is very heterogeneous across regions and the correlation between factors is positive for the one representing material and subjective individual welfare, but negative with the factors representing collective good and social wellbeing. Given these results, the methods used weighting and aggregation for calculating the index becomes critical in defining the final ranking of regions. For instance, the assumption about substitution between factors is a key issue. Three methods of aggregation are used to calculate the index: the arithmetic and geometric mean that allow perfect and imperfect substitution respectively and the min-function that does not allow substitution. The results show a great deal of variation in the Quality of Life Ranking among Chilean regions, suggesting policy makers that pursuing one or two dimensions is not enough for promoting quality of life due to the multidimensional character of the concept.

1. Introduction

This paper deals with the important question of what constitute quality of life understood as what matters for human beings to live a fulfilling life. This has been the domain of economists, philosophers, psychologists and other social scientists, but, on this issue, the influence in public policy decisions of the latter has been much limited than the former.

Modern economics has been built on a particular vision of what constitutes quality of life: originally happiness, subsequently income. Economics has generated a plethora of indicators to measure and analyze the goods and services produced by a country (or a region) and designed a complete toolbox to predict and control these indicators. However, this vision has been under attack for decades by philosophers and other social scientists from different perspectives. While these critiques have inspired shifts in policy discourse, their influence on current practice has been more limited due to the absence of a unified conceptual framework and lack of measurement instruments.

Starting from a review of the relevant theoretical literature on what constitute quality of life, this paper proposes an eclectic integration of different theories of quality of life based on (but not limited to) the capability approach. Starting from this conceptual basis, it aims to build an indicator of quality of life in the Chilean regions and analyze the differences across the country, taking especial consideration of environmental quality. For the construction of this index we use a large set of indicators based mostly on

☆ The support of the project, FONDAP 15130009-CONICYT – Chile, is gracefully acknowledged. Pablo González acknowledges support from FONDECYT 1171025 and CIE160009.

* Corresponding author.
E-mail addresses: patricio.aroca@uai.cl (P. Aroca), pgonzale@dii.uchile.cl (P.A. Gonzalez), rocio.valdebenito@uai.cl (R. Valdebenito).

http://dx.doi.org/10.1016/j.habitatint.2017.06.010
0197-3975/

micro-data, a quality of life index is calculated and the results are analyzed and compared to the traditional view.

The Chilean economy had grown significantly in the last four decades, especially when it is compared with other Latin American countries. This is also reflected in other indicators such as the human development index. However, growth has brought development to a reduced group of people and territories, generating inequality and discontent in a large share of the population. In fact, Michelle Bachelet second government was elected by almost two out of three Chileans on the basis of a large-scale reform program that promised rupture with the past. Very little was achieved while government popularity shrunk to unseen low levels since the return of democracy and discontent has increased.

This special issue focus on the concept of smart policy for the development cities and regions conditioned by the notion of spatial sustainability and the environmental quality. This paper contribute by focusing in an ample definition of quality of life, using the Chilean case to propose a measured of its level in a spatial context (Chilean regions) considering different dimensions of the development, which determine sustainability and among which is the environmental quality. In addition, the paper distinguishes between objective and subjective people wellbeing, showing that those perspectives not always move in the same directions.

The following section works on concepts to understand quality of life, looking at different perspectives; and gives details on the literature about measuring quality of life. Section three describes Chile and its regions, the variables and factors used to estimate the index of quality of life and the procedure for running a reliability and confirmatory factor analysis, using Chilean regions data. Section 4 develops the procedure for calculating the quality of life index and present different alternatives for its calculation, and section five concludes.

2. Understanding quality of life

2.1. Three dominant approaches

In this section, we approximate theoretically and empirically the concept quality of life, attempting to link both grounds. As a first attempt, one might start by revising the definition given in the most widely used dictionaries and websites. Quality of life is defined as the standard of health, comfort and happiness experienced by an individual or group (Oxford Dictionary), the level of satisfaction and comfort that a person or group enjoys (Cambridge Dictionary), or as the general wellbeing of a person or society (Collins Dictionary, Wikipedia). Well-being is in turn stated as the condition of being contented, healthy or successful (Collins), the state of feeling healthy and happy (Cambridge) or the condition of an individual or group, for example their social, economic, psychological, spiritual or medical state (Wikipedia).

Using Amartya Sen's words (referring to the concept standard of living), the concept quality of life is characterized by both 'competitive plurality' (different views stand as alternatives to each other) and 'constitutive plurality' (internal diversity within a view, which may have different aspects that supplement but do not supplant each other) (Sen, 1987, p. 58: 2). As for the first, there are many different philosophical approaches to the concept of quality of life that arise as a by-product from different theories of social justice. Within political liberalism, one might distinguish at least utilitarianism, fairness, libertarianism and capabilities. There are also other approaches such as Marxism and communitarianism. As for the second, constitutive plurality, within all these approaches, different authors might give varying degrees of consideration to sustainability, gender, children, and future generations.

The possibility of measuring each philosophical perspective depends on the availability of adequate indicators. Indicators have been developed, however, mostly without much concern for which philosophical perspective is being reinforced. In fact, on a more empirical basis, Diener and Suh (1997) distinguish three approaches to measuring quality of life: economic indicators, social indicators, and subjective wellbeing.

Economic indicators do not require much introduction. Part of its attractiveness arises from its "objective" measurement and the toolboxes that economists have developed to influence their trend and stability.

In contrast, subjective wellbeing indicators rely mostly on the perception of individuals, measured as, on the one hand, their answer to questions related either to an overall assessment of one's life or life satisfaction and, on the other hand, a more hedonic moment-to-moment affect such as the ones proposed by Kahneman, Krueger, Schkade, Schwarz, and Stone (2004), Csikszentmihalyi (1990) and Kahneman and Krueger (2006).

Most authors emphasizing economic indicators[1] and a few of those favoring subjective wellbeing give supremacy to a unique measure of wellbeing (whether income or utility) share a common philosophical anchor in utilitarianism (for instance Layard, 2006a,b; Bok, 2010). This is also the case of behavioral economists aligned with so-called "libertarian paternalism" (Thaler & Sunstein, 2008), where "nudge" is justified solely to "improve individual decision making" to obtain more "happiness" than would have happen without intervention.

Social indicators, in contrast, recognize explicitly a more plural basis of quality of life (see Land, 1996, for an historical account of the origin and development of social indicators). This is shared only with some authors contributing to subjective wellbeing research, such as Frey and Stutzer (2012), who argue that findings from happiness research should only be inputs into the political process and should not be used to maximize a social welfare function (as an utilitarian would pretend). Social indicators and all subjective wellbeing researchers, nevertheless, share in common the critique of development focused merely on economic aggregates and are also aware of the imperfect correlation between economic growth and these other dimensions (for instance, total utility is not related to the availability of resources neither is freedom of association and movement nor health and education).

Nowadays, this has been translated in a growing consensus about the inadequacy of measuring development or poverty solely on the basis of economic resources alone. Resources have only an instrumental function, from a certain level are not relevant, do not correlate perfectly with intrinsically valued states or activities, and many valued dimensions (such as love, friendship, or respect) cannot be traded in markets (Sen, 1980 and 1987, p. 58, Alkire, 2008; Stiglitz, Sen, & Fitoussi, 2008; González et al., 2012).

Moreover, even within political liberalism, many modern political philosophers reject (at least partially) Bentham's utilitarianism on which modern economics is based. This means that the evaluation of social change solely in terms of efficiency or productivity lies on unsafe ethical grounds. Many authors, including John Rawls, Amartya Sen and Robert Nozik, reject the possibility of reducing human life to a single teleological end, especially one called happiness or utility. For Rawls and Sen, it is the egalitarian access to freedoms what should be placed first not the subjective evaluation of life by individuals. However, this does not mean that information

[1] Modern economics assume individuals rationally maximize a utility function dependent on their consumption of goods and services, subject to their budget restriction. It is not necessary to measure utility thanks to Samuelson (1938) revealed preference theorem and improvements of social welfare are assimilated to GDP growth thanks to Kaldor-Hicks-Scitovsky principle of compensation.

about happiness – or suffering as proposed by Popper (1956) and Anderson (2014) – is totally irrelevant. For instance, Sen suggests that "although happiness is not everything that matters, it matters, and it is interesting to have evidence regarding whether we are achieving or not our objectives" (Sen, 2008, p. 27). Note that this statement is more compatible with a measure of subjective wellbeing as life satisfaction or evaluation rather than as hedonic wellbeing (as proposed in Kahneman et al., 2004; Csikszentmihalyi, 1990; Kahneman & Krueger, 2006). It might also be compatible with satisfaction with domains of life that acknowledges that there are several dimensions for carrying on an evaluation of objective's achievement. In contrast, Rawls (1971) rejects the ethical relevance of happiness and suggests justice should be evaluated in the space of primary goods, which after due consideration of Rawls' first two principles, is very much reduced to the distribution of income and wealth. Instead of primary goods, the capability approach suggests that justice should be evaluated in the space of functionings and capabilities.

The capability approach, developed independently by Amartya Sen and Martha Nussbaum, provided sound philosophical bases to the social indicators movement, although the later appeared before the former, and has an intuitive scientific appeal to evaluate the state of human systems (Land, 1996). By concentrating in what people value, the capability approach is able to illustrate that the capacity to transform resources into valuable capabilities and functionings depends on a set of individual, social and environmental factors, that vary between individuals, groups, regions, states and countries.[2]

Summing up, we have associated the three approaches to measuring quality of life to different political philosophies. Economic indicators are based on utilitarianism, but are also considered essential by Rawls. Subjective wellbeing might be based on utilitarianism or might be considered one functioning among many other valuable functionings and capabilities. Social indicators are more compatible with capability theory and deliberative democracy, although the latter impose some conditions that are not properly considered by the former, as evaluation is simply restricted to available indicators that make intuitive sense, as we will see in the next section.

2.2. Measuring quality of life: methodologies

This section revises the literature measuring quality of life in regions and cities. Early seminal work by Andrews and Withey (1976) and Campbell, Converse, and Rodgers (1976) conceived quality of life as a multidimensional concept that should be approximated through objective and subjective indicators. Since then, different authors have attempted to measure it for different places, with different purposes and from different theoretical perspectives. Marans and Stimson (2011) provide an excellent review of the measurement of the concept quality of urban life, suggesting an evolution from objective to more subjective indicators. This goes hand in hand with an increasing availability and interest on subjective measures, notably in health, psychology and behavioral economics.

Gough and McGregor (2007) acknowledged the existence of different approaches, none prevailing over the other on more solid scientific evidence but rather on different assumptions or presumptions, and revised the links and tensions between them. In their taxonomy, quality of life is equivalent to life satisfaction, as in the health literature (WHOQOL Group, 1995; WHOQOL-Old Group, 2005), while the more encompassing concept is referred as wellbeing. This is the case, for example, in Seik (2000), Michalos and Zumbo (1999), Türksever and Atalik (2001) and McCrea, Stimson, and Western (2005) who relate quality of life (defined as life satisfaction) with satisfaction in different domains of life. Similarly, many studies have measured quality of life using questions such as "How do you rate this city as a place to live?", "How do you rate your quality of life in this city?" and/or "satisfaction with your neighborhood in your city" (Dunning, Williams, Abonyi, & Crooks, 2008; Grzeskowiak, Sirgy, & Widgery, 2003; Ko & Choi, 2015; McCrea, Shyy, & Stimson, 2006; Mohan & Twigg, 2007).

The tendency to incorporate subjective measures has not permeated mainstream economics that still centers on welfare or wellbeing as synonymous of economic growth. Incidentally, modern economics has produced a measure of quality of life in a county, city or region that is different from standard macroeconomic indicators such as GDP, national income or household income. In this perspective, quality of life is calculated as the compensating differential in a general equilibrium model of three markets: housing, labor and amenities (Blomquist, 2006; Blomquist, Berger, & Hoehn, 1988; Rappaport, 2009; Roback, 1982; Rosen, 1979). This measure is also unique (reflecting the teleological nature of utilitarianism on which mainstream economics is based) and has been found to be highly sensitive to the estimation method.

This hedonic approach, together with migration models, have been criticized by its limited applicability to territories outside of equilibrium, and other limitations related to the identification and specification of the models used (see Lambiri, Biagi, & Royuela, 2007). The increasing acceptance and availability of more measures of subjective wellbeing has also been presented as an alternative to this approach, as a more direct measurement, feasible even in the absence of data on wages and housing prices. Moreover, Moro, Brereton, Ferreira, and Clinch (2008) show that, for the Republic of Ireland, three indices based on subjective wellbeing are highly correlated: a simple average across locations; a measure controlling for personal characteristics of individuals and the environmental amenities in their area; and weighting the environmental endowments in each location by the marginal rate of substitution between income and the amenity. They suggest that subjective wellbeing across locations is driven by the endowment of location-specific amenities across locations.

It is interesting to note that the compensating differential approach refers to quality of life as an unobserved dimension. It is something other than money but can be "bought" implicitly by giving up money. Moreover, there is subjective wellbeing equilibrium across these dimensions (i.e. encompass amenities, rents and wages) that, if perturbed, generate migration, changing wages and rents, until equilibrium is recovered. This allows for multiple distinct dimensions, including one that cannot be observed nor paid directly, requiring measurement of multiple indicators, although there is only one subjective state that ultimately matters that cannot be directly observed, but is marginally equalized across regions, making its very measurement futile. This ultimate subjective state is different in this literature from quality of life, as quality of life is the value of amenities, i.e. the dimension that allows for equilibrium across regions. We are using quality of life more in the sense of the ultimate subjective state although not agreeing this ultimate state is a unique dimension. We nevertheless agree that many dimensions define quality of life, some of them valuable directly in monetary terms, others not.

Another controversial point regarding the predominant

[2] The capability approach rests on three basic concepts: functionings, capabilities, and agency. Capabilities are the real possibilities of undertaking the actions and activities that a person desires to undertake and the states of being that a person might attain. Functionings are the valued achievements of a person. Agency is the possibility of a person of pursuing her own goals, whether individually or in association with others, independently of the valuation that might attach to that goal an external observer.

economic approach is the so-called Easterlin paradox (Eastertlin, 1974). A large literature has followed Easterlin seminal contribution, to explain why happiness has not increased in developed nations despite the increase in GDP per capita. Of course, the point is important for economists, given that mainstream economics is based on the assumption that consuming more goods increases happiness. Therefore, happiness and economic resources have also being recognized as distinct dimensions by recent mainstream work, with some authors attempting to define which one should be the most important guiding policy decisions or recognizing that both are important (see Bok, 2010; Layard, 2006a,b; Frey & Stutzer, 2012).

More in line with social indicators and the capability approach, other authors used more "objective" social indicators. For instance, Murgaš and Klobučník (2016) aggregated ten indicators to measure the quality of life in municipalities and regions in the Czech Republic: suicides, life expectancy at birth—males and females, mortality, birth rate, divorce rate, population with university education, unemployment, emission balance, and generativity (blood donation, used as a partial indicator of social capital). Jiménez and González (2014, pp. 159–175) used the Multidimensional Poverty Index proposed by Alkire and Foster (2009) to evaluate quality of life in Bogota. Martín and Mendoza (2013) evaluated the quality of life in the different municipalities of the Canary Island, using indicators for six domains: health, education, personal activities (including commuting and housing), social connections, environmental conditions, and personal and economic insecurity. A seventh domain, political voice and governance was acknowledged but not included due to lack of data. Each dimension was measured by a set of indicators and all were combined using Data Envelopment Analysis to produce a single index. Delmelle, Thill, and Wang (2016) analyzed the spatial process of neighborhood improvement and decline using an index of quality of life for 173 urban neighborhoods within the city of Charlotte, North Carolina, between 2000 and 2010 using 16 local indicators describing four dimensions of economic, social, criminal, and physical health of their residents. Finally, Naude et al. (2009) proposed to use the residuals of a regression between the Human Development Index (HDI) and income as a non-monetary measure of quality of life based on the capability approach. Not surprisingly, they found that rankings of quality of life were very different if based in a monetary (resource) indicator or in this non-monetary indicator.

Summing up, our revision of the empirical literature on quality of life in regions and cities shows that most recent empirical studies use either objective or subjective indicators but do not combine them (as also recognized by Marans, 2015), despite early work (e.g. Campbell et al., 1976) provided models suggesting linkages and causalities between both realms. Moreover, different authors have found a weak link between objective and subjective indicators of quality of life (Campbell et al., 1976; Cummins, 2000; Evans & Huxley, 2002; McCrea et al., 2006). This supports the idea that objective and subjective indicators represent different dimensions related to quality of life. However, mainstream economists and subjective wellbeing psychologists and health specialists appear comfortable with measuring one teleological dimension, in line with utilitarianism. Authors in the social indicators tradition explicitly recognize the plurality of dimensions, but they tend to exclude subjective dimensions, which appear to reflect a distrust of these indicators. This is in line with Amartya Sen earlier work (see Sen, 1980; 1987, p. 58 and 1998), and is largely due to the arguments of adaptive preferences and objective illusion.[3]

2.3. Further considerations

This section summarizes our conclusions about how quality of life should be measured. Based on our revision above, we consider that quality of life is a multidimensional phenomenon that cannot be summarized by a single dimension, such as income or subjective wellbeing, and this single dimension should not be regarded as the sole purpose of life as utilitarianism pretends. Nevertheless, as recognized by Sen (2009) for subjective wellbeing and Rawls (1971) for income, both are important dimensions of quality of life that should be taken into account together with other dimensions. Therefore, we followed an enriched version of the capability approach. This section first describes the problems that must be faced, and the capabilities and functionings that should and can be measured in the case of Chile.

The empirical operationalization of the capability approach must face two independent problems. First, valuable capabilities must be defined. While Nussbaum attempts to define a universal list of capabilities, Sen suggests they should be defined for each time and place, using the procedures of deliberative democracy (see Sen, 2009; for the conditions on the deliberative process). Fortunately, although not fulfilling all the desirable conditions suggested by Sen (2009), González et al. (2012) produced a list of basic capabilities to live a good life in Chile that might be used in our study. The (final) list included eleven capabilities: enjoy a good health; satisfy physical and material basic needs; be able to understand the world; be able to participate and influence in society; be able to enjoy and feel part of nature; be in peace with oneself and enjoy an interior life; feel secure and free of threats; be able to experience pleasure and emotions; be able to have meaningful relationships with others; be recognized and respected in dignity and rights; and be able to have and develop one's life project.

Having defined the list of capabilities, the second problem that the empirical operationalization of the capability approach must face is measuring each capability in the list. Inevitably, strict measurement of capabilities would have to rely on the subjective perception of human freedoms, as objective indicators might be a good measure of functionings, but not of capabilities, as these are not concrete realizations but sets of possibilities. Rather, empirical applications of the capability approach are focused on highlighting the barriers that people face in developing their life projects instead of producing a precise measure of their capabilities (see Nussbaum, 2000, or the various international or national human development reports that the UNDP has produced since 1990). Exceptions are the Gross National Happiness index developed by the Kingdom of Bhutan (consisting of 9 capabilities measured by a total of 35 indicators), Anand et al. (2009) and González et al. (2012) that use information produced by specially designed surveys, representative at a national but not regional level.

This turns us to the question of indicators available at a regional level. Of the capabilities list for Chile defined above, only the first four can be approximated through indicators of health, income and wealth, education and participation standardly measured in household surveys representative at the regional level. It is also possible to approximate part of the fifth capability through indicators of availability of gardens, parks and other facilities. Note that this adds just two dimensions to the ones used in the standard human development index. This already is above what most previous studies of quality of life in regions and cities have been able to include.

We turn now to check for other dimensions besides capabilities, resources and individual subjective wellbeing that might be

[3] For instance, inhabitants of Uttar Pradesh had much lower self-assessed morbidity than those of Kerala, while at the same time objective health indicators on morbidity and mortality were much better in Kerala (Sen, 1993).

important to measure quality of life in the case of Chile. There are three distinct important dimensions of quality of life that have not been emphasized so far: environment, subjective social wellbeing and inequality.

First, happiness, resources, functionings or capabilities are usually measured on indicators reported for living human subjects. The capability approach considers the possibility of enjoying nature and green spaces but this usually refers to a freedom available to living human beings and does not necessarily projects into the future. The same is true for the so-called value of amenities estimated without direct measurement by mainstream economists. However, many authors remind us that the wellbeing of future generations is also important. This is rarely included in quality of life measurement, as it requires the inclusion of indicators related to environmental quality or environmental damage. Although our strategy was to include as much information regarding environmental quality as possible, data limitations restricted our attention to air pollution, which a key problem in Chilean urban areas. Unfortunately, this indicator affects more directly the quality of life of actual generations than the possibilities of future ones, but might be correlated with them insofar as high air pollution might reflect a low concern with environmental damage. The same applies to social indicators studies attempting to approach the concept revised above.

Second, while evaluation of our own life and experiences is important, there is another realm of subjective experience that refers to the collective. As human beings, we also have a subjective evaluation of our society and the opportunities it offers for being whoever we want to be and doing whatever we wish to do (González et al., 2012). This has long been recognized in social psychology, where the concepts of individual wellbeing and psychological wellbeing are complemented by the concept of social wellbeing. The seminal work by Keyes (1998) considered five dimensions: social integration; social acceptance; social contribution; social actualization and social coherence. While there are instruments to measure such concepts, these are seldom applied in practice to characterize social wellbeing of countries, regions or cities. González et al. (2012) proposed to approximate the concept of social wellbeing using trust in different institutions and in other people, as measured in several international and national surveys. In the case of Chile, this allowed to identify a numerous group of people that are unsatisfied with society while at the same time are very satisfied with their own life. Both indicators have been increasing since the 90s and this group is now the largest when classifying the population according to both dimensions.

The third important issue is inequality. Besides the increasing awareness about the importance of the negative effects of inequality in quality of life, the higher the level of inequality in the space we are evaluating quality of life, the more important it becomes to go beyond averages and to consider the complete distribution. The Stiglitz-Sen-Fitoussi commission proposed: using median income and its difference with respect to the average, considering the income differences between the extreme deciles or of groups below a certain threshold and accounting not only for income but also for consumption and wealth indicators. Other indicators include the Gini and the Palma coefficient (see Palma, 2014). Furthermore, in its 20th anniversary edition of the human development report, UNDP proposed an index adjusted by inequality (UNDP, 2010, pp. 238–239) based on Alkire and Foster (2010). Given the levels of inequalities prevailing in Chile (the highest among OECD members), we considered necessary to include this dimension. Considering that previous work has illustrated that income inequality provides an upper bound for other inequalities (subjective wellbeing and capabilities) in Chile, we restrict our attention to indicators of income inequality (González et al., 2012).

Summing up, this paper departs from most of the recent empirical literature in considering both subjective and objective indicators to define quality of life. This is congruent with the theoretical literature and most notably with more pluralistic views of what are the valuable ends for individual and societies. We acknowledge the limitation of available social indicators, surveys and databases to measure capabilities, and therefore we utilize available information on functionings (achievements). In this line, we use all the available indicators related to the measurement of valuable capabilities as defined by the Chilean population as reported in González et al. (2012). We also use an indicator of individual subjective wellbeing that is the life satisfaction scale, also used in the World values survey, which is closer with Amartya Sen and John Rawls concerns about an evaluation of the fulfillment of one's own life projects. Another novelty with respect to the existing empirical literature is the addition of an indicator of subjective social wellbeing and the explicit consideration of inequality. This information is presented and described in next section.

3. Measuring quality of life

3.1. Chile and its regions

Chile is a “linear” country from north to south that is characterized for a high concentration around the metropolitan region where more than 40 percent of the population is located. In addition, the northern regions are specialized in mining while the southern region are dominated by the fishing and agriculture sector. On the other side, Metropolitan Region is dominating the manufacture and services production.

The political-administrative division of Chile at the regional level (first tier) includes fifteen regions. Most of the regions have just two neighbors, and they are organized from north to south as the following order: (see Fig. 1).

This order is preserved in the following bar graphs. Therefore, from left to right, the graphs show the results for regions from north to south.

In addition, until 2007 there were thirteen regions in Chile, the regions of Arica and Parinacota, and Los Rios were created in 2007 as a result of splitting in two Tarapacá and Los Lagos respectively. For this paper, all the variables were recalculated for the fifteen regions for the period where they were available just for thirteen, using either microdata sets or administrative data available at the municipality level.

3.2. Variables and factors

In order to measure the quality of life in Chilean regions,[4] 35 variables were used to create factors that were classified in two dimensions: objective and subjective people wellbeing. The variables, sources and the years for which each variable is available is shown in annex 1.

Table 1 shows the final results from a confirmatory factor and reliability analysis based on Cronbach's Alpha with the final 27

[4] Previous work on quality of life in Chile includes González et al. (2012) study of the relationship between subjective wellbeing and capabilities using a sample representative of the national population, Loewe, Bagherzadeh, Araya-Castillo, Thieme, and Batista-Fogue (2014) and Schnettler et al. (2015) analysis of subjective wellbeing using very small samples in particular groups in Chile (workers and university students respectively), and Banzhaf et al. (2014) preliminar exploration of environmental quality.

Fig. 1. Chilean regions.
Source: Geographical information from National Congress of Chile.

selected variables that were grouped in 10 factors: household resources, equality (inequality), house quality, health, safety, participation, green areas, clean air (air pollution), subjective social well-being, and subjective individual well-being.

In order to facilitate the interpretation, all the variables were normalized in such a way that they have a positive meaning. Therefore, if a higher value of the variable is expected to have a positive influence on quality of life, like years of education, then the normalization procedure was standard, while if a higher value is expected to deteriorate quality of life, such as cocaine use, then the normalization subtracted the actual value of the variable for the region from its country average. Then, a positive number will indicate that cocaine use is lower than the country's average, while a negative number will imply the opposite. This is the reason why factor inequality was named equality and factor air pollution, clean air. Because, the higher the value of the factor the lower the inequality or the cleaner the air.

Let X_{it} the value of a variable X for region i at year t, and X_{Nt} the national average of the variable at the same year, then the normalization process for a variable that improve the quality of life was done as: $x_{it} = \frac{(X_{it} - X_t)}{\sigma_{it}}$, while for a variable that reduce quality of life, the formula was $x_{it} = \frac{(X_t - X_{it})}{\sigma_{it}}$. Then, both have a positive meaning related to the factor.

Note that there are 3 factors (Participation, Green Areas and Subjective Individual Well-being) with only one variable to measure it, which implies a loading factor equal to 1 for the variable.

It is important to note that education was included in household resource because confirmatory factor analysis supported the case, which is congruent with the analysis by González et al. (2012) for the case of Chile with micro data, as education is strongly correlated with income and therefore do not have a distinctive influence on wellbeing.

The reliability and factor analysis was conducted using all the available observations (annex 2 give the detail periods for which is variable is available) normalized annually, in order to avoid problems that might arise in a particular year. It means that the normalization was done using the mean and standard deviation for each year. In addition, each factor was created using all the data available for the set of variables that conform the factor. For some factors we have several years, for others we as low as three.

In a second step, in order to calculate the factors and the index, only the period 2011–2013 was used, as these were the only years where observations for all variables were available. In order to do so, the factors were rescaled to a mean equal to 50 and a standard deviation equal to 10, as this allows both to compare the values directly as well as to avoid bias in the index due to the disproportionate level or variability of one of the factors.

The calculation was done for all ten factors. However, in order to save some space, only some of them will be discussed for illustrative purposes.

The factors associated to the objective people's wellbeing dimension, present some significant differences and territorial patterns. For example, Fig. 2 shows the results for the factor housing condition or quality, which is very similar to the factor housing resources (See Annex 2 - Fig. 8).

The graph has three bars for each region, representing years 2011, 2012 and 2013, in consecutive order from left to right. The horizontal line at 50 represents the (rescaled) mean of each factor. In addition, the regions are ordered according to their location in the map. Arica and Parinacota is located at the very North part of the country in the border with Peru, while Magallanes is at the far South, close to the Antarctic continent.

The graph shows a similar pattern for income and production per capita in the country. The Northern regions, from Arica and Parinacota to Antofagasta, are associated to the large copper mining industry, with higher productivity and higher salaries as compared to the South. However, it is also interesting to note that, while the first two regions show an increasing tendency in the factor, Antofagasta exhibits a decreasing trend. This might be attributable to two different causes. First, the development of the copper mining sector in the first two regions is more recent and is still experiencing several investment processes, while Antofagasta is having less investment because most of the mines are mature. Another cause is the immigration that has been larger in Antofagasta than in the other two regions, and most of the immigrants have lower income and poorer housing conditions than the locals. The other regions above average in this factor are Magallanes, located far South and rich in raw materials, and Valparaiso and Santiago, the two most populated regions that capture a large share of the wealth and the value added produced in the country. In contrast, most of the South is below average, with Araucanía, the region with the largest proportion of indigenous people and higher poverty rates, exhibiting the lowest index in housing conditions and housing resources.

The subjective social wellbeing factor is presented in Fig. 3, and its behavior is almost the opposite to the factors house quality and household resources. The three northern regions have lower level

Table 1
Dimensions, factors, variables and results from reliability and confirmatory factor analysis.

Dimension	#	Factor	Variable	Cronbach's Alpha if the item is deleted	Cronbrach's Alpha	Factor Loadings
Objective People Wellbeing	1	Household Resources	Monetary incomer per capita	0.689	0.849	0.403
			Years od education	0.866		0.357
			Wealth	0.799		0.379
	2	Equality (Inequality)	Regional Gini Index	0.982	0.967	0.188
			Ratio Average to Median Income	0.952		0.219
			Palma Index	0.947		0.223
			Ratio 20-20	0.951		0.220
			Ratio 90-10	0.963		0.210
	3	House quality	Physical structure index	0.463	0.626	0.480
			Water and Sewereage Water Index	0.167		0.516
			Housing overcrowding index	0.81		0.255
	4	Health	Life Expectancy	0.506	0.666	0.458
			Disability-adjusted life year	0.362		0.484
			Percentage of overweight children	0.779		0.320
	5	Safety	Cocaine use	0.781	0.793	0.241
			Teen Crime Rate	0.734		0.281
			Rate of Domestic Violence	0.816		0.192
			Crime rate greater social connotation	0.684		0.317
			Feeling safe streets	0.735		0.290
	6	Participation	Citizen participation	.	.	1.000
	7	Green areas	Square meters of green area per inhabitant	.	.	1.000
	8	Clean Air (Air Pollution)	PM_{10} ton/year	0.995	0.997	0.334
			$PM_{2.5}$ ton/year	0.994		0.335
			Carbon Monoxide (CO) ton/year	0.997		0.334
Subjective People Wellbeing	9	Subjective Social Wellbeing	Sub-Factor: Trust	.	0.769	0.555
			Sub-Factor: Discrimination	.		0.555
	10	Subjective Individual Welbeing	Satisfaction with life	.	.	1.000

[a] The detail results and the source of the data are available upon request.
Source: Own elaboration based on official sources.[a]

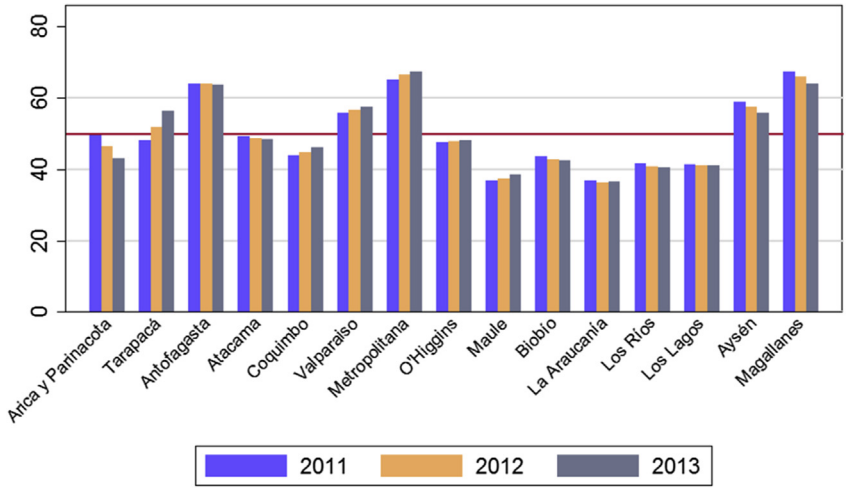

Fig. 2. Housing conditions factor - 2011 to 2013.
Source: Own elaboration.

of subjective social welfare compared to the rest of the country, while the poorest region, Araucanía, has one of the largest level in this factor. It is interesting to note that Atacama and Aysén exhibit the largest value of this factor, and both of them were the ones that organized successful citizen movements with regional demands during the same period. In addition, there is no a clear trend in the three years for any region, although some of them experience large swings. For instance, Magallanes has a strong regional identity and regional movement but has recently been less successful in mobilizing its citizen demands.

Similarly, the health factor (Annex 2 - Fig. 9) tends to be higher in the northern regions than in the South but the safety factor (Annex 2 - Fig. 10) shows exactly the opposite pattern. The explanation for this is that the North has more resources that can provide better health conditions but more resources also bring more problems like a more attractive market for drugs (aside more proximity to countries that are drug producers) and crime. Both are captured by the safety factor.

Likewise, the most populated and richer Metropolitan region shows the lowest levels in equality (Annex 2 - Fig. 7) and safety factors. However, it got the highest score in the factor household resources and housing quality.

In general, the factors show a high heterogeneity across the territory and also across factors. Some regions are very well posited in some factors and very low in others. This fact some entails serious consequence over the calculation of the index, which are

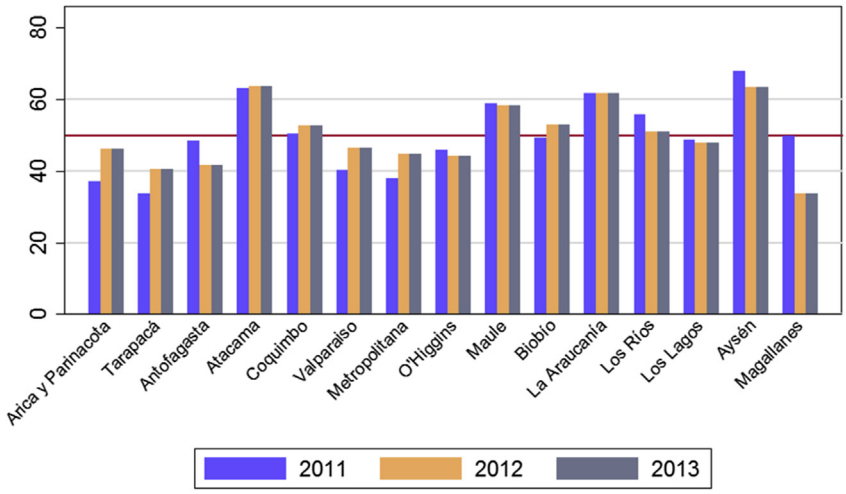

Fig. 3. Subjective social wellbeing - 2011 to 2013.
Source: Own elaboration.

described in the next section.

This illustrates that different objective and subjective factors move in different directions and are not perfectly correlated, which will be required to safely focus in just one dimension for public policy. To further corroborate the above, Table 2 shows the correlations between the different factors composing the index. Bold figures indicate that the correlation is significant at 95%. As expected, household resources, house quality and subjective individual wellbeing are positively correlated. More interesting, the first two are negatively correlated with subjective social wellbeing, safety and citizen participation, which in turn are correlated with each other (although the correlation is not significant between safety and subjective social wellbeing). It is worth highlighting the strong correlation between safety and participation, which is in line with modern theories of crime reduction. This indicates that social dimensions of quality of life are very distinct aspects of life than individual dimensions.

Equality is a factor that correlates only with household resources, and the correlation is negative. In Chile, higher household resources are associated with lower equality, which is in line with market oriented development complemented with a national social protection system targeted to the poor and the extreme poor, which are concentrated in less affluent regions. A puzzle is the negative correlation between health and green areas, safety and participation. Clean air is positively correlated with individual dimensions, which might be expected if resources are used to improve other living conditions, and negatively correlated with safety and participation, which is more surprising. The negative correlation of green areas with other factors is also puzzling.

More importantly, many factors do not correlate and in all cases the correlation is not very strong, which is consistent with our contention that they represent different dimensions of life. Therefore, it is wrong to concentrate only on household resources or subjective individual wellbeing – as an economist or an utilitarian might suggest – hoping that all other dimensions of quality of life would move in the same direction.

4. Calculating a quality of life index

The discussion above shows that the different dimensions of quality of life have a distinctive behavior and are not synchronized as unidimensional visions implicitly assume. They all should be considered together for policy purposes if the aim of public policy is the improvement of the quality of life of the inhabitants of a region or country. This poses two challenges for policymakers. Should policies give priority to some dimension over others? Can a bad result in a particular dimension be compensated by good results in other dimensions?

Table 2
Correlation between factors, years 2011–2013.

Factores	Household resources	House quality	Subjective individual welfare	Clean Air (Air pollution)	Health	Equality (Inequality)	Green areas	Subjective Social welfare	Safety	Citizen Participation
Household resources	1									
House quality	**0.77**	1								
Subjective individual welfare	**0.77**	**0.42**	1							
Clean Air (Air pollution)	**0.46**	**0.50**	**0.53**	1						
Health	0.04	0.26	-0.10	0.06	1					
Equality (Inequality)	**-0.45**	-0.16	-0.08	0.04	-0.06	1				
Green areas	-0.13	**-0.43**	0.13	-0.13	**-0.48**	-0.02	1			
Subjective Social welfare	**-0.44**	**-0.62**	-0.18	-0.28	-0.01	-0.04	0.10	1		
Safety	**-0.39**	**-0.63**	-0.07	**-0.34**	**-0.59**	0.25	**0.69**	0.25	1	
Citizen Participation	**-0.69**	**-0.87**	**-0.46**	**-0.58**	**-0.32**	0.00	**0.41**	**0.54**	**0.64**	1

Source: Own elaboration.

The first question requires weighting the preferences of the members of each community according to some criteria or mechanism. For instance, deliberative processes in each region might generate different weights for each dimension, posing the problem of how an aggregate index for the region, each according to the region's specific weights, might be compared. Moreover, such a deliberative exercise requires strong political will and the mobilization of vast resources, which exceeds the possibilities of our work. In what follows, we assume that all dimensions have the same importance.

The second question is methodologically more complex. In many countries, including Chile, development has been understood as the promotion of economic growth and material factors, that have generated disregard for more collective or social dimensions, such as subjective social wellbeing, safety, participation and equality. When quality of life is understood as a more pluralistic concept involving many dimensions, it is necessary to ask if the improvement of material aspects might compensate for other dimensions that are low or might deteriorate as a consequence of the pattern of economic growth. This question is important in Chile, as González et al. (2012) show that social dimensions are particularly low and subjective individual wellbeing lags well behind economic indicators as compared to other nations.

This section discusses alternative methodologies of aggregation that assume different stances regarding this second question and present the implications of these different methodologies with respect to the quality of life of the different regions. The first methodology assumes perfect substitution, the second imperfect substitution and the third no substitution, i.e. improvement can only occur if the worst factor ameliorates.

The most common method of aggregation is a weighted linear average where the weight can be defined by statistical or subjective procedures. The implicit assumption is that there is a perfect substitution between the factors. Another alternative to calculate the index is using the geometric mean, which penalizes larger variance, so two regions with similar average but different variance will have different geometric means, being the larger index the one of the region with smaller variance. Therefore, although the geometric mean allows for substitution among factors, this substitution is not perfect and it is penalized as compared to the arithmetic mean or weighted linear average (OECD, 2008;; Sharpe & Andrews, 2012).

Fig. 4 shows the Quality of Life Index (QLI) using the average or arithmetic mean and the geometric mean using the factors previously calculated. They are very similar in shape, but the variance of the last index looks a little bigger.

To better illustrate the differences between both indexes, Fig. 5 shows the regional rankings obtained by each method, being 1 the region with the best quality of life and 15 the lowest. The comparison between the arithmetic mean and the geometric mean in Fig. 4 shows some variations in the ranking of regions, generating some significant changes such as the region of Arica and Parinacota that, given the smaller variance relative to the rest of the regions among its factors, is ranked 11 when the arithmetic average is used, but reaches post 8 when the geometric mean is employed. The opposite occurs for Antofagasta: it happens to occupy the place 8 when the arithmetic average is utilized, and place 10 when the geometric mean is applied, due to its higher relative variance between factors. In general, all regions that are over the diagonal get a higher position in the arithmetic ranking due their large relative variance, while the ones below the diagonal get a higher position in the geometric ranking due to their smaller variance.

Antofagasta is a mining region with a very high GDP per capita which substitute some of the lower factor associated with more social or subjective wellbeing. That is the reason why it loses two position when variance is punished by the weighting method. On the other side, Arica is a less productive region, however, all the dimensions of the index are similarly developed, fact that is captures by a small variance, and increase three position in the ranking when the weighting method change from arithmetic to geometric one.

Another method of aggregation is to assume there is no possible compensation or substitution among factors. That is, if a region is very low in one factor it cannot compensate this factor solely by improving the others. In this third calculation of the quality of life index we assume there is no substitution among the factors. The simplest formula for this is the minimum function that calculates the index as equal to the factor with the lowest level among those that compose the index for a region i ($QLI_i = \min\{F_1, \ldots, F_{10}\}$).

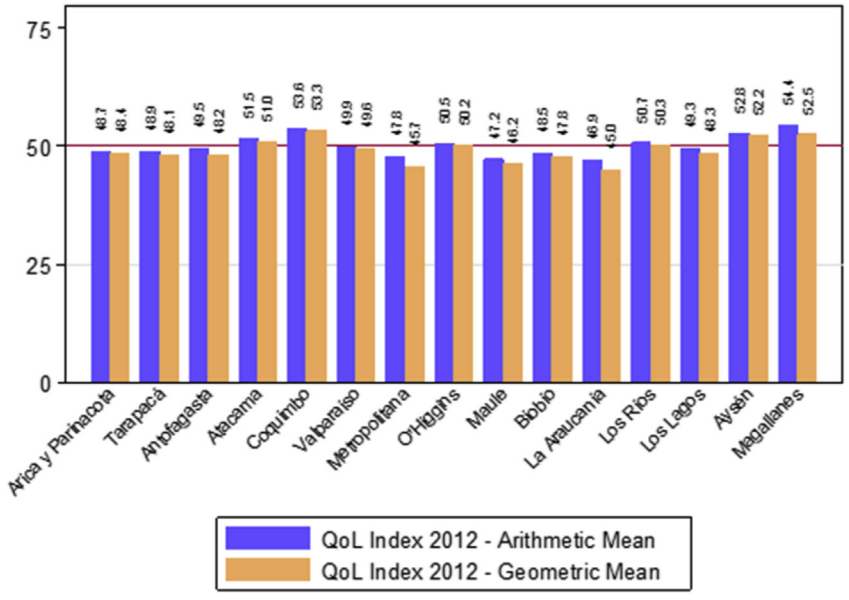

Fig. 4. Quality of Life Index with arithmetic and geometric mean method (2012).
Source: Own elaboration.

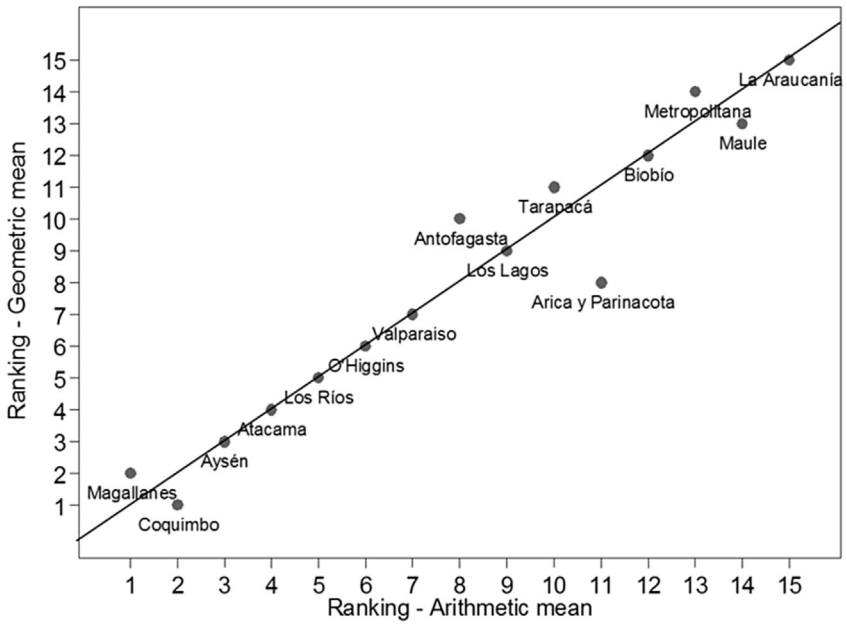

Fig. 5. Ranking comparison 2012 - Geometric mean vs Arithmetic mean.
Source: Own elaboration.

Fig. 6 plots the rankings derived from using the geometric mean and the minimum function. There are very significant changes applying the latter. For instance, the Magallanes region with the geometric mean would be in second place in the ranking, while with the minimum function it moves to the 11th place, indicating that it has a factor with a very low level compared to other regions. Regions that improve sharply include O'Higgins and Arica y Parinacota, which are not extremely good in any of the factors but are near or above average in all of them.

This reflects that assuming perfect substitutability between factors can lead to misunderstanding of the quality of life in a region, so it is less advisable to use the arithmetic mean. The geometric mean punishes the largest variance, however, when the results of the geometric mean and the one with no substitution are compared, the differences are very significant.

Another way to interpret these results is that there are some regions like Los Lagos and Coquimbo that do not change the ranking using Geometric or Min function method, which imply that their intra variation among factor is low, while there are others like Magallanes, Antofagasta, Atacama and Aysén that drop several places in the ranking. This means that they have larger variance among the factors or intra-variance. The cases of O'Higgins, Arica y Parinacota, Tarapacá and Biobío are even more interesting, because they improve their position in the ranking when substitution is not

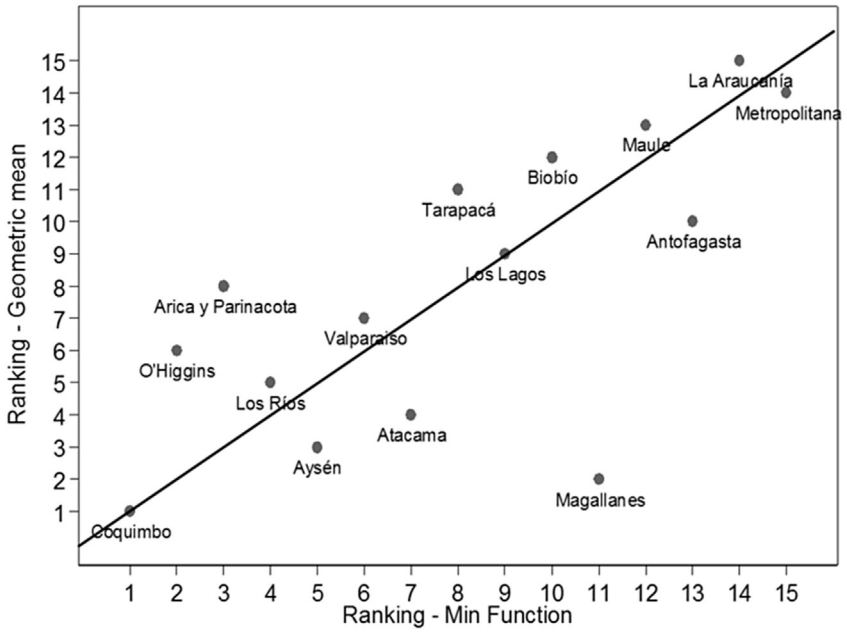

Fig. 6. Ranking comparison 2012 - Geometric mean vs Min function.
Source: Own elaboration.

allowed. It means, that they do not only have a lower intra-variance, but also they have a larger relative level in their lowest factor than the others regions.

The main question that arises from this exercise for policy purposes is what are the factors that are driving the results. As for rankings, at first sight it seems that the subjective factors are the ones that influence the most the relative standing of each region. However, there are cases like Araucanía that exhibits some of the largest values in subjective social wellbeing, but is at the bottom of both rankings. Looking closely, what drives the index is the combination among the factors, the relative level (especially among the lowest one of each region) the variance among them and the substitution allowed by the method among factors.

The larger changes in the rankings, with respect to the arithmetic or geometric means, are due mainly to the non-substitution assumption of the Min function. Therefore, currently there is a growing discussion about focus on growth or welfare. If the policy maker is more focused on growth leaving the problem of development or inequality for later, then building a quality of life index calculated using the arithmetic average is more proper. However, if the policy maker wants to promote a more balanced or multidimensional development, then the index calculated by the Min function is a better tool to measure the improvement of the country and its regions.

5. Conclusions

Given the different approaches to quality of life, the construction of a Quality of Life Index demands to take into account different factors that capture the diverse dimensions of the concept. There are several frameworks proposing different dimensions and factors that should be taken into account to build a quality of life index. From our literature review we conclude it is most appropriate to build an integrated index based on an extended version of the capability approach, encompassing environment, inequality and individual and social wellbeing.

Our empirical application to the regions of Chile shows that social dimensions of quality of life are very distinct aspects of life than individual dimensions. In addition, many factors do not correlate and in all cases the correlation is not very strong, which is consistent with our contention that they represent different dimensions of life.

A multidimensional measure of quality of life poses two problems for policy makers that a unifying teleological measure avoids: weighting and aggregation. Utility and money solve univocally the problem of assigning weights to each dimension through marginal utilities and prices. There is no escape route for defining an explicit process to determine weights when a multidimensional index is built. To be valid this requires political will and a large mobilization of resources well beyond the possibilities of our work. However, it is obvious that, given the evidence of imperfect correlation above, different weights will produce very different rankings.

On the second issue, different methods of aggregation might produce very different results and policy priorities. When quality of life is understood as a more pluralistic concept than economic growth, involving many dimensions, it is necessary to ask if the improvement of material aspects might compensate for other dimensions that are low or that might deteriorate as a consequence of the pattern of economic growth. This question is important in Chile, as social dimensions are particularly low and subjective individual wellbeing lags well behind economic indicators as compared to other nations. Can a bad result in a particular dimension, for instance social wellbeing, be compensated by good results in other dimensions, for instance material resources?

The method used to put together the factors in order to get the index is critical when there is a large variance among the factors for each region. In the Chilean case, the regions with best quality of life index are not the richest or more productive ones, but the ones with similar development in all the factors, like the case of Coquimbo, which is among the first two in the ranking independently of the method used. Also, the poorest region Araucanía is between the two worst regions independently of the method. However, between this two extreme case there is a lot of variation, and the changes are large as lower is the substitution degree, among factors, allowed by the method of calculation of the index.

Future research should investigate about which is the optimal degree of substitution allowed in order to get a proper level of the quality of life index, especially when there is a large variance among the factors in each region.

Annexes

Annex 1

Main data sources of factors.

	Factor	Variable	Period	Data
1	Household Resources	Monetary income per capita	1990–2015	National Socio-Economic Characterization Survey (CASEN in spanish)
		Years of education	1990–2015	CASEN
		wealth	1990–2015	CASEN
2	Inequality	Gini Index	1990–2015	CASEN
		Ration mean-median income	1990–2015	CASEN
		Palma Index	1990–2015	CASEN
		Ratio 20-20	1990–2015	CASEN
		Ratio 90-10	1990–2015	CASEN
3	Household conditions	Physical structure Index of households	1990–2015	CASEN
		Water and sewereage index of households	1990–2015	CASEN
		Housing overcrowding index	1990–2015	CASEN
4	Health	Life expectancy	2000–2014	National Institute of Statistics (INE in Spanish)
		Disability-adjusted life year	1997–2013	Ministry of Health
		Percentage of Overweight and obesity in children	1990–2015	CASEN
5	Subjective social welfare	Trust Variables	2003, 2006, 2009, 2012[a]	National Survey of Youth (INJUV in spanish)
		Discrimination variables		INJUV

(*continued*)

	Factor	Variable	Period	Data
			2003, 2006, 2009, 2012	
6	Safety	Cocaine use	1994–2014	National Service for the Prevention and Rehabilitation of Drug and Alcohol Consumption (SENDA in Spanish)
		Teen crime rate	2007–2013	Annual Report of Prosecutor General's Office.
		Rate of domestic violence	2007–2013	Annual Report of Prosecutor General's Office.
		Crime rate greater social connotation	2005–2014	Undersecretary of Crime Prevention - Ministry of the Interior and Public Security
		Feeling safe streets	200–2013	Citizen Security Survey
7	Subjective individual welfare	Life satisfaction	1990–2015	CASEN
8	Citizen participation	Citizen participation	1990–2015	CASEN
9	Green Areas	Square meters of green areas per inhabitant	2002–2014	Municipalities information system (SINIM in spanish)
10	Clean air (Air pollution)	MP10 ton/year	2005–2014	Ministry of Environment
		MP2.5 ton/yeat	2005–2014	Ministry of Environment
		Carbon Monoxide (CO) ton/año	2005–2014	Ministry of Environment

[a] In order to generate an index until 2013. We duplicate the 2012 INJUV data to 2013.

Annex 2. Factors

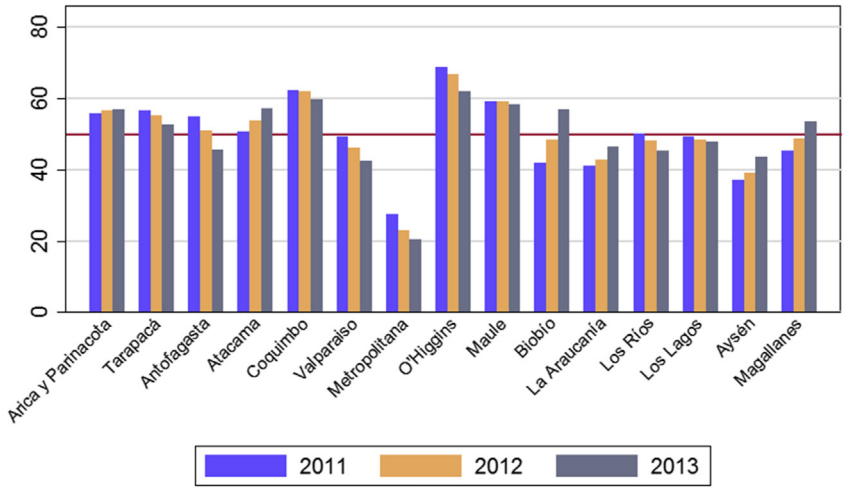

Fig. 7. Inequality (Equality).
Source: Own elaboration.

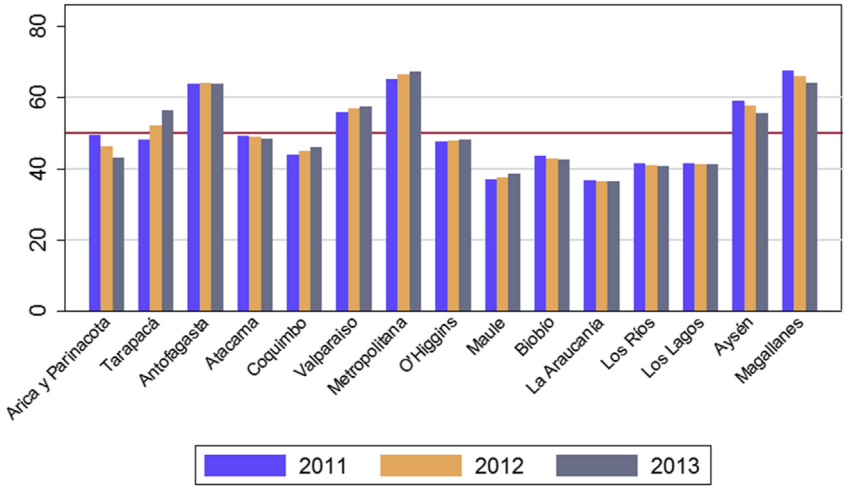

Fig. 8. Housing Resources.
Source: Own elaboration.

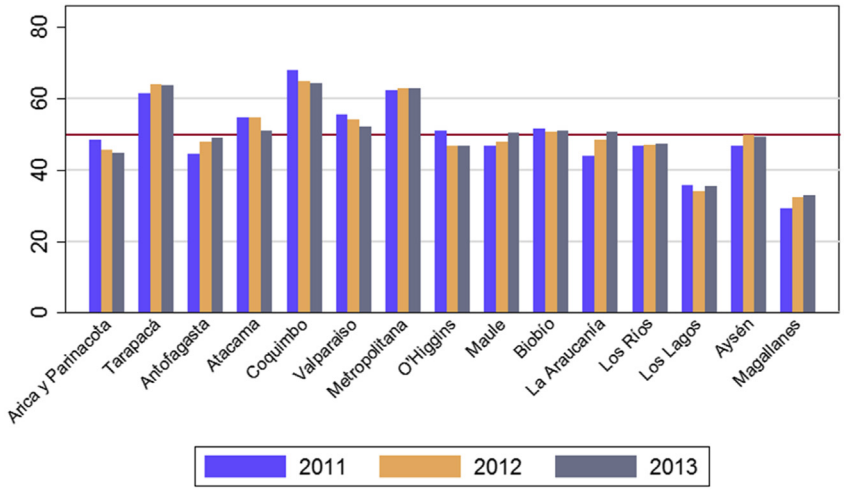

Fig. 9. Health.
Source: Own elaboration.

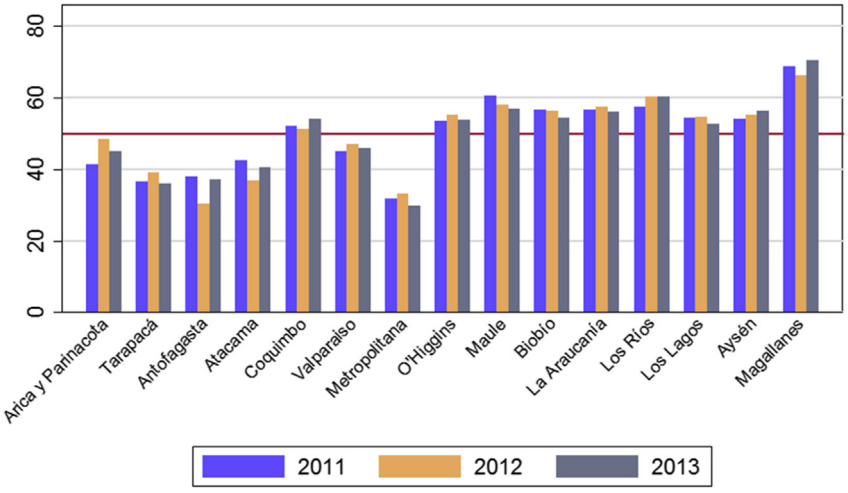

Fig. 10. Safety.
Source: Own elaboration.

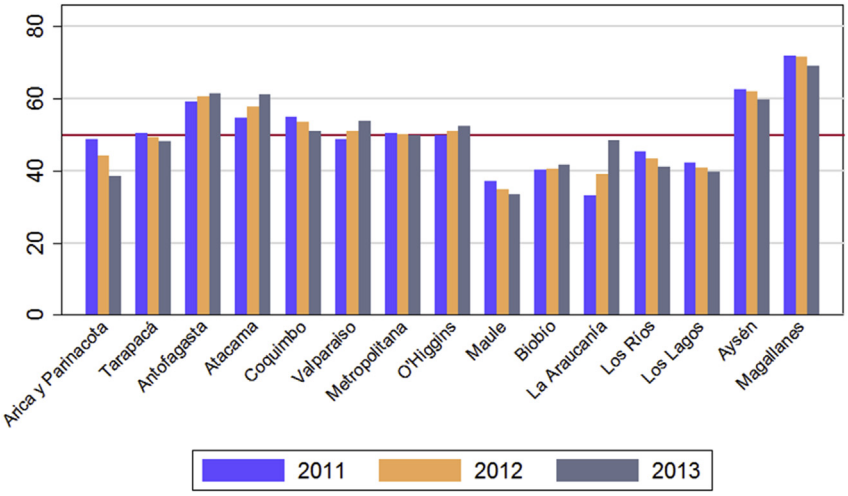

Fig. 11. Subjective individual well-being.
Source: Own elaboration.

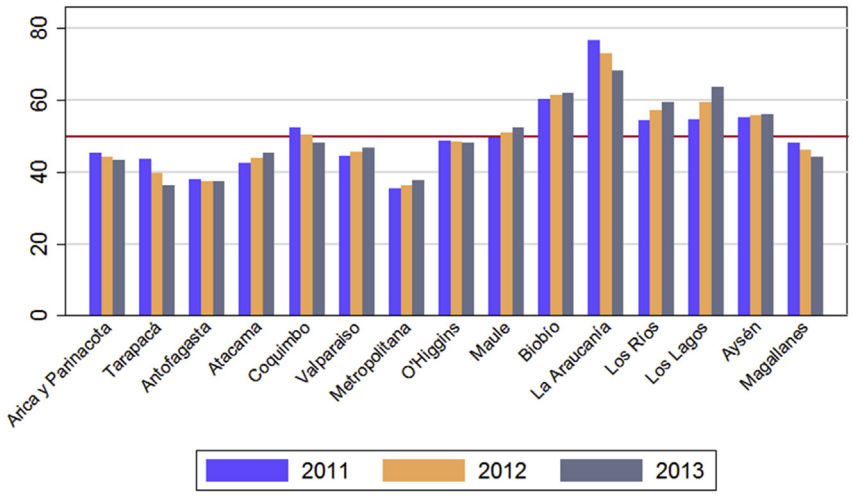

Fig. 12. Participation.
Source: Own elaboration.

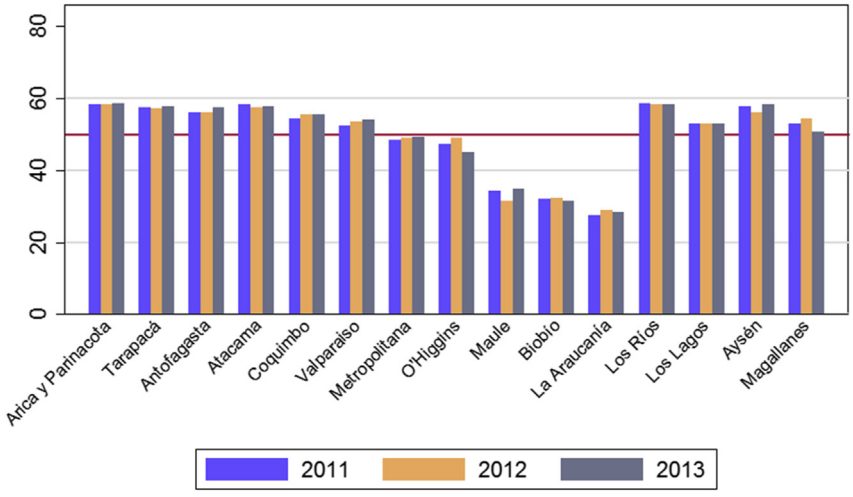

Fig. 13. Air Pollution (Clean air).
Source: Own elaboration.

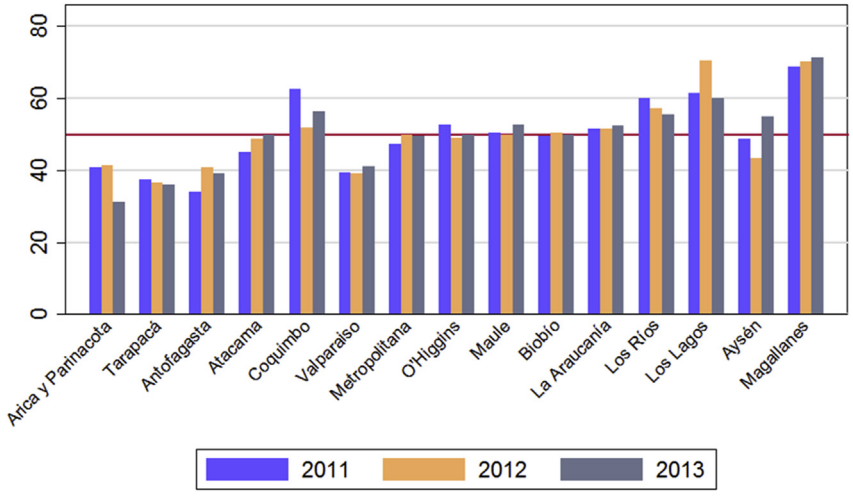

Fig. 14. Green Areas.
Source: Own elaboration.

References

Alkire, S. (2008). *Concepts and measures of agency. Queen elizabeth house*. University of Oxford.

Alkire, S., & Foster, y J. (2009). *Counting and multidimensional poverty measurement. OPHI working paper 32*. The Oxford Poverty and Human Development Initiative (OPHI) – Oxford Department of International Development – Queen Elizabeth House, University of Oxford.

Alkire, S., & Foster, y J. (2010). *Designing the inequality-adjusted human development index (HDI). Human development research working paper* (Vol. 28). Nueva York: PNUD-HDRO.

Anand, P., Hunter, G., Carter, I., Dowding, K., Guala, F., & van Hees, M. (2009). The development of capability indicators. *Journal of Human Development and Capabilities, 10*(1), 125–152. marzo.

Anderson, R. (2014). *Human suffering and quality of life: Conceptualizing stories and statistics*. forthcoming Springer.

Andrews, F. M., & Withey, S. B. (1976). *Social indicators of well-being. Americans' percepctions of life quality*. New York: Plenum Press.

Banzhaf, E., de la Barrera, F., Kindler, A., Reyes-Paecke, S., Schlink, U., Welz, J., et al. (2014). A conceptual framework for integrated analysis of environmental quality and quality of life. *Ecological Indicators, 45*, 664–668.

Blomquist, G. (2006). Measuring quality of life. In Richard J. Arnott, & D. P. McMillen (Eds.), *A companion to urban economics*. Malden: Blackwell Publishing.

Blomquist, G. C., Berger, M. C., & Hoehn, J. P. (1988). New estimates of quality of life in urban areas. *American Economic Review, 78*, 89–107.

Bok, D. (2010). *The politics of happiness. What governments can learn from the new research on well-being*. Princeton: Princeton University Press.

Campbell, A., Converse, P. E., & Rodgers, W. L. (1976). *The quality of American life: Perceptions, evaluations, and satisfactions*. Russell Sage Foundation.

Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper and Row.

Cummins, R. A. (2000). Objective and subjective quality of life: An interactive model. *Social Indicators Research, 52*(1), 55–72.

Delmelle, E., Thill, J. C., & Wang, C. (2016). Spatial dynamics of urban neighborhood quality of life. *The Annals of Regional Sciences, 56*, 687–705.

Diener, E., & Suh, E. (1997). Measuring quality of life: Economic, social, and subjective indicators. *Social Indicators Research, 40*, 189–216.

Dunning, H., Williams, A., Abonyi, S., & Crooks, V. (2008). A mixed method approach to quality of life research: A case study approach. *Social Indicators Research, 85*(1), 145–158.

Eastertlin, R. A. (1974). Does economic growth enhance the human lot? Some empirical evidence. In P. A. David, & M. Reder (Eds.), *Nations and households in economic growth: Essays in honor of moses abramowitz* (pp. 89–125). New York: Academic Press.

Evans, S., & Huxley, P. (2002). Studies of quality of life in the general population. *International Review of Psychiatry, 14*(3), 203–211.

Frey, B., & Stutzer, A. (2012). The use of happiness research for public policy. *Social Choice and Welfare, 38*(4), 659–674.

González, P., Güell, P., Márquez, R., Godoy, S., Orchard, M., Castillo, J., et al. (2012). *Bienestar subjetivo: El desafío de repensar el desarrollo. Informe sobre el desarrollo humano en Chile 2012*. Santiago.

Gough, I., & McGregor, J. A. (2007). *Wellbeing in developing countries: From theory to research*. Cambridge University Press.

Grzeskowiak, S., Sirgy, M. J., & Widgery, R. (2003). Residents' satisfaction with community services: Predictors and outcomes. *Journal of Regional Analysis and Policy, 33*(2), 1–36.

Jiménez, WiG., & González, J. (2014). *Calidad de vida urbana: Una propuesta para su evaluación*. Revista de Estudios Sociales No. 49, Agosto.

Kahneman, D., & Krueger, A. (2006). Development in the measurement of subjective wellbeing. *Journal of Economic Perspectives, 20*(1), 3–24.

Kahneman, D., Krueger, A., Schkade, D., Schwarz, N., & Stone, A. (2004). A survey method for characterizing daily life experience: The day reconstruction method (DRM). *Science, 306*(5702), 1776–1780.

Keyes, C. (1998). Social well-being. *Social Psychology Quarterly, 61*, 121–140.

Ko, M. C., & Choi, S. O. (2015). The effects of community quality of life on local policy decisions. *Applied Research Quality Life, 10*, 667–687.

Lambiri, D., Biagi, B., & Royuela, V. (2007). Quality of life in the economic and urban economic literature. *Social Indicators Research, 84*(1), 1–25.

Land, K. C. (1996). Social indicators and the quality of life: Where do we stand in the mid-1990s? *SINET, 45*, 5–8.

Layard, R. (2006a). Happiness and public policy: A challenge to the profession. *The Economic Journal, 116*(510), C24–C33.

Layard, R. (2006b). The case for psychological treatment centres. In *BMC, 332* pp. 1030–1032). British Medical Association, 7548.

Loewe, N., Bagherzadeh, M., Araya-Castillo, L., Thieme, C., & Batista-Fogue, J. (2014). Life domain satisfactions as predictors of overall life satisfaction among workers: Evidence from Chile. *Social Indicators Research, 118*, 71–86.

Marans, R. W. (2015). Quality of urban life & environmental sustainability studies: Future linkage opportunities. *Habitat International, 45*, 47–52.

Marans, R. W., & Stimson, R. J. (2011). *Investigating quality of urban life: Theory, method, and empirical research*. Dordrecht, The Netherlands: Springer Publishing.

Martín, J. C., & Mendoza, C. (2013). A DEA approach to measure the quality-of-life in the municipalities of the canary islands. *Social Indicators Research, 113*, 335–353.

McCrea, R., Shyy, T.-K., & Stimson, R. (2006). What is the strength of the link between objective and subjective indicators of urban quality of life? *Applied Research in Quality of Life, 1*(1), 79–96.

McCrea, R., Stimson, R., & Western, J. (2005). Testing a moderated model of satisfaction with urban living using data for Brisbane-South East Queensland, Australia. *Social Indicators Research, 72*(2), 121–152.

Michalos, A. C., & Zumbo, B. D. (1999). Public services and the quality of life. *Social Indicators Research, 48*(2), 125–156.

Mohan, J., & Twigg, L. (2007). Sense of place, quality of life and local socioeconomic context: Evidence from the survey of english housing, 2002/03. *Urban Studies, 44*(10), 2029–2045.

Moro, M., Brereton, F., Ferreira, S., & Clinch, J. P. (2008). Ranking quality of life using subjective well-being data. *Ecological Economics, 65*, 448–460.

Murgaš, F., & Klobučník, M. (2016). Municipalities and regions as good places to Live: Index of quality of life in the Czech Republic. *Applied Research Quality Life, 11*, 553–570.

Naude, W., Rossouw, S., & Krugell, W. (2009). The non-monetary quality of city life in South Africa. *Habitat International, 33*, 319–326.

Nussbaum, M. (2000). *Women and human development: The capability approach*. Cambridge: Cambridge University Press.

OECD. (2008). *Handbook on constructing composite indicators*. Paris: Methodology and User guide.

Palma, J. G. (2014). Has the income share of the middle and upper-middle been stable around the '50/50 Rule', or has it converged towards that level? The 'Palma Ratio' Revisited. *Development and Change, 45*, 1416–1448.

Popper, K. (1956). *The open society and its enemies*. New Jersey: Princeton University Press.

Rappaport, J. (2009). The increasing importance of quality of life. *Journal of Economic Geography, 9*, 779–804.

Rawls, J. (1971). *A theory of justice. Cambridge MA*. Harvard University Press.

Roback, J. (1982). Wages, rents, and the quality of life. *Journal of Political Economy, 90*, 1257–1278.

Rosen, S. (1979). Wage-based indexes of urban quality of life. In P. Miesziowslu, & M. Straszheim (Eds.), *Current issues in urban economics* (pp. 74–104). Baltimore, MD: Johns Hopkins University Press.

Samuelson, P. A. (1938). A note on the pure theory of consumer's behaviour. *Economica, 5*(17), 61–71.

Schnettler, B., Denegri, M., Miranda, H., Sepúlveda, J., Orellana, L., Paiva, G., et al. (2015). Family support and subjective well-being: An exploratory study of university students in southern Chile. *Social Indicators Research, 122*, 883–864.

Seik, F. T. (2000). Subjective assessment of urban quality of life in Singapore (1997-1998). *Habitat International, 24*(2000), 31–49.

Sen, A. (1987). *Gender and cooperative conflicts*. Helsinki: World Institute for Development Economics Research.

Sen, A. (2008). The economics of happiness and capability. *Capabilities and Happiness*, 16–27.

Sen, A. (1980). Equality of what?. In *Tanner lectures on human values* (Vol. 1) Cambridge: Cambridge University Press.

Sen, A. (2009). *The idea of justice*. Cambridge MA: Harvard University Press.

Sen, A. (1993). Positional objectivity. *Philosophy & Public Affairs, 22*(2), 126–145. Spring.

Sen, A. (1998 January). Mortality as an indicator of economic success and failure. *The Economic Journal, 108*(1), 1–25.

Sharpe, A., & Andrews, B. (2012). *An Assessment Of Weighting Methodologies For Composite Indicators: The Case Of The Index Of Economic Well-being*. CSLS Research Report No. 2012-10, December 2012.

Stiglitz, J., Sen, A., & Fitoussi, J. (2008). *Report by the commission on the measurement of economic performance and social progress*.

Thaler, R., & Sunstein, C. (2008). *Nudge. Improving decisions about health, wealth, and happiness*. New York: Penguin.

Türksever, A. N. E., & Atalik, G. (2001). Possibilities and limitations for the measurement of the quality of life in urban areas. *Social Indicators Research, 53*(2), 163–187.

UNDP. (2010). *The real wealth of nations: Pathways to human development. Human Development Report 20th Anniversary edition*. New York: Palgrave MacMillan.

WHOQOL Group. (1995). The world health organization quality of life assessment (WHOQOL): Position paper from the world health organization. *Social Science and Medicine, 41*(10), 1403–1409.

WHOQOL-Old Group. (2005). Development of the WHOQOL-Old module. *Quality of Life Research, 14*(10), 2197–2214.