

Measuring well-being:

A *Buen Vivir* (living well) indicator for Ecuador¹

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Abstract

Buen Vivir (*Living Well* in English) is a concept that breaks traditional paradigms. The central idea which underpins this philosophy is the balanced relationship between people and their community and natural surroundings. In other terms, it is based on enjoying human rights responsibly while respecting common goods within the context of a harmonious coexistence. The present study explores this idea to measure well-being in Ecuador, one of the countries where this concept was first introduced. The multidimensional nature of *Buen Vivir* involves a great deal of complexity when conducting analyses from a holistic perspective, which is the reason empirical studies on this issue are quite scarce. In the present work, an indicator is constructed by weighing different sub-indicators of well-being, such happiness and life satisfaction, trust and satisfaction with government and community, security, physical housing characteristics and environmental concern. For this purpose, individual data on the Ecuadorian population were analyzed in the period 2014-2016. The results reveal an average national indicator of 68 over 100, which could be considered relatively good. The highest levels are found in security, housing characteristics and happiness. This study also explores the heterogeneity among provinces, regions and urban/rural areas, and how *Buen Vivir* is related to individual characteristics. It shows that, rather than considering the well-being of people to be merely income-dependent, economic policies should take into account other aspects related to *Buen Vivir*, such as the protection of the environment and people's traditional livelihoods.

Keywords: *Buen Vivir*, Well-being measure, Social indicators, Ecuador.

JEL: I15, I31, I32

1. Introduction

Market economies that dominate most worldwide production structures are based on models of infinite growth, which lead to overexploitation of natural resources and the generation of economic and social inequalities within and between countries (Aristizábal-Ramírez et al., 2015; Castell-Quintana and Royuela, 2014; Van Gelder, 2013). In contrast, development can

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be seen as a process of expanding human capabilities and the real freedoms that people enjoy. (Sen, 1999).

Accordingly, development indicators have evolved over time. The first approximation mainly focused on monetary measures, such as income. However, at present, this approach is hardly realistic as income is not necessarily directly linked to development nor specifically to human development (Neumayer, 2003). From this perspective, new ideas have been introduced to observe and measure the concept of development and well-being, which goes beyond the traditional perspective of income accumulation and incorporate social and environmental aspects (Athanasoglou, 2015; Calcagnini and Perugini, 2019). Thus, the current academic debate has focused on analyzing and measuring well-being under an approach that considers the human being as the main aspect of development.

The Stiglitz-Sen-Fitoussi Commission is a good example of how the social point of view of indicators has changed. Formed in 2008, this commission was comprised of a high level expert group whose goal was to identify an optimal measurement of economic performance and social progress to achieve better quality of life. In this sense, new indicators have emerged to approach well-being and development from a broader perspective, considering social objective measures, e.g., Human Development Index (HDI), the Happy Planet Index, the Better Life Index, Canadian Index of Wellbeing, or the Index of Sustainable Economic Welfare (Calcagnini and Perugini, 2019; OECD, 2008; Phelán and Guillén, 2012). Similarly, and following the ideas of Sen (1999) on inequality capabilities, Alkire (2007) also emphasizes poverty as a deprivation of capabilities, while Burchi et al. (2018) use the constitutional approach to define the dimensions of well-being. In contrast, Robeyns (2003) analyzes gender inequality in Western societies and shows that women are worse off than men in some dimensions. Furthermore, there is currently a new trend of social well-being indicators which can include multiple dimensions (e.g., psychological, ecological, socio-economic), can utilize objective or subjective variables or both and can use individual and aggregated data (Alaminos, 2012; Alkire, 2007; Arias and Phélan, 2016; Burchi et al., 2018). *Buen Vivir* is one of these new concepts.

Buen Vivir (Sumak Kawsay in Kichwa, and Living Well in English, BV) is introduced in the early 2000s as a development goal in South American countries like Ecuador and Bolivia (Acosta, 2013; Alaminos, 2012; Walsh, 2010). BV is believed to have its origins in the traditional philosophy of indigenous native American tribes of the Amazon and Andean Highland areas, where these people live in harmony with nature and their local community (Guardiola and García-Quero, 2014). BV goes beyond economic values that are generally quantifiable. It is defined as a particular concept of life that differs from the economic view of well-being and poverty in terms of income and is more related to relational and environmental aspects of life (García-Quero and Guardiola, 2017).

This study is focused on BV in reference to Ecuador. This concept was selected because, unlike other human development indicators mentioned above, BV does not merely address the human being independently, i.e. how people live and grow as individuals. Instead, the latter is measured jointly with its community and its society, and their collective relationship with nature, according to its ancestral origins in Andean countries. Additionally, in Ecuador, BV is introduced as an official political guideline in the Constitution of 2008 (Ecuador Constitution, 2008).

The theoretical consideration of BV has significantly improved in terms of which dimensions should be evaluated. León (2015) suggests several components that capture the harmony concept of this indicator. However, his suggestions present several variables that are difficult to obtain or measure in practice, such as people's quantitative and qualitative deficit, work-life balance, relationships between neighborhoods, no vacation for children, tolerance toward the community and foreigners, among others. Other works have simplified the idea of BV using variables such as health, family relationships, employment, housing, education, free time and nature (Alaminos 2012; Guardiola and García-Quero, 2014; Ramírez, 2011).

In practice, few empirical analyses have measured BV due to the previously-cited difficulties and the scarcity of data (Ramírez, 2011). Only a few studies have been conducted in Ecuador, such as Guardiola and García-Quero (2014) and García-Quero and Guardiola (2017), which explore the relationship between subjective well-being and socioeconomic variables (e.g., income and unemployment) in rural areas; or Arias and Phélan (2016), which focuses on measuring BV as people's quality of life, also in rural areas. Although these approximations do prove interesting, a more in-depth analysis is needed, especially one based on a strong multidimensional perspective.

In this context, the present work aims to fill this gap, introducing an approach to measure development and well-being under the concept of BV. To achieve the main objective, a *Buen Vivir* Indicator (BVI) is proposed which was measured at individual level to explore different well-being components, some of which are subjective, related to environmental concern or relationship with the government and the community, among others. This study also explores the heterogeneity in provinces, regions and urban/rural areas, and how BV is related to personal characteristics.

Results show that Ecuador is performing relatively well as the national BVI is around 68 over 100. However, this result must be treated with caution as it cannot be compared to other countries. The highest levels are found in security, physical housing characteristics and happiness; followed by relationship with the government and the community; and, finally, environmental concern.

The rest of the paper is structured as follows: Section 2 includes a literature review of BV. Section 3 presents the case of study. Section 4 explains the methodology followed and the analysis of the data. Section 5 discusses the results, and Section 6 presents the main conclusions and policy implications.

2. Literature Review

The literature on development and well-being is vast, and the concept of development and its measurement have changed over time. A review of the literature reveals three approaches (Alaminos, 2012; Arias and Phélan, 2016; Phélan, 2011; Phélan and Guillen, 2012): i) Economic progress in terms of production and income accumulation. Thus, only economic terms are considered as indicators of development, such as GDP or GDP per capita. During the 1980s, other aggregated measures were included in GDP, such as investment in capital and depreciation rate. ii) Introduction of social indicators. The most well-known indicator is HDI (introduced in 1990), which expands the measure of development with variables such as health and education. However, only aggregated measures are considered and not individual subjective ones. iii) Indicators that assess people's quality of life in their countries, e.g. Bhutan Index, Happy Planet Index and BV. Since the beginning of the 21st century, subjective variables start to be considered, such as happiness, perception of well-being or life satisfaction, among others.

Within the framework of the latter approach, BV differs from other well-being indicators in that it is more focused on environmental rights and community multiculturalism, as maintained in equilibrium with society (Torrez, 2001). It is based on the balanced relationship between people, their community and nature (García-Quero and Guardiola, 2017).

In the last decade, the concept of BV has gained international visibility (Correa, 2012). Vanhulst and Beling (2014) present a thorough description of the origins of BV and how it appears in the political and academic scene. However, its application and measuring become relevant when it is introduced in the national constitution of Ecuador (2008) and Bolivia (2009), and the National Plan of Development 2007-2010/2009-2013/2013-2017.² Vega

² See the 2008 National Constitution of Ecuador at http://www.asambleanacional.gob.ec/sites/default/files/documents/old/constitucion_de_bolsil

(2014) presents a comparative analysis between the national constitution of Ecuador and the goals of the National Plan of Development. The common objective is to reach BV, but it is not completely defined (Dávalos, 2008; Hidalgo-Capitán and Cubillo-Guevara, 2013, Houtart, 2011; Vanhulst and Beling, 2014) and the concept is still in development (León, 2015). Villalba (2013) and Larrea (2014) consider BV as a conceptualization of development and quality of life that incorporates the idea of harmony and equity with nature. Similarly, García-Quero and Guardiola (2017) believe that BV is a particular concept of life that differs from the economic view of income accumulation and a lack of material goods, focusing more on relational and environmental aspects.

Furthermore, Beling et al. (2018) believe BV is a better conceptualization of what living better means. Although the main actors involved are the communities themselves and the government, from the perspective of BV, members interact in a system categorized as holism and the well-being of the community dominates over the individual. Thus, BV imposes a different perspective from capitalism, in which the market and the individual dominate the ideology. Moreover, BV also believes that culture is the major driving force of history, open to interculturality and diversity, while never forgetting the importance of traditional indigenous knowledge.

Acosta (2011) summarizes the characteristics of BV as harmony among human beings, harmony with nature, public over private interests, focus on the collective without denying the individual, diversity as a universal key, socioeconomic equity, plurinationality and interculturality. However, some researchers consider that there are certain contradictions to be resolved, such as the colonial and institutional presence that differs from the indigenous Andean life system, the extraction of natural resources and the self-definition of government and communities (Guardiola and García-Quero, 2014; Merino, 2016; Radcliffe, 2015).

Cubillo et al. (2016) consider that there are four main lines of thought based on BV ideology (Table 1): i) Indigenous/Culturalism, which is based on the traditional way of living in the Amazon and Andean regions; ii) Ecologism/Post-developmentalism, which focuses on nature and sustainable development; iii) Socialism-Statism/Eco-Marxism, which encourages a more equal distribution of wealth and a change in production systems; and iv) Well-being/Living well, presenting the approach taken by this paper, which is focused on human beings, community and environmental concern.

Table 1. Current lines of thought concerning BV

	(1)	(2)	(3)	(4)
Name	Indigenous	Ecologism	Socialism-Statism	Well-being
Alternative name	Culturalism	Post-developmentalism	Eco-Marxism	Living well
Epistemology	Ancestral Andean-Amazon cosmovision	Post-modern	Modern	Well-being
Terminology	<i>Sumak Kawsay</i> <i>Buen convivir</i> (coexisting well)	<i>Buen vivir</i>	<i>Buen Vivir</i> Well-being	<i>Buen Vivir</i> Well-being
Priorities	Andean Cosmovision (Identity and Spirituality)	Preservation of nature	Human development	Human development

[lo.pdf](http://ftierra.org/index.php/generales/14-constitucion-politica-del-estado) and 2009 National Constitution of Bolivia at <http://ftierra.org/index.php/generales/14-constitucion-politica-del-estado>.

	Communities' self-government/autonomy	Localized social emancipation	Recovery of the state	Minimum of well-being (material and emotionally well-being)
Nature	Widened living community	Biocentrism Strong sustainability	Equity and social justice Tactic/pragmatic (weak) sustainability	Economic sustainability Environmental concern
Relation with development	Alternative to development	Alternative to development	Alternative in development Neo-developmentalism	Alternative to development
Principal agent	People and nationalities	Society	State	Society
Strategies	Communitarian (re)construction	Post-extractivism Collective and participatory transitions	Transformation of the production matrix Endogenous accumulation	Community and nationalities Collective and participatory transitions

Source: Elaborated by the authors based on Villalba-Eguiluz and Etxano (2017).

Guardiola and García-Quero (2014) present a complex political discussion about BV, highlighting the extractive and the conservationist point of view. The former considers the extraction of natural resources as a tool to reduce poverty and inequality in order to achieve BV. It is labelled as “BV socialism” and considers that the income earned from this extraction makes it possible to achieve energy, food and financial sovereignty in the medium and long term, and that any resulting environmental damage can be reduced during the same given period (SENPLADES, 2009). The conservationist perspective directly opposes the extractive view. Columns (1) and (2) in Table 1 refer to the conservationist point of view, while Columns (3) and (4) denote the extractive point of view.

From another perspective, Vega (2016) presents four types of this indicator in Ecuador: urban BV, rural BV, BV of isolated tribes, and BV of nationalities. Although they all feature similarities, such as access to education, health, housing and basic services, they possess certain attributes. For example, rural BV is characterized by the use of traditional agricultural incantations and the promotion of crops and sustainable land, differentiating it from urban BV. Similarly, Guardiola and García-Quero (2014) and García-Quero and Guardiola (2017) explore in rural areas the relationship between subjective well-being and socioeconomic variables, such as income and unemployment. Results show that socioeconomic variables are related to subjective well-being, but they do not imply happiness.

A review of the literature reveals that hardly any attempts have been made to measure BV. León (2015) presents a long list of variables that are difficult to estimate in practice, such as people’s quantitative and qualitative deficit, improvement of slums, handling of waste and toxic waste, work-life balance, unpaid domestic work, safe access to work risks, among many others. However, the measurement of BV is considered a multidimensional idea that captures objective and subjective variables of the individual.

In this line, some empirical studies measuring BV present these kinds of approximations, such as Ramírez (2011) and García-Quero and Guardiola (2017), who measure BV as human

happiness, and Guardiola and García-Quero (2014), who consider life satisfaction. Arias and Phélan (2016) and Vega (2016) focus on measuring the rural BV as variables of work and agricultural production support. Alaminos (2012) applies the idea of BV to Europe through subjective well-being approaches, such as personalities, achievements, altruism, economic situation and employment, education and intellectual development, health and nutrition, infrastructure, interpersonal relationships, civic life, spiritual or religious activities and environment, and each of these approaches features different subdimensions. Arroyo (2014) compares Ecuador in an international context through the happiness indexes of Beenhover, HDI and GDP per capita, showing that although happiness is certainly related to economic growth, it is not exclusively explained by the idea of economic growth as an absolute goal. All these approximations do not greatly differ from the measures applied in the general framework of well-being (Calcagnini and Perugini; 2019; OECD, 2008, 2011, 2013; Podova and Pishniak, 2017).

3. The Case Study

As previously explained, this study focuses on Ecuador, located in South America between Colombia and Peru. Its current total population is 17 million (2019), and the administrative divisions are Provinces, Cantons and Parishes, which are either urban or rural. Also, Ecuador has four natural divisions: coastal region, Andean-highlands region, Amazon region and Insular region (Galapagos Islands). It has experienced a rapid rate of urbanization and its population is concentrated in the provinces of Guayas and Pichincha (Obaco and Díaz-Sanchez, 2018; Royuela and Ordoñez, 2016).

Ecuador is considered a developing country with high inequality and low economic activity, with gaps in gender, ethnicities and regions (Matano et al., 2018). Moreover, this country was dollarized after a severe economic crisis in 1999. The HDI was 0.76 in 2018, which is considered high. Nevertheless, the OECD places it among the last positions of the Economic Complexity Index (ECI), which measures the economic performance of countries. As for other ratings, it also has a Gini index of 0.48³. Ecuador introduced BV in its national constitution and development plans, but very few empirical approximations have been performed for the purpose of measuring these aspects.

4. Methodology and Data

For the purpose of developing an indicator for Ecuador, the present study followed the guidelines of the OECD (2008), which recommend using individual data to more properly address well-being. ENEMDU surveys (*Encuesta Nacional de Empleo, Desempleo y Subempleo*) were used. They are designed to analyze labor market variations and are taken quarterly, but in recent years these surveys have included a wide range of variables, such as environment, security, housing and life satisfaction.⁴ These surveys are representative at national, provincial, regional and urban/rural levels. The period analyzed was 2014 to 2016, as the surveys for said years maintained the same questions. The Insular region is not considered in the analyses due to data availability. The database contained 63,187 people (nationals and foreigners) living in Ecuador.

The BV general framework is shown in Figure 1. Following the constitutional conceptualization of BV (Ecuador Constitution, 2008:15), three main components are defined (León, 2015): Human being, Community and Environmental concern. These main components are based on both objective and subjective individual and household variables.

³ See <http://hdr.undp.org/en/countries/profiles/ECU> ,
<https://www.indexmundi.com/es/datos/ecuador/%C3%ADndice-de-gini>

⁴ The databases are available in <http://www.ecuadorencifras.gob.ec/institucional/home/>

Fig. 1 Conceptualization of the idea of BV



Source: Elaborated by the authors based on León (2015).

Accordingly, the construction of a *Buen Vivir* Indicator (BVI) was based on a multiple weighted linear combination of different components, or sub-indicators (Athanasoglou, 2015; Decanp and Lugo, 2013), as shown in the following equation:

$$BVI = (0.15 * HA + 0.19 * T + 0.19 * S + 0.19 * HO + 0.28 * EN) * 100 \quad (1)$$

Where:

HA = Happiness and life satisfaction of the individual.

T = Trust and satisfaction with the government and community.

S = Security of the individual.

HO = Physical housing characteristics.

EN = Environmental concern of the individual.

The *HA* sub-indicator refers to the human being component in Figure 1, and the *T*, *S* and *HO* sub-indicators represent the community component, while *EN* represents the environmental concern component in the living-well framework. The BVI is expressed as a linear index with principal component analysis (PCA) weights. The PCA analysis is a method that linearly combines observations of possibly correlated variables into a set of values of linearly uncorrelated variables (called principal components). The selection is based on the eigenvalues that concentrated a variance larger than sixty percent or eigenvalues larger than 1 (OECD, 2008; Podova and Pishniak, 2017)⁵. Thus, the weights in the BVI are based on the importance given by the corresponding PCA analysis (Belen et al., 2010; Hallerod, 1994; OECD, 2008; Vyas and Kumaranayake, 2006).

More specifically, each sub-indicator, *HA*, *T*, *S*, *HO*, *EN*, is estimated separately by PCA. Then, the importance given by the eigenvalue larger than one, in each analysis, is the indicator of similarity and the importance for each sub-indicator. The variance captured by these sub-indicators are 0.4509, 0.5716, 0.5546, 0.5471, and 0.8196, respectively. These weights are summed and the ratio between the variance of each sub-indicator and the total accumulated variance gives the importance for the final BVI. Thus, the larger weight is given by *EN* (environmental concern), followed by the community component sub-indicators, since coexistence with nature, firstly, and with the community, secondly, are the fundamental aspects in BV, in accordance with the findings of Alaminos (2012), García-Quero and Guardiola (2017) and Guardiola and García-Quero (2014). The final BVI is represented between 0 and 100. Table 2 shows all the variables used to calculate each sub-indicator of the BVI.

⁵ The first eigenvalue that concentrates both properties is used, as it generally presents the largest variance concentration. A data driven approach is followed, as it is more objective than considering equal or arbitrary weights (Alkire and Foster, 2011; Alkire and Santos, 2014; Decanq and Lugo, 2010; Machado et al., 2014).

Table 2. BV sub-indicators

	Variables	Description
HA =	<i>Happiness and life satisfaction of the individual</i>	
+	Work satisfaction	10 categories
+	Health	10 categories
+	Housing	10 categories
+	Free time	10 categories
+	Environment	10 categories
+	Education	10 categories
+	Government	10 categories
+	Life	10 categories
T =	<i>Trust and satisfaction with the government and community</i>	
+	Justice	3 categories
+	Public institutions	3 categories
+	Community	5 categories
+	Trust in police	10 categories
+	Public infrastructure	10 categories
S =	<i>Security of the individual</i>	
+	Car	Dummy: Y=0/N=1
+	House	Dummy: Y=0/N=1
+	Automobile parts	Dummy: Y=0/N=1
-	Crime	Discrete variable
HO =	<i>Physical housing characteristics</i>	
+	Access to the household	4 categories
+	Type of household	6 categories
+	Roof materials	5 categories
+	Wall materials	7 categories
+	Floor materials	6 categories
+	Quality of the roof	3 categories
+	Quality of the wall	3 categories
+	Quality of the floor	3 categories
+	Electricity	4 categories
+	Pipe water	4 categories
+	Water service	6 categories
+	Trash collector	4 categories
+	Sewage	5 categories
-	Overcrowding	Dummy: =1 if there are more than 3 people per room/= 0 if not
EN=	<i>Environmental concern (Recycling)</i>	
+	Organic waste	Dummy: Y=1/N=0
+	Paper	Dummy: Y=1/N=0
+	Plastic	Dummy: Y=1/N=0
+	Glass	Dummy: Y=1/N=0

Note: *+/- correlation with the indicator.

Source: Elaborated by the authors based on ENEMDU.

Happiness and life satisfaction of the individual (HA) was measured using different variables related to work, health, housing, free time, environment, education, government and life, where 10 was the maximum of happiness and satisfaction and 0 the minimum. Only one component was obtained, which accounted for approximately 45% of the total variance.

Trust and satisfaction with the community (T) was measured based on justice, public institutions, community, policy and public infrastructure. A variety of perceptions of institutions was found, ranging from the best to the worst. Two components accounted for 55% of the total variance. The average and the median of the sub-indicator were both around 0.5; thus, there is very little variation in the opinions of citizens, even when comparing areas, provinces or regions.

Security of the individual (S) is based on how many times a person has been a victim of a crime, such as home burglary, car theft or theft of part of a car and whether they have been robbed in the last year. Two components were obtained which accounted for 55% of the variance. Only about 3% of the individuals declared to be victims of robberies in homes or vehicles, and 7% were victims of other types of crimes. Consequently, this security sub-indicator has high values on average.

Physical housing characteristics (HO) is the last component, and it measures housing characteristics using dummies which indicated ease of access to the house itself, type of house, materials and conditions of the house in terms of the roof, walls and floors, types of access to electricity, type of plumbing, public water access, trash collection service, sewage system and overcrowding. Three main components were extracted for the construction of this indicator, the three represent the different components of the variables, accounting for approximately 60% of the total variance: the first component 37%, the second 12% and the third 9%. All three were used to weigh the final household value in this indicator. An average of 0.77 and a median of 0.80 indicate that, on average, citizens live in decent housing in Ecuador.

Environmental concern (EN) captures the interest of people for the environment. The variables considered are related to recycling, and they were determined using dummies which indicated whether individuals recycled organic, paper, plastic and glass (1) or not (0). The PCA indicated that only one component with an eigenvalue greater than or equal to 1 was obtained, which accounted for approximately 82% of the variance of the recycling questions.

Finally, personal characteristics were also explored: gender, age, education, ethnicity, number of members of the household, rural area and province. This analysis is important to observe the relationship of the individual characteristics with the different components of the BVI and heterogeneity across areas (Belen et al., 2010; Gonzáles et al., 2010). For that purpose, a regression model was carried out using *Ordinary Least Squares* (OLS).

5. Results and discussion

First, the results of the BVI and its components are presented at national and provincial level. Next, the BV sub-indicators are explored at provincial, regional and rural/urban level. Finally, the results of the regression model are shown.

5.1. BVI at national and provincial level

Table 3 shows the BVI results. The indicator displays a value around 68 over 100 in the period of analysis. Thus, on average, people in Ecuador are slightly above the indicator's halfway point, and this figure is experiencing a rising trend when evaluating the period from 2014 to 2016, although there is no real significant difference in terms of standard deviation.

Table 3. Evolution of national indicator and sub-indicators of *Buen Vivir*

	2014	2015	2016	Average
BVI	66	69	70	68
+HA	0.70	0.70	0.71	0.70
+T	0.64	0.63	0.63	0.64
+S	0.79	0.79	0.78	0.79
+HO	0.77	0.79	0.81	0.78
+EN	0.49	0.6	0.63	0.61

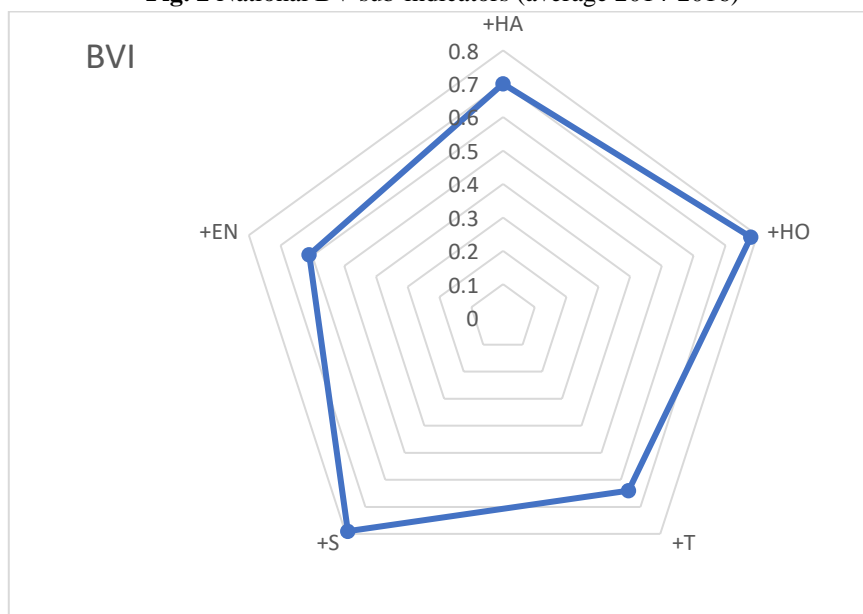
Source: Elaborated by the authors.

Summarizing BVI sub-indicators, HA, the indicator of Happiness and life satisfaction of the individual, is around 0.7 over 1. This indicates that Ecuadorian households are, on average, happy with their life. Housing, HO, and security, S, are the highest, 0.78 and 0.79, respectively, on average. This shows that housing characteristics are relatively good in Ecuador. In security, there are significant differences between males and females as females display a higher percentage of robbery. Finally, S has the highest value, thus, on average, inhabitants in Ecuador feel safe.

The lowest values are obtained for T, Trust and satisfaction with the community, 0.64, and EN, Environmental concern, 0.61. Thus, T and EN are components that need to be improved to reach, at least, the same level as the other components. They also represent the weakest aspects which would need to be improved to increase the well-being of individuals. When analyzing evolution over time, we can observe a rising trend, especially in EN, where there are statistically significant differences. Figure 2 summarizes the structure of the BVI.

If a comparison between the BVI and other measures of development is explored, the correlation with GDP is found to be negative (around 0.49) and there is a stronger positive correlation with the HDI (around 0.80) and the Happiness Index (0.98).

Fig. 2 National BV sub-indicators (average 2014-2016)

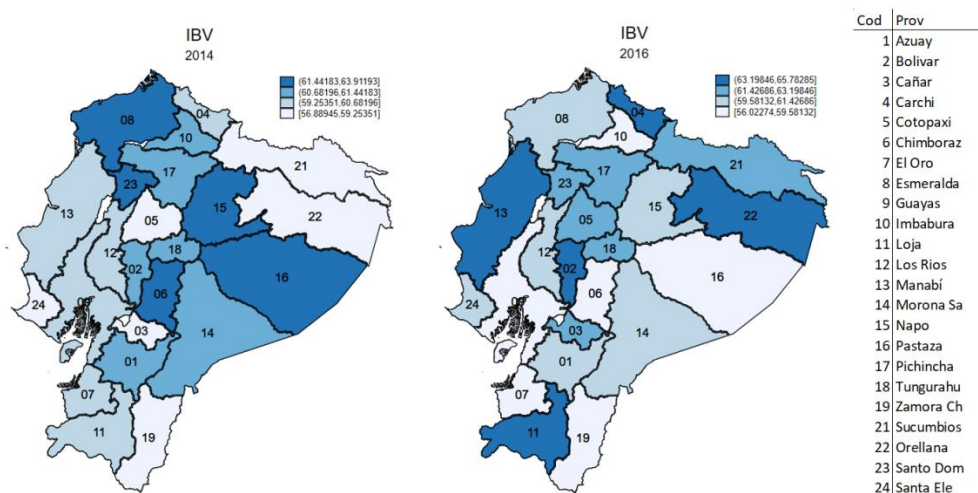


Source: Elaborated by the authors.

An important characteristic of the BVI is disaggregation at provincial level. When the BVI at provincial level is examined, substantial heterogeneity is found. Figure 3 presents the BVI of Ecuadorian provinces in 2014 and 2016.

The most populated provinces, Pichincha (17) and Guayas (09), with more income, do not possess the highest BVI. Instead, poor and small provinces have the highest BVI. These figures again corroborate previous results indicating that well-being is not directly related to income and production (García-Quero and Guardiola, 2017). In order to explore more in depth this spatial distribution, Table A1 in the Appendix presents some descriptive statistics of BVI sub-indicators at provincial level.

Fig. 3 BVI at provincial level

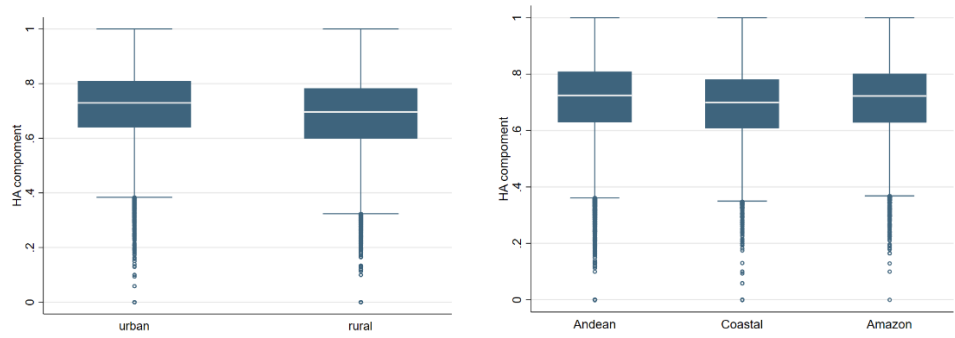


Source: Elaborated by the authors.

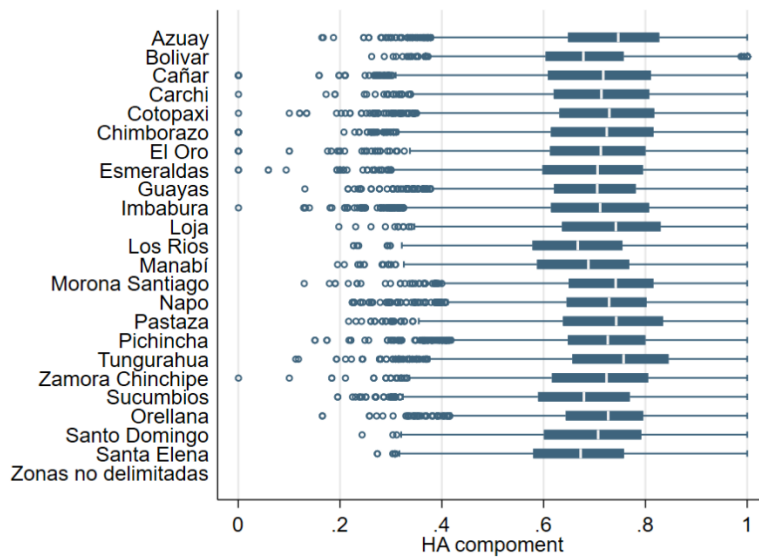
5.2. Exploring BV sub-indicators

Figure 4 shows the boxplot of the HA component—the happiness and life satisfaction sub-indicator. The box plot of HA presents results by urban/rural heterogeneity, by regions and by provinces in Ecuador. HA displays similar distributions among urban and rural areas, but the former have a slightly lower average than the latter, although this difference is not statistically significant. The coastal region is also slightly unhappier and unsatisfied than the Andean and Amazon region, though this is not statistically significant. Similar results are obtained when HA is explored by provinces; though, there are outliers at the beginning of the distribution. These distributions indicate that there are unhappy people in all the disaggregated areas, which usually indicates that individuals are not completely happy and satisfied with their lives.

Fig. 4 Box plot of happiness and life satisfaction in Ecuador
By urban/rural
by regions



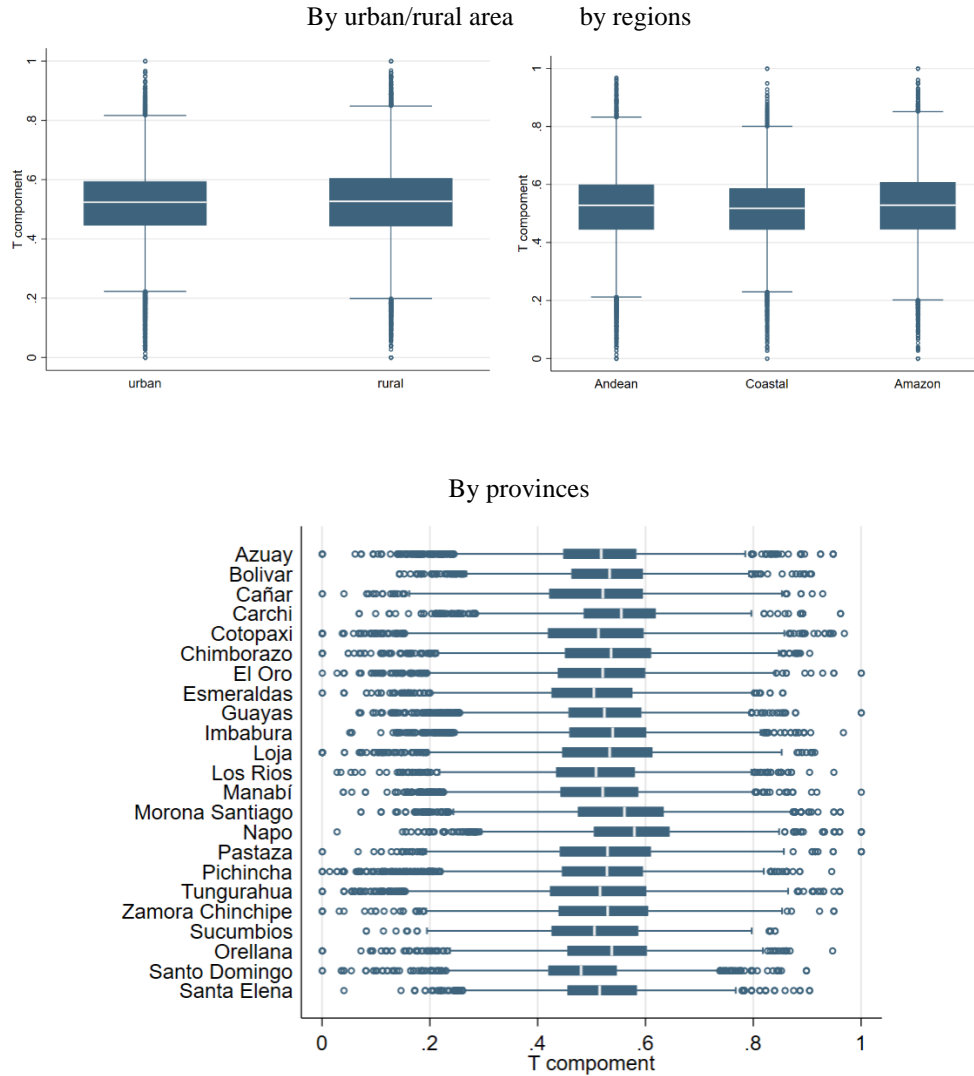
By provinces



Source: Elaborated by the authors.

Trust and satisfaction with the government and community, T component, is similar in urban/rural areas, regions and provinces (Figure 5). Similar to the happiness indicator, people do not completely agree, trust or are satisfied with the government and their community. This distribution is more centered, indicating that on average people are indecisive regarding this point. These results clearly reflect the political climate in Ecuador during the period analyzed, in which around a half of the population was in favor of the government and the other half was against it.

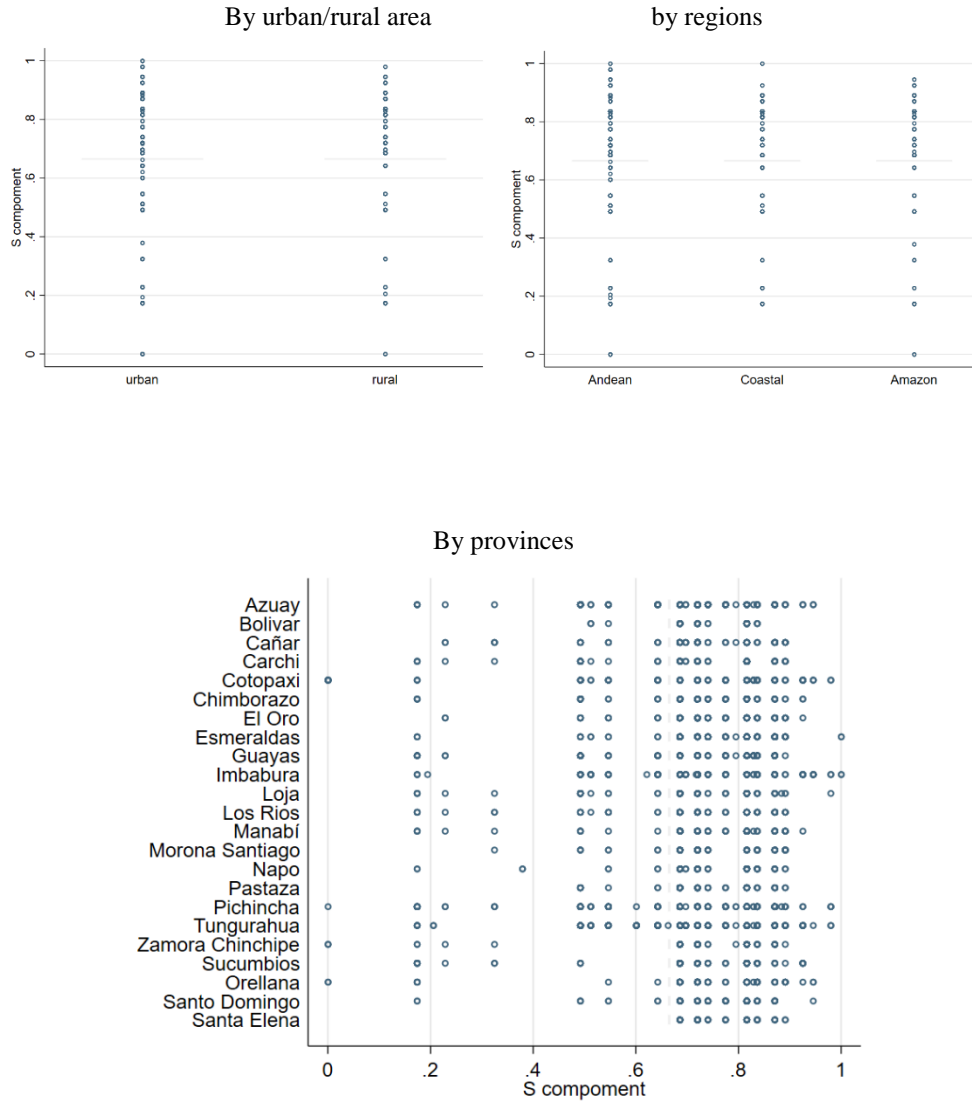
Fig. 5 Box plot of trust in government and community in Ecuador



Source: Elaborated by the authors.

Security is high. The box plot is very flat and there are outliers in the lower tail of the distribution in all cases (Figure 6). These distributions indicate that, on average, people might feel safe in all areas. These results are linked to the fact that very few people have declared to be victims of robberies in houses, but there are differences between males and females, as females have suffered more robberies. Nevertheless, using surveys to quantify this kind of variable may be susceptible to selection bias due to underreporting, causing measuring problems. Consequently, this result should be considered with caution.

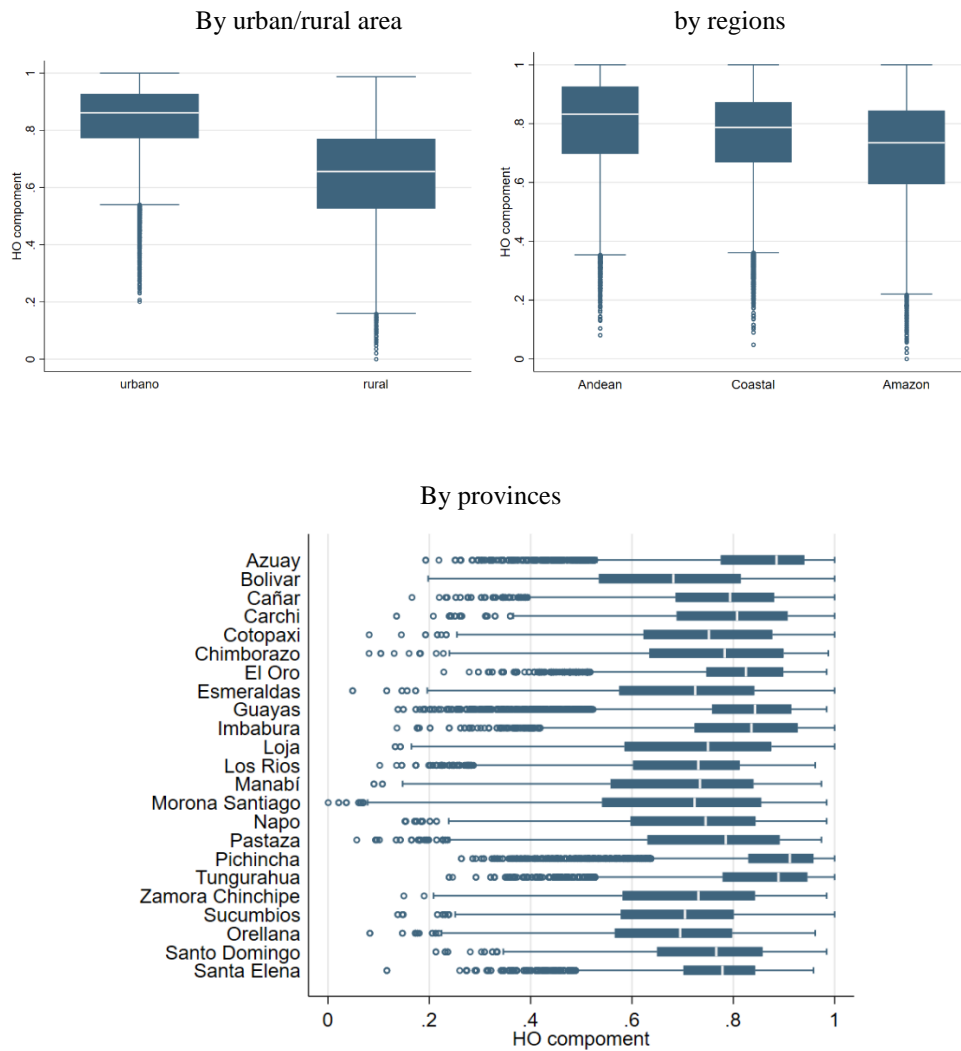
Fig. 6 Box plot of security in Ecuador



Source: Elaborated by the authors.

Figure 7 shows the HO sub-indicator, physical housing characteristics, and displays significant differences between urban and rural areas. Characteristics are much better in urban areas because people have access to better living standards. By regions, the Andean region has the best value, and the Amazon the lowest. By provinces, Pichincha and Azuay are at the top. In short, this indicator reveals the differences between urban and rural areas; for example, cities have better infrastructure. The Andean region has the best houses, which is related to the colonial period when the cities feature buildings with better, long-lasting materials, while in the Coastal and Amazon regions houses are mostly built with weaker, less suitable materials. Moreover, the capital has the best infrastructure, along with several Andean provinces.

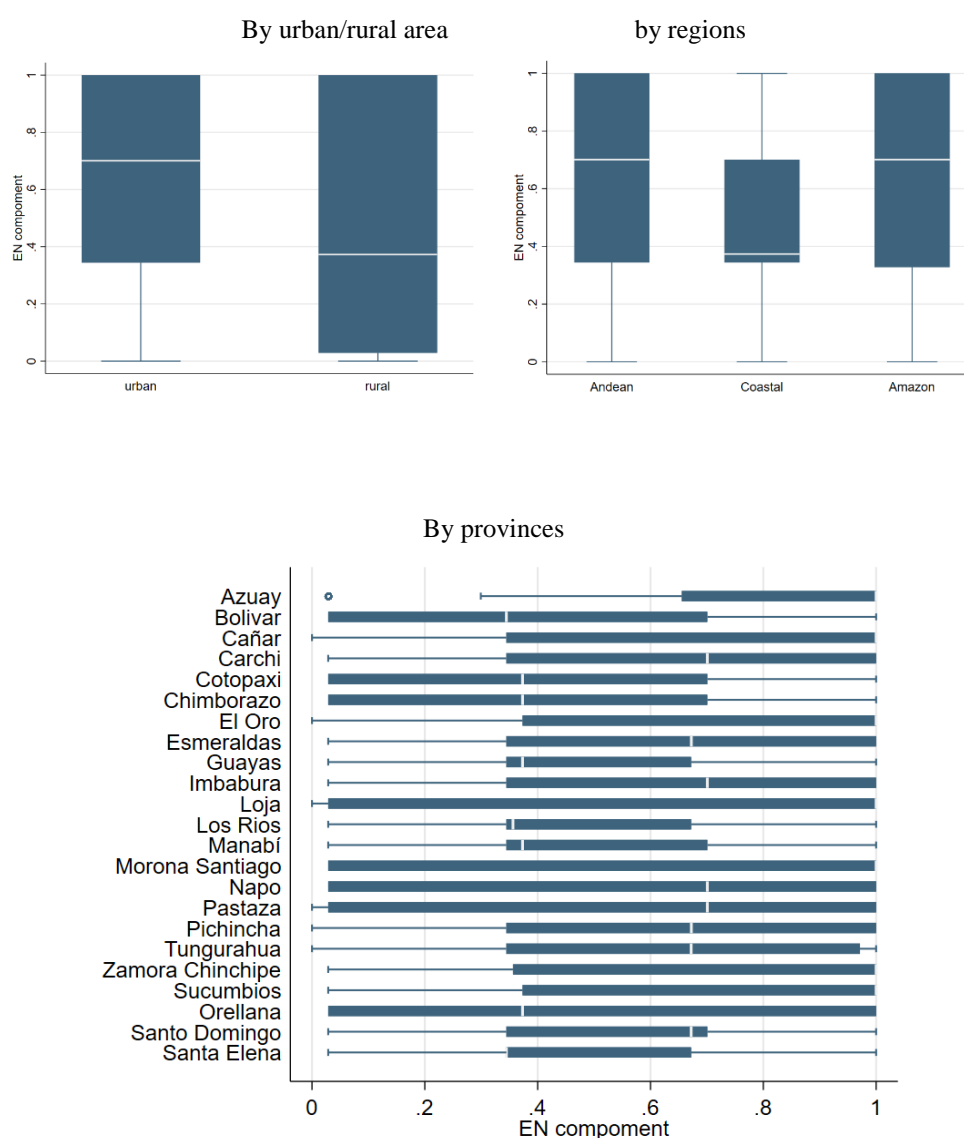
Fig. 7 Box plot of physical characteristics of houses in Ecuador



Source: Elaborated by the authors.

Regarding environmental concern, EN component in Figure 8, it is observed that Ecuadorian citizens recycle more plastic and organic materials than glass and paper. By areas, the urban areas display more environmental concern, with an average of 0.7, while in rural areas this figure is around 0.4. The main explanation is that cities offer more opportunities to recycle than rural areas. By regions, the Andean and Amazon present similar values, while the Coastal region has the lowest level. By provinces, Azuay shows the values which vary the most. This heterogeneity between provinces and regions is due to the differences in the population, budget and regulations that each municipality has in its administrative area. For example, the coastal region displays more problems in their regulations and low education in recycling, while the other two regions possess more regulations in recycling.

Fig. 8 Box plot of environmental concern in Ecuador



Source: Elaborated by the authors.

5.3. Regression model

This subsection presents the results of exploring the relationship between the sub-indicators of the BVI and the socio-economic characteristics of individuals not included in the analysis of PCA (Belen et al., 2010; OECD, 2008). The variables considered are: *gender* (0 if male and 1 if female), *age*, number of *members* of the household, *education* level (0 if none; 1 if only literate; 2 if primary; 3 if secondary; 4 if technical; 5 if university; and 6 if post-university), *ethnicity* (1 if indigenous, 2 if black, 3 if mestizo, 4 if white), *rural area* (0 if urban and 1 if rural), *province* and *year* dummies (García-Quero and Guardiola, 2017; Gonzáles, et al., 2010; Vandemoortele, 2014).

Table 4 presents the descriptive statistics of the main variables. The results indicate that 53% of individuals are females; the average age is 47 years old; the mean household size is around 6 people; the education level is between primary and secondary school; the main ethnic group is mestizo; and around 40% of the sample live in rural areas. Table A2 in the Appendix shows the correlation coefficients of variables.

Table 4. Descriptive statistics

Variable	Mean	Std. Dev.	Min	Max
Gender	0.53	0.49	0	1
Age	47.17	15.89	15	99
Members	5.7	3.57	1	18
Education	3*	1	0	6
Ethnicity	3*	1	1	4
Rural	0.37	0.48	0	1

*is the median.

Source: Elaborated by the authors.

Additionally, the *Lagrange Multiplier Test* was applied. The value obtained for Chi squared (χ^2) showed that the use of *Ordinary Least Squares* (OLS) for random effects model is preferable to the pooled model (pooled OLS). The *F* test for the significance of fixed effects indicated that it is also preferable to use the fixed effects of province and time better than the pooled model without these controls. Then, in order to decide between random and fixed effects, the *Hausman* test was used. The value of “ χ^2 ” exposed that the difference between the coefficients of random and fixed effects is systemic, making it appropriate to use fixed effects of provinces and time⁶. They allow to control for the heterogeneity given by the characteristics of provinces and time. Thus, the following model is estimated (Guardiola and García-Quero, 2014):

$$BV \text{ sub-indicator}_{it} = \alpha_0 + \alpha_1 Gender_{it} + \alpha_2 Age_{it} + \alpha_3 Age * Age_{it} + \alpha_4 Members_{it} + \alpha_5 Education_{it} + \alpha_6 Ethnicity_{it} + \alpha_7 Rural_{it} + \eta_i + \&_t + \varepsilon_{it}, \quad (2)$$

where BV sub-indicator is HA, T, S, HO or EN, respectively; α refers to the estimated coefficients; the variable η_i measures non observed individual effects specific to each province but constant in time; $\&_t$ gives non observed temporal effects that are variable in time but identical to all provinces; and ε_{it} is the error term. Table 5 presents the *OLS* estimation results. Column (1) is the regression of the HA sub-indicator, Column (2) is the regression T sub-indicator, while Column (3) is the S sub-indicator, Column (4) and Column (5) are the regression of the HO and EN sub-indicator.

Table 5. Regression model of BV sub-indicators on personal characteristics

Variable	BV sub-indicators				
	(1) HA	(2) T	(3) S	(4) HO	(5) EN
Gender	-0.005*** (0.001)	-0.001* (0.001)	0.0001 (0.0003)	0.005*** (0.001)	0.001 (0.003)
Age	0.001***	-0.001***	5.46E-06	0.004***	0.002***

⁶ Fixed effects of province and time are significantly different from zero at 99% of confidence. The standard errors are robust to the presence of heteroscedasticity. It was also validated to the bootstrapping standard errors based on 200 replicates.

	(0.0002)	(0.0002)	(4.34E-05)	(0.0001)	(0.001)
Age*Age	-1.83e-5***	5.27e-6***	-3.41E-07	-2.85e-5***	-1.30e-5**
	(1.61E-06)	(1.51E-06)	(4.30E-07)	(1.38E-06)	(5.21E-06)
Members	0.0005***	2.29E-05	3.96E-06	-0.0004***	0.001**
	(0.0001)	(0.0001)	(3.46E-05)	(0.0001)	(0.0005)
Education (None as base)					
<i>Literacy</i>	0.022***	0.014***	0.001	0.033***	0.030*
	(0.005)	(0.005)	(0.001)	(0.005)	(0.016)
<i>Primary</i>	0.039***	0.007***	0.001*	0.058***	0.078***
	(0.002)	(0.002)	(0.001)	(0.002)	(0.007)
<i>Secondary</i>	0.072***	0.009***	0.002***	0.113***	0.121***
	(0.002)	(0.002)	(0.001)	(0.002)	(0.008)
<i>Technical</i>	0.116***	0.019***	0.005***	0.150***	0.158***
	(0.005)	(0.004)	(0.001)	(0.004)	(0.013)
<i>University</i>	0.125***	0.012***	0.004***	0.155***	0.152***
	(0.002)	(0.002)	(0.001)	(0.002)	(0.008)
<i>Post-University</i>	0.163***	0.019***	-6.80E-05	0.162***	0.184***
	(0.004)	(0.004)	(0.001)	(0.004)	(0.013)
Ethnicity (Indigenous as base)					
<i>Black</i>	0.014***	-0.007***	-0.001	0.070***	0.064***
	(0.003)	(0.003)	(0.001)	(0.003)	(0.009)
<i>Mestizo</i>	0.021***	-0.008***	-0.0001	0.079***	0.069***
	(0.002)	(0.002)	(0.0004)	(0.001)	(0.005)
<i>White</i>	0.029***	-0.009***	0.001	0.088***	0.061***
	(0.004)	(0.003)	(0.001)	(0.003)	(0.011)
Rural	-0.009***	0.003***	-0.002***	-0.147***	-0.126***
	(0.001)	(0.001)	(0.0002)	(0.001)	(0.003)
Province	included	included	included	included	included
Year	included	included	included	included	included
Constant	0.634***	0.528***	0.668***	0.607***	0.539***
	(0.005)	(0.005)	(0.001)	(0.004)	(0.016)
Observations	63,187	63,187	63,187	63,187	63,187
R-squared	0.117	0.021	0.007	0.49	0.143

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Column (1) of Table 5 shows that females are less happy (HA) than males. Older people are happier than young people until a certain age, after which this level starts to decrease. Also, larger families are associated with being happier, as is higher education. In contrast, the indigenous population is less happy with respect to other ethnicities, as is the rural population with respect to the urban one. These socio-demographic characteristics are only able to explain 12% of the total variance of HA. These results are in line with similar approaches (Guardiola and Garcia-Quero, 2014; Ramírez, 2011).

Column (2) indicates that young, male, educated and indigenous individuals trust (T) and are more satisfied with the government and community. There is no difference between urban and rural areas in this case.

Regarding security (S), Column (3) demonstrates there are no statistical differences between gender, which must owe to the fact that this sub-indicator considers variables related to housing and vehicle. In contrast, younger, more educated people feel more secure, perhaps because their economic situation allows them to live in safer areas and invest in better security systems. Also, rural areas are more secure than urban areas.

Column (4) shows that female and young people display better housing (HO) characteristics. Education is strongly related to better housing as it is connected to income. Housing is better for white, mestizo and black populations (in that order) than indigenous. Furthermore, rural areas possess worse physical housing structures.

Finally, considering environmental concern (EN), in Column (5) it can be seen that females are not statistically different from males. In contrast, environmental concern is higher when the person is older, more educated, not indigenous, and the household has more members and is located in an urban area.

As R-squared indicates, housing (HO) is the BV sub-indicator most dependent on the socio-economic characteristics of people. The other sub-indicators have very low R-squared, as they are the most subjective, and more difficult to represent using socio-demographic characteristics.

6. Conclusions

This paper analyses well-being in Ecuador through the concept of BV and the construction of a *Buen Vivir* Indicator (BVI) based on information at individual and household levels. Thus, a new metric of BV is introduced in which not only quantitative variables of the traditional concept of development are considered, but also qualitative variables not included in the traditional measurement of progress. Thus, public policy can be evaluated according to different aspects. To calculate the BVI, six sub-indicators are used to address the idea of BV: happiness and life satisfaction, physical housing characteristics, trust and satisfaction with the community, security, and environmental concern. They are built using PCA and are weighted to calculate the BVI.

The results indicate that the average national BVI is 68 over 100, displaying a rising trend during the period analyzed. However, there are no statistically significant differences between years. The sub-indicator of Happiness and life satisfaction is on average high, 0.7 over 1, suggesting that households are relatively happy with their lives. However, trust and satisfaction with the community is around 0.64 over 1, indicating that people are happy, regarding the government's performance and their trust of institutions. Security and housing characteristics display relatively good levels of well-being for the Ecuadorian people, these are the highest levels in the BVI. Finally, environmental concern is 0.61 over 100, which indicates the interest of the population in taking care of the environment.

Moreover, high heterogeneity is found among provincial, regional and urban/rural sub-indicators. The provinces with the highest population, Guayas and Pichincha, do not have the highest indicator values. The Andean and Amazonian region possesses better values in most BV sub-indicators. Urban areas display higher levels in environmental concern, economic level and housing characteristics. This heterogeneity is indicative of the characteristics and infrastructures of each region/area, which are aspects that must be considered in Ecuadorian development projects. Therefore, reducing this heterogeneity is a key goal. Through the analysis of personal characteristics, it is mainly observed that ethnicity can be a determining factor when assessing BV. Although it is a multiethnic country, it can be seen that the indigenous group has a different perception of some sub-indices, such as housing and economic performance. However, as the level of education increases, these differences between ethnic groups appear to decrease.

In addition, the findings of this research infer some policy implications. In Ecuador, there are high levels of poverty and inequality, however, evaluating their subjective well-being indicates that they are happy. Thus, monitoring is needed, which might imply obtaining the help of international organizations to reach international standards of living in terms of quality of life; there are still many goals remaining, in terms of all sub-indicators, to reduce the gap between households. The characteristics of the population and all the possible dimensions of life mentioned previously should be taken into account in economic and social policies, as well as among researchers devoted to evaluating the success of such policies in terms of people's *Buen Vivir*. If they are not taken into consideration, policy recommendations may be unsuitable and ineffective. Efficient policies can only be implemented with a proper understanding of the multiple dimensions of a population and what living well means to them.

Finally, this study features some limitations, which could serve as reference for future works. Data from more periods and more observations could be useful for delving deeper into the analysis of well-being in Ecuador and to determine its evolution over time. Additionally, it would be of great interest to calculate BVI in other areas in order to be able to compare results. Furthermore, it could also be beneficial to contrast the provincial values of some sub-indicators with results of political elections. Nonetheless, this work constitutes a first step towards the analysis of well-being in Ecuador based on the idea of *Buen Vivir*, which could also be applied to other countries.

Declarations of interest: none.

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Data availability statement: Data will be made available under reasonable request.

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APPENDIX

Table A1. BV sub-indicators by province (average 2014-2016)

Province	HA		HO		T		S		EN	
	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.	Mean	Std. Dev.
Azuay (1)	0.72	0.13	0.84	0.13	0.64	0.14	0.79	0.07	0.74	0.38
Bolivar (1)	0.68	0.13	0.68	0.17	0.65	0.13	0.80	0.03	0.40	0.37
Cañar (1)	0.70	0.15	0.77	0.14	0.63	0.16	0.79	0.06	0.69	0.40
Carchi (1)	0.71	0.14	0.78	0.15	0.68	0.13	0.80	0.05	0.65	0.37
Cotopaxi (1)	0.71	0.14	0.74	0.16	0.61	0.16	0.79	0.07	0.49	0.37
Chimborazo (1)	0.70	0.15	0.75	0.17	0.63	0.16	0.79	0.06	0.46	0.39
El Oro (2)	0.70	0.13	0.81	0.11	0.64	0.15	0.79	0.07	0.71	0.37
Esmeraldas (2)	0.69	0.14	0.70	0.17	0.62	0.14	0.79	0.07	0.60	0.34
Guayas (2)	0.70	0.12	0.82	0.14	0.64	0.14	0.79	0.06	0.53	0.25
Imbabura (1)	0.70	0.14	0.80	0.14	0.65	0.14	0.79	0.06	0.66	0.38
Loja (1)	0.72	0.14	0.72	0.18	0.65	0.16	0.79	0.06	0.66	0.43
Los Ríos (2)	0.67	0.13	0.70	0.16	0.64	0.14	0.79	0.06	0.47	0.29
Manabí (2)	0.68	0.13	0.69	0.19	0.64	0.14	0.80	0.05	0.52	0.32
Morona Santiago (3)	0.72	0.13	0.68	0.21	0.67	0.15	0.79	0.07	0.67	0.42
Napo (3)	0.72	0.13	0.71	0.17	0.69	0.14	0.79	0.06	0.56	0.41
Pastaza (3)	0.72	0.14	0.74	0.19	0.64	0.16	0.78	0.07	0.57	0.39
Pichincha (1)	0.72	0.12	0.88	0.11	0.63	0.15	0.78	0.07	0.62	0.35
Tungurahua (1)	0.74	0.14	0.85	0.12	0.63	0.17	0.77	0.08	0.58	0.32
Zamora Chinchipe (3)	0.70	0.14	0.70	0.17	0.65	0.15	0.80	0.05	0.73	0.40
Sucumbíos (3)	0.67	0.13	0.69	0.16	0.62	0.14	0.79	0.07	0.73	0.38
Orellana (3)	0.71	0.13	0.68	0.17	0.64	0.15	0.79	0.07	0.49	0.40
Santo Domingo (2)	0.70	0.13	0.75	0.15	0.61	0.13	0.79	0.07	0.56	0.28
Santa Elena (2)	0.68	0.12	0.76	0.12	0.65	0.13	0.79	0.06	0.45	0.22
Total	0.70	0.14	0.77	0.17	0.64	0.15	0.79	0.06	0.60	0.37

(1) Andean region, (2) Coastal Region, (3) Amazon region.

Table A2. Pairwise correlation coefficients of variables

	Gender	Age	Members	Education	Ethnicity	Rural
Gender	1					
Age	0.0954	1				
Members	-0.1443	-0.131	1			
Education	-0.0489	-0.2756	-0.0702	1		
Ethnicity	0.028	0.0486	-0.1083	0.1925	1	
Rural	-0.0822	0.028	0.0961	-0.3361	-0.2957	1