Conjecturing Satisfaction: Econometric Approach to Determinants of Quality of Life in Ecuador 2013-2014

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Abstract

This study aims to analyze the key determinants for the level of life satisfaction and material satisfaction considering income level and reported depression as the main factors to be analyzed. For the research, the database from the Living Conditions Survey (ECV) of the National Institute of Statistics and Censuses (INEC) for the cross-section of 2013-2014 is used. Explanatory and control variables are used to analyze the determining components in the material satisfaction and life satisfaction of the surveyed individuals. A probit modeling is performed to determine the effect of each variable on the probability of the individual being satisfied or not, additionally, the results are contrasted with MPL and Logit models. From this research, a significant involvement of the most visible goods and services in both satisfaction metrics is perceived. Contrary to the initial assumptions, the variables of greater interest (income and depression) have a minimal marginal effect compared to other variables related to a better objective quality of life, such as water quality, health, social security, among others.

1 Introduction

For a long time, economics has largely neglected the study of happiness and its causes. The determinants of well-being were generally investigated by psychologists, sociologists, and political scientists. In recent years, following Easterlin's seminal contribution (1974), more and more research has examined the impact of economic conditions on subjective well-being, measured as self-reported levels of happiness or life satisfaction [4]. In this sense, a diverse number of studies have focused on the effects of macroeconomic conditions on happiness, life satisfaction, material satisfaction controlling for sociodemographic characteristics, personality factors, and the external context. Thus, empirical evidence provides relevant information such as the fact that income has a positive and significant relationship with the well-being of individuals and across various cohorts between countries, although the effect is relatively small and diminishing [2]. Likewise, other authors such as Di Tella have focused their studies on the effects of macroeconomic conditions on individual well-being.

In this vein, this research aims to analyze the dataset from the Living Conditions Survey (ECV) conducted and directed by the National Institute of Statistics and Censuses (INEC) of Ecuador. This survey allows obtaining indicators on the living standards and well-being of the Ecuadorian population based on information from 29,052 households across the 24 provinces of the country in relation to various factors such as education, health, poverty, and inequality in order to generate a useful tool in public policy management. For the present analysis, the ECV 2013-2014 will be used, where topics such as household habits, use of time, psychosocial well-being, perception of standard of living, social capital, public safety, among others, are included.

2 Literature Review

There are various studies that, through econometric modeling, analyze the factors that compose the determinants of quality of life by researchers such as Soukiazis & Ramos (2016), who highlight striking factors such as the reception of the scientific community in the SWB (subjective well-being) meter and its determinants. In their study, they employ two dimensions for Portuguese citizens who responded to the European Quality of Life Survey and estimate ordinary least squares (OLS) regressions and ordinal logistic models to identify the main factors that explain subjective well-being. They found that trust in public institutions, satisfaction with material conditions, volunteer activities, and employment status have a positive and significant effect on life satisfaction.

Another study that has used binary response models, in this case a probit model, to examine the determinants of quality of life is *Heterogeneity in the relationship between subjective well-being and its determinants over the life cycle: A varying-coefficient ordered probit approach* by Lin, Hwang, Deng (2015). They examined the evolution of the mechanism behind subjective well-being over the life course using data from the waves of 1972-2010 of the

US General Social Survey through a partially linear ordered probit and varying-coefficient approach to find the existence of considerable variation in average perception nonlinearly over the life cycle where the results pointed to a significant source effect from race and labor condition, mostly, along with a peak at the age of 40 in determining life quality satisfaction [5].

Similarly, Choi (2013) analyzes two different measures of SWB; one general well-being measure and another conjecturing whether people experienced happiness for most of the past day. With an OLS model and logit regression models from cross-sectional data, they found that travel time is statistically significant and negatively related to overall SWB evaluation [1]. In a more holistic approach, Stanca (2010) investigated how the variation between countries in the relationship between economic conditions and reported well-being; finding that the effect of income on well-being is greater in countries with a lower per capita GDP. On the other hand, the negative effect of being unemployed is stronger in countries with a higher unemployment rate or higher per capita GDP. It takes into account the effect of income on well-being, the negative effect of unemployment, and individual characteristics in 94 countries [7].

Winkelmann (2005) analyzes interdependencies in well-being at the family level. This work develops an ordered probit model with multiple random effects that allows identifying intrafamily correlation in well-being. The approach is illustrated in an application using data for the period 1984-1997 from the German Socio-Economic Panel where intergenerational and within-marriage correlations in well-being are estimated [8]. Other methodologies have also been used to study components of self-reported life satisfaction, for example, the research article *Lags and leads in life satisfaction: A test of the baseline hypothesis* by Clark et al. (2008) seeks to answer whether individuals tend to return to some basic level of objective state, within general considerations, such as: marriage, divorce, widowhood, childbirth, and dismissal through a test of the baseline hypothesis. The authors in question did not reject the hypothesis of complete adaptation to these situations [3]. However, there is not enough evidence of adaptation to unemployment for men. Participants were 65,658 men and 65,447 women aged 16 to 60 in West Germany.

Within academia, the paper *Do we really know what makes us happy? A review of the economic literature on the factors associated with subjective well-being* by Dolan, Peasgood, White (2008) subscribes to the idea that the growing interest in the economics of happiness over the past two decades found discernible patterns to suggest that poor health, divorce, unemployment, and lack of social contact are strongly negatively associated with SWB. Although they also mention that asserting causality in SWB is more complex, since there may be unobserved variables and uncertainty about the direction of causality. This study is part of a relatively new conception of self-perception study in quality of life, as well as contrasting with objective indicators about what a social paradigm

3 Identification Strategy

Three estimable models were employed for the data analysis. The first case [exploratory] considers a linear probability model, the second a normal distribution in the error through a probit model, and the third a logistic distribution through a logit model. Although all three deliver the same suggestive results regarding the directionality of the effect, it is considered that the probit model is much more concise for interpreting the results. In this sense, the variables of interest in this study are material satisfaction and life satisfaction reported by the head of the household for the ECV 2013-2014. This is in order to obtain both subjective and objective measures to contrast in the analysis of the level of life satisfaction.

To control for demographic factors, marital status, ethnicity, and level of education attained up to the moment were considered, collected in a vector X shown in the following updates. To create the construct to be evaluated in the satisfaction levels, factors such as satisfaction with health, food expenditure, and the type of insurance held by the household were considered [see table in appendix section for more information]. In this vein, the main regressors analyzed were the household income level (hh_incpc) and the level of depression (dep_comp) for material satisfaction and life satisfaction respectively. It is worth mentioning that for the latter, given the considerable latency level of a state such as depression, a composite variable was generated constructed from 5 highly correlated questions (alpha index greater than 0.70; Pearson correlation index greater than 30%). For more details, refer to the STATA Do-file.

* Linear Probability Model

$$\ln(s\_material) = \beta_0 + \beta_2 \mathbf{X} + \beta_3 \textbf{Satisfaction Factors} + \beta_4 hh\_incpc + \epsilon \tag{1}$$

$$\ln(sat\_vida) = \beta_0 + \beta_2 \mathbf{X} + \beta_3 \textbf{Satisfaction Factors} + \beta_4 dep\_comp + \epsilon \tag{2}$$

* Logit & Probit Models

$$prob\_satisf\_material = \beta_0 + \beta_2 \mathbf{X} + \beta_3 \textbf{Satisfaction Factors} + \beta_4 hh\_incpc + \epsilon \tag{3}$$

$$prob\_sat\_vida = \beta_0 + \beta_2 \mathbf{X} + \beta_3 \textbf{Satisfaction Factors} + \beta_4 dep\_comp + \epsilon \tag{4}$$

4 Results

According to the results presented in the Appendix table, a significant difference can be observed for individuals separated regarding the level of material satisfaction compared to the group of married individuals. It is worth noting that for the case of logit and probit regressions, the coefficients presented in the table correspond to the marginal effects of each regressor on the corresponding dependent variables. Likewise, age and gender demographics are not considered due to a high coefficient of collinearity; this is potentially because the analysis presented is for responses collected for the head of the household.

In this sense, there seems to be a detrimental effect of 0.0771 on material satisfaction when separated. More specifically, the separated individual appears to be 0.114% less satisfied with their material level than married households. However, when analyzing the logit and probit models, highly significant effects are found for other marital statuses such as divorced and widowed households. Specifically, divorced and widowed households show a 0.0102% and 0.0165% higher likelihood of being satisfied with their material living level compared to married households. Regarding life satisfaction, significant results are found for each marital status, with widowed households having a stronger effect among all groups (-0.0419%). Ultimately, marital status is a highly determining variable for material and subjective satisfaction levels.

Regarding ethnicity, it can be seen that, in relation to those who identified as mestizos, at a preliminary level (MCO), a significant effect is found for indigenous people where being indigenous seems to slightly increase life satisfaction by 0.0123. However, when disaggregating these results more specifically, it can be seen that both blacks, mulattos, and indigenous people have a probability of 0.14%, 0.113%, 0.0842% of being less satisfied with their material living level. A similar effect can be seen for the subjective case, albeit to a lesser extent, with the interesting addition of the white ethnic group with a minimal reduction of -0.00491%.

Regarding the level of education, those who completed their primary education are taken as the comparison base. It can be observed that both the second-level and third-level education are highly significant. In this sense, both those who completed high school seem to have a positive probability of 0.0618% about their material satisfaction level, although this is not the case for life satisfaction. For those who completed higher education, they report a higher likelihood of being satisfied with their material life and subjective well-being by 0.158% and 0.0164% respectively. Furthermore, it can be noted that although income is statistically significant at 1%, it does not present a determining magnitude for life satisfaction and material satisfaction. Likewise, with the level of satisfaction with health, statistically significant effects are seen at 1%, but their magnitudes are not particularly considerable. Food expenditure is highly significant at 1% with an increase of 0.0167% on subjective satisfaction level and a reduction of 0.0966%. Among the key determinants, it can be seen that the total number of live-born children, the number of animals (pets) have highly significant effects. Being the number of live children the variable that presents the highest magnitude in the probability of feeling satisfied with life and with the material level (0.000168% and -0.0350%).

Regarding social security reported by household heads, high statistical significance is found for the three categories reported in relation to those individuals who have private insurance. In this sense, having public insurance decreases the probability of material satisfaction by 0.0694%, while being affiliated with ISFA/ISPOL reduces it by 0.113%. Regarding life satisfaction, the former has an equally negative effect of -0.0222%, and the latter also at a level of -0.0234%.

Finally, the analysis for the level of depression shows significant and considerable effects

when analyzing behavior in life satisfaction and material satisfaction. It can be seen how reporting depression in at least the last seven (7) days reduces material satisfaction by 0.0159% and by 0.0134% for life satisfaction.

5 Discussion

This study explores two main determinants of quality of life through their relationship among various associated components such as material satisfaction and life satisfaction, which can be compared with subjective well-being (SWB) measures described in studies on happiness, self-satisfaction, and quality of life surveys. Such relationships are aided by probit, logit, and linear probability model estimations with components reported by the head of the household. The findings of this study are compared with the results of previous studies that used similar research designs, considering demographic variables gathered by categories. An overview of the findings of this study and their implications shows that the marital status of individuals congregates a significant difference for separated individuals regarding material satisfaction compared to the group of married individuals. Specifically, divorced and widowed households present more satisfaction with their material standard of living compared to married households.

In the international research landscape, relationships have been presented with higher levels of subjective well-being that also incorporate marital status, but they differ, in this case, in the legal and socially normative configuration of each country. With the additional exposure of possible endogeneity between factors influencing decisions to marry or not, versus how satisfied an individual is with their life on average. Furthermore, the quality of life and subjective well-being that other models address highlight the ethnic importance in the self-perception of life in different parts of the world, as mentioned in Soukiazis' paper (2016) [6]. Our study places Afro-Ecuadorian, mulatto, and indigenous ethnic groups with a probability of being less satisfied with their material standard of living, in relation to mestizos. A relevant point is the omission of demographic variables such as age and gender that other studies, for different contexts and with data extracted from other surveys, find useful for measuring SWB.

Both in the level of education, it was observed that obtaining a second-level or third-level education is highly significant with a positive probability in material satisfaction, although not for life satisfaction. The satisfaction level with health, on the other hand, does not present results of considerable magnitudes, unlike food expenditure. There is a point of dissent with the analysis of authors who do not take into account determinants such as the number of cohabiting children in the household and pets. The number of living children is the variable that presents a greater magnitude in the probability of feeling satisfied with life and with the material level, something also mentioned in Clark et al.'s study (2008) [3].

The theoretical argument would attribute an increase in income to an incidence on life satisfaction. However, we can observe that factors such as depression and individuals' status

regarding social security mechanisms yield significant and considerable effects when analyzing behavior with the variables of interest. These findings of the present study have important implications for understanding the relationship between quality of life and subjective well-being. Specifically, the findings suggest that generalizable objective metrics in different countries to measure quality of life may be associated with subjective well-being when seeking more accurate estimators of this relationship than other models, although variables with considerable collinearity can modify the results considerably. The potential contributions that could be made from this study seek to provide relevant information on the potential of state and social policy interventions for improving life in terms of population well-being.

6 Conclusions

Among the key conclusions from the statistical interpretation and econometric analysis, we have the substantial task of taking into account variables such as the depression index that prove to be a robust guide to the behavior of unobserved psychological factors for the determinants of the level of life satisfaction of households at both subjective and objective levels. Similarly, representative determinants under the Ecuadorian social security system were found to comprise statistically significant effects for IESS, ISSPOL and ISSFA affiliation as a state with a negative impact on material and life satisfaction.

The ethnic group category for Afro-Ecuadorians, mulattos and indigenous people shows a probability of being less satisfied with their material standard of living in a determinant way. It is also observed that individuals who have completed more years of education seem to have a higher level of material and life satisfaction. Finally, the number of children with whom the head of household lives has a greater magnitude in the probability of feeling satisfied with life and with the material level. The variables mentioned above are indicative of initial notions for the resolution of economic problems with econometric techniques, opening at the same time the opportunity to cover more segmented fields of study.

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7 Annexes

Table 1: Table 1 OLS, Logit and Probit regressions

Variables	(1) MCO1	(2) MCO2	(3) LOG1	(4) LOG2	(5) PROB1	(6) PROB2
Free union	-0.00122	0.00986	-0.0150***		-0.00916***	
	(0.0395)	(0.00685)	(0.00333)		(0.00329)	
Separated	-0.0771**	-0.0118	-0.116***	-0.0143***	-0.114***	-0.0124***
	(0.0314)	(0.00913)	(0.00273)	(0.00127)	(0.00268)	(0.00125)
Divorced	0.00383	0.00180	0.00493	0.00848***	0.0102***	0.00884***
	(0.0340)	(0.00562)	(0.00331)	(0.00118)	(0.00322)	(0.00117)
Widow	0.0115	-0.0197	0.00879*	-0.0538***	0.0165***	-0.0419***
	(0.0441)	(0.0290)	(0.00467)	(0.00428)	(0.00460)	(0.00389)
Single	-0.0295	-0.00227	-0.0495***	-0.00356***	-0.0457***	-0.00498***
	(0.0301)	(0.00682)	(0.00281)	(0.00126)	(0.00276)	(0.00126)
Afro-descen dent	-0.176***	0.0135	-0.245***		-0.251***	
	(0.0470)	(0.00872)	(0.00529)		(0.00525)	
Black	-0.103	-0.0210	-0.143***	-0.0347***	-0.140***	-0.0249***
	(0.0640)	(0.0415)	(0.00592)	(0.00377)	(0.00589)	(0.00332)
Mulato	-0.0838*	-0.00838	-0.115***	-0.0255***	-0.113***	-0.0368***
	(0.0488)	(0.0222)	(0.00371)	(0.00293)	(0.00375)	(0.00319)
Montubio	-0.0542	0.0265**	-0.0745***		-0.0695***	
	(0.0544)	(0.0123)	(0.00440)		(0.00438)	
Indigenous	-0.0648	0.0123**	-0.0882***		-0.0842***	
	(0.0447)	(0.00549)	(0.00518)		(0.00528)	
Withe	-0.0250	-0.00762	-0.0282***	-0.00716***	-0.0233***	-0.00491**
	(0.0511)	(0.0256)	(0.00441)	(0.00213)	(0.00447)	(0.00218)
Observations	2,222	950	395,046	137,711	395,046	137,711
R^2	0.151	0.037				
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1						

Variables	(1) MCO1	(2) MCO2	(3) LOG1	(4) LOG2	(5) PROB1	(6) PROB2
High School	0.0511	0.00371	0.0602***	0.00176	0.0618***	-0.000778
	(0.0420)	(0.0269)	(0.00376)	(0.00226)	(0.00379)	(0.00194)
Superior	0.122***	0.0139	0.153***	0.0266***	0.158***	0.0164***
	(0.0398)	(0.0248)	(0.00361)	(0.00210)	(0.00364)	(0.00179)
House Hold income	6.38e-05**	6.32e-06*	0.000136***	0.000134***	9.93e-05***	0.000157***
	(3.04e-05)	(3.74e-06)	(4.67e-06)	(1.04e-05)	(3.39e-06)	(1.04e-05)
Satisfaction health	-0.00441	-0.0101	-0.00549***	-0.0191***	-0.00658***	-0.0179***
	(0.0174)	(0.00677)	(0.00142)	(0.000852)	(0.00142)	(0.000816)
Food expense n	-0.0743***	0.0115	-0.0951***	0.0180***	-0.0966***	0.0167***
	(0.0229)	(0.00798)	(0.00190)	(0.000712)	(0.00192)	(0.000700)
General Insurance (IESS)	-0.0506	-0.00713	-0.0725***	-0.0218***	-0.0693***	-0.0222***
	(0.0318)	(0.00538)	(0.00326)	(0.00297)	(0.00326)	(0.00264)
Insurance Peasant	0.0254	0.0129	0.0809***		0.0693***	
	(0.0423)	(0.0116)	(0.00461)		(0.00443)	
ISFFA/ISSPOL	-0.0786***	-0.0138**	-0.113***	-0.0282***	-0.113***	-0.0234***
	(0.0207)	(0.00638)	(0.00167)	(0.000762)	(0.00167)	(0.000749)
Last year loan delivery	0.0428**	-0.00682	0.0657***	-0.0261***	0.0606***	-0.0172***
	(0.0198)	(0.00779)	(0.00177)	(0.00187)	(0.00175)	(0.00152)
Observations	2,222	950	395,046	137,711	395,046	137,711
R^2	0.151	0.037				
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1						

Variables	(1) MCO1	(2) MCO2	(3) LOG1	(4) LOG2	(5) PROB1	(6) PROB2
Has Animals	-0.0178 (0.0306)	-0.00873 (0.0156)	-0.0203*** (0.00271)	-0.0109*** (0.00117)	-0.0223*** (0.00274)	-0.00999*** (0.00125)
Total children born alive	-0.0264*** (0.00840)	0.000242 (0.00189)	-0.0346*** (0.000668)	0.00115*** (0.000374)	-0.0350*** (0.000678)	0.000168 (0.000366)
Owns business home	-0.00130 (0.0191)	0.00492 (0.00570)	-0.00872*** (0.00156)	0.00693*** (0.00100)	-0.00603*** (0.00154)	0.00482*** (0.000959)
Owns lands additional	0.00676 (0.0331)	0.0102 (0.0120)	-0.000386 (0.00319)	0.0345*** (0.00222)	0.00256 (0.00316)	0.0190*** (0.00195)
Employment state of the household	-0.0270 (0.0232)	-0.00457 (0.0106)	-0.0365*** (0.00189)	-0.0162*** (0.00114)	-0.0368*** (0.00188)	-0.0156*** (0.00115)
Existence of water	0.0213	-0.00355	0.0301***	-0.00892***	0.0314***	-0.0102***
Uses twitter	0.0582** (0.0277)	-0.00689 (0.0133)	0.0915*** (0.00216)	-0.0212*** (0.00112)	0.0898*** (0.00211)	-0.0196*** (0.00109)
Has internet service	0.0836*** (0.0192)	-0.00556 (0.00866)	0.121*** (0.00150)	-0.0176*** (0.000923)	0.120*** (0.00149)	-0.0110*** (0.000852)
Owns a cellphone cellphone activated	-0.0353 (0.0283)	-0.0174 (0.0159)	-0.0462*** (0.00228)	-0.0260*** (0.00103)	-0.0472*** (0.00230)	-0.0254*** (0.00107)
Depression index		-0.00895 (0.00781)		-0.0159*** (0.000524)		-0.0134*** (0.000481)
Observations R^2	2,222 0.151	950 0.037	395,046	137,711	395,046	137,711
Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1						

Variable	Obs	Media	Desv. Estan.	Min	Max
satisfacción material	33223	1.556	.497	1	2
satisfacción vida	30012	1.987	.112	1	2
ingreso per-cápita (hogar)	109694	144.674	692.974	0	40600
índice depresión	24048	-.011	.781	-.958	2.684
salud	62724	.427	.495	0	1
hijos	5733	2.427	1.686	1	13
	.	.	.	.	.
estado civil					
Casado	80960	.337	.473	0	1
Unión Libre	80960	.192	.394	0	1
Separado	80960	.052	.222	0	1
Divorciado	80960	.017	.128	0	1
Viudo	80960	.041	.199	0	1
Soltero	80960	.362	.48	0	1
	.	.	.	.	.
etnia					
Mestizo	109534	.729	.444	0	1
Afrodescendiente	109534	.01	.1	0	1
Negro	109534	.016	.126	0	1
Mulato	109534	.018	.132	0	1
Montubio	109534	.043	.203	0	1
Indígena	109534	.16	.367	0	1
Blanco	109534	.023	.151	0	1
	.	.	.	.	.
nivel educación					
Básico	93025	.339	.473	0	1
Colegio	93025	.369	.482	0	1
Superior	93025	.293	.455	0	1
	.	.	.	.	.
gasto alimenticio					
0. No	33223	.791	.407	0	1
1. SÍ	33223	.209	.407	0	1
préstamos	.	.	.	.	.
0. No	33223	.833	.373	0	1
1. SÍ	33223	.167	.373	0	1
animalitos	.	.	.	.	.
0. No	33223	.627	.484	0	1
1. SÌ	33223	.373	.484	0	1
negocios hogar	.	.	.	.	.
0. No	33223	.637	.481	0	1
1. SÌ	33223	.363	.481	0	1
terrenos	.	.	.	.	.
0. No	33223	.686	.464	0	1
1. SÍ	33223	.314	.464	0	1
empleo jefe hogar	.	.	.	.	.
0. Desempleado	33223	.126	.332	0	1
1. Empleado	33223	.874	.332	0	1
calidad agua del barrio	.	.	.	.	.
0. No	33223	.796	.403	0	1
1. SÌ	33223	.204	.403	0	1
Twitter	.	.	.	.	.
0. No	8061	.851	.356	0	1
1. SÍ	8061	.149	.356	0	1
internet	.	.	.	.	.
0. No	33223	.798	.402	0	1
1. SÌ	33223	.202	.402	0	1
celular	.	.	.	.	.
0. No	33223	.712	.453	0	1
1. Sí	33223	.288	.453	0	1

Figure 1: Descriptive statistics of the variables used

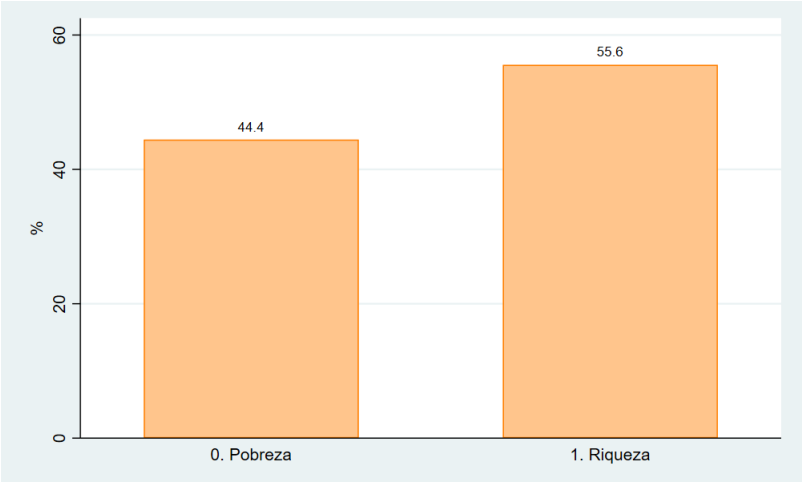

Figure 2: Histogram of data for the variable Material Satisfaction

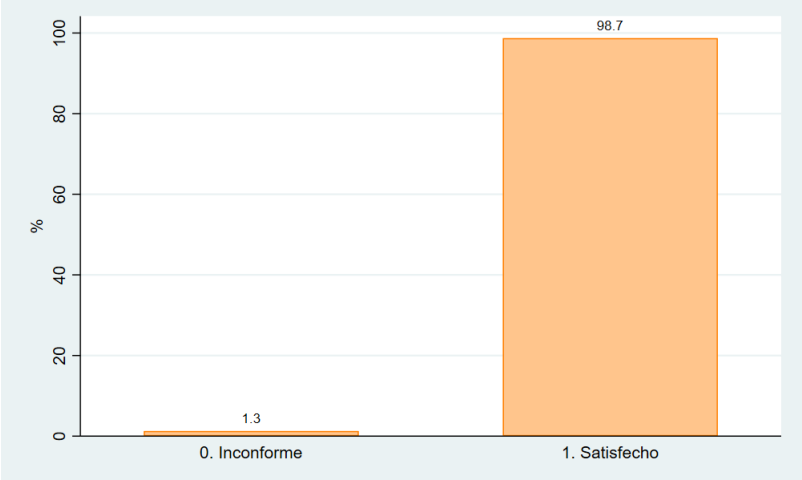

Figure 3: Histogram of data of the variable Satisfaction with Standard of Living.

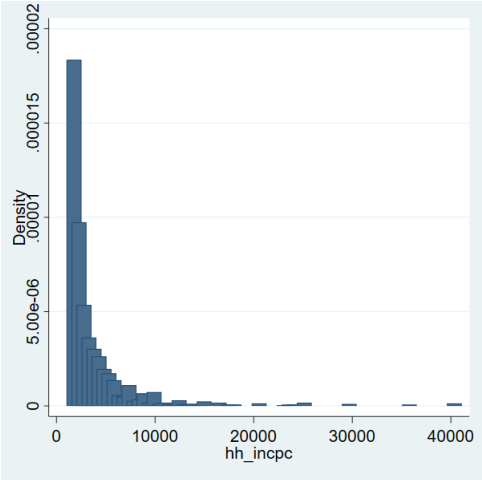

Figure 4: Histogram of data of the variable Household Income

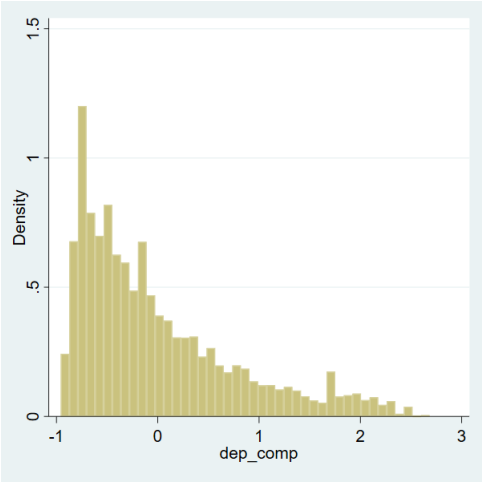

Figure 5: Histogram of data of the variable Depression.

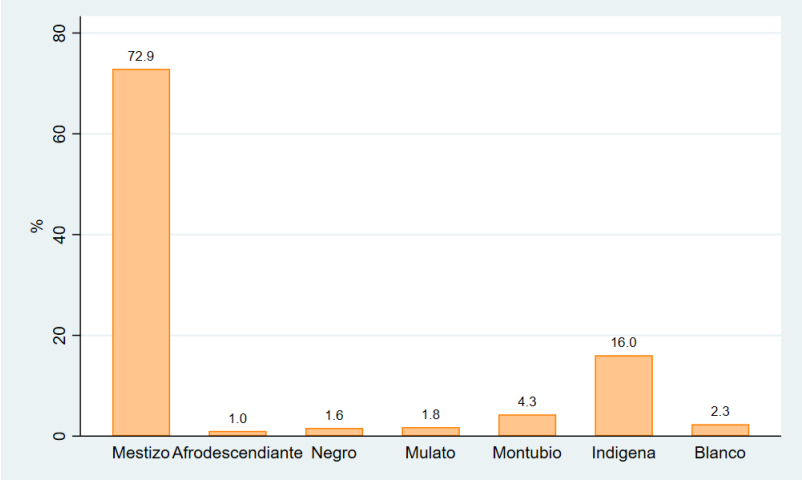

Figure 6: Histogram of the data of the variable Ethnicity

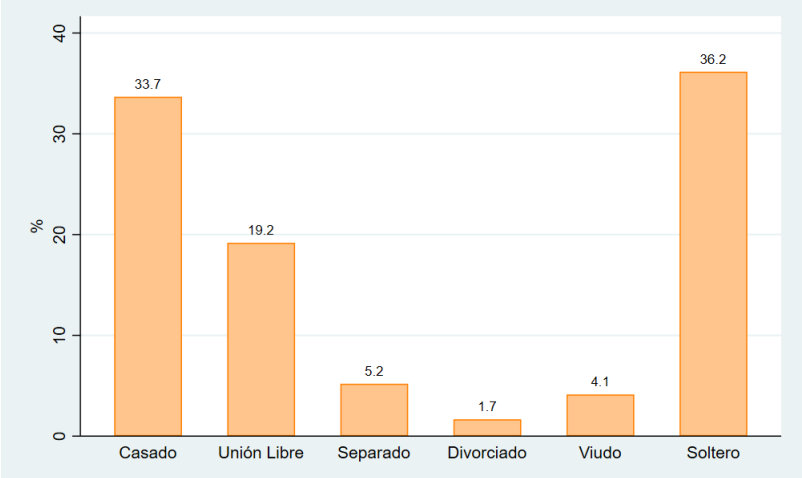

Figure 7: Histogram of data of the variable Marital Status

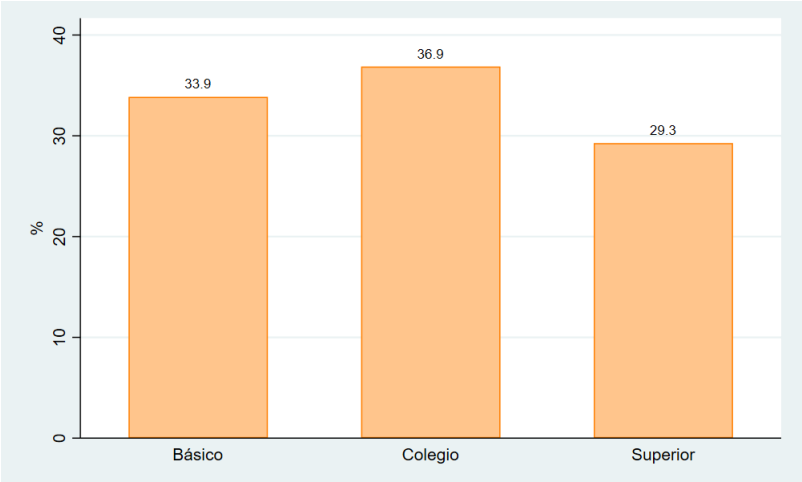

Figure 8: Histogram of data for the variable Level of education

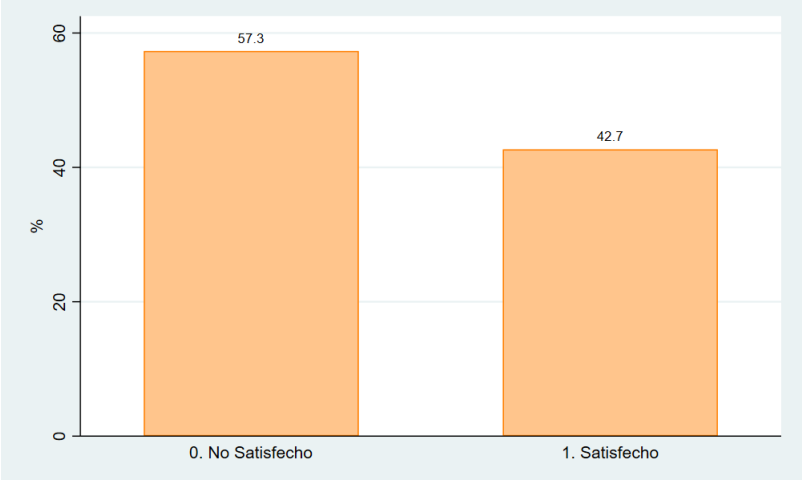

Figure 9: Histogram of data of the variable Health

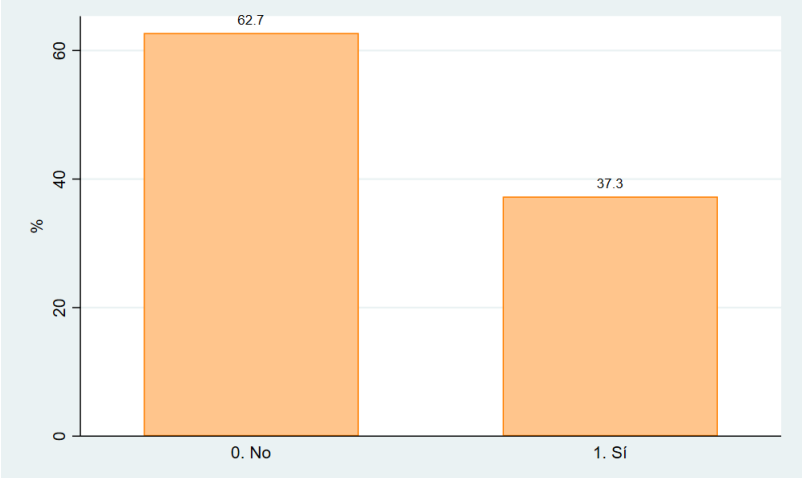

Figure 10: Histogram of data of the variable Has animals