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What explains life satisfaction? Relative income or rank income? The case of Ecuador

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Abstract

We test whether various measures of relative income and rank income hypothesis explain life satisfaction in Ecuador. We found robust evidence that the rank position of the income within the reference group explains life satisfaction. In contrast, the effect of relative income measures on happiness is sensitive to the variables used to construct the reference group.

Keywords

relative income, rank, happiness, life satisfaction, Ecuador

JEL codes: I31, D60

Introduction

The effect of income on happiness has been well studied. Clark et al. (2008) and Ferrer-i-Carbonell (2005) remark, in terms of subjective well-being (SWB), the importance of comparison of the individual's income with income from a socially constructed group or with a social norm, i.e., a reference group.

Several studies found that the larger the individual income is, in comparison with the reference group, the happier the person is (Ferrer-i-Carbonell, 2004; Clark et al., 2008; Caporale et al., 2009¹; Rojas, 2019). On the other hand, Caporale et al. (2009)² found that the reference group income's influences positively on individual satisfaction; a plausible explanation for this odd

¹ For Western European countries.

² For Eastern European countries.

result is the Hirschman's conjecture, i.e., the individuals perceive the reference group income as a signal of their success.

The construction of the reference group is based on variables, such as age, education and region (Ferrer-i-Carbonell, 2005); age, gender and education (Oshio et al., (2010); age, gender and country (Rojas, 2019). Alternatively, Oshio et al. (2010) used the Yitzhaki relative deprivation income index³ within the reference group and found a negative association between the Yitzhaki index and happiness.

When differentiating by income level, in terms of SWB, the income comparisons between richer and poorer individuals could be asymmetrical; Ferrer-i-Carbonell (2005) found the poorer individuals are influenced negatively by their reference group income (upward comparison), while the richer people are not (the effect is not significant and smaller than the effect for the poorer).

Recent research has focused on the rank-income hypothesis, which suggests that the utility of income comes from a higher position in the income rank of the income distribution. Powdthavee (2009) found that individuals care about current income and family expenditure but also about their rank-position. Conversely, Boyce et al. (2010) found that only ranked positions explain life satisfaction rather than absolute income or relative income.

In this paper we test for Ecuador whether relative-income hypothesis or rank-income hypothesis explain life satisfaction. To the best of our knowledge, this is the first paper on this topic for Ecuador.

Data and Methods

The empirical analysis uses the National Employment, Unemployment and Underemployment Survey (ENEMDU), a quarterly rotating panel data survey. We use the 2013-2014 panel since it is the last survey available that includes subjective well-being questions (i.e., life satisfaction). Table 1 presents the descriptive statistics of the variables used to construct the reference groups. We can observe that life satisfaction and income are higher for those with university or greater education, for men, between 30-50 years and those living in the Amazon region.

The dependent variable is life satisfaction measured on a scale from 1 to 10, where 10 means very happy and 1 very unhappy; this question asks for happiness in a life-evaluative mode. We use an ordered logit model with fixed time effects and individual random effects. The fixed time effects control for variables that are constant across individuals, but change over time. Conversely, the individual random effects account for characteristics that differ across individuals, but changes are constant over time, for instance, positive or negative traits that might affect life satisfaction.

The first approach is to test whether income affects life satisfaction (model 1); we express income in logarithms since the relationship between income and life satisfaction is concave. In the second approach (model 2), we test whether the relative income affects life satisfaction. We construct the reference group based on education, gender, and age. Then, we create a variable that is the difference between a person's income and reference group income [$\ln(\text{inc}) - \ln(\text{refinc})$]. A positive coefficient means that the greater is the income in comparison to the reference group, the greater life satisfaction is.

In order to test asymmetric comparison by income level, a third approach (model 3) consists of creating a variable called *richer*, which equals $\ln(\text{inc}) - \ln(\text{refinc})$ if the person's income is greater

³ The higher the Yitzhaki index, the higher the gap between the actual income with the reference group income.

than reference's group income, whereas equals 0 otherwise. We also create a variable called *poorer* that equals $\ln(\text{inc}) - \ln(\text{refinc})$ if the reference's group income is higher than the person's income, whereas equals 0 otherwise. A fourth approach (model 4) consists of using the Yitzhaki index. Finally, a fifth approach (model 5) consists in testing the rank-income hypothesis. We construct a variable called *R* that captures the individual rank within the reference group; $R = \frac{i-1}{n-1}$, where the term $(i-1)$ is the number of individuals with an income worse than a particular individual and the term $(n-1)$ is the number of people with the individual's reference group.

Results and Discussion

In Table 2 we present the econometrics analysis using an ordered logit model with fixed effects. In model 1, we found a positive association between absolute income and life satisfaction. In model 2, we found that the difference between an individual's income with the income of the reference group $\ln(\text{inc}) - \ln(\text{refinc})$ does explain life satisfaction. The sign is negative, indicating that the higher the individual's income is compared to the income of the reference group, the higher life satisfaction is. Model 3 shows the asymmetric comparison by income level; the effect for *poorer* is statistically significant, while the effect for *richer* is not. As Ferrer-i-Carbonell (2015), these results indicate that income comparison is asymmetric and upwards. In Model 4, we found a negative coefficient that supports the relative-income hypothesis as Oshio et al. (2010). Finally, in Model 5, we found that rank-income position within the reference group defined as (*R*) explains life satisfaction, supporting the rank-income hypothesis as Boyce et al. (2010).

Table 3 shows the same estimates for the relative-income and rank-income hypothesis controlling for the same variables of Table 1, but with eight different reference groups (A-H) based on age, education, gender and region. For relative income models (2, 3, 4), the statistical significance is ambiguous, it depends on the reference group, and at most, it is significant for two out of eight combinations. In contrast, for ranking income hypothesis, in seven out of eight different reference groups (A, B, D, E, F, G, H) the income rank by reference group (Model 5) does explain life satisfaction. Moreover, in these seven reference groups, the t-statistic of the rank-income hypothesis (Model 5) is the largest compared to the relative income models (2, 3, 4).

Finally, we test whether the logarithm of income or the effect of absolute income decreases when including the income rank parameter (Model 5). We found in all of the reference groups that the t-statistic of the income rank is greater than the logarithm of income. Furthermore, in four out of eight reference groups, the logarithm of income was no significant. This implies that rank position within the reference group explains significantly more life satisfaction than the absolute income.

Conclusions

We test whether relative-income and rank-income hypothesis and found that rank-income position with the reference group explains significantly more life satisfaction than the absolute income and relative income measures. As Boyce et al. (2010) the rank-income hypothesis does not imply a causal relationship between income and SWB. A higher income does not automatically upgrade life satisfaction since social rank could remain equal, and it is less clear in countries with positively skewed income distribution like Ecuador. Future research could test in what points of the income distribution a higher income upwards the rank and increases life satisfaction.

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Data availability statement

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Table 1: Descriptive Statistics
Mean Income and Life Satisfaction Values

		Life satisfaction	Income
Age	Age 20-	7.41	259.15
	Age 20	7.62	670.69
	Age 30	7.66	947.32
	Age 40	7.66	1165.73
	Age 50	7.64	1185.09
	Age 60	7.41	871.42
	Age 70+	7.22	515.40
Education	Primary	7.36	618.21
	Secondary	7.62	819.31
	University+	8.06	1822.56
Sex	Male	7.57	1078.08
	Female	7.61	688.35
Region	Highlands	7.59	867.66
	Coast	7.57	992.49
	Amazon	7.72	853.89
Sample		7.61	919.51

Table 2: The effect of relative income on life satisfaction
Reference group (educ, age, region)

	Model 1	Model 2	Model 3	Model 4	Model 5
ln(inc)	0.144*** (10.96)	0.279*** (6.06)	0.281*** (6.10)	0.157*** (10.80)	0.0791** (3.04)
Female	0.0813** (3.25)	0.0822** (3.29)	0.0784** (3.13)	0.0815** (3.26)	0.0827*** (3.31)
ln(age)	1.071 (1.87)	-0.329 (-0.45)	-0.168 (-0.23)	0.741 (1.25)	1.781** (2.86)
ln(age squared)	-0.154* (-1.96)	0.0275 (0.28)	0.00454 (0.05)	-0.113 (-1.41)	-0.247** (-2.92)
High School ^a	0.276*** (9.56)	0.212*** (5.94)	0.213*** (5.97)	0.252*** (8.15)	0.309*** (9.94)
University ^a	0.679*** (19.36)	0.527*** (8.67)	0.529*** (8.71)	0.613*** (13.07)	0.754*** (17.24)
Ethnic Minority ^b	-0.161*** (-4.92)	-0.161*** (-4.92)	-0.161*** (-4.93)	-0.161*** (-4.93)	-0.159*** (-4.86)
Married	0.268*** (10.30)	0.267*** (10.29)	0.263*** (10.13)	0.268*** (10.30)	0.264*** (10.16)
Coast Region ^c	-0.0164 (-0.71)	-0.0429 (-1.73)	-0.0385 (-1.55)	-0.0239 (-1.01)	-0.000954 (-0.04)
Amazon Region ^c	0.104 (1.56)	0.104 (1.55)	0.0996 (1.49)	0.106 (1.58)	0.0994 (1.49)
ln(inc)-ln(refinc)		-0.139** (-3.06)			
Richer			-0.0464 (-0.88)		
Poorer			-0.184*** (-3.89)		
Yitzhaki Index ^d				0.0477* (2.10)	
Income Rank (R)					0.260** (2.89)
Dummy for 2014	-0.237*** (-10.76)	-0.236*** (-10.72)	-0.238*** (-10.83)	-0.236*** (-10.72)	-0.240*** (-10.91)
<i>N</i>	26660	26660	26660	26660	26660

Notes: Excluded categories (^a Primary or less education, ^b White and mestizo, ^c Highland Region)

^dYitzhaki index is scaled by dividing by the average family income in our sample
t statistics in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3: The effect of relative income on life satisfaction with different reference groups

	A. Reference group educ, age		B. Reference group: educ, gender		C. Reference group: educ, region		D. Reference group: age, gender		E. Reference group: age, region		F. Reference group: gender, region		G. Reference group: educ, age, gender		H. Reference group: educ, age, gender, region	
	b	t	b	t	b	t	b	t	b	t	b	t	b	t	b	t
Model 2																
ln(inc)-ln(refinc)	-0.0506 <i>LL=-48066.4</i>	(-0.90)	0.0347 <i>LL=-47526.7</i>	(0.35)	-0.463*** <i>LL=-47516.4</i>	(-4.56)	0.00129 <i>LL=-47526.7</i>	(0.02)	-0.0331 <i>LL=-47526.6</i>	(-0.54)	0.0781 <i>LL=-47526.5</i>	(0.60)	-0.00246 <i>LL=-47526.7</i>	(-0.05)	-0.0667 <i>LL=-47525.4</i>	(-1.64)
Model 3																
Richer	0.0301	(0.49)	0.0922	(0.91)	-0.379***	(-3.66)	0.0674	(0.99)	0.0406	(0.62)	0.157	(1.19)	0.0668	(1.20)	0.0189	(0.38)
Poorer	-0.0977 <i>LL=47526.7</i>	(-1.68)	-0.0237 <i>LL=-47522.5</i>	(-0.23)	-0.536*** <i>LL=-47508.6</i>	(-5.18)	-0.0409 <i>LL=-48063.1</i>	(-0.62)	-0.0783 <i>LL=-47521.7</i>	(-1.25)	0.0220 <i>LL=-47520.5</i>	(0.17)	-0.0388 <i>LL=-47523.4</i>	(-0.77)	-0.105* <i>LL=-47519.1</i>	(-2.48)
Model 4																
Yitzhaki Index ^d	0.0013 <i>LL=-47526.7</i>	(0.04)	-0.136** <i>LL=-47522.6</i>	(-2.89)	0.0777 <i>LL=-47526.1</i>	(1.09)	-0.0816 <i>LL=-48065.4</i>	(-1.75)	-0.0241 <i>LL=-47526.6</i>	(-0.54)	-0.2041 <i>LL=-47524.0</i>	(-2.33)	-0.039* <i>LL=-47525.5</i>	(-1.60)	0.0092 <i>LL=-47525.0</i>	(0.51)
Model 5																
Income Rank (R)	0.483***	(5.03)	0.473***	(4.76)	0.329**	(3.19)	0.452***	(4.54)	0.333**	(3.24)	0.319**	(2.99)	0.406***	(4.69)	0.283***	(3.43)
ln(inc) ^e	0.0221 <i>LL=-47514.1</i>	(0.80)	0.0248 <i>LL=-47515.4</i>	(0.88)	0.0635* <i>LL=-47521.6</i>	(2.23)	0.0392 <i>LL=-47516.4</i>	(1.48)	0.0685* <i>LL=-47521.4</i>	(2.56)	0.0733** <i>LL=-47522.3</i>	(2.71)	0.0388 <i>LL=-47515.7</i>	(1.49)	0.0714** <i>LL=-47519.3</i>	(2.86)

Notes:

b represents the regression coefficients, and t is the t-statistic (in parentheses); * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

LL is the Log-Likelihood

^dYitzhaki index is scaled by dividing by the average family income in our sample

^eCoefficient of the logarithm of income $ln(inc)$ in the Income Rank (R) model