Income and Happiness: Easterlin Paradox in Colombia*

[English Version]

Ingresos y felicidad: paradoja de Easterlin en Colombia

Renda e Felicidade: Paradoxo de Easterlin na Colômbia

Received April 8, 2020. Accepted October 7, 2020

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› *To cite this article:* Botello-Peñaloza, Héctor-Alberto; Guerrero-Rincón, Isaac (2021). Income and Happiness: Easterlin Paradox in Colombia. *Ánfora*, *28*(50). 275-294. https://doi.org/10.30854/anfv28.n50.2021.696 Universidad Autónoma de Manizales. ISSN 0121-6538 / e-ISSN 2248-6941.

Abstract

Objective: this research aims to verify the relationship between income and happiness in Colombia, with special emphasis on the linearity of this relationship known in literature as the "Easterlin paradox". **Methodology:** based on data from Quality of Life Survey of 2017, it was investigated into whether the Colombian population conforms to the paradox, that is, whether monetary income positively influences the subjective well-being revealed. **Results:** the proposed proportional odds model shows that income is a determining variable of happiness, but it is secondary to others such as the

* The origin of this manuscript comes from the Research Group of Regional Development and Territorial Planning. The authors declare no conflict of interest in executing this research project.

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perception of well-being in health, safety and work. These results coincide with those raised in the paradox, and challenge development plans in which a comprehensive context of well-being increases the quality of life of the inhabitants. **Conclusions:** the happiness revealed by individuals is subjective in nature, therefore, it may be influenced by conjunctural aspects at the time of the survey.

Key words: Economics of happiness; Easterlin paradox; Proportional odds model; Income; Colombia.

Resumen

Objetivo: este trabajo busca comprobar la relación entre ingreso y felicidad en Colombia, haciendo especial énfasis en la linealidad de esta relación conocida en la literatura como la "paradoja de Easterlin". **Metodología:** con base en los datos de la Encuesta de Calidad de Vida 2017 se constató si la población colombiana se adapta a la paradoja; es decir, si el ingreso monetario influye positivamente en el bienestar subjetivo revelado. **Resultados:** el modelo ordinal propuesto evidencia que el ingreso es una variable determinante de la felicidad, pero es secundaria frente a otras como la percepción del bienestar en salud, seguridad y trabajo. Estos resultados están en línea con los planteados en la paradoja y plantean desafíos de los planes de desarrollo donde un contexto integral de bienestar es el que logra incrementar la calidad de vida de los habitantes. **Conclusiones:** la felicidad revelada por los individuos es de tipo subjetivo, por lo tanto, puede estar influida por aspectos coyunturales al momento de la encuesta.

Palabras-clave: Economía de la felicidad; Paradoja de Easterlin; Modelo ordinal; Ingreso; Colombia.

Resumo

Objetivo: este trabalho busca verificar a relação entre renda e felicidade na Colômbia, com ênfase especial na linearidade dessa relação conhecida na literatura como o "paradoxo de Easterlin". **Metodologia:** com base em dados da Pesquisa de Qualidade de Vida de 2017 conseguiu se descobrir se a população colombiana se adapta ao paradoxo; ou seja, se o rendimento monetário influencia positivamente o bem-estar subjetivo revelado. **Resultados:** o modelo ordinal proposto mostra que a renda é uma variável determinante da felicidade, mas é secundária a outras como a percepção de bem-estar na saúde, segurança e trabalho. Esses resultados estão em consonância com os levantados no paradoxo e colocam desafios dos planos de desenvolvimento onde

um contexto abrangente de bem-estar é aquele que consegue aumentar a qualidade de vida dos habitantes. **Conclusões:** a felicidade revelada pelos indivíduos é subjetiva por natureza, portanto pode ser influenciada por aspectos conjunturais no momento da pesquisa.

Palavras-chave: Economia da felicidade; Paradoxo da Páscoa; Modelo ordinal; Entrada; Colômbia.

Introduction

The World Values Survey (WVS 2006) shows that Colombia is the second happiest country in the world, with an average per capita income of $6000 per year. The situation of violence, inequality and crime make Colombia a curious case to explain why this situation happens. A possible explanation to this is the called Easterlin paradox.

According to Veenhoven (2007), individual happiness entails important information on the quality of government-driven development models. Research on the economy of happiness is important, as the well-being of individuals positively impacts various dimensions of their lives, for example, their productivity and social coexistence (Torrecilla, 2005; Botello and Rios, 2014). Therefore, happiness is a component with significant social, political and economic connotations to be assessed in the current development model.

The results of this research could help the government to encourage or foster economic policies that promote the well-being of the inhabitants. Consequently, there is a need to research the determinants of individuals' happiness; however, there is limited robust empirical evidence in Colombia to prove this theory. Thus, this research aims at validating two hypotheses: the first is that income generates a positive effect on people's happiness, but it is not the most important component, and the second infers that from a certain threshold of increase in income, it no longer influences people's happiness.

This research contributes to the literature in two ways. Firstly, because it uses a wide base of micro-data of individuals and their satisfaction levels with various dimensions of their lives. And because a ordered *probit* model is used to determine different levels of happiness and not binomial models. The use of this model will allow us to compare the results with other findings in the literature on happiness in Latin America. Finally, the model used serves to cardinalize the factors that Colombians assess when considering their levels of subjective satisfaction, such as health, work and safety.

The proportional odds model proposed evidences that income is a determining variable of happiness, but it is secondary to others such as the perception of well-being in health, safety and work. The results are aligned to the ones proposed in the paradox and international evidence. The borderline effect of each income quantile shows that the effect of income on happiness is marginally linear, i.e. the hypothesis that, above a certain income threshold income no longer influences people's happiness, is not fulfilled.

The restrictions of this research are based on the source of information, since happiness revealed by individuals is subjective in nature, therefore, it may

be influenced by conjunctural aspects at the time of the survey. Likewise, the scope of this research may be focused on longitudinal analysis of individuals, and how their perceptions change in the face of changes in public policy applied to their individual context, family and wealth.

Theoretical Framework

Although reflections on the relationship between income and happiness had taken place in philosophical debates since the 16th century, in 1974 the economist Richard Easterlin (1974) conducted the first empirical studies aimed to quantify the contribution of income into the well-being of individuals. This line of research arose due to the main focus on issues such as economic growth, but it was neglected that people's well-being should be the main objective of economies.

In the model of consumer according to traditional microeconomics, a greater amount of income expands the border of individual's consumer possibilities by affecting budgetary constraint. This movement increases the utility experienced by the individual. Thus, a higher income impacts positively the economic well-being. In this sense, Easterlin (1974) found that while happiness grows with income, this relationship ceases to exist after a certain threshold, in short, "money doesn't buy happiness".

There were two explanations to this counterintuitive phenomenon in traditional microeconomics: The first states that people adapt to their income and possibilities. This concentration neutralizes the effect of higher incomes as expectations of consumption, and the enjoyment increase at the same rate, and happiness is maintained at the same level. The second explanation is that people compare their current income with their previous experience or their environment, therefore, through subjective assessments, their definition of happiness arises (Frank, 1985). In consequence, well-being is a personal experience that greatly depends on the social environment. This result prompted a set of research aimed at assessing the historical correspondence between income and happiness.

Literature Review

Happiness is a subjective assessment made by a person of its cognitive and affective dimensions (Diener *et al.*, 1995). The sense of freedom and control over it is associated with a positive self-assessment of this situation (Reich and Diener, 1994). Within an imbued company by material well-being, the control relates to the position of goods and services. Thus, the reason for addressing

the determinants of happiness from a point of view of wealth (Borrero *et al.*, 2013). Here, the role of Easterlin paradox comes in, and two methodological approaches have been proposed to address it.

The first approach is through macroeconomic data such as GDP growth per capita (or other measures) that affects the average level of happiness reported. Easterlin (1995), Oishi and Kesebir (2015) and Mikucka, Sarracino y Dubrow (2017) are the most recent results. These authors found evidence that economic growth increases happiness on average, but it is required to be accompanied by a reduction in inequality. With the use of micro-data, in developed countries that income surveys are combined with perception questionnaires, there has been abundant research that validates the Easterlin paradox, although ambivalent results were found due to two effects on growth and inequality (Slag, Burger and Veenhoven, 2018). While, Tella, MacCulloch and Oswald (2003) analyzed data from the United States and 12 European countries that reveal that positive developments in macroeconomic variables are associated with the reported happiness. Japan is also an example of positive partnership between income and average happiness (Stevenson and Wolfers, 2008).

Kahneman (2002) showed with data from the United States that the increased income does not behave directly with positive variations in happiness. Similarly, in Taiwan and Malaysia, Lim, Shaw and Liao (2017) found no significant evidence. Gerstenblath, Melgar and Rossi (2013) state that income has little significance on its own when it relates to the determinants of individuals' happiness. Indeed, according to Frey and Stutzer (2002) in developed countries the increase in mean income due to higher economic growth has not brought higher levels of mean happiness in the last 50 years. For this reason, control variables have been added to improve the results. Krueger and Schkade (2007) infer that a broad group of internal and external features of individuals may correlate with subjective well-being such as employment, safety or health.

Layard, del Rey y Ramírez (2005) analyzed the World Values Survey, 50 countries in four years in the *logit* model, the authors found that Europeans were happier than Americans because they have a greater facility to socialize as they work fewer hours. The control variables were: family relationships, financial situation, relationship with work, community and friends, their perception of freedom, health and personal values, among others.

In Latin America, Godoy-Jaramillo (2019) studies the determinants of happiness in Ecuador with micro-data of Latin Barometer survey 2017. The results of the proportional odds model show that the main determinant of happiness is income, so it proposes a better distribution of income through a more progressive tax system. In Colombia, empirical research has been done related to the economy of happiness (Londoño-Vélez, 2011). And among quantitative re-

search related to the hypothesis raised in this research, Pinzón-Gutiérrez (2017) studies relative poverty based on microdata of National Quality of Life Survey of the National Administrative Department of Statistics (DANE, 2011). A logit model assesses the determinants of subjective poverty. The results show that income has significant relevance in the perception of poverty, but aspects such as good nutrition, perception of safety and good social ties were also relevant aspects. These results go beyond those found in Ecuador by Godoy (2019), whose main determinant is income.

In concordance with the results of this research, Cruz and Torres (2006) applied a probabilistic model of discrete choice in which health has a positive relationship with the perception of satisfaction. The fact of being unemployed decreases the options of responding whether the conditions are good or very good by 4% and 0.5%, respectively. The correspondence of age and happiness has an inverse U relationship. Its inflection occurs around 50 years old. Human capital also offers a positive relationship with happiness due to its relationship to living condition. For each education year, the probability of being satisfied with living conditions increases by 0.07%.

Based on this review, there is a need for conducting quantitative studies that encompass happiness from a perspective beyond monetary income to validate the Easterlin paradox or not.

Methodology

Data

Micro-data of Quality of Life Survey (QLS) 2017 conducted in Colombia by the DANE (2017). The survey of physical conditions of individuals such as their home, acquisition of household-sized property, etc. Likewise, an overview of socioeconomic features of individuals (age, gender, educational level and income, among others) was obtained. Finally, individual's perceptions as satisfaction with employment, health, safety and life were asked about. The 32 departments of the country were covered. This research used data from people who had reported all survey responses related to the perception module with a total of 15.2 million participants.

Table 1. Average of Chosen Variables

Gender	Age	Deviation	Per capita income	Deviation	Home size	Number
Man	46	15.7	1,057,284	2,004,597	3.34	9,581,092
Woman	49	16.8	984,622	2,105,796	3.07	5,618,847
Total	47	16.1	1,030,424	2,042,899	3.24	15,199,939

Source: Authors' based on QLS from DANE (2017)

According to QOL in this research, men have a mean of 46 years versus 49 years for women. The mean income per household is 1 million pesos with a mean household size of 3.24 people.

For this research, the variable of interest corresponds to the levels of happiness self reported by the individual. It is reported from 0 to 10 for implementation in this research; these levels are summarized in five levels from 0 to 5. This organization favored the optimization of the model and interpretation of results. The different mean levels of happiness are distributed according to income levels.

Table 2. Percentage of Population at Each Happiness Level and Income Quantile

Level of happiness	Income quantile					Total
	1	2	3	4	5	
0	3.42	2.11	1.83	2.01	1.14	1.93
1	2.50	1.79	1.48	1.02	0.99	1.43
2	5.72	4.18	3.17	2.93	2.05	3.30
3	15.64	14.46	13.02	10.44	8.21	11.64
4	37.29	38.52	38.71	38.38	37.07	37.94
5	35.41	38.94	41.80	45.22	50.54	43.76

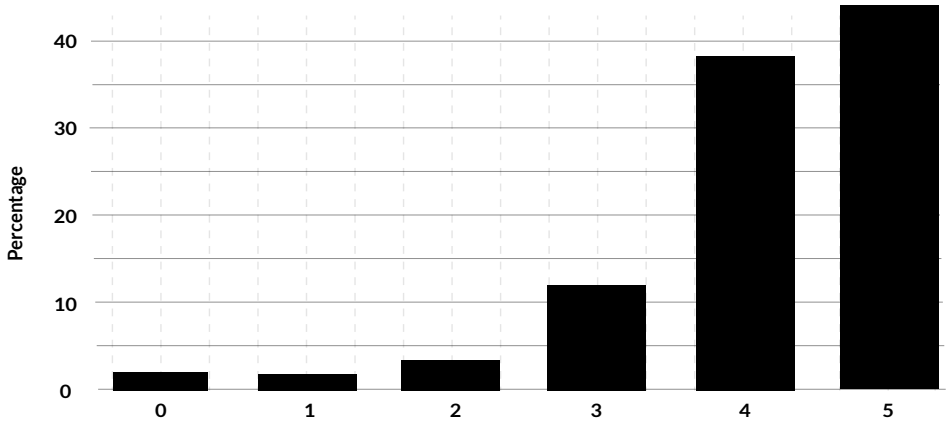
Source: Authors' Based on QLS from DANE (2017)

Descriptive analysis shows that 80% of the population has the highest levels of observed happiness (4 and 5). In the case of the high quantiles (4 and 5),

45% and 50% of the population is at the highest level of happiness. The nature of the variables identified in the QLS demonstrates the use of models to be adapted to the set of explanatory variables.

Now, the proportional odds model is used to identify the effect of income on the level of happiness in Colombian population. Figure 1 shows the target variable that is sequential ordinal.

Figure 1. Distribution of the Dependent Variable in Colombia.



Source: Authors' Own Elaboration Based on QLS from DANE (2017).

Proportional odds models are a type of probabilistic estimation based on the existence of a continuous latent variable (Y*) which cannot be observed, but determines the observed dependent variable(Y) (Williams, 2006). This process also assumes Y as discrete and Y* nature is divided in cut-off points with a statistically significant difference among them. This can be represented as:

$$\begin{aligned} Y_1 &= 1 \; si \; Y^* \leq \kappa_1 \\ Y_2 &= 1 \; si \; \kappa_1 \geq Y^* \leq \kappa_2 \\ Y_3 &= 1 \; si \; Y^* \geq \kappa_2 \end{aligned} \qquad (1)$$

A lineal regression model served for the estimation on Y* variable:

$$Y^* = \sum_{k=1}^{K} B_k X_{Ki} + \varepsilon_i \;\; Si \rightarrow \;\; Z_i = \sum_{k=1}^{K} B_k X_{Ki} \Rightarrow Y^* = Z_i + \varepsilon_i \qquad (2)$$

Where i corresponds to each one of the observations in the dataset, K is the number of control variables and ε is the error. The proportional odds model demands a transformation of the expected value in the equation (1) as follows:

$$Z_i = \sum_{k=1}^{K} B_k X_{Ki} = E(Y^*) = P(\kappa_{i-1} \geq Y^* \leq \kappa_i) \qquad (3)$$

The function of Z_i takes the form of a logistic curve expressed in the following equation:

$$P(\kappa_{i-1} \geq Y^* \leq \kappa_i) = \frac{1}{1 + exp\,(Z_i - \kappa_i)} - \frac{1}{1 + exp\,(Z_i - \kappa_{i-1})} \qquad (4)$$

The impact of the coefficients obtained will depend on the influence of the amount of data to be placed within each of the categories of the target variable. The equation to be calculated in this study had an ordinal variable as dependent with six intervals based on a group of control variables that are related to the individuals' socioeconomic characteristics:

The control variables were:

- Income quintile: indicates the segment of the per capita income of the interviewee. This means the income distribution is divided into 5 intervals and a categorical variable is given to identify each individual within each one of groups.

- Health indicator: on a scale from one to five, and individuals evaluate the degree of satisfaction of their health condition.

- Work indicator: on a scale from one to five, and the individuals evaluate the degree of job satisfaction.

- Perception of security: on a scale from one to five, and individuals evaluate the degree of safety in their community.

- Type of dwelling: inquires as to whether the interviewee lives in a house, apartment or room type dwelling.
- Age: How old the interviewee is.
- Department: Where the interviewee lives.
- Gender of the interviewee
- People living in the same dwelling: Number of people living in the same dwelling.

Level of education: the highest level reached according to the Colombian education system.

The independent variable is categorical (income) that seeks to test the hypotheses of Easterlin Paradox.

$$P(\kappa_{i-1} \geq Y^* \leq \kappa_i) = f(Z_i) = \sum_{k=1}^{K} B_k X_{Ki} \qquad (5)$$

Where X_K is the vector of independent variables. The coefficients (B_k) show the change in the logarithm of the odds-on Y against a change in the unit of measurement of the variable X associated with the respective coefficient. An invlogit function of equation 3 must be used to obtain the marginal effects. The StataCorp (2013) software is used for the estimates previously appointed.

Results

Table 4 shows the results of the ordinal model estimates showing the marginal effects of each one of the independent variables on the probability of being in the highest reported happiness interval (PENF). In terms of the global fit, the model is acceptable considering that all the variables introduced showed statistical significance levels of 5% and according to the R^2 the model manages to explain 10% of the variance of the dependent variable.

Table 3. Results of the Ordinal Model Estimates. Colombia 2017

Variables	Evaluated characteristic	Marginal Effect	Error	Base characteristic
Income quantile	2	0.0456***	(0.00109)	1
	3	0.0855***	(0.00110)	
	4	0.134***	(0.00113)	
	5	0.207***	(0.00127)	
Health indicator	1	0.109***	(0.00545)	0
	2	0.319***	(0.00476)	
	3	0.499***	(0.00462)	
	4	0.712***	(0.00460)	
	5	1.115***	(0.00463)	
Work indicator	1	0.0505***	(0.00292)	0
	2	-0.0305***	(0.00247)	
	3	0.114***	(0.00221)	
	4	0.391***	(0.00218)	
	5	0.862***	(0.00225)	
Perception of security	1	0.0782***	(0.00345)	0
	2	0.0324***	(0.00295)	
	3	0.111***	(0.00277)	
	4	0.176***	(0.00273)	
		0.432***	(0.00278)	
Type of dwelling	Apartment	0.0212***	(0.000704)	House
	Room(s)	-0.0712***	(0.00193)	
	Aboriginal	-0.113***	(0.00375)	
	Others	-0.197***	(0.00978)	
Age^2		0.0455***	(0.000500)	Continuous

Variables	Evaluated characteristic	Marginal Effect	Error	Base characteristic
Department	Atlántico	-0.0507***	(0.00163)	Antioquia
	Bogotá, D.C.	-0.0995***	(0.00111)	
	Bolívar	-0.106***	(0.00164)	
	Boyacá	0.0484***	(0.00195)	
	Caldas	-0.0114***	(0.00264)	
	Caquetá	0.0323***	(0.00271)	
	Cauca	-0.0881***	(0.00184)	
	Cesar	0.148***	(0.00261)	
	Córdoba	0.144***	(0.00195)	
	Cundinamarca	-0.0923***	(0.00141)	
	Chocó	0.0358***	(0.00307)	
	Huila	0.131***	(0.00216)	
	La Guajira	-0.00775***	(0.00267)	
	Magdalena	0.0980***	(0.00259)	
	Meta	0.0297***	(0.00220)	
	Nariño	-0.0748***	(0.00177)	
	Norte de Santander	0.0967***	(0.00210)	
	Quindío	0.0101***	(0.00288)	
	Risaralda	-0.0233***	(0.00240)	
	Santander	0.0904***	(0.00168)	
	Sucre	0.0878***	(0.00273)	
	Tolima	-0.0214***	(0.00200)	
Departamento	Valle del Cauca	0.0235***	(0.00135)	Antioquia
	Arauca	0.117***	(0.00383)	
	Casanare	0.127***	(0.00382)	
	Putumayo	-0.116***	(0.00280)	
	Archipiélago de San Andrés	-0.332***	(0.00561)	
	Amazonas	0.0757***	(0.00675)	
	Guainía	-0.0507***	(0.00946)	
	Guaviare	-0.0280***	(0.00564)	
Gender	Female	-0.0425***	(0.000635)	Male

Variables	Evaluated characteristic	Marginal Effect	Error	Base characteristic
People living in the same type of dwelling	2	0.0789***	(0.00102)	1
	3	0.0571***	(0.00102)	
	4	0.102***	(0.00108)	
	More than 5	0.0649***	(0.00112)	
Level of education	Preschool	-0.160***	(0.0110)	None
	Primary school	-0.0717***	(0.00132)	
	Secondary school	-0.0450***	(0.00153)	
	Middle school	-0.0620***	(0.00146)	
	Technician with a diploma	-0.0255***	(0.00185)	
	Undergraduate degree	-0.0686***	(0.00173)	
	postgraduate degree	-0.0677***	(0.00211)	
Constant 1		0.693***	(0.00484)	
Constant 2		0.948***	(0.00482)	
Constant 3		1.316***	(0.00484)	
Constant 4		2.004***	(0.00487)	
Constant 5		3.222***	(0.00493)	

Observations	14,724,495
R2	0.09955

Source: Authors' Estimates

Standard errors in parentheses. | *** p<0.01, ** p<0.05, * p<0.1

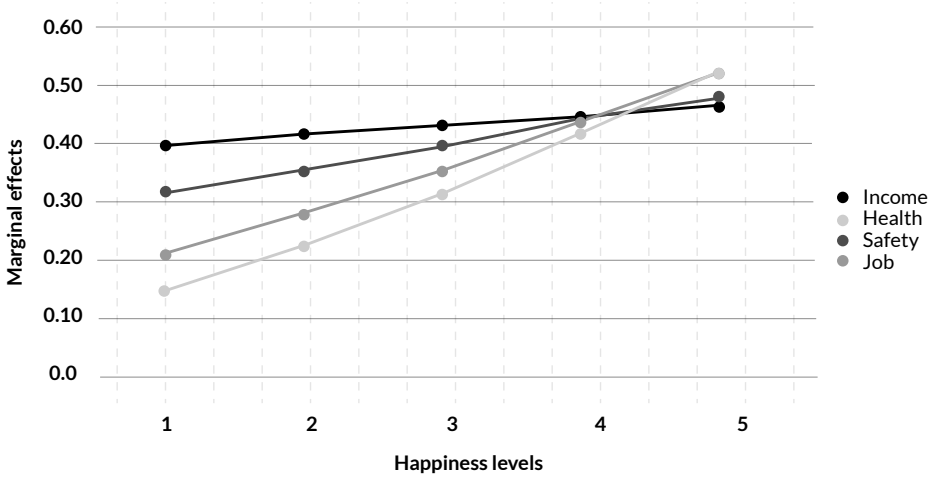
For the interpretation of the results, the marginal effect in the continuous variables is equivalent to the percentage in which the probability of being placed increases, given a change of 1% in the independent variable of analysis. For example, an increase in the square of the individual's age affects the probability of being very happy by 0.04%. For the categorical variables, the marginal effect measures the change in the probability of being at the highest level of happiness compared to the base characteristic; for example, people who live in

apartments are 0.02% more likely to be at happiness level 5 (PENF) compared to those who live in a house.

With respect to the main hypothesis and in agreement with international evidence, individuals with higher incomes show higher levels of happiness on average. People in income quantile 5 are 0.2% more likely to be in PENF. According to these same data, the hypothesis of Kahneman (2002) in which to some extent wealth increases happiness and then it is maintained, it would not apply because the marginal change between quantiles remains constant. Moving on to the second hypothesis, on the importance of income, its effect is compared with the other conditions perceived by the individual. Figure 1 shows that individuals placed at level 5 of happiness, having a good job, safety and health outweigh quantile 5 of income. Therefore, the Easterlin Paradox is validated. It states that money does not achieve happiness in its entirety, but it must be supplemented with other aspects of life.

For the control variables, men report being happier than women, in agreement with international evidence results (Lykken and Tellegen, 1996). Social capital is also positively associated with the perception of individuals, since single-person households have a probability of -0.07% of PENF. To this respect, people with higher levels of education have -0.06% of PENF compared to those with no education level. Likewise, significant geographical differences are shown.

Figure 2. Marginal Effects by Dimensions Between Happiness Levels. Colombia 2017



Source: Authors' Based on the Estimates of the Ordinal Model.

Conclusions

Happiness is a complex phenomenon that develops in the individual and social sphere; however, according to Veenhoven (2007), happiness implies paramount information about the quality of development models fostered by governments. For this reason, the so-called "economics of happiness" has aimed at researching its determinants in terms of material perspective of individuals. Within these studies there has been an interest in the Easterlin Paradox. This states that the relationship between income levels and happiness is not proportionally positive, that is, an increase in income does not correlate with changes in happiness, consequently, there are other determining factors that individuals consider in their perception of quality of life.

This research explored, based on data from the 2017 Quality of Life Survey in Colombia, on this paradox, that is, on the role of income in the well-being of the Colombian population. This proposed ordinal model showed that income is a determining variable of happiness, but secondary to others such as the perception of health, safety and work. These results are in agreement with those raised in the paradox and in the international evidence. Another interesting result is that the marginal effect of each income quantile shows that the effect of income on happiness is marginally linear, that is, the hypothesis as of a certain income threshold is not fulfilled. It does not have an influence on people's happiness.

The limitations of the present study are based on the source of information, because the state of happiness revealed by individuals is subjective, therefore, it may be influenced by specific circumstances at the time of this survey. Likewise, future research may be focused on longitudinal analysis of individuals and how their perceptions are different considering changes in public policy of their individual, family and wealth contexts.

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