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RESEARCH PAPER

Happiness and Victimization in Latin America

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Abstract This study examines the effect that crime victimization has on Latin American citizens' life satisfaction. The data comes from the Americas Barometer Survey of 2014, a public opinion project that collects self-reported measures of life satisfaction. To overcome some of the methodological issues faced by previous studies, a generalized ordered logit with partial constraints is used to examine the existence of a relationship. The results reinforces the negative association between being a victim of a crime and an individual's level of life satisfaction as found by previous studies. It also supports previous findings showing that what matters is being a direct victim of a crime rather than living in a country with high homicides rates. In both cases, the size of the relationship differs by country.

Keywords Crime · Happiness · Life satisfaction · Generalized ordered logit

JEL Classification I3 · K42 · D62

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1 Introduction

In the World Happiness Report of 2015, an individual's happiness was defined as an indicator of social progress, which implies that the level of happiness can be used by policy makers to evaluate policies addressed to improve their well being.[1] The first question that arises is how to define it and measure it. From an objective perspective, happiness is defined as a set of real time measures of experiences. Such measures can be stored and aggregated to yield a measure of objective well-being anchored to present experiences (Kahneman 1999). In contrast, subjective happiness is understood as a subjectively experienced feeling or a happiness state measured through an individual's self-reported level of life satisfaction (MacLeod 2015). Under this approach, individuals can judge their happiness status by considering events or experiences affecting it (Alexandrova 2005). In recent decades, self-reported measures of life satisfaction have become available leading towards a subjective approach regarding the study of happiness. Moreover, there are social and economic factors that do not only affect happiness but that might be affected by policy makers. But, which are those factors?

For many decades, policy makers have centered their attention on raising income as a way to improve social welfare. Though, previous studies have failed to support this hypothesis. Frey and Stutzer (2002) show that, even though countries like the United States, Belgium and Japan have experienced a substantial growth in their income per capita, the individuals' level of life satisfaction have not followed the same trend. Furthermore, Easterlin (2004) finds that, besides income, there are additional variables that determine individiual's subjective well-being. Likewise, the study by Frey and Stutzer (2002) examined the role of past experiences, sickness, marriage and divorce. An individual's safety starts to be considered as a life satisfaction determinant through the use of different proxies, such as an individual's victimization. As a recognized public good, safety is always a priority for policy makers.

The aim of this study is to analyze the effect that being a victim of a crime has on the life satisfaction of individuals living in Latin America, a region characterized by its higher levels of violence. In fact, after the end of the Cold War, many countries around the world experienced a continous drop in their crime rates, but the opposite trend has been maintained by Latin American countries. In 2015, the region reached a homicide rate of 24 deaths per 100,000 inhabitants (four times the global average), i.e., the highest rate among all regions in the world. Similarly, as shown in Fig. 1, eight out of the ten most violent countries in the world are from Latin America.

The higher the levels of crime are, the higher the costs faced by the region and its inhabitants. Jaitman et al. (2017) classified the costs of crime in three different groups: social costs, private costs, and government (public) costs. Expenditure in police and private security are classified as public and private costs, respectively. Costs associated to repair victims (e.g., hospital costs, judges, etc.) are among the social ones.

Crime related costs are higher in Latin America in comparison to developed economics (see Fig. 2). The pattern of higher costs is followed by most of the countries within the region (Fig. 3). Nevertheless and despite the higher levels of expenditure, neither the crime rates nor the safety indicators have improved (Jaitman et al. 2017).

[1] It is a common practice in the literature to use *welfare* to denote longer term happiness, but it is often used interchangeably with *happiness.*

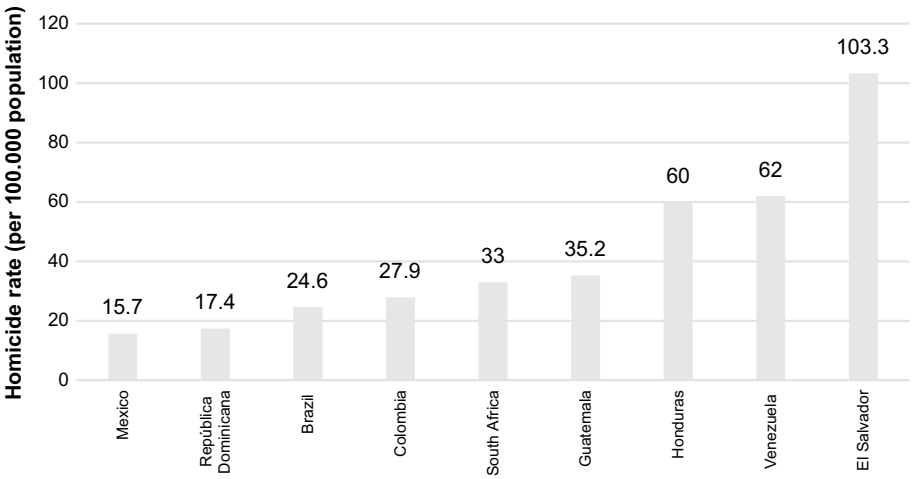

Fig. 1 Countries with the Highest Recorded Homicide rates in the World (2015). *Source*: Jaitman et al. (2017). Data from UNDC

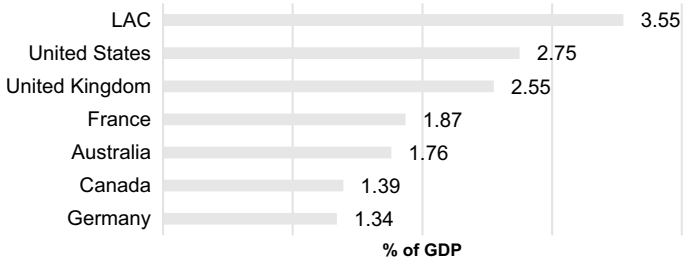

Fig. 2 Crime Related Costs—LAC vs Developed countries. *Fuente*: Jaitman et al. (2017)

Fig. 3 Crime Related Costs some LAC countries. *Fuente*: Jaitman et al. (2017)

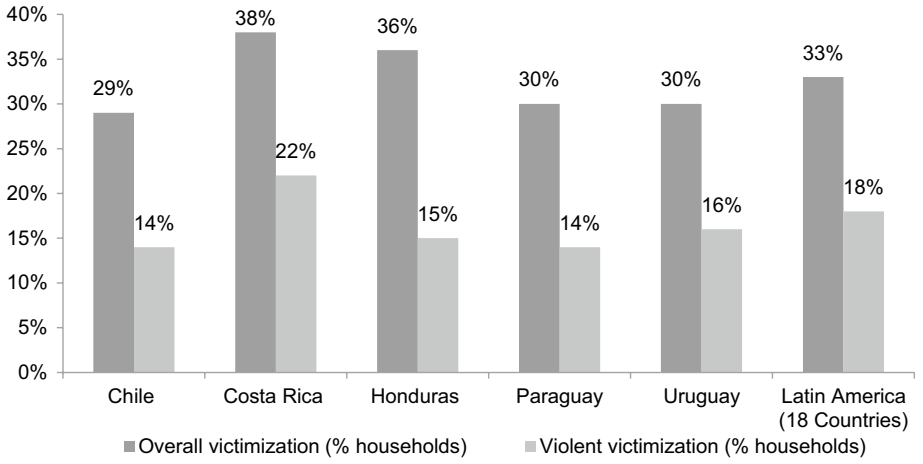

Fig. 4 Victimization rate in Latin America. *Source*: Jaitman et al. (2015) using information from Lagos and Dammert (2012)

The increase in social costs also reveal the higher levels of victimization, placing an individual's safety among the main concerns of policy makers. According to Di Tella et al. (2008), the Latin American region has the second highest rate of victimization in the world, outranked only by sub-Saharan Africa. Only within the region, one out of three households have been victims of a crime (see Fig. 4) and 18% have experienced a violent one (as reported by Lagos and Dammert (2012) and cited by Jaitman et al. 2015). In 2014, when Latin American citizens were asked about the most serious problem faced by their country, delinquency and crime were the categories answered by 23% of the respondents, followed only by a country's economic situation as answered by 15% of the respondents (see Fig. 5).[2]

Moreover, when looking at aggregate figures of happiness, most countries in the region are ranked among the top 50 happiest countries in the world as measured by the Annual World Happiness Report[3] (Helliwell et al. 2016). According to the previous stylized facts we would be facing a paradox: countries with higher levels of criminality are the ones reporting higher levels of happiness. This association deserves further attention, specially in the Latin American context. Thus, any evidence aimed to understand how an individual's happiness is affected, would provide better insights of how individuals understand their well being (as measured by their levels of happiness or life satisfaction).

In this study we examine the association between crime victimization and life satisfaction for Latin American citizens, contributing with additional evidence between crime victimization and life satisfaction using data for Latin America. By using a generalized

[2] This figure is built using a sample of 28,874 individuals who participated in the LAPOP survey in 2014, Fig. 1a reports the frequency of each possible answer to the question, "*In your opinion, what is the most serious problem facing this country?*".

[3] Following the World Happiness Report (2016) the following countries are among the first 50 with the highest levels of happiness (rank position in parenthesis): Costa Rica (14), Brazil (17), Mexico (21), Chile (24), Panama (25), Argentina (26), Uruguay (29), Colombia (31), Guatemala (39), El Salvador (46), Nicaragua (48).

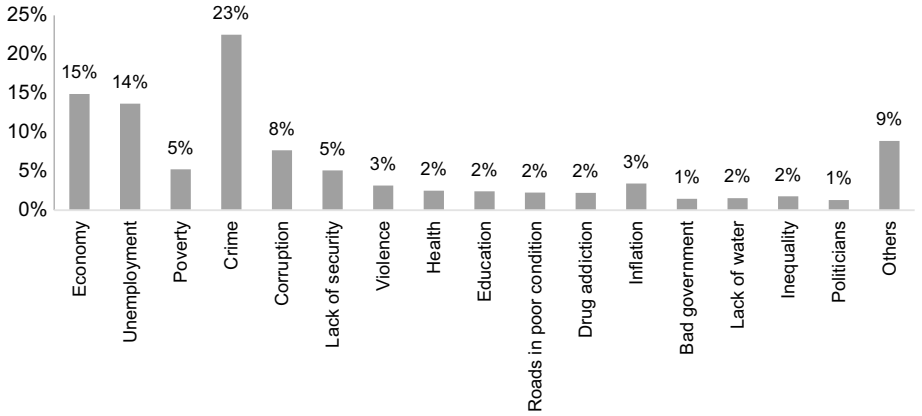

Fig. 5 What is the most serious problem facing this country? *Source*: Authors' calculations based on LAPOP 2014. It corresponds to the percentage of individuals in Latin-American countries stating each category as the most serious problem faced by each country

ordered logit approach, it also overcomes the methological issues faced by previous studies when examining the association between happiness and victimization. The data used comes from the Americas Barometer Survey of 2014. The question used to define victimization is whether an individual has been victim of a crime in the past 12 months or not. While assessing an individual's well-being, a self-reported measure of life satisfaction was used. The results suggests that after controlling for individuals' characteristics (e.g., age, education, ethnicity, income, etc.), having been a victim of a crime in the last 12 months diminishes the probability reportinh the highest level of life satisfaction in each of the countries considered. The paper is organized as follows. Section 2 presents a review of the main studies on an individual's life satisfaction and its relationship with crime and victimization. Section 3, describes the data used for this analysis. The empirical approach is discussed in Sect. 4, while the results are reported in Sect. 5. Section 6 concludes.

2 Empirical Evidence of the Effects of Victimization on Individual's Life Satisfaction

Economists began studying happiness at the end of the twentieth century once survey information arrived with alternatives to measure it. Focusing on the subjective well-being approach, economists began to provide new insights into the determinants of well-being and its measurement.

One of the first studies relating happiness and economic variables was the one by Easterlin (1974) who examined the association between happiness and income using data for different countries between 1946 and 1970. Even though the study found a positive and significant association between income and a country's level of happiness, its causality was not always strong. Among the main findings of this study, an interesting pattern arised: despite a considerable increase in a country's per capita income, no similar trend was observed on an individuals' levels of happiness, inconsistency known as Easterlin's Paradox (Di Tella and MacCulloch 2008).

Not to mention, Di Tella et al. (2003) examined the role of macroeconomic variables on individuals' life satisfaction using data from Europe and the United States. The authors show that changes in macroeconomic variables were related to changes in individuals' levels of life satisfaction. While GDP growth was related to higher levels of life satisfaction, the unemployment rate was associated with lower levels of it. They also observed that changes in life satisfaction due to increases in income vanished with time, which reflect the appearance of people's indifference once they get used to a particular level of income.

Withal, several studies started to examine the explanatory power of non-economic variables when explaining an individuals' well-being. Cohen (2008) analyzed the effects of crime on self-reported levels of life satisfaction for the U.S. between 1993 and 2004. The study uses an indicator variable for whether a person reports being victim of robbery or burglary to explain patterns of life satisfaction. As a result, both being a victim of a crime and safety perceptions are negatively associated to individuals' levels of life satisfaction. It also shows that victimization is the best variable to explain changes in life satisfaction as a consequence of crime.

The association between both variables was also examined by Staubli et al. (2014) using data for Switzerland. Even though, a negative association arised, more significant effects were found for crimes affecting the individual in a direct manner, such as sexual offenses. They also observe a high correlation between life satisfaction and an individual's perception of security in his own neighbourhood.

Accordingly, Powdthavee (2005) had similar findings. Using alternative crime measures with South African data, he finds that for individuals living in areas with higher crime levels the effect of victimization on life satisfaction is negligible as individuals become indifferent to a crime event. Medina and Tamayo (2012) have a related discovery as they show that homicide rates, perceptions of a neighbourhood's security and being a robbery victim have a negative effect on self-reported levels of life satisfaction. They came to this results when neighbourhoods in Medellin, the second largest city of Colombia. This pattern was also observed when studying rural areas [see Wills-Herrera et al. (2011)].

Di Tella et al. (2008) using data from different countries around the world, relate crime patterns with subjective and objective measures of happiness. While subjective well-being was measured using a Cantril Ladder[4] with steps numbered 0 through 10 (being 10 the best possible situation), objective well-being was built as an indicator variable expressing the desire of an individual wanting to have more days like the day before. According to the authors, such consideration would have less subjective elements than the previous scale. Data used came from the Gallup World Poll of 2006 and 2007.

Ditella et al. (2008) report three sets of results: one for the whole set of countries in the sample and two more separating Latin America from the rest of the world. Among the main findings, the authors report a negative association between being a crime victim and objective measures of an individual's well-being. Meaning that victimization decreased the desire of wanting more days like the day before. The relationship was found to be statistically significant and of a magnitude as large as the effect of being employed. Even though the negative association was also found when restricting the analysis to Latin America, it was not the case for subjective measures of individuals' well-being. This suggest that, even

[4] "Individuals place themselves regarding how they feel about their life right now on an imaginary ladder with steps numbered from 0 at the bottom to 10 at the top, where the top represents the best possible situation and the bottom the worst possible situation. Thus, this variable ranges between 0—the worst possible situation- and 10 –the best possible situation." (Ditella et al. 2008, p. 44).

though there is a negative response in one's well-being due to victimization, the nature of the response differs between Latin America and the Rest of the World.

Following the previous evidence, special consideration needs to be given to alternative definitions of an individual's well-being and its relationship with their victimization. As Di Tella et al. (2008) pointed out, empirical studies linking victimization and life satisfaction using economists' approach are fewer when contrasting them to those conducted by other disciplines, which is one of the goals of this study.

3 Data

The data used came from the Americas Barometer, a survey created by the Latin America Public Opinion Project (LAPOP), a public opinion and social behavior survey administered annually in various Latin American countries since 2000 (Vanderbilt University 2016). The 2014 round of the survey emphasized questions related to crime and violence in each country (Zechmeister 2014). To study the association between crime victimization and life satisfaction this study uses a sample of countries in Latin American and the Caribbean representing more than 93% of the region's population, and more than 97% of region's GDP. Those countries are Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, Uruguay and Venezuela.

The study uses an indicator variable for whether an individual has been a victim of a crime in the previous 12 months and a self-reported measure of life satisfaction. According to Kahneman and Krueger (2006), a subjective measure of life satisfaction is useful with some caveats. While it is not a verifiable or known fact, it is rather "a global retrospective judgment […] determined in part by the respondent's current mood and memory, and by the immediate context" (Kahneman and Krueger 2006). Regarding the first issue, the authors consider that, on average, if the surveyed sample is representative of the population, the idiosyncratic effects of recent events are not significant. This suggests that for the present study this issue has already been addressed. Furthermore, self-reported satisfaction may also be biased due to earlier questions in the survey. This source of bias would be absence in this study since the question of life satisfaction is the second one in the survey. It is preceded only by the question asking for the individual's year of birth. The exact question is phrased as follows: "*To begin, in general how satisfied are you with your life? Would you say that you are: (1) very satisfied, (2) somewhat satisfied, (3) somewhat dissatisfied, (4) very dissatisfied*".[5]

The sample consists of 18 countries[6] representing more than 93% of Latin America and the Caribbean's population in 2014 and more than 97% of the region's GDP in the same year.[7] This accounts for 28,874 individuals. Except for Bolivia, which contributes with 10% of the sample, each country countributes with 5% of it (see Table 1).

Table 2 reports some statistics of the main variables used in the analysis. The raw measure of life satisfaction is 3.3, suggesting that most of the respondents placed themselves in levels of life satisfaction that are above the average. In fact, 44.8% report being "somewhat

[5] Options for *doesn't know/doesn't answer* are also included among the list of answers.

[6] These data, administered by the Latin American Public Opinion Project at Vanderbilt University, were freely accessed. The project does not take responsibility for any interpretation of the data.

[7] The countries included account also for the highest participation rate in the region's GDP.

Table 1 Sample taken from LAPOP 2014 by country. *Source*: Authors' calculations based on LAPOP 2014

Country	Frequency	%	Country	Frequency	%	Country	Frequency	%
Argentina	1512	5.24	Dominican Republic	1520	5.26	Nicaragua	1546	5.35
Bolivia	3066	10.62	Ecuador	1489	5.16	Panama	1508	5.22
Brazil	1500	5.19	ElSalvador	1512	5.24	Paraguay	1503	5.21
Chile	1571	5.44	Guatemala	1506	5.22	Peru	1500	5.19
Colombia	1496	5.18	Honduras	1561	5.41	Uruguay	1512	5.24
Costa Rica	1537	5.32	Mexico	1535	5.32	Venezuela	1500	5.19
Total	28,874							

Table 2 Descriptive statistics of variables. *Source*: Authors' calculations based on LAPOP 2014

Variable	Mean	SD	Variable	Mean	SD
Life satisfaction	3.309	0.726	Victim	0.195	0.396
Woman	0.516	0.500	Ethnic group		
Age	40.741	16.109	White	0.282	0.450
Education (years)	9.422	4.489	Black	0.041	0.198
Marital status			Multatto	0.065	0.247
Single	0.301	0.458	Mestizo	0.488	0.500
Married	0.593	0.491	Indigenous	0.110	0.313
Divorced	0.059	0.235	Other	0.014	0.117
Widowed	0.046	0.209	Neighborhood safety		
Family income			Very unsafe	0.135	0.342
Low	0.335	0.472	Somewhat unsafe	0.314	0.464
Medium	0.331	0.470	Somewhat safe	0.401	0.490
High	0.335	0.472	Very safe	0.145	0.352
Unemployed	0.051	0.219	Attends weekly meetings		
Children (numbers)	2.214	2.195	Non-religious	0.077	0.267
Intentional homicides	22.274	20.818	Religious	0.323	0.467
log GDP per capita PPP 2013	9.333	0.491	Drinking water	0.860	0.347
Urban area	0.721	0.448	Observations	28,874	

satisfied" and 44.2% report being in the highest level of life satisfaction. In contrast, only 2.33% of the individuals surveyed report being "very dissatisfied" with life. Regarding crime victimization, 19.5% of the respondents claim to have been victims of crime in the last 12 months[8] and 47.9% of them are women. Approximately 54.6% of respondents have a sense of safety in their own neighborhoods. In addition, the average rate of intentional homicides per 100,000 inhabitants is 22.

[8] The question on the LAPOP 2014 states, "*Now, changing the subject, have you been a victim of any type of crime in the past 12 months? That is, have you been a victim of robbery, burglary, assault, fraud, blackmail, extortion, violent threats or any other type of crime in the past 12 months? (1) Yes (2) No (88) DK (98) DA*".

Women account for 51.6% of the sample. The average age of individuals in our sample is 41. The average years of education is 9, which is equivalent to not complete secondary education. With 4.5 years being the standard, the higher the levels of heterogeneity of indivdiuals' level of education within the region. 59% of respondents report being married, cohabitating or living in a civil union; 30% are single; 6% are separated or divorced and 5% are widowed. On average, individuals report having two children. Most of individuals live in urban areas (72%) and 86% have access to drinking water in their homes. Regarding their economic activity, 53% of individuals in the sample are employed, and 5.1% of the respondents report being unemployed or searching for a job. 32% of respondents attend weekly religious meetings and a smaller fraction (8%) attend non-religious ones.

Regarding ethnicity, 48.8% of the sample consider themselves to be Mestizo, the predominant race in Mexico, El Salvador, Honduras, Nicaragua, Panamá, Colombia, Ecuador, Bolivia, Peru, Paraguay and Dominican Republic. 28.2% consider themselves to be White, the dominant ethnic group in Costa Rica, Chile, Uruguay and Argentina. Even though only 6.5% consider themselves to be Mulatto, this is the predominant answer among Brazilian respondents (46%). 11% of all respondents classify themselves as indigenous, specially if living in Guatemala where 52% of the population identify themselves as such.

Since the survey uses sixteen categories to classify individuals according to their income level, we follow Di Tella et al. (2003) and group individuals into three categories according to their own placement within their own country's categories. After sorting individuals from the lowest to the highest level of income, the first 33% of them are defined as low-income individuals, the following 33% are classified as middle-income ones and the remaining 33% are among high income individuals (see Table 2). We expect such indicators to be enough to understand the role of income on individual's happiness. In fact, previous findings show that what matters for happiness is not individual's absolute wealth but relative to others (Easterlin 2004). In that context, it is more important for individuals whether they are richer or poorer than their compatriots, rather than their level of wealth in comparison to individuals living in different countries. In this way the income variable becomes comparable across countries.

Figure 6 relates the two variables of interest using our data. The figure suggests a negative association between life satisfaction and victimization. Countries with higher proportion of victims of crime have lower proportions of individuals placing themselves in the maximum level of life satisfaction.

4 Methodology

The true level of life satisfaction is a latent variable, i.e., not observed in the data, in contrast to the self-reported question of life satisfaction that individuals answer. The question, as previously explained, is a categorical variable taking the values 1–4, going from very dissatisfied (1) to very satisfied (4). Due to the nature of this variable, the effect of victimization on life satisfaction is generally studied in the literature using an ordered probit or logit model. We find this models to be inaccurate in this case due to the parallel regression or proportional odds assumption. It assumes the coefficients explaining the dependent variable odds on taking the value of any category are the same. To check whether this is the case, the Brant test is used (Brant 1990). After rejecting the hypothesis of equal coefficients, the generalized ordered logit model is the most suitable one to study the relationship between victimization and life satisfaction (Greene and Hensher 2010).

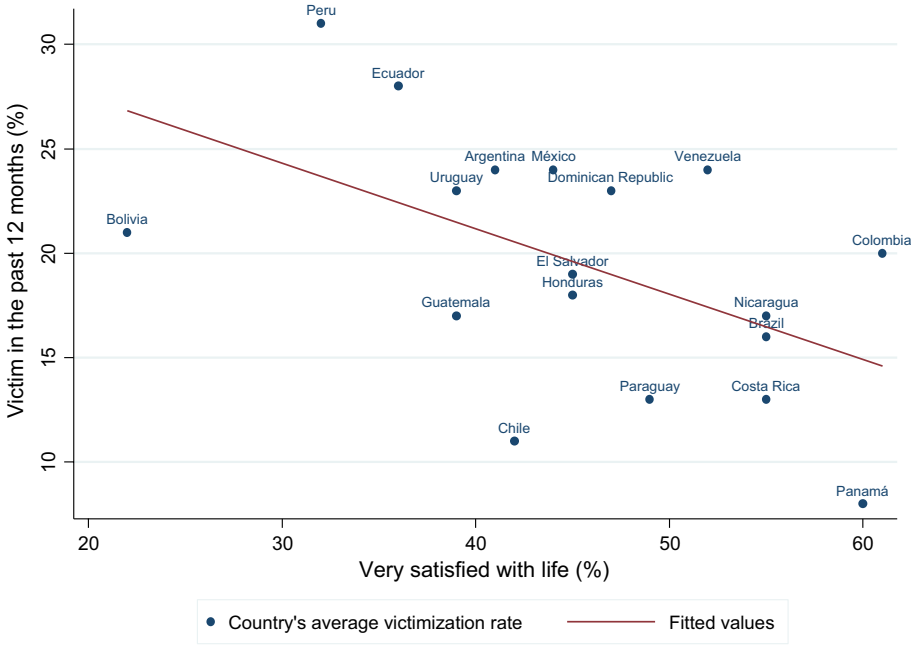

Fig. 6 Percentage of crime victims and proportion of individuals in the maximum level of life satisfaction. *Source*: Authors' calculations based on LAPOP 2014

We use the generalized ordered logit with partial constraints or proportional odds model, as proposed by Williams (2006). This is a multinomial response model derived from the ordered logit that does not impose the proportional odds assumption but allows some variables to meet the conjecture. Results are interpreted based on the marginal effects of each variable's change on the probability that individuals rate their level of life satisfaction to be "very high".

The model is specified as follows:

$$P(Life\ Satisfaction_i > j) = \frac{\exp(\alpha_j + Victim_i\beta_1 + X_{2i}\beta_2 + X_{3i}\beta_{3j})}{1 + \{\exp(\alpha_j + Victim_i\beta_1 + X_{2i}\beta_2 + X_{3i}\beta_{3j})\}}, \quad j = 1, 2, 3, 4. \tag{1}$$

where $Life\ Satisfaction_i$ is an ordered categorical variable that takes the values 1–4, being 1 the lowest level of life satisfaction and 4 the highest one for the i-th individual in our sample. X_{2i} and X_{3i} are vectors containing sociodemographic controls such as gender, age, years of education, employment status, ethnic group, number of children at home, family income, marital status, etc. It also includes dummies that capture the specific characteristics of each country in the sample. The explanatory variable $Victim_i$ is a dummy variable that equals one (1) if an individual reports being a victim of any crime (e.g., robbery, burglary, assault, fraud, blackmail, extortion, violent threats, among others) in the last 12 months.

As previously stated, the generalized ordered logit with partial constraints allows some variables to meet the proportional odds assumption. That is, for some explanatory variables, the β coefficient must vary for each possible outcome while for others, it may be correctly restricted. Adding these restrictions reduces the number of parameters to be

estimated and results in a more parsimonious model. In Eq. (1), X_{2i} is a vector of explanatory variables in which coefficients are restricted to be equal for each value of Y (i.e., the effect of each explanatory variable is constant for all categories of life satisfaction). X_{31} includes the variables for which the constraint is not maintained; i.e., the associated parameters to this vector of variables vary across all values of Y.

To determine the variables for which the proportional odds assumption holds, an iterative process that begins by estimating the previous model without restrictions is used. This is one where X_{2i} is a null vector. The model estimates $M-1$, binary logit models (being M the number of categories of Y, i.e., 4). For each iteration, a Wald test is used to verify whether the coefficients are statistically significant across regressions. If the statistic is not significant for at least one variable, it restricts the variable with the least significant value. The model is estimated again, including the new restriction. It tests each iteration until the test is significant for all the remaining set of variables. As previously stated, the parameters of interest are not the β coefficients. It rather focusses on how the probability of obtaining a specific value for Y varies with changes in the explanatory variables, i.e., the marginal effects.[9]

5 Results

Table 3 reports the marginal effects[10] of the generalized ordered logit,[11] i.e., how the probability of being in the highest level of life satisfaction (level 4) changes when one of the variables used as controls varies. The estimates from Column (1) show that being victim of a crime in the last year reduces the probability an individual report being in the highest level of life satisfaction by 3 ppts. An effect that is similar to the reduction in life satisfaction when losing a partner (widow and divorce individuals). Being unemployed makes individuals less likely to report themselves in the highest level of life satisfaction (8 ppts less likely) while belonging to the highest level of the income distribution increases the probability of being in the highest level of life satisfaction by 11 ppts. Such increase is only surpassed by the one resulting from living in a safe neighborhood (16 ppts). This finding reinforces the importance that safety areas have among Latin American individuals when valuing life satisfaction. In fact, the increase in life satisfaction that is observed among individuals living in very safe areas is even larger than the reduction in life satisfaction experienced by those who were victims of a crime. This result supports also previous evidence found by Medina and Tamayo (2012).

[9] Notice that the effects will also depend on the values of the independent variables for which they are estimated.

[10] The use of "marginal effect" in this section refers to the effect of a change of a given variable on the probability of declaring the highest level of life satisfaction, i.e., *P(Life Satisfaction = 4)*.

[11] The model left without constraints some variables, allowing their effect to vary on each category of life satisfaction. Those variables are: age squared, unemployment, number of children, race (indigenous), perception of neighborhood safety (all categories), weekly attendance at non-religious meetings and country dummies for Argentina, Bolivia, Brazil, Chile, Dominican Republic, Guatemala, Mexico, Paraguay, Peru and Uruguay. This model is estimated using the tools developed by Williams (2006). It is estimated using maximum likelihood estimators with an autofit option set at the 1% level. This command sets the level of confidence at which the constraints previously mentioned are imposed. The estimation consisted of 24,918 observations, the hypothesis of joint non-significance is rejected at a 99% level of confidence, and the Pseudo R2 is 0.0637. The estimation was robust to account for possible heteroscedasticity caused, for instance, by correlation among country groups. (Wooldridge 2010).

Table 3 Marginal effects on the probability of being at the highest level of life satisfaction. *Source*: Authors' calculations based on LAPOP 2014

	Marginal effect (1)	SE	Marginal effect (2)	SE	Marginal effect (3)	SE	Marginal effect (4)	SE
Victim	−0.034***	0.008	−0.048***	0.008	−0.046***	0.008	−0.047***	0.008
Woman	−0.002	0.006	−0.003	0.006	−0.006	0.006	−0.003	0.006
Age	−0.002***	3.E−04	−0.002***	3.E−04	−0.002***	3.E−04	−0.002***	3.E−04
Education (years)	0.007***	0.001	0.004***	0.001	0.003***	0.001	0.004***	0.001
Marital status								
Single								
Married	0.007	0.008	0.002	0.008	−0.001	0.008	0.002	0.008
Divorced	−0.043***	0.015	−0.043***	0.015	−0.049***	0.015	−0.043***	0.015
Widowed	−0.036**	0.018	−0.047***	0.018	−0.054***	0.018	−0.048***	0.018
Family income								
Low								
Medium	0.046***	0.008	0.039***	0.008	0.042***	0.008	0.039***	0.008
High	0.113***	0.009	0.111***	0.008	0.119***	0.009	0.111***	0.008
Unemployed	−0.080***	0.016	−0.075***	0.015	−0.071***	0.015	−0.075***	0.015
Children (numbers)	−0.001	0.002	−0.004*	0.002	−0.001	0.002	−0.004*	0.002
Ethnic group								
White	0.011	0.009	0.066***	0.008	0.047***	0.008	0.066***	0.008
Black	−0.019	0.017	0.077***	0.016	0.064***	0.016	0.077***	0.016
Mestizo								
Mulatto	−0.005	0.015	0.094***	0.013	0.078***	0.014	0.094***	0.013
Indigenous	−0.015	0.012	−0.049***	0.011	−0.049***	0.011	−0.049***	0.011
Other	−0.034	0.029	0.024	0.029	0.024	0.029	0.024	0.029
Urban area	0.006	0.008	0.010	0.008	0.002	0.008	0.01	0.008

Table 3 (continued)

	Marginal effect (1)	SE	Marginal effect (2)	SE	Marginal effect (3)	SE	Marginal effect (4)	SE
Neighborhood safety								
Very unsafe	0.001	0.011	0.003	0.011	0.006	0.011	0.003	0.011
Somewhat unsafe	−0.015*	0.008	−0.025***	0.008	−0.023***	0.008	−0.024***	0.008
Somewhat safe								
Very safe	0.166***	0.010	0.172***	0.010	0.178***	0.01	0.173***	0.01
Attends weekly meetings								
Non-religious	0.050***	0.012	0.058***	0.012	0.056***	0.012	0.058***	0.012
Religious	0.037***	0.007	0.05***	0.007	0.064***	0.007	0.05***	0.007
Drinking water	0.007	0.010	0.006	0.009	0.000	0.009	0.0063	0.009
Intentional homicides			0.001***	1.6.E−04			0.001***	2.E−04
log GDP per capita PPP 2013					0.059***	0.00726		
Argentina	−0.228***	0.022						
Bolivia	−0.399***	0.019						
Brazil	−0.037*	0.02						
Chile	−0.199***	0.021						
Colombia								
Costa Rica	−0.026	0.02						
Dominican Republic	−0.101***	0.02						
Ecuador	−0.244***	0.019						
El Salvador	−0.16***	0.019						
Guatemala	−0.207***	0.021						
Honduras	−0.152***	0.019						
Mexico	−0.149***	0.02						
Nicaragua	−0.063***	0.019						

Table 3 (continued)

	Marginal effect (1)	SE	Marginal effect (2)	SE	Marginal effect (3)	SE	Marginal effect (4)	SE
Panama	−0.012	0.019						
Paraguay	−0.113***	0.02						
Peru	−0.29***	0.021						
Uruguay	−0.206***	0.02						
Venezuela	−0.083***	0.02						

Marginal effect is the marginal effect of each variable on the probability of reporting the highest level of life satisfaction. Statistical significance is presented for the 1% (***), 5% (**) and 10% (*) levels. Column SE corresponds to the standard deviations of the marginal effects as obtained using the delta method. The Delta Method is used to obtain the asymptotic variance of the marginal effects as $\left[\nabla_{\beta} h\left(\widehat{\beta}\right)\right] \widehat{V} \left[\nabla_{\beta} h\left(\widehat{\beta}\right)\right]'$, where $\nabla_{\beta} h\left(\widehat{\beta}\right)$ is the gradient of the marginal effects with respect to $\widehat{\beta}$ and $\widehat{V}$ is the asymptotic variance of the estimate of $\widehat{\beta}$ (Wooldridge 2010)

Education was found among other factors to contribute positively with the probability of being in the highest level of life satisfaction, moreover the magnitude of the increase is below 1 ppt, showing how income and safety are factors highly weighted by Latin American individuals. Attending weekly meetings was found to increase the probability of being in the highest level of life satisfaction. The effect is even larger when asking for non-religious meetings (5 ppts), which goes in line with what Powdthavee (2005) found for the UK when examining meetings with friends and levels of social involvement.

The observed signs for the marginal effects of a country's controls are also notable. The country left out for comparison purposes is Colombia. The negative coefficients in the set of country dummies suggest that among the 18 countries considered for the analysis, Colombia experiences the highest level of life satisfaction when comparing to the rest of countries in the study.

The marginal effect of age is negative and significant suggesting that individuals older than the average individual have lower levels of life satisfication. Furthermore, the relationship is not linear since at older ages the opposite is observed (age squared is positive and significant).

The specification reported in Column (2) includes each country's homicide rate among the explanatory variables. The results show that after controlling for this aggregate measure of violence, the effect that being a victim of a crime has on life satisfaction is even larger (more negative) than before. Even though the effect of the national homicide rate on individual's highest level of life satisfaction is positive, the magnitude is very low (below 1 ppt). Even though it looks counterintuitive, previous evidence has pointed out that what matters when explaining an individual's perception of life satisfaction is the direct experience of victimization rather than aggregated levels of crime. This is supported in this study, when being victim of a crime is still significant after controlling for aggregate meausures. Similarly, it might not affect most of citizens, or might it not be experienced in a direct manner. Moreover, by including a variable of homicide rate per country, the possibility of including additional characteristics that are particular to each country such as GDP, weather, etc. Hence, this specification would be suffering from an omitted variable bias problem.[12]

The fact that what matters for an individual's life satisfaction is the direct experience of a crime event rather than its aggregate measure, should not be surprising in the Latin American context. The higher levels of homicides rates in Latin America have led to a culture of violence, followed by one of impunity that has perpetuated violence (Koonings and Krujit 1999; Kruijt 2007). This has modified social norms and has led people to view with different indignation crimes related to life and those related to property(Rotker and Goldman 2002). Our findings suggest, on one hand, that individuals of some Latin-American countries still feel their quality of life is affected by direct crimes, even though they are already in violent countries. Similarly, being in a violent country does not add to the already existent reduction on life satisfaction occurred after an event of victimization.

Our prefered specification is the one controlling for every country's specific characteristics (Column 1) through the inclusion of country dummies. However, to understand better our previous finding, an interaction term between a country's homicide rates and crime

[12] Column (3) includes country's GDP and shows that individuals living in countries with higher levels of income experience higher probabilities of being in the maximum level of life satisfaction. As explained before, this could be suffering from omitted variable bias by not allowing controlling for other specific country's characteristics.

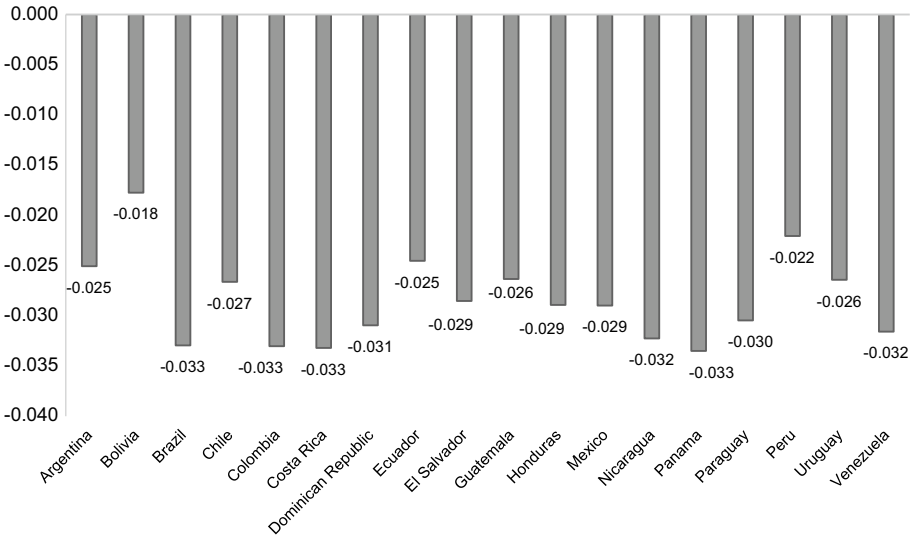

Fig. 7 Marginal effect of victimization on life satisfaction by country. *Source*: Authors' calculations based on LAPOP 2014

victimization at the individual level is added to complement the main effect of victimization and of homicide rates separately. By doing so, we would understand better how life satisfaction is affected when one is victim in a country with higher homicide rates. The coefficient of the interaction term (not reported in the table)[13] was not found to be statistically significant, but the individual effect of being a victim of a crime continue being significant, suggesting that individuals living in Latin American countries with relative higher levels of homicide rates, do not experience higher effects from victimization, variable which continue being very similar to the previous findings. This reinforce our previous findings: victims of crimes are less likely to report being in the highest level of life satisfaction even within a country with higher homicide rates.

This relates closely to the premise that suggests that once individuals are used to a particular state (in terms of income, or in this case, violence levels), its effects on life satisfaction vanishes over time due mainly to the fact that the effect has been already discounted. While in this case, the positive coefficient of homicide rates suggests that the negative effect of homicide rates at the country level was already discounted, it is very likely that is recovering the effect of additional factors at the country level that are not possible to include since they are collineal to any country' specific variable (e.g., other crime rates different to homicide, GDP, weather, etc.).[14]

The fact that what matters for an individual's life satisfaction is the direct experience of a crime event rather than its aggregate measure, should not be surprising in the Latin

[13] The interaction term is not shown explicitly in Table 3, because the marginal effect of the interaction is included in the marginal effect of each variable, i.e., intentional homicides and victim.

[14] Column (3) includes country's GDP and shows that individuals living in countries with higher levels of income experience higher probabilities of being in the maximum level of life satisfaction. As explained before, this could be suffering from omitted variable bias by not allowing to control for other specific country's characteristics.

American context. The higher levels of homicides rates in Latin America have led to a culture of violence, followed by one of impunity that has perpetuated violence (Koonings and Krujit 1999; Kruijt 2007). This has modified social norms and has led people to view with different indignation crimes related to life and those related to property(Rotker and Goldman 2002). Our findings suggest, on one hand, that individuals of some Latin-American countries still feel their quality of life is affected by direct crimes, even though they are already in violent countries. Similarly, being in a violent country does not add to the already existent reduction on life satisfaction occurred after an event of victimization.

The marginal effects for the average individual in each country are represented in Fig. 7.[15] The results suggest that these effects are negative and significant for ervery country analyzed (standard errors are shown in parentheses in Table 4 in the "Appendix"). The lowest effects are observed for the average individual in Bolivia and Peru, with the likelihood of being very satisfied with life reduced by 1.8 and 2.2 percentage points, respectively, after a victimization event. Furthermore, higher effects of victimization were observed for individuals in Brazil, Colombia, Costa Rica and Panama, with a reduction in the odds closed to 3.3 percentage points.

6 Concluding Remarks

The study of happiness is a growing field among economists and other disciplines, due to its close relationship with quality of life at the individual level. It is also an indicator of the efficiency of policy makers. Moreover, following the previous evidence about determinants of life satisfaction, there is a need to identify and examine the material and non-material determinants of well-being, one of which is an individual's safety.

Latin America and the Caribbean account for the 33% of all homicides in the world (followed only by Africa with 31%) and the region comprises only 9% of the world's population (Jaitman et al. 2015). This emphasizes the importance of the role for policy makers to implement strategies addressed to reduce crimes such as robbery, burglary, physical assaults, extortion and other types of crime that directly affect individuals' well-being and satisfaction.

It is important to highlight that Latin America is the only region where violence has continuously increased since 2005 (Jaitman et al. 2015), including murder and theft.[16] By reducing the incidence of crime in the region, policy makers would also be addressing the different costs associated with it [e.g., costs of fighting against crime, costs repairing the victims, and the behavioral changes faced by individuals affected by it (Jaitman et al. 2015)].

Previous literature, that has studied the relationship between victimization and life satisfaction, has relied on ordered probit models. However, the 2014 LAPOP survey, which is the data used in this study, suggests the previous assumptions underlying those models are not met. Therefore, a generalized ordered logit model is proposed to solve these problems and to estimate consistent parameters.

[15] Marginal effects for the average woman and man from each country were included in the document; however, after the variable for gender was not found to be statistically significant, the marginal effects for the average man and woman only have negligible differences.

[16] Theft is disproportionately common in Latin America, in less than one decade, the robbery rates in many LAC countries have dramatically increased and on average, six out of ten robberies in the region are violent.

The main results of this study suggest that for the 18 Latin-American countries that were analyzed, being a crime victim has a negative and significant effect on the probability that an individual reports the highest level of life satisfaction. This effect ranges from − 1.8 to − 3.3 percentage points, depending on each country's socioeconomic context. Being a crime victim reduces the odds of the average citizen being very satisfied with life from 26.9 to 24.3% in Chile, while for the average citizen of Panama, they are reduced from 43.2 to 39.9%, and in Colombia they go from 60.1 to 56.8%. The lowest reduction was observed among individuals who had been crime victims in Peru and Bolivia. The effects of being widowed or transitioning from low income to medium income are, in magnitude, comparable with those of being victimized, which highlights the role of victimization.

Besides victimization, this study also finds that individuals living in what they considered "very safe neighborhoods" are more likely to be very satisfied with life than individuals experiencing some safety issues. Similarly, higher levels of income are related to individuals reporting the highest level of life satisfaction. In addition, there is an important role of belonging to social groups for an individuals' being very satisfied with life with the effect holding for both, religious and non-religious meetings. Moreover, the highest effect on the probability of declare one in the highest level of life satisfaction come from individuals living in very safe neighbourhoods, reinforcing the weight individuals in Latin America place on safety and crime.

This study also shows that consistent with previous findings, crime leads to welfare costs besides the monetary costs already identified. When intentional homicide rates per country are included in the regression, the results are contrary to the expected: higher homicide rates are related with higher odds of being very satisfied with life. Moreover, once this variable is interacted with crime, the results show that being a victim in a country with higher homicide rates does not add to the already observed reduction that being a victim has on an individual's life satisfaction. Result that reinforce the importance of being directly victimized. Furthermore, Cohen (2008) verifies this hypothesis as he finds that living in a territory with high homicide rates and crime does not have a significant effect on the reported level of life satisfaction, whereas being directly affected by crime does.

In relation to this, previous studies have reported how the culture of violence has not only emerged after the higher homicide rates, but has been perpetuated due to a culture of impunity (Koonings and Krujit 1999; Kruijt 2007). This culture of violence has modified social norms and it has led people to view some crimes, such as crimes related to life, with different indignation than others, such as crimes related to property(Rotker and Goldman 2002). Moreover, results of this study suggest that individuals in some Latin-American countries continue to see their quality of life affected by crime, even though they are already accustomed to violent environments. Therefore, it suggests that no matter how extensive the incidence of violence is in each country, the role of policy makers to fight against crime and violence should remains a priority.

Given that measurements of happiness are gradually becoming accepted as proxies for social progress, the study of happiness is driving policy makers to rethink their role regarding quality of life at the individual level. Their role must go beyond just designing policies focused on GDP growth and per capita income. It is also important to understand what makes citizens feel good on a daily basis, and it must be understood that what makes them feel good is more than just GDP digits or macroeconomic variables. Rather, it is a combination of economic variables, which might be relative to other individuals, public goods (such as security) and individuals' specific demographic characteristics.

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Appendix

See Table 4.

Table 4 Marginal effect of victimization in each country. *Source*: Authors' calculations based on LAPOP 2014

Country	Marginal effect	SE	Country	Marginal effect	SE
Argentina	−0.025***	0.006	Guatemala	−0.026***	0.007
Bolivia	−0.018***	0.004	Honduras	−0.029***	0.007
Brazil	−0.033***	0.008	Mexico	−0.029***	0.007
Chile	−0.027***	0.007	Nicaragua	−0.032***	0.008
Colombia	−0.033***	0.008	Panama	−0.033***	0.008
Costa Rica	−0.033***	0.008	Paraguay	−0.03***	0.008
Dominican Republic	−0.031***	0.008	Peru	−0.022***	0.006
Ecuador	−0.025***	0.006	Uruguay	−0.026***	0.007
El Salvador	−0.029***	0.007	Venezuela	−0.032***	0.008

Column marginal effect is the marginal effect of the variable *victim* on the probability of being at the highest level of life satisfaction for the average individual of each country. Statistical significance is presented for the 1% (***), 5% (**) and 10% (*) levels. Column SD. corresponds to the standard deviations of the marginal effects as obtained by using the delta method

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