TESTING HAPPINESS HYPOTHESES AMONG THE ELDERLY

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Resumen

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Se emplea un amplio conjunto de datos que permite evaluar de diferentes formas la hipótesis de la felicidad, empleando cuatro enfoques metodológicos. Se constata que las personas de mayor edad en Uruguay tienen una tendencia a reconocerse felices cuando están casadas, cuando tienen un buen estado de salud y si tienen altos ingresos monetarios o estiman que su ingreso es conveniente para su nivel de vida. Contrariamente, señalan niveles más bajos de felicidad cuando viven solos o cuando su nutrición es insuficiente. Se evidencia que la educación no tiene un impacto claro sobre su percepción de felicidad. Este trabajo es una contribución al estudio de los factores que pueden explicar la felicidad entre las personas de la tercera edad en los países de América Latina. El trabajo futuro se concentrará sobre un análisis empírico mejorado y sobre la expansión del estudio a otros países.

Palabras clave: felicidad, salud, familia, modelos econométricos censurados, métodos semi-paramétricos, evaluación de tratamiento. **JEL:** C14, C24, I10, J12.

Abstract

Cid, Alejandro; Ferrés, Daniel y Rossi, Máximo. "Testing Happiness Hypothesis among the Elderly," *Cuadernos de Economía*, v. XXVII, n. 48, Bogota, 2008, pages 23-45.

We use a rich data set that allows us to test different happiness hypotheses employing four methodological approaches. We find that older people in Uruguay have a tendency to report themselves happy when they are married, when they have higher standards of health and when they earn higher levels of income or they consider that their income is suitable for their standard of living. On the contrary, they report lower levels of happiness when they live alone and when their nutrition is insufficient. We also find that education has no clear impact on happiness. We think that our study is a contribution to the study of those factors that can explain happiness among the elderly in Latin American countries. Future work will focus on enhanced empirical analysis and in extending our study to other countries.

Keywords: Happiness, Health, Family, Censored Econometric Models, Semiparametric Methods, Treatment Evaluation. **JEL:** C14, C24, I10, J12.

Resumé

Cid, Alejandro; Ferrés, Daniel y Rossi, Máximo. « Un Test de l'hypothèse du bonheur dans la population du troisième âge », *Cuadernos de Economía*, v. XXVII, n. 48, Bogota, 2008, pages 23-45.

On utilise un ensemble de données très large qui permet d'évaluer des formes différentes d'hypothèse de bonheur sous quatre approches méthodologiques différentes. On constate que les personnes les plus âgées en Uruguay ont une tendance de se reconnaitre heureux quand ils sont mariés, quand ils ont de niveaux de santé plus élèves et quand ils ont plus de revenus monétaires ou ils estiment que leur revenu est convenable pour leur niveau de vie. Au contraire, ils signalent des niveaux plus bas de bonheur quand ils vivent seuls et quand leur nutrition est insuffisante. Nous constatons aussi que l'éducation n'a aucun impact clair sur leur perception du bonheur. Ce travail est une contribution à l'étude des facteurs qui peuvent expliquer le bonheur parmis les personnes âgées dans les pays de l'Amérique Latine. Le travail futur se concentrera sur une analyse empirique améliorée et sur l'extension de l'étude à d'autres pays.

Mot clés : bonheur, santé, famille, modèles économétriques censurés, méthodes semi-paramétriques, évaluation de traitement. **JEL :** C14, C24, I10, J12.

Fresh interest among economists in using surveys of reported well being as a way to measure individual utility and its relation to a range of economic and social phenomena provides a new tool to understand what causes happiness.

Happiness indicators have been defined in different ways in the economics literature (see Layard, 2005 or Argyle, 2002 for a reflective summary). A large body of research on happiness in economics takes reported subjective well-being as a proxy measure for utility. Various studies are based on surveys that contain the following question: "How satisfied are you with your life?" In our work we follow this approach and we define "happiness" as satisfaction with life in general. Based on the analysis of survey data on subjective well-being, our work is guided by the question: "how does x affect happiness?", where x can be income, health, marital status or employment status.

It is hard to make comparisons of happiness levels accross countries. As Diener and Suh (2000) state, although researchers can empirically study quality of life and make comparisons of the subjective well-being of societies, it is unclear if we will be ever able to conclude in a definitive way that one society is better than another in terms of overall quality of life. In the end, happiness and other indicators of quality of life depend on idiosyncratic values and judgements. Still, survey data allows us to make comparisons and draw conclusions about which societies have greater subjective well-being.

Different relationships between happiness and specific variables have been explored in recent economic work. In particular, various scholars have devoted a good amount of effort trying to assess the relationship between income and happiness. This issue is particularly attractive to many people for one reason: there is vast evidence indicating that differences in income explain only a low proportion of the differences in happiness among persons. Moreover, although many countries have experienced strong increases in their

per capita GDP, it is not generally true that these countries have seen average happiness rise (Blanchflower and Oswald 2004, Layard 1980). This observation is particularly true for the cases of the US, the UK, Japan and Belgium.

Along these lines, Oswald (1997) finds that happiness with life appears to be increasing in the United States throughout the 1970s, 1980s and 1990s. However the rise is so small that it seems extra income is not contributing dramatically to the quality of people's lives. Also he finds that since the early 1970s reported levels of satisfaction with life in the European countries have on average risen very slightly. In addition, Argyle (2002) provides a good summary of the "income and happiness" relationships and he obtains contradictory results. For example, he observes that rising incomes have not affected life satisfaction and that winning lotteries has negative effects for some. Also, he finds that often the rich are not happier than those with middle income. On the other hand, Argyle observes that the very poor are less happy, and richer countries have higher levels of reported happiness than poorer countries. Scholars, puzzled by these surprising observations, have worked on coming up with new hypotheses to try to explain subjective well-being. In particular, recent work has focused on testing the relevance of inequality, relative income and income aspirations when trying to understand what causes happiness.

Alesina *et al.* (2003) studied the effect of income inequality in society on individual well-being. In their work, they found that "individuals have a lower tendency to report themselves happy when inequality is high, even after controlling for individual income". They compared results obtained for European countries and the United States.[1] Interestingly, their results are clearly different across socioeconomic groups in Europe and the US. In particular, they found that in Europe the poor and those on the left of the political spectrum become unhappy as inequality grows. On the other hand, in the US, the happiness of the poor and of those on the left is uncorrelated with inequality.

Frey and Stutzer (2003) tested different happiness hypotheses. In particular, they conducted an empirical test of the role of income aspirations. Their idea is based on the observation that many people compare themselves to those that are considered their others. In the past, many economists have explored this idea when trying to understand different socioeconomic phenomena.

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[1]   For the US, they present data by state.

Frey and Stutzer concluded that "the evidence presented indicates that people's well-being is better understood when their income aspirations are taken into consideration". Layard (1980) observed that happiness depends on income and status relative to what you expected it to be. An obvious problem with high income is that you get used to it. Richer people take high income for granted and cannot do without it. The same is true for status. Layard also stated that this could explain why people fight much harder against cuts in their income than for increases in their earnings.

Clark and Oswald (1994) analyzed the impact of unemployment on happiness using data from the British Household Panel Study (1991). In their work, they constructed a "caseness score" using 12 questions present in the survey. After controlling for specific individual characteristics, they utilized ordered probit estimation in order to explore the relationship between unemployment and mental well-being. They concluded that there is a strong negative relationship between these variables. Moreover, they observed that the effect of unemployment on well-being can be stronger "than any other single characteristic, including important negative ones such as divorce and separation".

Other economists have examined the relationship between happiness and different individual variables. Stack and Eshleman (1998) analyzed the relationship between marriage and happiness in a multi-country study. In particular, they observed that the positive relationship between being married and happiness indicators held for 16 of the 17 cases analyzed.

Health status is another factor that can be expected to be an especially important determinant of happiness. Gerdtham and Johannesson (1997) analyzed the relationship between happiness and health status based on data on a sample of 5,000 individuals in the Swedish adult population. In their study, they found a positive and statistically significant relationship between higher health status and happiness.

Various studies focus on the relationship between aging and happiness. Oswald (1997) and Cruz and Torres (2006) found that the relationship between happiness and age is U-shaped. While Oswald found that happiness indicators in Europe reach the minimum levels at age around 30, Cruz and Torres find that for the case of Colombia, the happiness curve decreases as it approaches to age 40; then it becomes a growing function. In our research we have focused on a sample of individuals of age 60 or more. As we will indicate in the results section, we get no robust "age" effect in our investigation.

GRAPH 1
DISTRIBUTION OF AGES IN THIS SAMPLE
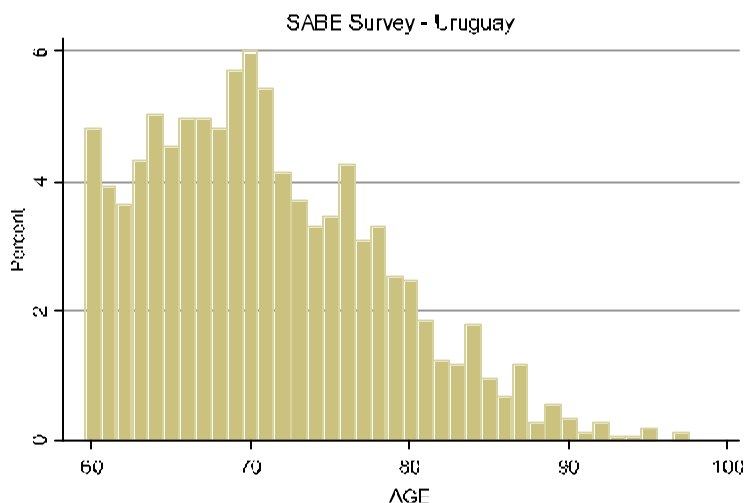
Source: author's estimates.

So far, most of the research on the relationship between individual characteristics and happiness has focused on industrialized countries. It is evident that factors affecting satisfaction with life may vary from region to region. The impact of income or family composition on happiness can be very much related to cultural issues. Recent studies have focused on happiness analysis in Latin America. Interestingly, Graham and Felton (2005) analyzed the effect of income inequality on happiness across Latin American countries. Their work is based on data gathered in Latinobarometro. Also, Gerstenbluth *et al.* (2007) studied the relationship between happiness and health in Argentina and Uruguay using the Latinobarometro survey. Bucheli (2003) focused on analyzing happiness issues among Uruguayan women in the age range between 25 and 54 and Cruz (2006) tested various happiness hypotheses among Colombians.

Our work represents a fresh attempt to understand the factors that may be related to a higher satisfaction with life in Uruguay, a Latin American country. In particular we will explore the correlation between happiness and income, family structure and health.

Correlations do not establish causation. In this sense, we understand that a crucial aspect of our future work will be related to trying to understand the way in which causality goes. A happiness function assumes that the right hand variables determine the level of the dependent variable. In the case of our study, we are aware that there may also be a reverse causation. For example,

are happy people more likely to be married or is it that marriage causes happiness? In order to explore and deal with this selection bias we employ the propensity score technique.

The rest of the paper continues as follows. In section 2 we describe the data set and different happiness indicators. In section 3 we deal with multiple methodological aspects of our work. In section 4 we present the obtained results. In section 5 we present the p-score results. In section 6 we conclude.

DATA AND HAPPINESS INDICATORS

Data

Our analysis of the determinants of happiness in Uruguay relies on data from a multicountry survey called Salud, Bienestar y Envejecimiento en América Latina y el Caribe (SABE), a study sponsored by the Pan American Health Organization (PAHO)[2] . Since the survey is limited to the single largest

TABLE 1
MEANS (1999 – 2000) SABE SURVEY

	Women	Men	Difference	p-value
Age	71.09	70.73	0.36	0.358
White	0.88	0.92	-0.04**	0.009
Living Alone	0.22	0.13	0.09**	0.000
Without Formal Education	0.053	0.026	0.027**	0.008
Last Education Level=University	0.041	0.098	-0.057**	0.000
Last Education Level=Secondary School	0.204	0.178	0.026	0.221
Frequent Religion Practice	0.62	0.33	0.29**	0.000
Catholic	0.74	0.57	0.17**	0.000
Married	0.32	0.66	-0.34**	0.000
Widow Widower	0.49	0.15	0.34**	0.000
Health[3]	5.35	5.13	0.22**	0.001
Compared Health[4]	1.55	1.51	0.042	0.226

Source: author's estimates.
* Means are statistically different at 10 percent, ** Means are statistically different at 5 percent
Note: This table includes the results of t-tests on the equality of means between women and men, allowing the variances to be unequal.

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[2] The survey includes information for Argentina, Barbados, Brazil, Chile, Cuba, Mexico and Uruguay.

[3] Health takes the rank of values from 2 to 8, where superior values indicate worse health.

[4] Compared Health takes the values 1, 2 and 3, where superior values indicates worse health subjectively compared with other people of similar age.

city in each country, we focus on information for Montevideo (1,444 observations). SABE data was collected in 1999-2000.

Since the survey gathers information about the elderly, the sampling frame limits its scope to those 60 and older. Individuals living in institutions, such as nursing homes and mental institutions are excluded from the sample. Table 1 presents descriptive statistics of both dependent and independent variables.

Independent variables include indications of age, gender, family structure, education, health status, employment status and income. Information on these variables is present on SABE, except for income.[5] The income variable is a constructed variable, obtained after extrapolating data from the Encuesta Continua de Hogares. Our approach leads to a new indicator for individual income level (see Appendix A for details) and is different from the analysis of Graham and Felton (2005) who constructed an "asset index" based on household possessions.

Table 2 presents mean values for the independent variable among the happy and the unhappy.

Happiness Indicators

Our objective is to test how individual's judgment of well-being is affected by a group of individual characteristics and socioeconomic variables. We follow two paths when defining the dependent variable. Constructing two types of "happiness" indicators will allow us to conduct more robust econometric analysis about the impact of specific variables on happiness. We believe that this issue constitutes a strong aspect of our estimation approach.

First, we construct a dummy variable indicating "satisfaction with life". This variable is constructed based on the following question: "In the last two weeks: have you been satisfied with your life?" Respondents can answer "yes" or "no". We use this binary variable in a probit estimation. Also we build an index of happiness based on 15 binary responses to questions related to life satisfaction (for each question, a 0 is assigned to "No" and 1 to "Yes"). Thus, this index takes the integer values from 0 to 15, where superior values mean

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[5]   Although SABE has an "Income" chapter, data on income is rather incomplete in the Uruguayan survey.

TABLE 2
MEANS – HAPPY AND UNHAPPY PEOPLE (1999 – 2000) SABE SURVEY

	Unhappy	Happy	Difference	p-value
Age	70.28	70.96	-0.68	0.178
White	0.898	0.896	0.002	0.919
Living Alone	0.24	0.17	0.07**	0.018
Number of unemployed (or unable to work) descendants not living at home	0.19	0.14	0.05	0.245
Number of unemployed (or unable to work) people living at home	0.37	0.25	0.12**	0.030
Without Formal Education	0.03	0.04	-0.01	0.375
Last Education Level=University	0.03	0.07	-0.04**	0.002
Last Education Level=Secondary School	0.20	0.19	0.01	0.856
House Owner	0.53	0.66	-0.13**	0.000
Enough Income for Ordinary Necessities	0.27	0.49	-0.22**	0.000
Income per capita	6458	7716	-1258**	0.000
Frequent Religion Practice	0.47	0.52	-0.05	0.158
Catholic	0.67	0.68	-0.01	0.851
Married	0.31	0.48	-0.17**	0.000
Widow Widower	0.48	0.33	0.15**	0.000
Number of offspring	2.64	2.89	-0.25	0.122
Health[6]	5.85	5.13	0.72**	0.000
Compared Health[7]	1.77	1.48	0.29**	0.000

Source: author's estimates.
* Means are statistically different at 10 percent, ** Means are statistically different at 5 percent
Note: This table includes the results of t-tests on the equality of means between happy and unhappy people (using the binary index of satisfaction with life), allowing the variances to be unequal.

greater life satisfaction. We used this definition of happiness when conducting OLS analysis. Finally, we expressed this index in percentage terms in order to use it in the semiparametric model.

Table 3 presents descriptive statistics about the constructed happiness indicators.

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[6]   Health takes the rank of values from 2 to 8, where superior values indicate worse health.
[7]   Compared Health takes the values 1, 2 and 3, where superior values indicates worse health subjectively compared with other people of similar age.

TABLE 3
INDEX OF HAPPINESS (Index built based on 15 questions related to life satisfaction)

	Women – 916 observations	Men – 528 observations
Mean	11.49	12.39
Median	13	13
Smallest Value	0	0
Largest Value	15	15
Standard Deviation	3.71	3.02
Variance	13.79	9.14

Source: author's estimates.

Income and Happiness

As we said, the relationship between income and happiness can be analyzed from several different points of views. Economists have focused on issues such as the relationship between (a) absolute income and happiness; (b) relative income and happiness; (c) income inequality and happiness; (d) income aspirations and happiness.[8] There is sufficient evidence that absolute income, alone, does not play a substantial role in explaining happiness levels. In our work we will consider income as an independent variable, but also relative income and income aspirations.

Broadly speaking, relative income is defined as the difference between individual income and the average income for the reference group. In our work we take the following approach: we include a variable indicating the income percentile to which the respondent belongs.[9] Income aspirations information is collected from the following question: "Do you think that you (and your partner) have enough money in order to cover your daily expenses?"

Family and Happiness

In a context of rapid transformation of typical family structures we attempt to understand the effects of changes in family composition on happiness. In this sense, since our data set focuses on the elderly, it provides a unique opportunity to assess the long term impact of divorce and remarriage on individual happiness.

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[8]   Income aspirations reflect people's perception about them having enough money for paying their daily expenses. Clearly, there is an objective, but also a subjective component in this perception.
[9]   We do this to avoid difficulties in defining "reference groups".

There is vast evidence about the negative impact of divorce on life satisfaction. Again, most of this evidence is reflected by data related to industrialized countries. Our dataset allows us to investigate the impact of marriage and divorce in the Latin American region. We know that our dataset restricts our attention to those that were 60 or older in 1999-2000. In issues related to moral related values, it is definitely interesting to compare our results to other studies that may contain information for younger cohorts.

Health status and Happiness

In our work we analyze the impact of health in both absolute and relative terms. In particular we constructed two different variables: one that indicates the self reported health condition and another that expresses respondents' opinions about individual health compared to other people in their age group. The intuition for taking both variables into account is that working with both absolute and relative terms will enhance our understanding of happiness levels.

ESTIMATION

We follow four different strategies because we understand that by proceeding in this way we add robustness to our analysis. We believe that each of the techniques that we use presents a potential advantage:

Ordinary Least Squares Estimation[10]

We run an OLS regression where a "happiness index" is the dependent variable. This particular model estimation presents a major advantage: it is very intuitive and it has a straightforward interpretation. On the downside, we are aware that the index is built based on answers to 15 questions (point values range from 0 to 15, where superior values indicate greater life satisfaction). Defined in this way, "Happiness" could be seen as a doubly censored variable which takes on the value zero and fifteen with positive probability. In other words, the dependent variable suffers from interval censoring and OLS could provide inconsistent estimators. Other shortcomings of the linear probability model are: a) predicted values for "Happiness" could be negative or greater than fifteen; b) the variance of "Happiness" is probably heteroskedastic; c) E(Happiness|x) is nonlinear.

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[10]   In the empirical application of this paper, we use robust standard errors in OLS, Probit, and Tobit models to cope with the possible existence of heteroskedasticity.

Probit

In our study, we define a dummy variable that takes the value of 1 when individuals express satisfaction with life. Both logit and probit models are suitable to analyze the link between independent variables and the "satisfaction with life" variable. Probit may be a more appropriate choice for the case in which normal distribution of the dependent variable can be assumed.

Tobit

Because the dependent variable suffers from interval censoring, we also applied a Tobit Model. We take into account that heteroskedasticity and nonnormality result in the Tobit estimator being inconsistent.

A Semiparametric Censored Regression Model

As mentioned above, Tobit models require some specifications of the error distribution: normality and homoskedasticity. In order to relax these requirements, the semiparametric approach has been proposed in the recent economic literature to provide consistent estimates for censored data. Thus one of the advantages of semiparametric models for censored models is that estimators are consistent under weaker distributional assumptions. The attribute "semiparametric" in this model comes from the fact that the distribution of the errors given the explanatory variables does not have a known parametric form. In this work we present results for the symmetrically censored least squares (SCLS) estimator.

The symmetrically censored least squares (SCLS) approach was proposed by Powell (1986). This estimator is based on the assumption that errors are symmetrically (and independently) distributed around zero, so it is less restrictive than Tobit requirements (normally distributed and homoskedastic errors). The SCLS estimators are consistent and asymptotically normal for a wide class of symmetric error distributions with heteroskedasticity of unknown form (for a summary, see Chay and Powell, 2001, or Cameron and Trivedi, 2005).

Powell (1986) states that if the underlying error terms were symmetrically distributed about zero, and if the latent dependent variables were observable, classical least squares estimation would yield consistent estimates. But due to the censoring, the observed dependent variable y has an asymmetric distribution. Powell's approach consists in symmetrically censoring the dependent variable y (it is usually known as a "symmetric trimmed" method)

so that symmetry can be restored, and then the regression coefficients can be estimated by least squares. Symmetric censoring of the dependent variable implies that observations with values above the censoring point are dropped, and this means that there could be a loss of efficiency due to the information dropped in those observations. However this problem is reduced in the present paper because a relatively large sample is used.

RESULTS

Table 4 presents results for the four model estimations. We present results for men and women separately.

Obtained results indicate that:

- Being married has a statistically significant positive effect on happiness among men and women[11] . This result is consistent with Stack and Eshleman (1998), who found that in "16 out of 17 analyses of the individual nations, marital status was significantly related to happiness. Further, the strength of the association between being married and being happy is remarkably consistent across nations". Also, Argyle (2002) finds that social relationships like romantic love, marriage and friendship positively impact various well-being indicators (happiness, mental and physical health). Similarly, Oswald (1997) observes that happiness is high among those who are married in the US and UK.
- Living alone is associated with men showing lower levels of happiness. Similar results were found by Argyle (2002), who observed that there is a close link between sociability and happiness.
- Income appears to be a significant explicative variable in our study. This result is similar to the findings of Cruz and Torres (2006) for the case of Colombia. In the case of Uruguay, absolute and relative income levels are more heavily related to higher satisfaction with life among females than among males. In fact, we barely found any statistically significant relationship between income levels and happiness among men.
- Having bad health has a statistically significant negative effect on happiness among men and women. The relationship holds when individuals answer about their own health status and when they compare themselves to their "reference group". This result is robust to the four specifications. In this sense, it is possible to conclude that bad health is clearly related to low levels of satisfaction with life. Focusing on developing countries, this result is

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[11]   We only capture the effect of current marital status. Thus, our interpretation refers to whether the individual is married today or not.

TABLE 4

ESTIMATES OF HAPPINESS - PEOPLE ABOVE AGE 59 (1999-2000)

SABE SURVEY

Dependent Variable: Happiness	Women				Men			
	OLS	PROBIT	TOBIT	SCLS	OLS	PROBIT	TOBIT	SCLS
Age	-.043	.016	-.003	-.003	-.028	-.022	-.002	-.003
	(.016)***	(.007)**	(.001)***	(.002)*	(.019)	(.011)*	(.001)	(.007)
White	-.875	-.547	-.091	-.087	.099	.065	.012	.040
	(.359)**	(.171)***	(.030)***	(.038)**	(.438)	(.247)	(.034)	(.131)
Living alone	-.470	-.082	-.037	-.053	-1.176	-.368	-.095	-.120
	(.308)	(.138)	(.024)	(.040)	(.500)**	(.227)	(.038)**	(.143)*
Secondary School: last grade achieved	-.141	-.244	-.004	.010	-.454	-.287	-.040	-.060
	(.268)	(.149)	(.023)	(.051)	(.324)	(.207)	(.027)	(.135)
University: last grade achieved	-.608	-.378	-.036	-.042	.123	-.068	.037	.246
	(.504)	(.319)	(.050)	(.122)	(.528)	(.375)	(.051)	(.280)*
Hunger before 15 years old	-.914	-.140	-.076	-.093	-.617	-.481	-.047	-.075
	(.415)**	(.179)	(.031)**	(.079)	(.374)*	(.206)**	(.030)	(.151)
Only one meal a day	-1.180	-.162	-.099	-.108	-.481	.058	-.052	-.075
	(.324)***	(.137)	(.024)***	(.047)**	(.337)	(.239)	(.027)*	(.227)
Absolute income ok	.386	.342	.026	.019	.327	.497	.032	.050
	(.235)	(.119)***	(.019)	(.028)	(.256)	(.167)***	(.022)	(.127)
Log income	.712	.114	.067	.066	.321	.091	.030	.022
	(.268)***	(.119)	(.022)***	(.033)***	(.299)	(.163)	(.026)	(.155)
Married	.685	.278	.049	.082	.718	.458	.061	.054
	(.254)***	(.127)**	(.021)**	(.041)**	(.325)**	(.182)**	(.027)**	(.280)
Absolute bad health index	-.842	-.221	-.069	-.084	-.516	-.125	-.039	-.057
	(.106)***	(.050)***	(.008)***	(.018)**	(.125)***	(.074)*	(.010)***	(.084)*
Relative bad health index	-1.246	-.173	-.101	-.116	-1.036	-.251	-.082	-.075
	(.211)***	(.082)**	(.016)***	(.027)**	(.261)***	(.133)*	(.021)***	(.135)
Constant	15.605	.583	1.090	1.215	15.495	2.619	1.066	1.326
	(2.520)***	(1.07)	(.206)***	(.475)**	(2.66)***	(1.49)*	(.235)***	(1.49)*
Observations	859	845	859	709	499	497	499	376
R-squared	.267				.209			
Pseudo-R2		.096				.148		

Source: author's estimates.

Robust standard errors in parentheses for OLS. PROBIT and TOBIT. Standard errors in parentheses for SCLS.

In the cases of OLS. PROBIT. TOBIT: * significant at 10%; ** significant at 5%; *** significant at 1%.

For SCLS ** means that 0 is not included in both bias-corrected and Normal 90% confidence interval.

consistent with Gerstenbluth *et al.* (2007), who also studied the case of Uruguay (and Argentina), and with Cruz and Torres (2006) who analyzed satisfaction with life in Colombia.

- Malnutrition ("Only one meal a day") is negatively related to happiness indicators in the case of women. The relationship is weaker for the case of men. Additionally, results indicate that malnutrition in the early stages of life may have long term negative effects over happiness indicators.
- The relationship found between education variables and happiness is ambiguous. Nothing can be concluded in the present investigation about

the impact of higher education over happiness levels. While our results are similar to those obtained by Graham et al (2005) for various Latin American countries, they differ from those obtained by Bucheli and Rossi (2003) for the specific analysis of the Uruguayan case. In that work they analyzed the relationship between university education and happiness in Uruguay. The authors found that access to terciary level education explains higher happiness levels among the Uruguayan women between 25 and 54 years of age. Also, Cruz and Torres (2006) observed a positive relationship between higher education levels and happiness for the case of Colombia, Care is required when interpreting our obtained result since our sample restricts attention to those 60 or older. The obtained result might imply that education level is not relevant when explaining happiness levels of the elderly. Our results are similar to those obtained by Graham *et al.*

- We consider that we cannot make profound judgements about the relationship between labor market status and happiness levels. The relationship between unemployment status and lower levels of happiness is generally confirmed. In our case, due to the specific characteristics of our sample, we could not check for this particular relationship. Instead, as we bear in mind that 60 percent of the sample are retired individuals, we tested whether there is a clear impact of retiring on happiness. We found no robust results.

In sum, we find that our results are pretty much in line with those obtained by other studies but in this case for a non-industrialized country. Individuals who have higher health levels, are or feel richer and are married show higher levels of satisfaction with life. We also find some evidence showing that malnutrition and living alone is negatively related to happiness.

TREATMENT EVALUATION AND MARITAL STATUS

The typical dilemma in treatment evaluation involves the inference of a causal association between the treatment and the outcome. In this paper, we pay particular attention to the effects of personal marital status on happiness. Thus, we observe (y_i, x_i, D_i), $i=1,...,N$, where y_i is the happiness index, x_i represents the regressors, and D_i is the treatment variable and takes the value 1 if the treatment is applied (got married) and is 0 otherwise. The impact of a hypothetical change in D on y, holding x constant, is of interest. But no individual is simultaneously observed in both states. Moreover, the sample does not come from a randomized social experiment: it comes from observational data and the assignment of individuals to the treatment and control groups is not random. Hence, we estimate the treatment effects based on propensity score. This approach is a way to reduce the bias by performing comparisons of outcomes using treated and control individuals who are as

similar as possible (Becker and Ichino 2002). The propensity score is defined as the conditional probability of receiving a treatment given pre-treatment characteristics:

$$p(X)=Pr\{D=1|X\}=E\{D|X\}$$

where D={0,1} is the indicator of exposure to treatment and X is the vector of pre-treatment characteristics.

The propensity score was estimated in this application using a Probit model[12]. Since the probability of observing two units with exactly the same value of the propensity score is in principle zero since p(X) is a continuous variable, various methods have been developed in previous literature (for a summary, see Cameron *et al.* 2005) to match comparison units sufficiently close to the treated units. In the present paper, after estimating p(X) we employed the Kernel Matching method.[13]

The tables below show the result:

In the case of men, though the "Average Effect of Treatment (got married) on the Treated" is positive at a 90 percent, the 95 percent confidence interval includes zero. In the case of women, the point estimates indicate that being married increases happiness and it is significantly different from zero. Thus, data suggest positive association between being married and happiness, especially in the case of women above the age of 59.

As we said in the beginning of this section, the matching method attempts to made comparisons between treated and control individuals who are as similar as possible. Thus, in order to gauge the goodness of the matching, we

TABLE 5
AVERAGE EFFECT OF TREATMENT (MARRIED) ON THE TREATED - ESTIMATION WITH THE KERNEL MATCHING METHOD

	Women (age>59)	Men (age>59)
Number Treated	287	142
Number Control	525	334
ATT	0.922	0.570
Std. Error	0.282	0.413
T-stat	3.26	1.38

Source: author's estimates.

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[12]   Applied with the Stata ado file "pscore" developed by Becker and Ichino (2002).
[13]   This matching method was applied using the Stata ado file "psmatch2" developed by Leuven and Sianesi (2003).

TABLE 6
DESCRIPTIVE STATISTICS FOR THE TREATED (MARRIED), NOT
TREATED AND MATCHED GROUPS - WOMEN (AGE >59)

Variable	Sample	Mean		t-test[14]	
		Treated	Control	t	p>t
Never employed	Unmatched	0.15679	0.15048	0.24	0.811
	Matched	0.15679	0.15649	0.01	0.992
Number of divorces	Unmatched	0.08711	0.29143	-6.05	0.000
and separations	Matched	0.08711	0.09408	-0.26	0.792
Duration of present	Unmatched	40.575	30.836	9.96	0.000
marriage or cohabitation	Matched	40.575	40.842	-0.29	0.774
Relative wealth index	Unmatched	0.48007	0.34589	5.75	0.000
	Matched	0.48007	0.46582	0.51	0.610
Some secondary education	Unmatched	0.42857	0.28381	4.22	0.000
	Matched	0.42857	0.39331	0.86	0.392

Source: author's estimates.

TABLE 7
DESCRIPTIVE STATISTICS FOR THE TREATED (MARRIED), NOT
TREATED AND MATCHED GROUPS - MEN (AGE >59)

Variable	Sample	Mean		t-test	
		Treated	Control	t	p>t
Number of divorces	Unmatched	0.14793	0.58451	-7.57	0.000
and separations	Matched	0.1497	0.16752	-0.52	0.600
Duration of present	Unmatched	37.867	27.958	7.20	0.000
marriage or cohabitation	Matched	37.659	37.516	0.15	0.882
Relative wealth index	Unmatched	0.49681	0.35623	4.15	0.000
	Matched	0.49785	0.50836	-0.41	0.685
Some secondary	Unmatched	0.42899	0.25352	3.66	0.000
education	Matched	0.42216	0.39847	0.62	0.535
(Relative wealth index)^2	Unmatched	0.36017	0.2434	3.22	0.001
	Matched	0.36241	0.36743	-0.18	0.861
White	Unmatched	0.95562	0.85915	3.76	0.000
	Matched	0.95509	0.9624	-0.47	0.635

Source: author's estimates.

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[14]   This Mean Comparison Test (t-tests for equality of means in the treated and non-treated groups, both before and after matching) was applied using the Stata ado file "pstest" developed by Leuven and Sianesi (2003).

built the tables below. The similarity between the treated and control individuals can be seen in the mean comparison test (t-test) shown on the table: there is no statistically significant difference in the characteristics of the treated and control matched individuals.

CONCLUSION

We performed empirical analysis in order to test various happiness theories on a group of older people in a Latin American country. In particular, we analyzed data from Uruguay gathered by SABE.

We find that older people in Uruguay have a tendency to report themselves happy when they are married, when they have higher standards of health and when they earn higher levels of income. However, the relationship between income and happiness is far stronger in the case of women than when men are asked. When we analyze the impact of health and income on happiness we include variables indicating absolute and relative indications. Results indicate that accounting for relative positions improves our understanding of those factors affecting happiness. This implies that individuals often compare themselves with their reference groups.

Individuals report lower levels of happiness when they live alone and when their nutrition is insufficient. In the case of nutrition, we included a variable indicating malnutrition while the individual was a child and also a dummy variable signaling whether the person eats one meal a day or less. We also find that education has no clear impact on happiness.

Obtained results are robust to different methodological strategies. Most observed relationships are consistent with those present in the literature. In this sense, our work is a contribution to exploring those factors that affect individual happiness in Latin American countries, with a special focus on the elderly and their particularities.

Our study presents various limitations. Our future efforts will focus on three aspects: 1) to extend analyses to additional countries (Brazil, Argentina, Chile, and Mexico); 2) to incorporate additional semiparametric analysis of the relationships; and 3) to incorporate enhanced analysis of endogeneity.

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APPENDIX A

In our work we deal with a major issue: a high number of no responses to income related questions in the SABE survey. In order to deal with this situation we estimated individual income using data from Encuesta Continua de Hogares (ECH, the Uruguayan household survey). We conducted different estimations for men and for women.

We regressed (the logarithm of) per capita income against a set of individual and socioeconomic variables using ECH data. Our major challenge consisted in selecting those independent variables that we could identify both in the ECH and in the SABE survey. In particular independent variables included indications of age, gender, family composition, educational level, employment status, sources of income and the ownership of different kinds of durable goods. In the case of men, our regression had an R^2 of 0.67; in the case of women, R^2 was 0.65.

Once we obtained the income estimations from ECH we predicted individual income for the SABE respondents. In our prediction, we utilized those coefficients obtained in our initial estimation in order to express the relationship between individual variables and income levels.

TABLE 8

DETERMINANTS OF INCOME PER CAPITA FROM ENCUESTA CONTINUA
DE HOGARES (ECH, THE URUGUAYAN HOUSEHOLD SURVEY) - MEN

Number of obs =   5080   F(44, 5035) = 218.56   Prob > F = 0.0000
R-squared   = 0.6688   Root MSE   = 0.4089

LN_INCOME	Robust Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
YEAR_2000	.0148613	.0115447	1.29	0.198	-.0077713	.0374939
AGE	.0238305	.0130145	1.83	0.067	-.0016837	.0493446
AGE^2	-.0001215	.0000879	-1.38	0.167	-.0002938	.0000508
WOMAN (dropped)						
MARRIED	.115897	.0307923	3.76	0.000	.0555307	.1762632
DIVORCED	.0548168	.0397826	1.38	0.168	-.0231744	.1328081
WIDOWER	.0762522	.0340066	2.24	0.025	.0095844	.1429199
FRAC_WORK	.4163109	.0292997	14.21	0.000	.3588708	.473751
PEOPLE<14	.0016656	.0109217	0.15	0.879	-.0197456	.0230769
PEOPLE>14	.1083066	.0062643	17.29	0.000	.0960259	.1205873
TECHNICAL_EDUC	.1190719	.0593646	2.01	0.045	.0026913	.2354524
YEARS_T_EDUC	.019889	.0049212	4.04	0.000	.0102414	.0295367
YEARS_T_EDUC^2	.0010551	.0002492	4.23	0.000	.0005666	.0015437
HOUSE_WORK	-.0489834	.0958708	-0.51	0.609	-.2369319	.1389651
WORKING	.0621104	.0322686	1.92	0.054	-.0011501	.1253709
PENSIONER	.0358602	.0252206	1.42	0.155	-.0135832	.0853036
UNEMPLOYED	-.1482197	.0456124	-3.25	0.001	-.2376399	-.0587995
EMPLOYEE	-.2704704	.1018127	-2.66	0.008	-.4700676	-.0708731
FIRM_OWNER	-.1875959	.1043794	-1.80	0.072	-.3922249	.0170331
SMALL_FIRM	-.4588513	.1027651	-4.47	0.000	-.6603156	-.257387
NOT_PAID_JOB	-.510277	.1543748	-3.31	0.001	-.8129189	-.2076351
COOPERATIVE_FIRM	-.3210936	.1170529	-2.74	0.006	-.5505683	-.0916189
HOUSE_QUALITY	-.0260743	.0491769	-0.53	0.596	-.1224824	.0703339
NUMBER_ROOMS	.0709688	.0061323	11.57	0.000	.0589469	.0829908
HOUSE_OWNER	.1502919	.0227288	6.61	0.000	.1057337	.1948502
PAYING_HOUSE	.1318506	.0269961	4.88	0.000	.0789264	.1847747
RENTING_HOUSE	-.0171247	.0270978	-0.63	0.527	-.0702481	.0359988
GOOD_WATER_SERV	.1304853	.0698193	1.87	0.062	-.006391	.2673615
GOOD_WATER_EVAC	.134898	.0166771	8.09	0.000	.1022036	.1675925
ELECTRICITY	-.2172444	.1305276	-1.66	0.096	-.4731353	.0386464
ELECTRIC_COOKER	.0436419	.0861056	0.51	0.612	-.1251625	.2124463
GAS_COOKER	.1414735	.0872601	1.62	0.105	-.0295944	.3125413
GAS_NOT_PIPELINE	-.0559598	.084665	-0.66	0.509	-.22194	.1100203
KEROSENE_COOKER	-.1740744	.0949791	-1.83	0.067	-.3602748	.012126
REFRIGERATOR	.303929	.0695169	4.37	0.000	.1676455	.4402125
WASHING_MACHINE	.0648043	.0151837	4.27	0.000	.0350377	.094571
HEATER	.2488623	.0302086	8.24	0.000	.1896403	.3080843
MICROWAVE	.156748	.0288891	5.43	0.000	.1001128	.2133832
TV	.1187221	.0696766	1.70	0.088	-.0178743	.2553186
VIDEO	.1363645	.0201886	6.75	0.000	.096786	.1759431
CAR	.2270395	.0261289	8.69	0.000	.1758154	.2782636
DEPRIV_INDEX^2	.0022991	.0708796	0.03	0.974	-.1366559	.141254
PRIVATE_INCOME	.2588584	.0223393	11.59	0.000	.2150637	.3026532
PENSION_INCOME	.0857423	.0224015	3.83	0.000	.0418257	.129659
INCOME_FROM_AID	.0017535	.0136779	0.13	0.898	-.0250612	.0285681
_cons	6.762053	.5127299	13.19	0.000	5.756879	7.767227

Source: author's estimates.

TABLE 9

DETERMINANTS OF INCOME PER CAPITA FROM ENCUESTA CONTINUA
DE HOGARES (ECH, THE URUGUAYAN HOUSEHOLD SURVEY) – WOMEN

Number of obs = 8135	F(44, 8090) = 338.03	Prob > F = 0.0000
R-squared = 0.6525	Root MSE = .41487	

		Robust				
LN_INCOME	Coef.	Std. Err.	t	.P> t	.[95% Conf. Interval]	
YEAR2000	.0315988	.0092567	3.41	0.001	.0134532	.0497443
AGE	.0365937	.0089242	4.10	0.000	.0190999	.0540875
AGE^2	-.000205	.0000596	-3.44	0.001	-.0003217	-.0000882
WOMEN	(dropped)					
MARRIED	.0976865	.0185496	.5.27	0.000	.0613245	.1340485
DIVORCED	-.0515766	.022366	-2.31	0.021	-.0954197	-.0077335
WIDOW	-.0077479	.017392	-0.45	0.656	.-.0418408	.0263449
FRAC_WORK	.3838997	.0237062	.16.19	0.000	.3374294	.43037
PEOPLE<14	.0224457	.0092541	.2.43	0.015	.0043052	.0405862
PEOPLE>14	.1198269	.00533	.22.48	0.000	.1093788	.1302751
TECHNICAL_EDUC	.1586978	.054467	.2.91	0.004	.0519286	.2654671
YEARS_T_EDUC	.0252096	.0042251	.5.97	0.000	.0169272	.0334919
YEARS_T_EDUC^2	.0006763	.0002275	.2.97	0.003	.0002304	.0011222
HOUSEWIFE	-.0459613	.0292682	-1.57	0.116	-.1033345	.011412
WORKING	-.1044963	.0294221	-3.55	0.000	-.1621711	-.0468215
PENSIONER	.0462178	.0228584	.2.02	0.043	.0014095	.0910261
UNEMPLOYED	-.1777202	.0577603	.-3.08	0.002	-.2909452	-.0644952
EMPLOYEE	.0034088	.0132999	.0.26	0.798	-.0226623	.02948
FIRM_OWNER	.0241111	.0362066	.0.67	0.505	-.0468632	.0950853
SMALL_FIRM	-.0817272	.0169033	-4.83	0.000	-.114862	-.0485924
NOT_PAID_JOB	-.1048696	.059634	.-1.76	.0.079	.-.2217676	.0120284
COOPERATIVE_FIRM	.4274787	.2185136	.1.96	.0.050	.-.0008642	.8558217
HOUSE_QUALITY	.0784739	.0396912	.1.98	0.048	.0006688	.1562789
NUMBER_OF_ROOMS	.0765004	.0049459	.15.47	0.000	.0668052	.0861956
HOUSE_OWNER	.1439314	.0175403	.8.21	0.000	.1095479	.178315
PAYING_HOUSE	.1195974	.0211428	.5.66	0.000	.078152	.1610428
RENTING_HOUSE	-.0868588	.02089	.-4.16	0.000	-.1278086	.-.0459089
GOOD_WATER_SERV	.0538595	.0645877	.0.83	.0.404	-.072749	.1804679
GOOD_WATER_EVAC	.1763818	.0142232	.12.40	0.000	.1485008	.2042629
ELECTRICITY	.-.1337919	.0989056	.-1.35	0.176	-.3276723	.0600884
ELECTRIC_COOKER	.1801844	.119032	.1.51	0.130	-.053149	.4135178
GAS_COOKER	.3356385	.1192253	.2.82	0.005	.1019262	.5693508
GAS_NOT_PIPELINE	.057185	.118454	.0.48	0.629	-.1750154	.2893854
KEROSENE_COOKER	-.1098215	.1223036	.-0.90	0.369	-.3495681	.1299251
REFRIGERATOR	.1812655	.0556843	.3.26	0.001	.07211	.290421
WASHING_MACHINE	.0854027	.0116366	.7.34	0.000	.0625919	.1082135
HEATER	.2545987	.0218802	.11.64	0.000	.211708	.2974895
MICROWAVE	.1823968	.0226082	.8.07	0.000	.138079	.2267146
TV	.1271151	.0531993	.2.39	.0.017	.0228308	.2313995
VIDEO	.1460376	.0164909	.8.86	0.000	.1137111	.178364
CAR	.2379684	.0240535	.9.89	0.000	.1908173	.2851195
DEPRIV_INDEX^2	-.0113153	.0617847	-0.18	0.855	-.1324293	.1097987
PRIVATE_INCOME	.2048746	.0218591	.9.37	0.000	.1620252	.2477241
PENSION_INCOME	-.0022481	.0238874	-0.09	0.925	-.0490735	.0445772
INCOME_FROM_AID	-.0620368	.011066	-5.61	0.000	-.0837291	-.0403445
_cons	.5.952345	.357258	.16.66	0.000	5.252028	.6.652663

Source: author's estimates.

TABLE 10 - VARIABLES AND DESCRIPTIVE STATISTICS
SABE AND URUGUAY'S NATIONAL HOUSEHOLD SURVEY
(ECH; 1999 AND 2000)

	(1) Men SABE	(2) Men ECH	(3) Women SABE	(4) Women ECH
YEAR2000	0.348	0.508	0.297	0.507
AGE	70.729	70.371	71.087	71.634
MARRIED	0.718	0.787	0.346	0.380
DIVORCED	0.087	0.055	0.123	0.095
WIDOW	0.146	0.114	0.492	0.438
FRAC_ WORK	0.189	0.293	0.238	0.259
PEOPLE<14	0.206	0.172	0.365	0.186
PEOPLE>14	2.634	2.639	2.586	2.407
TECHNICAL_EDUC	0.074	0.085	0.051	0.034
YEARS EDUC	5.952	6.996	5.582	6.968
HOUSEWIFE	0.019	0.007	0.111	0.116
WORKING	0.214	0.274	0.117	0.113
PENSIONER	0.693	0.647	0.532	0.704
UNEMPLOYED	0.009	0.016	0.009	0.008
EMPLOYEE	0.723	0.728	0.563	0.619
FIRM_OWNER	0.091	0.090	0.045	0.023
SMALL_FIRM	0.140	0.169	0.216	0.152
NOT_PAID_JOB	0.008	0.002	0.019	0.008
COOPERATIVE	0.009	0.005	0.003	0.000
HOUSE QUALITY	0.987	0.987	0.992	0.986
NUMBER_OF_ROOMS	3.309	3.535	3.385	3.466
HOUSE_OWNER	0.631	0.685	0.631	0.672
PAYING HOUSE	0.070	0.101	0.087	0.105
RENTING_HOUSE	0.064	0.137	0.088	0.144
GOOD_WATER_SERV	0.981	0.992	0.991	0.994
GOOD_WATER_EVAC	0.941	0.856	0.962	0.873
ELECTRICITY	0.991	0.999	0.996	0.999
ELECTRIC COOKER	0.045	0.123	0.055	0.136
GAS COOKER	0.053	0.104	0.061	0.116
GAS_NOT_PIPELINE	0.867	0.756	0.868	0.734
KEROSENE_COOKER	0.025	0.013	0.010	0.012
REFRIGERATOR	0.964	0.990	0.977	0.991
WASHING_MACHINE	0.666	0.683	0.600	0.610
HEATER	0.812	0.943	0.810	0.941
MICROWAVE	0.279	0.318	0.253	0.274
TV	0.966	0.989	0.987	0.991
VIDEO	0.407	0.457	0.369	0.398
CAR	0.371	0.377	0.258	0.260
PRIVATE_INCOME	0.047	0.100	0.051	0.062
PENSION_INCOME	0.847	0.768	0.778	0.796
INCOME_FROM_AID	0.138	0.196	0.272	0.182
Observations	528	5.081	916	8.137

Source: author's estimates.