Testing Happiness Hypothesis among the Elderly

Cid, Alejandro and Ferrés, Daniel and Rossi, Máximo

Departamento de Economía , Universidad de Montevideo,
Departamento de Economía Facultad de Ciencias Sociales
Universidad de la República

11 December 2018

Testing Happiness Hypothesis among the Elderly

Alejandro Cid
Departamento de Economía
Universidad de Montevideo
Montevideo, Uruguay
Tel: 598-2-707-44-61 int 320
Email: acid@um.edu.uy

Daniel Ferrés
Departamento de Economía
Universidad de Montevideo
Montevideo, Uruguay
Tel: 598-2-707-44-61 int 316
Email: dferres@um.edu.uy

Máximo Rossi
Departamento de Economía
Facultad de Ciencias Sociales
Universidad de la República
Montevideo, Uruguay
Tel.: 598-2-410-6449
Fax: 598-2-410-6449
email: mito@decon.edu.uy

Abstract

A growing strand of economic literature focuses its attention on the relationship between happiness levels and various individual and socioeconomic variables. Recent studies analyze the impact of income, marital status, health and educational levels and other socioeconomic variables on satisfaction with life. A large majority of these studies limit their attention to industrialized countries. In our work, we analyze data for a group of individuals living in a Latin American country (Uruguay) with age 60 or older. We use a rich data set that allows us to test different happiness hypothesis employing four methodological approaches. We find that older people in Uruguay have a tendency to report themselves happy when they are married, they have higher standards of health and when they earn higher levels of income. 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 an initial 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.

1. Introduction

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.

A large body of research on happiness in economics takes reported subjective well-being as a proxy measure for utility. In particular, "happiness" is defined as satisfaction with life in general.[1] Based on the analysis of survey data on subjective well-being, current work is guided by the question: "how does x affect happiness?", where x can be income, health, marital status or employment status.

Different relationships between happiness and specific variables have been explored in recent economic work. In particular, various scholars have devoted 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. Also, although many countries have experienced strong rises in their per capita GDP, it is not generally true that these countries have seen average happiness to rise. This observation is particularly true for the cases of the US, the UK, Japan and Belgium. Scholars, puzzled by this surprising observation, have worked in order to come up with new hypothesis trying to explain subjective well-being. In particular, recent work has focused in 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.[2] 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 hypothesis. 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. 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."

Clark and Oswald (1994) analyzed the impact of unemployment in 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".

[1] Most studies are based on surveys that contain the following question: "How satisfied are you with your life?".
[2] For the US, they present data by state.

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.

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 with cultural issues. Interestingly, Graham and Felton (2005) analyzed the effect of income inequality on happiness in Latin America. Their work is based on data gathered in Latinobarometro.

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? For the moment we deal with selection bias following an extensively used technique: propensity score. Although we are aware that propensity score use has its critics, we believe that it lead us to a neater idea of the effect of the treatment (marriage, say) on happiness.

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.

2. 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 America Latina y el Caribe (SABE), a study sponsored by the Pan American Health Organization (PAHO)[3]. Since the survey is limited to the single-largest 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, including nursing homes and mental institutions are excluded from the sample. Table 1 presents descriptive statistics of both dependent and independent variables.

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

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[4]	5.35	5.13	0.22**	0.001
Compared Health[5]	1.55	1.51	0.042	0.226

Note: This table includes the results of t-tests on the equality of means between women and men, allowing the variances to be unequal.

** means are statistically different at 5 percent; * at 10 percent

Independent variables include indications of age, sex, family structure, education, health status, employment status and income. Information on these variables is present on SABE, except for income.[6] The income variable is a constructed variable, obtained after extrapolating data from Encuesta Continua de Hogares (see Appendix A for details). Our approach is different from the analysis of Graham and Felton (2005). In their work, they constructed an "asset index" created based on household possessions. Although that option was available for us, we believe that our approach conducts to a better indication of the individual income level.

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

[4] Health takes the rank of values from 2 to 8, where superior values indicate worse health.
[5] Compared Health takes the values 1, 2 and 3, where superior values indicates worse health subjectively compared with other people of similar age.
[6] 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[7]	5.85	5.13	0.72**	0.000
Compared Health[8]	1.77	1.48	0.29**	0.000

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.

** means are statistically different at 5 percent; * at 10 percent

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

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

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" o "no". we use this binary variable in a Probit estimation. Also we built an index of happiness based on 15 binary responses to questions related with 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 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.

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

Income and Happiness

As 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.[9] There is sufficient evidence that absolute income, alone, does not play a substantial role explaining happiness levels. In our work we will consider income as a dependent 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.[10] 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 in typical family structures it is fundamental that social scientists may try 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

[9] 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.
[10] We do this to avoid difficulties to define "reference groups".

opportunity to assess long term impact of divorce and remarriage on individual happiness.

There is vast, unambiguous, 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 o 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 one that expresses respondents' opinion 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.

3. 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 Square Estimation[11]

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 straight forward 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. Another 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.

Probit

In our study, we define a dummy variable that takes a 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 more appropriate choice for the case in which normal distribution of the dependent variable can be assumed.

[11] 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.

Tobit

Due to 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 said, 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 the 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 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 of the parameter vector β. 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 relative large sample is used.

4. Results

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

Table 4
Estimates of happiness - People of age over 59 - 1999-2000 SABE Survey

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

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%

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

Obtained results indicate that:

- Being married has a statistically significant positive effect on happiness among men and women. This result is consistent Stack and Eshleman (1998). In their study, they 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”.

- Living alone is associated to men showing lower levels of happiness. This relationship does not hold for women.

- Absolute and relative income levels are more heavily related to higher satisfaction with life among female than among male. 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.

- 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 between education variables and happiness is ambiguous. Nothing can be concluded about the impact of higher education over happiness levels. Care is required when interpreting this 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.

- Most works that intend to explain happiness focus on the relationship between being unemployed and satisfaction with life. In our case, we believe that due to the fact that our data set restricts attention to those 60 or older, it is wise not to try to explore this relationship.

In sum, we find that our results are pretty much in line with those obtained by other studies. Individuals that have higher health levels, are 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.

5. Treatment Evaluation and Marital Status

In our study, we aim to determine the "pure" effect of specific socioeconomic and individual variables on happiness. In this paper, we pay particular attention to the connection between individual marital status and satisfaction with life. 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. Conducting p score analysis is a way to reduce the bias performing comparisons of outcomes using treated and control individuals who are as similar as possible.

A propensity score is generally defined as the conditional probability of assignment to a particular treatment given a vector of observed covariates (Rosenbaum and Rubin 1983).[12] The propensity score is defined as the conditional probability of receiving a treatment given pre-treatment characteristics:

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

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[13]. Due to 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 to match comparison units sufficiently close to the treated units (for a summary, see Cameron et al. 2005). So, after estimating p(X) we employed four matching methods: Nearest Neighbor Matching, Radius Matching, Kernel Matching and Stratification Matching[14]

The tables below show the results:

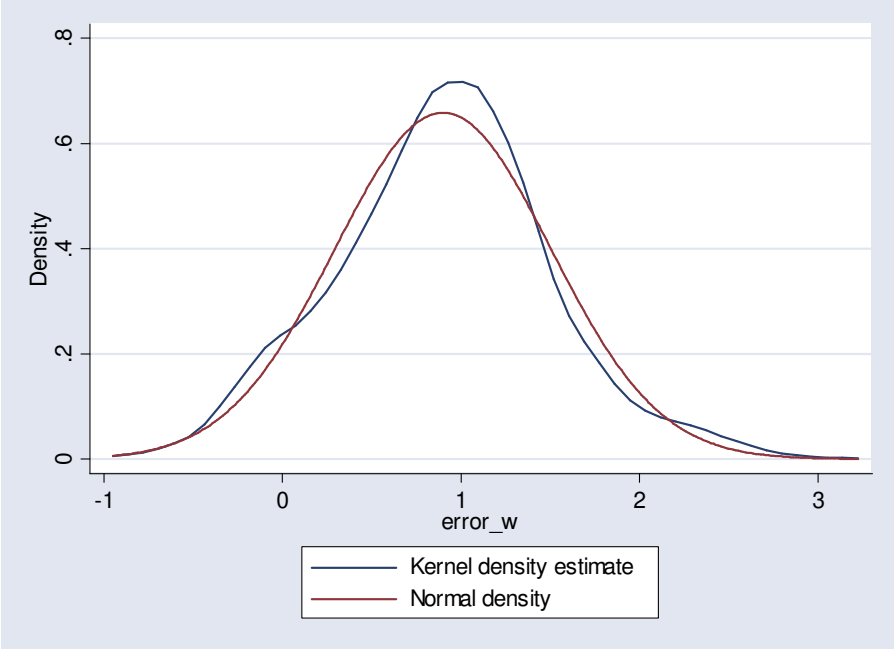
Table 5 - Probit estimation of propensity scores – Women above 59 years old

	Coef.	Std. Error
Never employed	-.210	.133
Number of divorces and separations	-.226	.133*
Duration of present Marriage or Cohabitation	.030	.004**
Relative Wealth Index	.518	.166**
Some Secondary Education	.187	.112*
Constant	-1.669	.179**
Pseudo R2	.118	

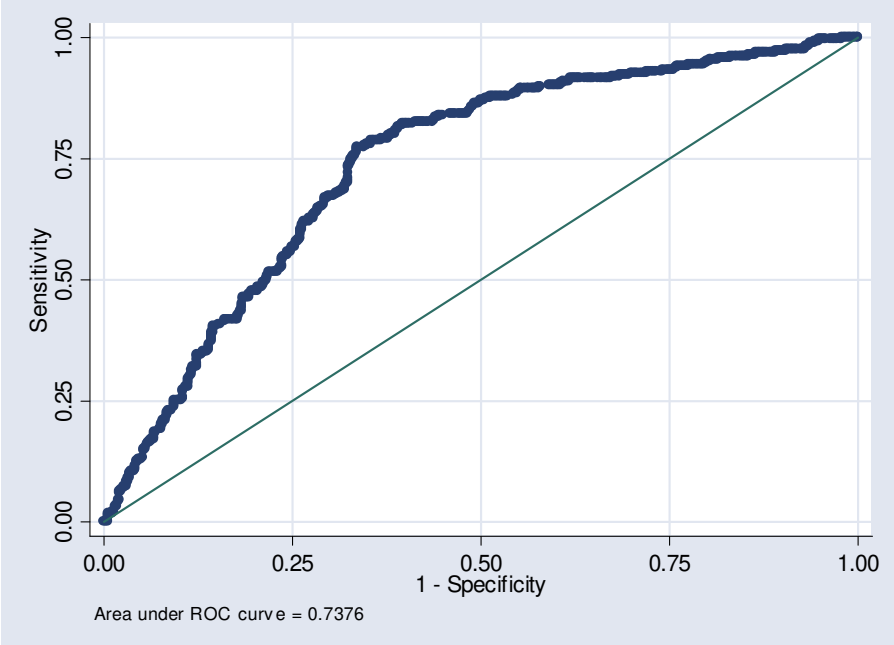
Number of observations: 812 - ** significant at 5%; * at 10% - Dependent variable: Married

[12] In the propensity score method, for each variable with missing values, a propensity score is generated for each observation to estimate the probability that the observation is missing.
[13] Applied with the Stata ado file "pscore" developed by Becker and Ichino (2002)
[14] Those matching methods were applied using the Stata ado files attn, attr, attk and atts developed by Becker and Ichino (2002)

Kernel density estimation of the residuals of the PROBIT model for got married (variables and results in Table above) - Normal density overlaid for comparison - Only Women with age above 59.



Correctly Classified Outcomes - Probit estimation of propensity scores for got married - Women with age above 59



Note: Sensitivity means the fraction of observed positive-outcome cases that are correctly classified; specificity is the fraction of observed negative outcomes cases that are correctly classified. A model with no predictive power has area 0.5; a perfect model has area 1.

Results of the Matching Methods:

Average Effect of Treatment on the Treated (ATT)
Women with age above 59

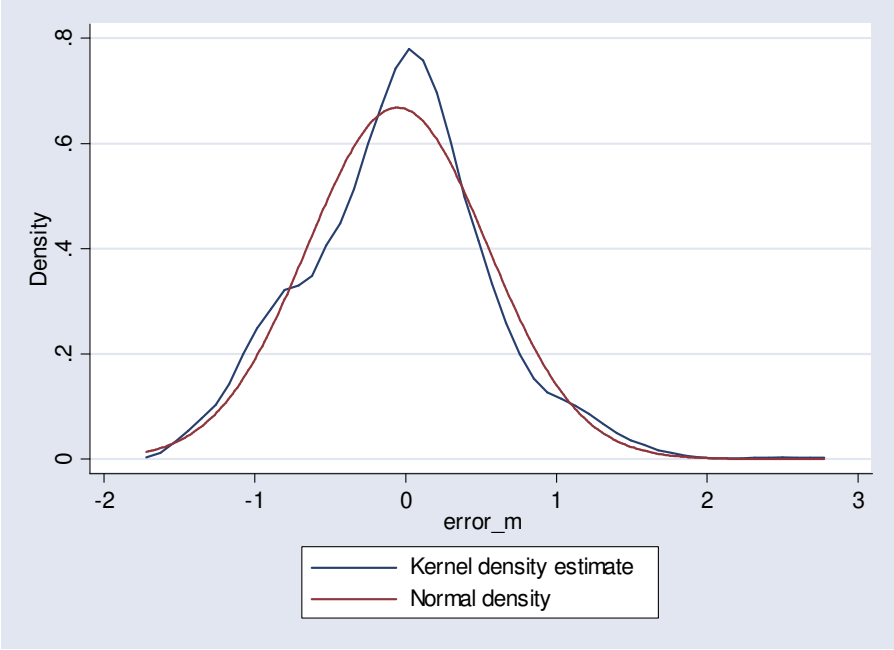
Bootstrapped Standard Error	n. treat.	n. contr.	ATT	Std. Err.	t
Nearest Neighbor Matching method	287	200	1198	0,509	2,356
Radius Matching method	287	511	0,981	0,254	3,861
Kernel Matching method	287	511	0,942	0,274	3,435
Stratification method	285	513	0,931	0,248	3,747

Table 6 - Probit estimation of propensity scores – Men above 59 years old

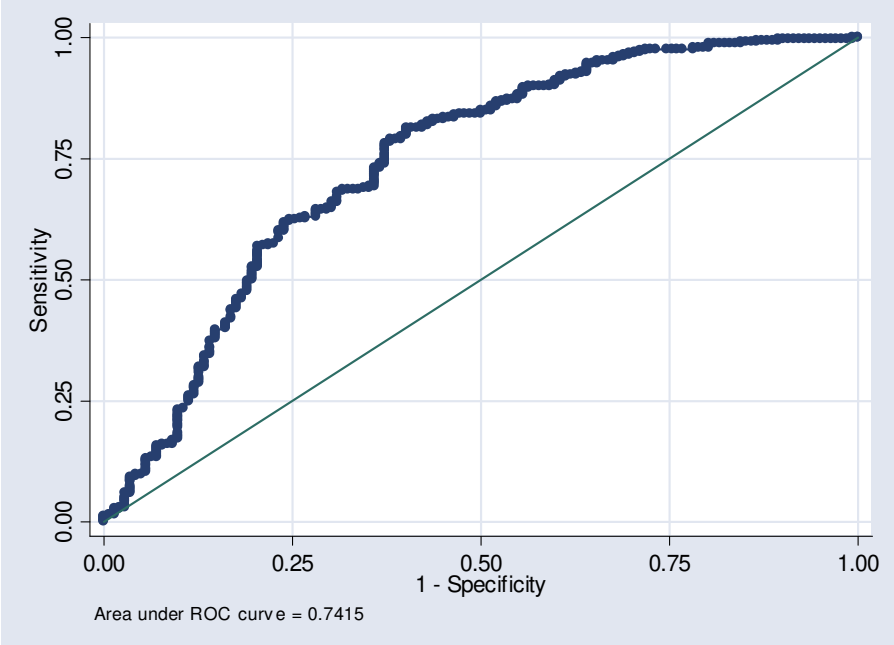
	Coef.	Std. Error
Number of divorces and separations	-.425	.119**
Duration of present Marriage or Cohabitation	.018	.005**
Relative Wealth Index	1.884	.741**
(Relative Wealth Index)^2	-1.617	.705**
Some Secondary Education	.368	.153**
White	.430	.246*
Constant	-.794	.308**
Pseudo R2	.147	

Number of observations: 480 - ** significant at 5%; * at 10% - Dependent variable: Married

Kernel density estimation of the residuals of the PROBIT model for got married (variables and results in Table above)- Normal density overlaid for comparison - Only Men with age above 59.



Correctly Classified Outcomes - Probit estimation of propensity scores for got married - Men with age above 59



Results of the Matching Methods:

Average Effect of Treatment on the Treated (ATT)
Men with age above 59

Bootstrapped Standard Error	n. treat.	n. contr.	ATT	Std. Err.	t
Nearest Neighbor Matching method	338	87	0,905	0,431	2,1
Radius Matching method	338	141	0,669	0,452	1,481
Kernel Matching method	338	141	0,666	0,376	1,77
Stratification method					

In the case of men, though the "Average Effect of Treatment (got married) on the Treated" is positive through all the approaches, the confidence intervals include zero in all but one matching methods. In the case of women, all 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 with age above 59.

Conclusion

We perform empirical analysis in order to test various happiness theories in 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, 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. Observed relationships are consistent with those present in the literature analyzing the case for industrialized countries. In this sense, our work is an initial attempt in order to explore those factors that affect individual happiness in Latin American countries. This issue has received very little attention from economists.

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.

References

Alesina, A., Di Tella, R. and MacCulloch,R. (2004). Inequality and happiness: are Europeans and Americans different? Journal of Public Economics. 2009-2042.

Becker,S. and Ichino, A. (2002). "Estimation of average treatment effects based on propensity scores", The Stata Journal (2002) Vol.2, No.4, pp. 358-377.

Clark, A. E. and Oswald, A.J. (1994). “Unhappiness and Unemployment”. The Economic Journal, Vol 104, No 424, pp. 648-659.

Cameron, A. C. and Trivedi, P. K. (2005). "Microeconometrics. Methods and Applications". Cambridge University Press.

Chay, K. Y. and Powell, J.L. (2001). "Semiparametric Censored Regression Models." Journal of Economic Perspectives. Fall 2001, 15:4, pp. 29-42.

Frey, B. and Stutzer, A. (2002). “What can Economists learn from Happiness Research? “Journal of Economic Literature, Vol 40, No2, pp. 402-435.

Frey, B. and Stutzer, A. (2003). Testing Theories of Happiness. Institute for Empirical Research in Economics, University of Zurich. Working Paper Series, No 147.

Gerdtham, U and Johanesson, M. (1997). “The relationship between happiness, health and socio-economic factors: results based on Swedish micro data”. Working Paper Series in Economics and Finance No. 27. Department of Economics, Stockholm School of Economics, Stockholm, Sweden.

Graham, C. and Felton, A. (2005). “Does Inequality Matter to Individual Welfare? An initial exploration based on happiness surveys from Latin America”. The Brookings Institution. Center on Social and Economic Dynamics. Working Paper No 38.

Honoré, Bo E. and Powell, J. L. (1994). "Pairwise Difference Estimators for Censored and Truncated Regression Models." Journal of Econometrics. September/October, 64:1-2, pp. 241-78.

Powell, J. L. (1984). "Least Absolute Deviations Estimation for the Censored Regression Model." Journal of Econometrics. July, 25:3, pp. 303-25.

Powell, J. L. (1986). "Symmetrically Trimmed Least Squares Estimation for Tobit Models." Econometrica. November, 54:6, pp. 1435-60.

Stack, S. and Eshleman, J. R. (1998). “Marital Status and Happiness: A 17-Nation Study”. May, pp527-536.

Rosenbaum, P. and Rubin, D. (1983). “The central role of the propensity score in observational studies for causal effects”. Biometrika 1983 70(1), pp 41-55.

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 solve this situation we estimated individual income using data from Encuesta Continua de Hogares (ECH, the Uruguayan household survey). We conducted different estimations for both men and 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.