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# **Religion as an Unemployment Insurance and the Basis of Support for Public Safety Nets**

**The Case of Latin America and the Caribbean**

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**Inter-American Development Bank  
Country Department Caribbean**

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## **Abstract**

This paper explores the role of religion in mitigating the degree to which unemployment reduces subjective well-being and it examines its support of social programs. The paper goes beyond existing literature in three ways: It extends existing literature to Latin America and Caribbean countries; it explicitly includes analysis of two confounders (social capital and personal traits) ignored in existing literature; and it moves beyond correlation by using the propensity score method to tease out a causal relation between religion and well-being. We find that religion acts as a buffer: Unemployed religious people are relatively happier than are nonreligious unemployed people. However, in contrast with the existing literature, we find that religious people are relatively more supportive of public social policy.

**JEL Codes:** Z12, I31, J65, D02

**Keywords:** life satisfaction, religion, unemployment, insurance

## I. Introduction

In this paper, we explore the role of religiosity in mitigating the adverse effect of unemployment on happiness and in support of social programs in Latin America and the Caribbean (LAC) countries.<sup>1</sup> The potential insurance role of religion in buffering the well-being effect of stressful life events—such as unemployment—has economic and social implications. One hypothesis (see Clark and Lelkeys, 2005) is that the two sources of insurance—governmental and religiosity—may be substitutes, and that religious citizens are less supportive of public social programs.

The topic has policy implications beyond the issue of tax expenditure (e.g., churches are often exempt from taxes). Recent research, mainly in high-income Organisation for Economic Co-operation and Development (OECD) member-countries, reveals a tradeoff between religiosity and social insurance. Religious citizens are less likely to support public unemployment schemes and social expenditure in general (Clark and Lelkes, 2005). Hence, we attempt to discern the differential support of religious versus nonreligious citizens for public unemployment and social policy schemes in addition to whether religion acts as a buffer for unemployment.

We add to the literature by extending it to countries in LAC and by teasing out the causality relationship between religiosity and happiness by using the propensity score-matching method instead of the typical cross-sectional or panel database regressions. The propensity score-matching method presents a good solution for observational studies whereby causal relations can be discerned when observational data is available.

The rest of the paper is organized as follows. Section II presents a brief literature review. Section III presents the data and research strategy. Section IV presents the central findings. The last section concludes.

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<sup>1</sup>LAC comprises the following countries: The Bahamas, Barbados, Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Mexico, Nicaragua, Panama, Paraguay, Peru, Suriname, Trinidad and Tobago, Uruguay, and Venezuela.

## II. Literature Review

A large body of empirical literature has uncovered a positive relation between religiosity and subjective well-being. In a survey of the literature, Myers (2008) reports that almost all cross-sectional studies have found positive correlations between life satisfaction and religious practice, with religiosity accounting for 10 to 15 percent of the variation in happiness. These figures are obtained by introducing a religious measure as a right-hand variable among other control variables in a regression, often a logistic equation, with a well-being measure as the explained variable.

There is also growing empirical literature that finds that religion is positively associated with well-being during stressful events such as illness, unemployment, and marital problems (see Clark and Lelkes, 2005). The stress-buffering effect is often obtained from an interaction term between religion and the stressful event in a regression. This stress-buffering effect of religion could be the result of two reasons: main effect and negative shock-buffering effect (see Elison, 1991). The main effect is that religious individuals declare to have higher life satisfaction. The negative shock-buffering effect is that religious unemployed individuals show greater life satisfaction than do nonreligious unemployed individuals. Separating the two effects is typically done by introducing a religiosity variable (the main effect), a shock variable, and an interaction term between the shock event and the religiosity variable (negative shock-buffering effect).

However, different aspects of religion do not necessarily relate to well-being in the same way; hence, religiosity's buffer role may differ. Measurements of a personal religious dimension such as private prayer do not have negative shock-buffering or stress-buffering effects on well-being (Pargament, 2002). However, social religious dimension measures do have stress-buffering effects. Social religious dimensions often differ between different denominations because institutional religions differ by their degree of social solidarity and hence have different roles of the religious community relative to the individual.

To the extent that religious individuals are less subject to unemployment's adverse psychological effects, religious individuals may be less supportive of public unemployment schemes and social expenditure in general. A number of studies support this assertion. Scheve and Stasavage (2005) show that frequent churchgoers demonstrate a lower level of support for social spending and that social spending as a percentage of GDP is lower in countries where religiosity is higher. Hungerman (2005) found that church and government spending are substitutes. Clarke and Lelkes (2005) found that the majority of churchgoers disagreed with the statement, "It is the government's responsibility to provide a job for everyone who wants one,"

whereas a minority of nonchurchgoers disagreed. The authors also demonstrate that the replacement ratios of unemployment insurance schemes are lower in countries in which a greater percentage of the population is religious (particularly Roman Catholics).

Another strand of research considers whether and to what extent people with more social capital are sheltered from the harmful effects of unemployment (see Helliwell and Putnam, 2005; Winkelmann, 2006). If an individual participates in cultural, sport, and volunteering activities (and in that way is connecting with other individuals), he or she—in the event of unemployment—could expand the time spent on these activities. Thus, the main argument is that people who have a larger social network and who have many alternative uses of their time might not be as much exposed as others are to the adverse psychological mechanisms of unemployment (Goldsmith, Veum, and Darity, 1996). Thus, a possible problem with the existing literature is ignoring social capital where the religious are highly socially connected; hence, regression results may be overestimating the relation between religiosity and well-being. The problem will be that, by nature, religious people belong to a larger set of social groups, which may increase their social capital and their coping capacity with unemployment’s psychological effects in a better way in comparison with nonreligious people.

## Data and Research Strategy

### Data

The data used are from the 2010 Latin American Public Opinion Project Survey of 24 countries. Sample size is 40,990 individuals, with an average of 1,500 per country. The subsample of unemployed persons is 8,912, with an average of 371 per country.

Our main left-hand side variable—happiness—is derived from the question in the survey: “To begin, in general how satisfied are you with your life?” with possible response options ranging from 1 (*very satisfied*) to 4 (*very unsatisfied*). Table 1 presents the distribution of life satisfaction. We define a person as satisfied with life if the respondent falls in either of two answers (*very satisfied* and *somewhat satisfied*); 81.2% (32,924 cases) are satisfied with life.

**Table 1. Life Satisfaction and Religiosity**

Variable	Percentage				Cases					
	Very satisfied	Somewhat satisfied	Somewhat dissatisfied	Very dissatisfied	Very satisfied	Somewhat satisfied	Somewhat dissatisfied	Very dissatisfied	Total	attrition rate
Satisfaction	36.990%	44.250%	13.813%	4.947%	14,991	17,933	5,598	2,005	40,527	1.14%
Religiosity	Very important	Rather important	Not very important	Not at all important	Very important	Rather important	Not very important	Not at all important	Total	attrition rate
	61.135%	24.251%	9.185%	5.429%	24,707	9,801	3,712	2,194	40,414	1.43%

The survey includes three distinct measures of religiosity: denomination, church attendance, and degree of belief. All respondents of the survey are asked the following three questions: “What is your religion, if any?”<sup>2</sup> and “How often do you attend religious services?”<sup>3</sup> They were also asked, “Please, could you tell me how important religion in your life is?” with response options ranging from 1 (*very important*) to 4 (*not at all important*). The survey does not ask regarding the practice of private prayer. Table 1 presents descriptive statistics regarding religiosity, and Table 2 presents frequencies in attending religious services and the importance of religion to the respondents of the survey.

**Table 2. Religion Importance and Church Attendance**

Please, could you tell me how important is religion in your life?				How often do you attend religious services?			
	Frequency	Percent	Cummulative		Frequency	Percent	Cummulative
Very important	24,707	61.13	61.13	More than once per week	6,810	16.86	16.86
Rather important	9,801	24.25	85.39	Once per week	11,858	29.37	46.23
Not very important	3,712	9.18	94.57	Once a month	8,271	20.48	66.71
Not at all important	2,194	5.43	100	Once or twice a year	5,768	14.28	81
Total	40,414	100		Never or almost never	7,674	19	100
				Total	40,381	100	

To define our treatment variable, we used the degree of belief in religion because this variable contains slightly more observations than does the variable regarding attendance at religious services and because there is a strong correlation of the former with the latter:

**Table 3. Relationship Between Attendance at Church and Importance of Religion**

	Church attendance
Importance of religion	0.828***
	(0.00673)
Constant	1.575***
	(0.0121)
Number of observations = 40034, Adj. R-sq =0.275, standard errors in parentheses, *** p<0.05	

<sup>2</sup> With more than 10 religious denominations identified.

<sup>3</sup> With possible replies of “more than once a week,” “once a week,” “once a month,” “one or two times a year,” and “never or practically never.”



Respondents to the question on importance have four options ranging from 1 (*very important*) to 4 (*very unimportant*). We defined the strong believer population as the set of individuals who answered *very important* to this question and those that answered any of the remaining three categories as non–strong believers; very religious represent 61% of the total sample.

The main stressful event considered in this study is unemployment, for which the survey asks, “Have you lost your job in the last two years?” with the alternatives of “yes but has a new job”; “yes and has not found a new job”; “has not lost his/her job,” or “has no job because of own decision or incapacitation.” The survey also asks whether the person is looking for a job. We define a person as unemployed if he or she reports looking for a job and has lost a job in the past 2 years but has not yet found one. With this definition, Table 4 presents unemployment statistics of the sample; 22% are unemployed in a sample of 8,912 persons.

**Table 4. Unemployment Statistics of Sample**

Mean	Std Deviation	Frequency	
		Total	Unemployed
0.217	0.412	40,990	8,912

To test the hypothesis that religiosity undermines public support for government social policy, we used a set of questions about the role of the government as a provider of social welfare. The survey asks six questions regarding the government’s role:

1. The government, instead of the private sector, should own the most important enterprises and industries of the country;
2. The government, more than individuals, should be the most responsible for ensuring the well-being of the people;
3. The government, more than the private sector, should be primarily responsible for creating jobs;
4. The government should implement strong policies to reduce income inequality between the rich and the poor;
5. The government, more than the private sector, should be primarily responsible for providing retirement pensions;

6. The government, more than the private sector, should be primarily responsible for providing health care services.

Each question has 7 possible response options ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). We divided the answers into two options: (1) *agree*, for those who answer any value between 4 and 7 who are classified as supporting social policy; and (2) *disagree*, for those who answer any value between 1 and 3 who are classified as opposing public social policy. Table 5 presents a frequency table that highlights the distribution in the opinions about the government's action.

**Table 5: Opinions on Government Role**

	The (Country) government, instead of the private sector, should own the most important enterprises and industries of the country. How much do you agree or disagree with this statement?		The (Country) government, more than individuals, should be the most responsible for ensuring the well-being of the people. To what extent do you agree or disagree with this statement?		The (Country) government, more than the private sector, should be primarily responsible for creating jobs. To what extent do you agree or disagree with this statement?		The (Country) government should implement strong policies to reduce income inequality between the rich and the poor. To what extent do you agree or disagree with this statement?		The (Country) government, more than the private sector, should be primarily responsible for providing retirement pensions. How much do you agree or disagree with this statement?		The (Country) government, more than the private sector should be primarily responsible for providing health care services. How much do you agree or disagree with this statement?	
	Cases	Percentage	Cases	Percentage	Cases	Percentage	Cases	Percentage	Cases	Percentage	Cases	Percentage
1 Strongly disagree	6,309	16.07	1,068	2.67	956	2.38	1,063	2.67	792	1.99	569	1.41
2	3,078	7.84	917	2.29	812	2.02	844	2.12	650	1.63	572	1.42
3	3,806	9.69	2,102	5.26	1,829	4.56	1,851	4.65	1,505	3.78	1,246	3.1
4	5,461	13.91	3,940	9.86	3,912	9.74	3,835	9.63	3,514	8.82	2,688	6.68
5	5,857	14.92	6,335	15.85	6,037	15.04	5,949	14.94	5,826	14.62	4,540	11.28
6	5,276	13.44	8,109	20.29	7,835	19.52	7,795	19.58	7,758	19.47	7,671	19.06
7 Strongly agree	9,472	24.13	17,487	43.76	18,764	46.74	18,474	46.4	19,797	49.69	22,956	57.04
Total	39,259	100	39,958	100	40,145	100	39,811	100	39,842	100	40,242	100

### Research Strategy

As previously mentioned, the research strategy followed in the literature is estimating a probit or logistic regression of the form:

$$H_i = \alpha + \beta R_i + \gamma Unemp_i + \delta R_i \times Unemp_i + \lambda \mathbf{X}_i + \varepsilon_i, \quad (1)$$

where  $H$ ,  $R$ ,  $Unemp$ , and  $\mathbf{X}$  are the life satisfaction, religiosity, unemployment, and other control variables, respectively. The main effect of religion is captured by  $\beta$  and the buffer effect by the cross-term effect  $\delta$ .

We, in contrast, use the propensity score-matching method.<sup>4</sup> This method balances the distribution of observed covariates between the treatment group (religious) and a comparison

<sup>4</sup> For a review of methodology to study the determinants of happiness, see Ferrer-i-Carbonel and Frijters (2004).

group (nonreligious) on the basis of similarity of their predicted probabilities of having a given treatment—that is, their propensity score. The differences in the mean values of the outcomes are then attributable to the treatment.<sup>5</sup> Specifically, two groups are constructed: individuals in the treatment group (denoted  $D_i = 1$  for individual  $i$ ) and individuals in the control group ( $D_i = 0$ ). In the present case, the treatment is to be religious so that religious people are matched to nonreligious people on the basis of their propensity score,  $P(x_i)$ :

$$P(x_i) = \text{Prob}(D_i=1 | x_i)$$

where  $x_i$  is the vector of observed control variables and  $P(x_i)$  is obtained from the predicted values from a standard logit participation equation using the vector  $x_i$ . The selection of observable variables was based on Clark and Lelkes (2005). We used age, sex, marital status (single, married, common law, separated, and widowed), religious denomination (Catholic, Protestant, non-Christian Eastern religions, none [believes in a supreme entity], Evangelical and Pentecostal, LDS [Mormon], traditional religions or native religion, Jewish, agnostic, atheist, Jehovah's Witness), income decile, years of education, urban location, number of children in household (also included are second order variables of age, years of education, and number of children), and country. Apart from these variables, we used social participation variables: (1) how often have you tried to help to solve a problem in your community?, (2) attend meetings of religious organizations, (3) attend parent association meetings at school, (4) attend meetings of a community improvement committee or association, (5) attend meetings of an association of professionals, merchants, manufacturers or farmers, and (6) attend meetings of a political party or political organization.

The self-evaluation of personal traits variables included are (1) critical and quarrelsome person, (2) anxious and easily upset person, and (3) disorganized and careless person. There are seven more that we did not use since they had no statistical significance. The personal traits questions can be seen as the unobserved variables lost in standard observational studies so that their inclusion makes the model stronger against the presence of confounders.

Questions regarding participation in social meetings are used to proxy social capital. Given that each variable comes with four answers (“once a week,” “once or twice a month,” “once or twice a year,” and “never”), a standardized index is created for each variable. The index is built taking the lowest assistance (“never”) and assigning the value of 0, the value 1 to

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<sup>5</sup> This assertion holds only if (1) the  $D_i$ 's (the treatment) are independent over all  $i$  and (2) conditional independence holds—that is, outcomes are independent of treatment given  $x$ , then outcomes are independent of  $P(x_i)$ , in which case they would be the same as if they had been assigned randomly.

“once or twice a year,” the value 2 to “once or twice a month,” and the value 3 to “once a week.” Then, each value is divided by the maximum (3) so that we obtain an index that ranges from 0 to 1, where 1 is the highest participation possible. With respect to personal traits, a set of questions regarding personality and the individual’s self-perception has been used. These questions can be seen as the unobserved variables lost in standard observational studies, thus making the model stronger against the presence of confounders.

Using the estimated propensity scores, matched pairs are constructed on the basis of how close the scores are across the two groups. Specifically, we use the nearest neighbor with no replacement algorithm—that is, treatment individuals will have only one matched control. The mean effect of religion on happiness,  $\Delta H$ , is calculated from the following:

$$\Delta H_k = \frac{1}{N} \sum_{i \in N} \left( y_{ik} - \frac{1}{J} \sum_{j \in J_i} y_{jk} \right)$$

Where  $\Delta H_k$  is the difference in the individual’s happiness category  $k$  of the individual attributable to religion,  $y_{ik}$  and  $y_{jk}$  are the  $k$  happiness category of the  $i^{\text{th}}$  nonreligious individual and  $j^{\text{th}}$  religious individual,  $N$  is the total number of religious individuals,  $J$  is the total number of matched nonreligious individuals.<sup>6</sup>

However, the validity of the findings depends critically on the extent to which the treated (religious) and nontreated (nonreligious) subgroups would have obtained those same results through random assignment. We use the following statistical tests to gauge success: (1) a test for joint equality of all covariate means between groups (i.e., the Hotelling test); (2) a test to determine whether the distributions of the propensity scores of the treated and comparison group are equal (i.e., the Kolmogorov-Smirnov test); and (3) to test the model’s sensitivity to unobservable confounders, we use the Rosenbaum bounds approach that measures the degree of departure from random assignment. This measures the degree to which two subjects with the same observed characteristics (included in the vector of explanatory variables in the participation equation) may differ in the odds of receiving treatment.

As robustness checks, we implemented four different matching methods in addition to the nearest neighbor algorithm: three radius matching methods where the caliper was shortend by  $1/10^{\text{th}}$  each time and a kernel matching using the Gaussian (normal) distribution to assign the weight to the matched controls. Furthermore, LAPOP survey contains information that does not

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<sup>6</sup> In the present case,  $k = 2$  because the outcome variable, happiness is equal to 1 if the individual answer to be very or somewhat satisfied with life.

exist in standard household surveys, namely personal traits and social participation. These constitute an important set of unobservable information that might bias the estimation of the effect. We tested the hypothesis that social and personal traits variables matter and that failure to include them in this type of calculation will overestimate the actual effect. For that purpose, we use four different participation equation models: (1) the complete one that incorporates the mentioned variables, (2) one that excludes the social participation but incorporates the personal traits, (3) one that incorporates social participation but excludes personal traits, and (4) one that excludes both social participation and personal traits. We expect that the balancing tests for each model will change as variables are excluded and that the sensitivity analysis will show that failure to include these variables will lead to biased results.<sup>7</sup>

### **III. Results**

In this section, we first present the results of the main internal consistency. We then discuss the results of religiosity's effect on life satisfaction and finally the effect of religiosity on support to social policy.

#### **Internal Consistency Tests**

To validate the approach, in this section we present the results of six tests: (1) a Hotelling test for differences in means of the vector of observable means; (2) a balancing test that allows us to show that the variables used to build the propensity score behaves equally in both samples, treated and control; (3) Psuedo R –squared; (4) a Kolmogorov- Smirnov test for equality of distributions; (5) a figure that shows the distribution of the propensity score before and after matching; and finally (6) the Rosenbaum test that assesses the sensibility of the estimation to potential confounders.

As mentioned in the methodology section, although we implemented five different matching mechanisms and different specifications of the participation equation (full model, and without either social capital and/or personal traits), we present the entire set of tests only for the full model and the nearest neighbor approach because it is the algorithm that passes all the proposed tests.<sup>8</sup> The tests are applied for the unemployed sample and the full sample.<sup>9</sup>

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<sup>7</sup> For reasons of space, we do not present the full set of tests because the total of estimations performed is 96 (5 matching algorithms, 4 participation equations, 5 tests). They can be obtained from the authors.

<sup>8</sup> For all the other algorithms, the test can be provided on request.

<sup>9</sup> In both cases, the simple reduction is due to two issues: (1) attrition to response social capital questions (around 9% of total simple dis not answer to this questions), and (2) common support restriction (the matched simple represents 51% of total sample and 53% of unemployed sample).

## Table 6. Hotelling Test

a. All sample	b. Unemployed
2-group Hotelling's T-squared = 33.126751	2-group Hotelling's T-squared = 16.486374
F test statistic: $((21298-39-1)/(21298-2)(39)) \times 33.126751 = .84788823$	F test statistic: $((4742-39-1)/(4742-2)(39)) \times 16.486374 = .41933859$
H0: Vectors of means are equal for the two groups	H0: Vectors of means are equal for the two groups
F(39,21258) = 0.8479	F(39,4702) = 0.4193
Prob > F(39,21258) = 0.7364	Prob > F(39,4702) = 0.9995

Table 6 shows the results of the Hotelling test and Table 7 shows the result of the pseudo  $R^2$  test. The Hotelling's high  $p$  value indicates the null hypothesis that the vector of means of the two groups is equal and cannot be rejected. The pseudo  $R^2$  shows how well the set of covariates explains the probability of being treated (religious) so that after matching, since there should be no systematic differences in covariates' distribution, the pseudo  $R^2$  should be low.<sup>10</sup> This rule is followed by the main model for both samples and the results. When we restrict the main model (omitting social or personal variables, or both) we obtain that the Pseudo  $R^2$  for omitted variables does not change dramatically and it is not zero (in red). This constitutes evidence that the restricted selection of covariates cannot balance relevant unobserved confounders, creating a selection bias problem for these cases.

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<sup>10</sup> Caliendo and Kopeinig (2005), page 16.

**Table 8. Pseudo  $R^2$  test**

a. All sample

	Sample	Pseudo R2	LR Chi2	p>chi2	MeanBias	MedBias
Main Model	Raw	0.147	7278.15	0	12.7	7.7
	Matched	0.001	33.16	0.733	0.7	0.4
Omitted variables	Raw	-	-	-	-	-
	Matched	-	-	-	-	-
Model without social vars	Raw	0.114	5767.2	0	11.6	7.4
	Matched	0.000	15.31	0.996	0.6	0.5
Omitted variables	Raw	<b>0.069</b>	<b>3445.41</b>	<b>0</b>	<b>17.9</b>	<b>11.3</b>
	Matched	<b>0.03</b>	<b>924.11</b>	<b>0</b>	<b>12.9</b>	<b>7.4</b>
Model without personal traits	Raw	0.14	7495.92	0	12.2	7.7
	Matched	0.001	46.8	0.107	0.7	0.6
Omitted variables	Raw	<b>0.014</b>	<b>693.92</b>	<b>0</b>	<b>16.9</b>	<b>19.1</b>
	Matched	<b>0.007</b>	<b>195.95</b>	<b>0</b>	<b>10.9</b>	<b>14.3</b>
Model without social variables and personal traits	Raw	0.104	5742.81	0	11.1	6.6
	Matched	0.003	87.58	0	0.9	0.5
Omitted variables	Raw	<b>0.08</b>	<b>3974.4</b>	<b>0</b>	<b>17.3</b>	<b>12.4</b>
	Matched	<b>0.033</b>	<b>1023.9</b>	<b>0</b>	<b>10.5</b>	<b>6.8</b>

b. Unemployed sample

	Sample	Pseudo R2	LR Chi2	p>chi2	MeanBias	MedBias
Main Model	Raw	0.154	1791.15	0	13.1	8.2
	Matched	0.003	16.56	0.999	1.1	0.9
Omitted variables	Raw	-	-	-	-	-
	Matched	-	-	-	-	-
Model without social vars	Raw	0.117	1396.2	0	11.9	7.9
	Matched	0.002	10.67	1	1.3	1.1
Omitted variables	Raw	<b>0.078</b>	<b>900.01</b>	<b>0</b>	<b>19.2</b>	<b>11.4</b>
	Matched	<b>0.03</b>	<b>205.05</b>	<b>0</b>	<b>10.7</b>	<b>4.9</b>
Model without personal traits	Raw	0.147	1710.06	0	12.8	8.1
	Matched	0.002	12.47	1	1.1	0.8
Omitted variables	Raw	<b>0.014</b>	<b>159.21</b>	<b>0</b>	<b>15.9</b>	<b>18.9</b>
	Matched	<b>0.005</b>	<b>35.56</b>	<b>0</b>	<b>8.5</b>	<b>12.5</b>
Model without social variables and personal traits	Raw	0.109	1294.93	0	11.4	7.8
	Matched	0.003	17.71	0.963	1.4	1.3
Omitted variables	Raw	<b>0.08</b>	<b>3974.4</b>	<b>0</b>	<b>17.3</b>	<b>12.4</b>
	Matched	<b>0.033</b>	<b>1023.9</b>	<b>0</b>	<b>10.5</b>	<b>6.8</b>

Table 8 presents the Kolmogorov-Smirnov. This test indicates that the hypotheses of the two distributions are equal and cannot be rejected.<sup>11</sup> Matching on observables appears to have been successful.

**Table 8. Kolmogorov Smirnov Test**

a. All sample				b. Unemployed			
Smaller group	D	P-Value	Corrected	Smaller group	D	P-Value	Corrected
0:	0.0002	1.000		0:	0.0004	1.000	
1:	-0.0061	0.673		1:	-0.0076	0.872	
Combined K-S	0.0061	0.989	0.988	Combined K-S	0.0076	1.000	1.000

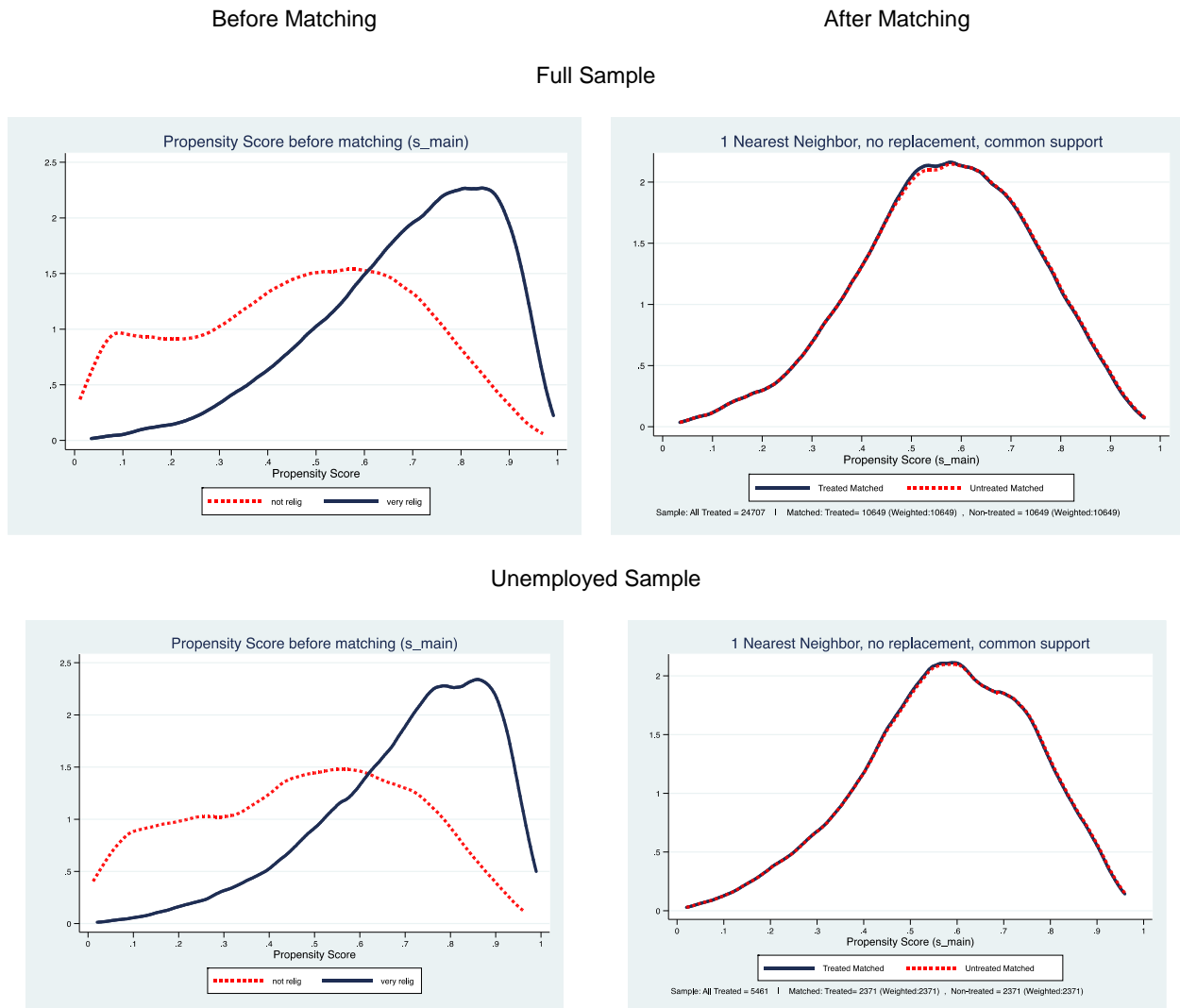
An eyeball test is a chart of the two groups' propensity score distributions before and after matching. Figure 1 shows the distributions of the score for the treated and untreated groups before matching. The score is the predicted value of the probability of being beneficiary or receiving intervention from the participation equation. The lines of predictive probabilities have been smoothed using a kernel density estimator. Figure 1 shows that the two distributions upon matching are indistinguishable in both full and unemployed samples.

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<sup>11</sup> To see this, see row "Combined K-S" that refers to the maximum difference between distributions. Note that the *p* value and the corrected are both equal to one, such that the maximum difference is not statistically significant.



**Figure 1. Distributions of the Propensity Scores Before and After Matching**



There remains the problem of unobservable variables. Identical individuals with respect to observable characteristics, used in matching, may have different probabilities of receiving treatment due to unobservable variables in which case the estimates will be biased. This assumption, of no hidden bias, cannot be directly tested but can be assessed by the Rosenbaum Bounds test. The latter is used to tackle the problem of whether unobservable factors (i.e., variables not included in the vector of covariates used in the participation equation) could alter the inference about the treatment effect. This approach provides evidence of how

strongly an unmeasured confounding variable must affect selection into treatment in order to undermine the casual interpretation of the matching exercise.<sup>12</sup>

Table 9 gives the results of the Rosenbaum Bounds test. Gamma ( $\Gamma$ ) measures the degree to which two subjects with the same observed characteristics (included in the vector  $x$ ) may differ in the odds of receiving treatment.  $Q_{mh+}$  and  $Q_{mh-}$  are the Mantel-Haenszel statistics, and  $P_{mh+}$  and  $P_{mh-}$  are the upper and lower significance levels, respectively, for the test where the null hypothesis is that the treatment has no effect. For increasing values of gamma (i.e., increasing the influence of an unobserved covariate's differential selection), the point impact estimates of upper and lower bounds diverge but, as indicated by the upper and lower bounds'  $p$  values, the estimates are not statistically significant. The test rejects the null hypothesis for the most values of gamma. The study is insensitive to bias that would double or triple the odds of being happy given the treatment.<sup>13</sup>

**Table 9. Rosenbaum Test**

Full Sample			Unemployed Sample		
Gamma	$Q_{mh+}$	$p_{mh+}$	Gamma	$Q_{mh+}$	$p_{mh+}$
1	5.71065	5.60E-09	1	3.47243	0.000258
1.5	5.51931	1.70E-08	1.5	2.51815	0.005899
2	13.5773	0	2	6.83791	4.00E-12
2.5	19.9398	0	2.5	10.2319	0
3	54.912	0	3	13.0504	0
3.5	29.8527	0	3.5	15.4765	0
4	33.9353	0	4	17.6178	0
4.5	37.6255	0	4.5	19.5429	0
5	41.0075	0	5	21.2983	0
5.5	44.1407	0	5.5	22.9168	0
6	47.0685	0	6	24.4226	0
6.5	49.8236	0	6.5	25.8338	0
7	52.4315	0	7	27.1645	0
7.5	54.912	0	7.5	28.4258	0
8	57.2812	0	8	29.6267	0

<sup>12</sup> A confounder is a variable that predicts treatment and outcome.

<sup>13</sup> In the present case, positive selection bias may occurs when those individuals who are most likely to be stronger believers tend to be happier even if they were not religious at all, and given that they have the same set of observables as did the non-strong believers.

### **Religion as a Buffer**

Before presenting the results we first consider a standard regression (see Table 10). As can be seen the cross-term (unemployed \* religion) parameter is not statistically different from zero, such that there is no evidence that religious unemployed people are happier than nonreligious unemployed people. However, as we previously noted, this type of estimation has problems.

**Table 10. Benchmark Regression**

	Happiness
treatment	0.0226*** (0.00452)
unemployed	-0.0751*** (0.00760)
Cross-term	0.0134 (0.00973)
Constant	0.804*** (0.00350)
N	40990
adj. R-sq	0.006

Standard errors in parentheses  
\* p<0.05, \*\* p<0.01, \*\*\* p<0.001"

The effect of religiosity on life satisfaction—using the propensity score matching method—when a person is unemployed is given in Table 11, in the row denominated as ATT (average treatment effect on the treated) using the nearest neighbor matching procedure (bold). The buffer effect of religiosity is about 3 percent in all samples and 4.4 percent in the unemployed sample in the LAC region. However, the traditional assumption of a normal distribution, assumed for the *t* test, *SE* may not hold given that the estimated variance of the treatment effect also includes the variance resulting from the estimation of the propensity score, the imputation of the common support, and the order in which treated subjects are matched. To deal with this problem, bootstrapping is used.

**Table 11. Average Treatment Effects on Treated Individuals (ATT)**

Matching procedure		All sample						Only Unemployed									
		Main Specification		Excluding social capital		Excluding personal traits		Excluding S.Capital and P. Traits		Main Specification		Excluding social capital		Excluding personal traits		Excluding S.Capital and P. Traits	
		Treated	Control	Treated	Control	Treated	Control	Treated	Control	Treated	Control	Treated	Control	Treated	Control	Treated	Control
Nearest Neighbor	Sample	<b>10649</b>	<b>10649</b>	<b>11323</b>	<b>11323</b>	<b>11679</b>	<b>11679</b>	<b>12391</b>	<b>12391</b>	<b>2371</b>	<b>2371</b>	<b>2544</b>	<b>2544</b>	<b>2393</b>	<b>2393</b>	<b>2550</b>	<b>2550</b>
	ATT	<b>0.030</b> ***		<b>0.032</b> ***		<b>0.038</b> ***		<b>0.045</b> ***		<b>0.044</b> ***		<b>0.051</b> ***		<b>0.045</b> ***		<b>0.051</b> ***	
	SE	<b>0.005</b>		<b>0.005</b>		<b>0.006</b>		<b>0.005</b>		<b>0.014</b>		<b>0.012</b>		<b>0.012</b>		<b>0.013</b>	
Radius,r=0.01	Sample	11540	21886	12231	22430	12582	24052	13154	24664	2673	5226	2773	5360	2624	5235	2750	5353
	ATT	0.031 ***		0.038 ***		0.033 ***		0.043 ***		0.055 ***		0.056 ***		0.042 ***		0.055 ***	
	SE	0.007		0.007		0.006		0.006		0.017		0.014		0.014		0.012	
Radius,r=0.001	Sample	11540	21750	12231	22253	12582	23992	13154	24509	2665	5071	2771	5174	2620	5076	2745	5242
	ATT	0.030 ***		0.037 ***		0.033 ***		0.042 ***		0.048 ***		0.060 ***		0.044 ***		0.057 ***	
	SE	0.006		0.006		0.006		0.006		0.014		0.013		0.013		0.014	
Radius,r=0.0001	Sample	11233	19113	11801	20241	12273	21691	12773	22768	1798	2505	1999	2874	1823	2530	1964	2954
	ATT	0.031 ***		0.037 ***		0.037 ***		0.041 ***		0.044 **		0.057 ***		0.049 ***		0.070 ***	
	SE	0.006		0.006		0.006		0.005		0.018		0.017		0.019		0.017	
Kernel (Gauss-Normal)	Sample	14793	21886	15172	22430	15851	24052	16283	24664	3361	5226	3451	5360	3361	5235	3451	5353
	ATT	0.029 ***		0.034 ***		0.035 ***		0.040 ***		0.053 ***		0.062 ***		0.054 ***		0.063 ***	
	SE	0.005		0.005		0.005		0.005		0.013		0.012		0.012		0.011	

Bootstraped S.E. (100 reps)  
 \* p<0.1, \*\* p<0.05, \*\*\* p<0.01

As can be seen, changing the matching algorithm for the main specification does not change the ATT dramatically, however changing the model(i.e. excluding social capital and personal traits) that is used to predict the propensity score does increase the value of the ATT.<sup>14</sup> This later confirms the hypothesis that social participation and personal traits are common confounders in other studies, and failing to include them implies an overestimation of the effect of religion on happiness.<sup>15</sup>

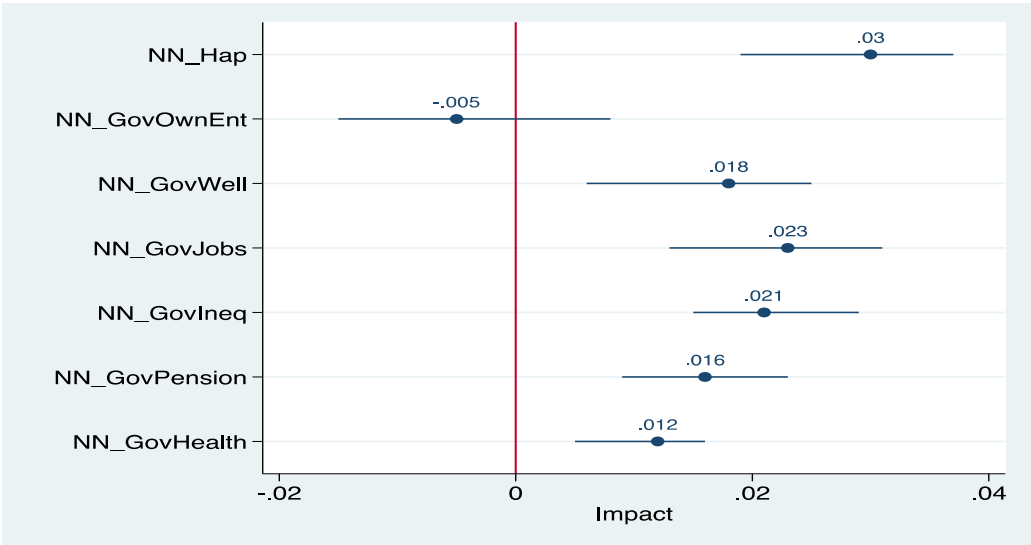
<sup>14</sup> We are thankful to the anonymous peer reviewer for this suggestion.

<sup>15</sup> Further tests (e.g., balancing “t”, pseudo  $R^2$ , and Hotelling) for the variables used in the propensity score prediction and for the omitted variables reveal that potential confounders are not balanced. So, having confounders that are not balanced in the matched sample represent potential selection bias in the estimated ATT and failing to include them in estimation will, in this case, overestimate the actual effect.

**The Effect of religion on Individuals' Support to Government Action on Social Sector**

Figure 2 presents the results of the effect of religiosity on happiness and support to the government social policy using the entire sample (i.e., unemployed and employed).

**Figure 2. Average Treatment Effects on the Treated of Support to Government Social Policies**



In line with the existing literature religious individuals have higher life satisfaction (four percentage points). However, in contrast with the existing literature, religious individuals support public responsibility for unemployment. Religious individuals also have a positive and statistically significant effect on support to social programs such as income redistribution, pensions, health provision, and social well-being promotion. Nonetheless, religious individuals are against government ownership of enterprises.

Support to government as job creator is positive and statistically significant (around 3 percent). This finding is contrary to the standard literature based on data from Europe that has found a negative effect of religion on support for public programs for unemployment.

Strong believers in LAC are against government ownership of important enterprises and industries: strong believers disagree, around 2 percent, with the idea of the government owning the most important enterprises in the country. The difference is statistically significant at 5 percent.

Being a strong believer in religion also has a positive and statistically significant effect on support to social programs such as income redistribution, pensions, health provision, and social well-being promotion (reduction of inequality: 2 percent; retirement pensions: 1.2 percent;

government as a well-being promoter: 1.6 percent; and that the government should be the primary provider of health: 1 percent).

## **Discussion**

In this paper, we tested empirically the effect of religiosity in acting as a buffer for unemployment. We extended the literature from OECD countries to LAC countries and from the correlation to casual relation using the propensity score-matching method. We explicitly incorporated social and personal traits often ignored in the literature. To enhance confidence in the results they have been subjected to, and passed, a series of internal consistency tests, and the strength needed of an unmeasured confounder to undermine the results (Roesenbaum test), with and without social capital and personal traits in the participation specification.

We find that religiosity acts as a buffer when an individual becomes unemployed, causing religious individuals to be more satisfied, by 4 percent, in comparison with nonreligious individuals. Although positive, the size of the effect is smaller than the restricted ones, indicating potential overestimation as a result of ignoring social capital and personal traits. Further, unlike the existing literature, religiosity causes an increased level of support for public social policy other than direct ownership of enterprises. This difference remains on the agenda for future research.

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