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Religion, religiosity and depression: re-assessing their relationship

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Abstract

We provide evidence on the significant effect of religiosity (measured by attendance to religious services) on reducing depression. In particular, it is found a significant negative effect of religiosity on the probability of being depressed. Findings of previous studies are extended by showing that while the religious denomination seems to have a non-significant effect on the probably of depression, other aspects of religiosity, in particular the religious diversity of the country of residence does affect the prospects of depression. The probability of being depressed is higher, the lower the religious diversity. Other personal socio-economic variables have the expected and documented effects.

Key words: depression, religion, religiosity

JEL classification: I10, Z12, Z13

Resumen

Esta investigación provee evidencia sobre el rol de la religiosidad (medida como la asistencia a servicios religiosos) en reducir la probabilidad de sentirse deprimido. En particular se encuentra un efecto significativo y negativo, por lo cual las personas que asisten regularmente a servicios religiosos, tienden a mostrar una menor tendencia a estar deprimidos. Se extienden los resultados de investigaciones previas mostrando los efectos de la diversidad religiosa en el país también juega un rol relevante. Mientras que la afiliación a un grupo religioso concreto resulta no relevante, los resultados muestran que el hecho de vivir en un país donde la diversidad religiosa es baja tiende a incrementar la probabilidad de estar deprimido.

Palabras clave: depresión, religión, religiosidad

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1. Introduction

There is evidence of the role of personal socio-economic attributes (age, gender, marital status, employment status etc.) as risk factors for depression (e.g., Al-Issa, 1982; Fehring, 1997; Koenig et al., 1998; Melgar and Rossi, 2011; Murphy et al., 2000; Roxburgh, 2004; and Schnittker, 2001). Many of the studies indicated the role of religion, but very few examined more specific aspects of religion and religiosity.

We introduce personal and country-level religion variables: The religious denomination of the respondent, personal church-attendance, the religious similarity/low-diversity of the country of residence (measured by a dummy variable that is set to 1 if more than 75% of the population in the country of residence share the same religious denomination, and alternatively by the HHI Index), and an interaction term between personal church-attendance and the country's religious landscape.

The paper is organized as follows: Section two presents a literature overview on risk factors of depression. Section three includes a description of the data and the estimated depression equations. The last section offers concluding remarks.

2. Risk factors for depression – a literature overview

There is an extensive body of research that relates to the impact of religion and religiosity on depression. It is claimed that dimensions of religion and religiosity might affect life choices or judgments of life experiences, with implications for mental health. Fehring (1997), Genia and Shaw (1991), Koenig et al. (1998), Murphy et al. (2000) and Schnittker (2001) show that more intensive religious performance is associated with a decline in depression.

The role of other personal socio-economic characteristics has also been examined: Al-Issa (1982), Melgar and Rossi (2011) and Roxburgh (2004) focus on the higher rates of depression among women. Age may constitute a risk factor that involves both positive and negative effects such as: the change in social status, maturity, and the erosion of functions (Kennedy et al., 1989; and Pearlin et al., 1981). Depression is influenced by negative life-events like divorce or unemployment (Miech and Shanahan, 2000; and Turner, 1994). Higher income is associated with higher living standards and greater life satisfaction (Burr et al., 1994; and House et al., 1988), leading to lower depression rates. Living in urban areas could lead to an increase in the probability of depression, because urban areas are

more stressful than rural environments due to higher crime rates, higher divorce rates and other social pathologies (Glass and Singer, 1972; and House et al., 1988).

3. Data and estimation of 'depression equations'

The data source is the 2007 GALLUP Public Opinion Poll. It includes 80 countries and almost 60,000 observations. Gallup employs many of the world's leading scientists in management, economics, psychology, and sociology and has studied human nature and behavior for more than 70 years. The Gallup Poll delivers relevant and timely data on what people around the world think and feel, and its consultants assist leaders in identifying and monitoring behavioral economic indicators worldwide. More information is available at www.gallup.com.

The question that identifies the respondent's subjective level of depression is: “*Did you experience yesterday feelings of depression during most of the day?*”. The response alternatives are: a) “yes”, b) “no”, c) “do not know” and d) “refuse to respond”. It appears that this question was not included in the surveys distributed in most European countries. Therefore, many European countries are not included in the empirical analysis.

Our dependent variable *DEPRESSION* is set to 1 if the response was “yes” and 0 if he/she marked the “no” response. Respondents who chose one of the other two categories were excluded from the analysis.

The following socio-economic explanatory variables are used to explain depression: gender, age, age squared, income, marital status, urban area of residence, and employment status. The religion/religiosity variables are: the respondent's religious denomination, individual attendance of church services (at least once during the last 7 days), a measure of religious homogeneity/low-diversity of the country of residence, and the interaction of the country's religious homogeneity and church-attendance. Two alternative measures are used for the county-level religious landscape: (i) *NON-PLURALISTIC*: a dummy variable which equals one if 75 percent or more of the country's inhabitants identify with the same religious denomination (based on the Gallup Poll), and (ii) the *HHI* Concentration Index which is defined as the sum of the squares of the shares of people who identify with each religious group within each country. Country dummy variables are also added (Uruguay is the reference country). Table 1 presents the definitions of the explanatory variables.

Insert TABLE 1 - Description of variables

Given that our dependent variable is binary, we estimate Probit models. To account for repeated observations from the same country (which leads to correlation between error terms for respondents from the same country), clustered (by country) standard errors are used.

Insert TABLE 2 - Percentage of depressed people (country-specific upper figures), and regression country dummy variables (country-specific lower figures: dummies represent marginal effects and are estimated using model 1.1 of Table 3).

As Table 2 indicates, 16.0% of respondents confirmed that they had felt depressed in the 'previous day'. This is indeed an exceptionally high percentage. The country distribution reveals differences between countries: the share varies widely from 4.2% in Albania to 47.4% in the case of Ethiopia. Interestingly, the shares of depressed individuals by continent are very similar in Africa, Asia and Europe (around 15.5%) and somewhat higher in the Americas (17.8%). Differences between countries could be linked to differences in socio-economic attributes and also to a different perception and understanding of the question. Most of the country regression dummies are negative, indicating that when differences in socio-economic attributes are controlled for, people who live in these countries seem to be less depressed than the Uruguayans. The rankings of countries are somewhat different when the 'cleaner' regression estimates are examined. For instance: Albania who had the lowest share when the raw data was considered, ranks now fifth (from low to high) and Senegal takes the lead with the lowest share of depressed people. Ethiopia has the highest share, in both the raw and net rankings. Singapore has the second largest estimate in the list of net estimates, while in the list of raw shares there are 12 countries with larger shares than that of Singapore

Table 3 presents the depression regression equations. The coefficients relate to marginal effects of the explanatory variables and standard errors are presented in brackets. The regressions differ only with respect to the variable that represents the country's religious diversity. In the first two regressions the 'religiously-non-pluralistic' measure is used, while in the last two regressions, we use the HHI Concentration Index that increases with an increase in religious concentration. In both groups of models, the first one includes only

the mentioned independent variable while in the second one, we add an interaction effect between this variable and church attendance.

Insert TABLE 3 – Depression regressions, probit models, marginal effects

3.1. Socio-economic personal attributes

In line with previous findings, there is clear evidence of significant differences between the genders: men tend to be less depressed than women.

Age is an important determinant of depression. Is depression more likely to strike at any particular age? Findings consistently show that the impact of age is nonlinear: depression is first increasing with age, and after a maximum point, depression decreases with advanced age. Based on our sample, the age of maximal probability of being depressed is around 61 years. Interestingly, a recent study (Oswald, 2011) that investigated the use of antidepressants by age, in 27 European countries, using the 2010 Eurobarometer data, also found a hill-shaped age pattern (with a peak at the late 40s).¹ This inverse U-shaped pattern is consistent with the well-being research literature that claims that human well-being follows a U-shape life circle.

As expected, depression is negatively correlated with income: the higher the income level, the lower is the probability of being depressed.

Marital status also shapes the probability of being depressed. The estimated models show that people who have experienced disruptive family events (such as divorce or widowhood) are more likely to be depressed, compared to single (the reference group) and to married individuals. Oswald (2011) arrived at similar results for antidepressants' use – divorced and separated individuals have higher prospects to use them, compared to married/single individuals.

Living in urban areas also plays a relevant role. It elevates the probability of being depressed. This result may be explained by the fact that social problems could be more visible or more intense in urban areas where higher rates of poverty and crime, as well as suicide, are registered.

¹ Oswald (2011) used a more homogeneous sample (composed only of European countries) and a somewhat more objective measure – use of antidepressant medication (versus our subjective measure of feeling depressed). His results on the effects of the socio-economic variables are in line with the results of this study, adding some support to the robustness of our results.

Moreover, as expected, those who are unemployed tend to be more depressed. Unemployment leads to a decrease in self-esteem and to more uncertainty about the future. WHO (2008) highlights that unemployment affects mental health, leading to depression and anxiety. Longer duration of unemployment could further increase depression. However the Gallup Poll does not include information on unemployment duration. Unemployed also have a higher tendency to use antidepressants (Oswald, 2011).

3.2. Religious personal attributes

Less is known about the contribution of personal- and country-level religion and religiosity to the individual's depressive feelings. In order to shed more light on the intersection between religiosity and depression, several dimensions of religiosity are added as explanatory variables: The religious denomination of the respondent (BUDDHIST, CHRISTIAN, HINDU, JEWISH, MUSLIM and OTHERS); church *ATTENDANCE* (=1 if attended church services during the last seven days); the country's religious landscape: measured by two alternative variables – a dummy variable *NON PLURALISTIC* (=1 if 75% or more of the country's population share the same denomination); and the *HHI CONCENTRATION INDEX*. As is evident from Table 3, indeed, religiosity affects depression, in particular the religious homogeneity (low religious diversity: 'non-pluralistic' and a higher HHI) of the country of residence. Low religious diversity tends to increase significantly the probability of depression. Alternatively, in countries that are more diverse and 'competitive' in terms of religious denominations, residents enjoy less depression. The negative effect of religious homogeneity is much larger than the negative effects of divorce or unemployment: residing in a non-pluralistic country leads to an increase of 6.2 percentage points in the probability of depression (model 1.1) compared to increases of 4.2 percentage points) due to divorce and 2.6 percentage points as a result of being unemployed. Personal church –attendance (*ATTENDANCE*) has also a role in reducing depression (significant at the 10 percent level). The interacted effect of church-attendance and religious-homogeneity is insignificant, indicating the individual-level and country-level religious dimensions have independent effects on depression. Interestingly, depression rates are not different within different religious denominations, except for respondents who belong to the Jewish faith, who tend to have lower prospects of depression.

4. Concluding remark

The relevance of investigating the specific role of religion and religiosity (at a personal-level and a country-level) on depression is undeniable. Depression has a pronounced impact on the quality of life and happiness. Our findings may provide useful information for the identification of groups at risk and for the design of welfare and health policies.

In line with previous research, it is found that depression is shaped by personal attributes. We add new elements to the discussion. The probability of being depressed depends also on the country's characteristics. In this paper, we provide evidence on the role of the country-specific religious homogeneity/pluralism. It appears that people (mentally) enjoy religious diversity or religious pluralism. This element is more important than the individual's denomination that appears to be insignificant (after the country measure of religious homogeneity has been considered) and even more important compared to active church attendance – that only marginally diminishes depression (at a significance level of 10%).

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Annex I - Tables

Table 1: Description of variables

Dependent variable	DEPRESSED	Dummy=1 if he/ she indicated that he/ she had experienced feelings of depression during most of the day before of the interview and 0 if not
Individual attributes	AGE	Respondent's age divided by 100
	AGE SQ	AGE * AGE
	INCOME	Placement in an income-scale (0 to 28)
	MAN	Dummy=1 if a man
	UNEMPLOYED	Dummy=1 if unemployed
	URBAN	Dummy=1 if living in an urban area
	DIVORCED	Dummy=1 if divorced
	MARRIED	Dummy=1 if married or cohabiting
Individual religious variables	WIDOWED	Dummy=1 if widowed
	ATTENDANCE	Dummy=1 if attended religious services at a religious place of worship, within the last 7 days
	BUDDHIST	Dummy=1 if identifies with the Buddhist faith
	CHRISTIAN	Dummy=1 if identifies with the Roman Catholic or Protestant denominations
	HINDU	Dummy=1 if identifies with the Hindu denomination
	JEWISH	Dummy=1 if belongs to the Jewish denomination
Religious concentration at the country level	MUSLIM	Dummy=1 if belongs to the Muslim faith
	NON-PLURAL	Dummy=1 if 75% or more of the population belongs to the same religious denomination
Interacted terms	HHI	Herfindahl-Hirschman Index
	HHI*ATTEND	HHI * ATTENDANCE
	NONPL*ATTEND	NON-PLURAL * ATTENDANCE

Table 2: Percentage of depressed people (country-specific upper figures), and regression country dummy variables (country-specific lower figures: dummies represent marginal effects and are estimated using model 1.1 of Table 3)

Americas		Africa		Asia/Pacific		Europe	
Panama	10.2	Senegal	5.0	Laos	4.9	Albania	4.2
	-0.102***		-0.122***		-0.119***		-0.110***
Jamaica	10.6	Mozambique	6.7	Indonesia	5.7	Lithuania	7.8
	-0.099***		-0.112***		-0.120***		-0.065***
Paraguay	11.5	Burkina Faso	7.6	Uzbekistan	8.0	Cyprus	11.4
	-0.087***		-0.085***		-0.110***		-0.052***
Honduras	12.5	Kenya	8.3	Myanmar	8.5	Montenegro	13.9
	-0.071***		-0.109***		-0.099***		-0.010***
Argentina	13.3	Niger	8.6	Taiwan	11.3	Slovakia	14.3
	-0.075***		-0.116		0.073***		-0.036***
Costa Rica	14.7	Angola	9.4	Vietnam	12.0	Bulgaria	14.5
	-0.058***		-0.102***		0.015***		-0.062***
El Salvador	15.4	Benin	10.5	Israel	11.1	Bosnia Herzegovina	15.1
	-0.074***		-0.066***		-0.059***		0.022***
Chile	15.7	Mali	10.8	Kyrgyzstan	13.7	Ukraine	15.3
	-0.051***		-0.099***		-0.091***		-0.055***
Trinidad y Tobago	16.7	Zambia	11.1	Nepal	14.5	Georgia	15.8
	0.056***		-0.096***		-0.054***		-0.075***
Colombia	17.3	Tanzania	11.6	Kazakhstan	15.7	Macedonia	16.2
	-0.075***		-0.069***		-0.033***		0.010***
Uruguay	17.8	Togo	11.6	Malaysia	16.4	Serbia	16.2
			-0.055***		0.082***		-0.049***
Puerto Rico	18.0	Nigeria	12.4	Sri Lanka	17.2	Croatia	16.4
	-0.008***		-0.030***		-0.054***		-0.028***
Cuba	19.7	Ghana	13.6	Tajikistan	18.4	Russia	17.0
	0.011***		-0.072***		-0.059***		-0.048***
Guatemala	20.1	Chad	13.8	Afghanistan	21.7	Estonia	19.4
	-0.030***		-0.028***		-0.032***		
Dominican Rep.	20.8	Malawi	15.4	Singapore	22.5	Kosovo	19.8
	-0.037***		-0.074***		0.148***		0.091***
Nicaragua	21.9	Cameroon	15.5	Cambodia	23.7	Belarus	20.3
	-0.005		-0.064***		0.023***		-0.010***
Ecuador	22.7	Botswana	15.6	Bangladesh	27.5	Azerbaijan	23.6
	-0.020***		-0.037***		0.043***		-0.026***
Peru	23.3	Uganda	15.8	Armenia	33.9	Moldova	23.8
	-0.016***		-0.073***		0.014**		-0.020***
Haiti	25.1	South Africa	15.9				

	-0.043***		-0.035***					
Bolivia	27.8	Burundi	16.1					
	0.010**		-0.084***					
		Madagascar	21.9					
			-0.025***					
		Zimbabwe	23.6					
			-0.040***					
		Rwanda	24.7					
			0.006					
		Sierra Leone	26.9					
			0.096***					
		Ethiopia	47.4					
			0.241***					
Sub-total	17.8	Sub-total	15.3	Sub-total	15.7	Sub-total	15.6	
TOTAL	16.0							

Note: * significant at 10%; ** significant at 5%; *** significant at 1%

Table 3: Depression regressions, marginal effects based on probit models estimations

	NON-PLURALISTIC				HHI			
	Model 1.1		Model 1.2		Model 2.1		Model 2.2	
MAN	-0.010**	[0.004]	-0.010**	[0.004]	-0.010**	[0.004]	-0.010**	[0.004]
AGE	0.385***	[0.059]	0.384***	[0.059]	0.385***	[0.059]	0.384***	[0.059]
AGE SQ	-0.314***	[0.060]	-0.313***	[0.060]	-0.314***	[0.060]	-0.314***	[0.060]
INCOME	-0.008***	[0.000]	-0.008***	[0.000]	-0.008***	[0.000]	-0.008***	[0.000]
MARRIED	-0.006	[0.005]	-0.006	[0.005]	-0.006	[0.005]	-0.006	[0.005]
DIVORCED	0.042***	[0.010]	0.042***	[0.010]	0.042***	[0.010]	0.042***	[0.010]
WIDOWED	0.020**	[0.008]	0.020**	[0.008]	0.020**	[0.008]	0.020**	[0.008]
URBAN	0.019***	[0.006]	0.018***	[0.006]	0.019***	[0.006]	0.018***	[0.006]
UNEMPLOYED	0.026***	[0.004]	0.026***	[0.004]	0.026***	[0.004]	0.026***	[0.004]
ATTENDANCE	-0.010*	[0.005]	-0.021*	[0.012]	-0.010*	[0.005]	-0.037*	[0.018]
NON-PLURAL	0.062***	[0.003]	0.059***	[0.004]				
NON-PLURALISTIC * ATTEND			-0.014	[0.013]				
HHI					0.162***	[0.008]	0.153***	[0.010]
HHI * ATTEND							0.037	[0.023]
CHRISTIAN	0.013	[0.009]	0.013	[0.009]	0.013	[0.009]	0.015	[0.009]
MUSLIM	0.015	[0.012]	0.016	[0.012]	0.015	[0.012]	0.017	[0.012]
HINDU	0.001	[0.027]	0.002	[0.027]	0.001	[0.027]	0.004	[0.027]
BUDDHIST	0.000	[0.025]	0.000	[0.025]	0.000	[0.025]	0.001	[0.025]
JEWISH	-0.054*	[0.031]	-0.054*	[0.031]	-0.054*	[0.031]	-0.053*	[0.03]
Observations	57,251		57,251		57,251		57,251	
Pseudo R-squared	0.06		0.06		0.06		0.06	

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%,
robust standard errors in brackets (clustered at the country level)
all models include country dummies.