Religious values, secular education and development: empirical evidence from some Latin American countries

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Abstract. Religion as a component of family background may transmit values that positively affect children’s educational achievements. Nevertheless, in its conservative dimension religion hampers children’s self-determination and may lead them not to invest in higher education. Notably religion may adapt to the cultural changes triggered by economic development and modernization, which influences the prevailing effect of religion on education. These aspects are investigated through an overlapping generations model with human capital. The hypotheses from the model are tested with probit regression using the data from some Latin American countries. The results seem to support the role of development as a force driving the process of cultural change, which can promote children’s educational achievement.

Keywords: religion, development, human capital.

JEL codes: J24, O10, Z1.

1. Introduction

The role of family background in the acquisition of education by children has been widely acknowledged in the literature. Some scholars identify family background with parents’ human capital, which may help children to acquire education, their positive educational expectations and self-confidence (Becker and Tomes, 1986, Coleman, 1988, Checchi, Ichino, Rustichini, 1999). Interestingly family may also transmit values that shape children’s behavior at school. Among these values an important role is played by religious values. On the one hand, they can help the learning process of children and strengthen the acquisition of secular education. On the other hand, these values may hinder children’s educational performance as they may conflict with secular education. Specifically, as to the former aspect, the religion in which one has been raised can embody values promoting hard work following Weber’s argument, achievement orientations (Mueller, 1980), a sense of discipline and of responsibility (Fan, 2008) and influences students’ positive educational expectations and self-confidence (Lehrer, 2005). Yet religious values and secular education may also be conflicting depending on the content of education and the underlying
approach to knowledge. Conservative religions may be adverse to secular education as the latter may transmit values inspired to humanism and to scientific scrutiny against an authoritarian approach to knowledge. This contrast may induce very religious parents to limit the aspirations and the choice set of their children in terms of higher education, by reducing financial support, shaping their preferences and making difficult studying (Darnell, Shekart, 1997, 1999). It is worth stressing that some religions may hamper higher educational achievements as they promote fatalism and conformity rather than self-determination whereas others like Jewish religion promote the attainment of a high socio-economic status through its positive emphasis on educational performance (Mueller, 1980).

Importantly, the antagonism between religion and education can be responsive to the stage of economic development and modernization as religion may be a force reactive to economic processes (Vallier, 1970) and become less conservative with development. As to the relationship between development, on the one hand, and cultural and religious values on the other, Inglehart and Baker (2000) test the modernization theory according to which industrialization and economic development lead to predictable systems of cultural values. They show that the transition from preindustrial and agrarian societies to industrial societies contributes to the shift from traditional values and orientation towards materialist, rational and secular values. Notably, tradition is characterized by social conformity and a deferent attitude towards parental and religious authority. In particular, religious faith along with obedience preserve individual and social order and matter more than independence and self-determination. Nevertheless the conservative dimension of religion can change with economic development and modernization and the antagonism between secular education and religion can be reduced. In fact, Saroglou, Delpierre and Dernell (2003) emphasize that once a stable development level is reached, religion evolves and becomes less focused on conservative values and follows the cultural changes induced by modernization, promoting for instance promote rationalism, independence and self-determination.

Given that religion may have an ambivalent influence on educational achievement, it is not mistaken to hold that the overall impact of religion and the prevalence of its conservative dimension may depend on the stage of economic development.

Following this theoretical background, the aim of the paper is to analyse the causal link between religion and the formation of human capital through an analytical model, by considering that religion can work in two antithetical directions, which affect the acquisition of secular education by children. The results are empirically tested through a probit model by using sample data from the World Values Survey. The sample consists of individuals from eight Latin American Countries: Argentina, Brazil, Chile, Colombia, Guatemala, Mexico, Peru and Uruguay. These aspects are dealt with in the following paragraphs. Specifically, in §2 we build a model where the influence of family background on children educational achievements is analysed. As part of family background it is considered the religion in which individuals have been brought up. In §3, the characteristics of the sample are described whereas in §4 the empirical model and results are shown and discussed. Finally conclusions are drawn.
2. The analytical model

As to the analytical framework, we partly draw on the model by Glomm and Ravikumar (1992), which takes into consideration the influence of family educational background on children’s human capital accumulation. In our model, parents’ human capital and the religion in which individuals have been raised, define family background. Our economy is characterized by overlapping generations where individuals live for two periods and die at the end of the second period. In the first period, \( t \), the members of the old generation are endowed with a stock of human capital \( h_t \), defining family educational background. Individuals of the young generation born in \( t \) are raised in the religion of the old generation. In this model religion corresponds to religious affiliation, which is indicated by \( R_t \) with \( R_t = 1 \) for being religious and \( R_t = 0 \) for not being religious. Individuals allocate their time between leisure and the accumulation of human capital when young, and consume \( c_{t+1} \) in the subsequent period, \( t+1 \), when old. Total time disposable to young individuals is normalized to one and \( n_t \) units are devoted to leisure whereas \( 1 - n_t \) to the acquisition of education. Individuals’ preferences over leisure and over consumption are the same, their heterogeneity is characterized by the educational and religious background of their family.

The utility function\(^1\) of an individual born in \( t \) is:

\[
U(n_t, c_{t+1}) = \ln n_t + \ln c_{t+1} \tag{1}
\]

The process generating human capital is:

\[
h_{t+1} = \vartheta(1 - n_t)\alpha h_t^\beta (\mu + \delta R_t + \varphi R_t \bar{D}_t)^\gamma \tag{2}
\]

In (2) it is assumed that the parameters  \( \alpha, \beta, \gamma \in ]0,1[ \), \( \vartheta > 0 \) and that \( \mu = 0 \) if \( R_t = 1 \) whereas \( \mu = 1 \) if \( R_t = 0 \), whereby the process generating human capital becomes the standard one. Individual learning ability is captured by \( \vartheta \). \( \bar{D}_t > 0 \) is the level of economic development of the collectivity to which young individuals belong.

Our main point is that religion is believed to shape children’s attitudes and motivations towards education and to affect the impact of the other factors – the time devoted to the acquisition of education, individual abilities and family human capital – on the process generating human capital. Specifically religion alone always positively influences education with \( \delta \in ]0,1[ \), as one cannot overlook the argument that it generally transmits values like hard-work and self-discipline that facilitate learning and educational achievements. The parameter \( \delta \) captures also the fact that religion may present a conservative dimension promoting fatalism and hampering individual self-reliance, whereas a less conservative religion may foster modern values like self-determination along with independence. Conservative values discourage human capital accumulation as higher

\(^1\) In the utility function it is assumed that young individuals regard the utility from leisure in \( t \) and from consumption in \( t+1 \) equally – in which case the subjective discount rate is equal to zero. A subjective discount rate greater than zero does not change the results as to the aim of the model.
education is not believed to be conducive to better jobs and social status. The stronger this conservative dimension, the closer to zero the parameter $\delta$, which is taken as the degree of religious conservatism. Thus, the size of the positive influence of religion upon education depends on the degree of religious traditionalism. Following Saroglou, Delpierre and Dernell (2003), religious conservatism can be moderated by the cultural change caused by development and modernization. Consequently the overall effect of religion depends as well on the level of economic development, which enters the accumulation of human capital and is interacted with religion in (2). The component $R_t D_t$ (with $R_t = 1$) represents being religious in a collectivity with a certain level of development and modernization. The influence of $D_t$ on the human capital of a religious individual ($R_t = 1$) is partly captured by $\varphi > 0$, which implies that with rising economic development religion conforms to modern values enhancing, in particular, individual independence and self-determination. This strengthens the positive influence of religion alone on children’s educational achievements. We interpret the parameter $\varphi$ as embodying the ability of religious institutions to adapt to the values fostered by economic development and modernization. It will be shortly defined as religion reactivity to development. The higher the $\varphi$, the greater the influence of development as religion tends to promote modern values fostering educational achievements.

Adults’ earnings depend on human capital and are assumed to be equal to $h_{t+1}$. Finally, in the last period individuals consume all their income. Thus, they choose $n_t$ and $c_{t+1}$ in order to maximize their utility:

$$\ln n_t + \ln c_{t+1}$$

given the following constraints

$$h_{t+1} = \mathcal{G}(1 - n_t)^\alpha h_t^\beta (\mu + \delta R_t + \varphi R_t \overline{D_t})^\gamma$$

$$y_{t+1} = h_{t+1}$$

$$h_{t+1} = c_{t+1}$$

and given $h_t$, $R_t$ and $\overline{D_t}$.

It is easy to show that:

$$n_t^* = \frac{1}{1 + \alpha}$$

(3)

$$h_{t+1}^* = \mathcal{G}\left(\frac{\alpha}{1 + \alpha}\right)^\alpha h_t^\beta (\mu + \delta R_t + \varphi R_t \overline{D_t})^\gamma$$

(4)

As one would expect, in equilibrium children’s human capital is determined not only by the optimal time devoted to the acquisition of education, $1 - n_t^*$, family endowment of human capital
and children’s learning ability but also by religion and by the level of economic development interacted with religion.

The role of development becomes more evident from the analysis of the derivative of $h_{t+1}^*$ with respect to $D_t$ in the case of a religious family, with $R_t = 1$ and $\mu = 0$:

$$\frac{\partial (h_{t+1}^*)}{\partial D_t} = \vartheta\left(\frac{\alpha}{1-\alpha}\right) (h_t)^\beta \left(\delta + \varphi D_t\right)^{\gamma-1}$$

In (5), the expression $\vartheta\left(\frac{\alpha}{1-\alpha}\right) (h_t)^\beta$ corresponds to the optimal level of children’s human capital that one would achieve in absence of religion. As $\vartheta\left(\frac{\alpha}{1-\alpha}\right) (h_t)^\beta$ is greater than zero given the assumptions on the parameters, we inspect the inequalities $\gamma\varphi(\delta + \varphi D_t)^{-1} < 1$ and $\gamma\varphi(\delta + \varphi D_t)^{-1} > 1$, which imply that in equilibrium an increase in the development level raises children’s education in both cases. Yet in the former case, the influence of $D_t$ tends to curtail the optimal level of children’s human capital determined by individual learning ability, $\vartheta$, the optimal time devoted to education and family human capital. In the latter case, higher development reinforces children’s optimal educational level. The conditions under which the inequalities hold, are synthesized in the following proposition.

**The influence of the level of development on children’s optimal human capital**

**CASE OF $\varphi$ BELOW $\frac{1}{\gamma}$**

When $\varphi \in \left[0, \frac{1}{\gamma}\right]$, if the initial development is sufficiently high with $D_t > \frac{1-\delta}{\varphi}$, further development promotes children’s optimal education.

In the case of $\varphi \in \left[\frac{1}{\gamma\varphi}, \frac{1}{\gamma}\right]$, if the initial development is so low that $D_t < \frac{1}{\gamma\varphi}(\frac{1}{\gamma} - \frac{1}{\varphi})$, with $\frac{1}{\gamma\varphi}(\frac{1}{\gamma} - \frac{1}{\varphi}) < \frac{1-\delta}{\varphi}$, further development restrains children’s optimal education.
CASE OF \( \varphi \) ABOVE \( \frac{1}{\gamma} \)

When \( \varphi > \frac{1}{\gamma} \), if the initial development is sufficiently high such that \( \bar{D}_t > \frac{(\gamma \varphi)^{\frac{1}{\gamma}} - \delta}{\varphi} \), an increase in the development level tends to foster children’s optimal education. Whereas if the initial development is so low that \( \bar{D}_t < \frac{1 - \delta}{\varphi} \), with \( \frac{1 - \delta}{\varphi} < \frac{(\gamma \varphi)^{\frac{1}{\gamma}} - \delta}{\varphi} \), an increase in the development level tends to curb children’s optimal education.

It is worth stressing that though the ability of religious institutions to follow the values fostered by economic development and modernization - \( \varphi \) - can be relatively low (below \( \frac{1}{\gamma} \)), if the initial level of development is sufficiently high, further development can improve children education. If there is a high ability of religious institutions to adapt to modern values (above \( \frac{1}{\gamma} \)) but it is associated with a low initial development level, further development can curtail the educational improvement of children. Accordingly, high development promotes less traditional values related to self-determination, autonomy and openness to changes, which become deeply rooted in societies and end up permeating religious values as well despite a scarce responsiveness of religious institutions to modernization. This contributes to fostering children’s educational performance. Conversely, when there is a conservative religion, the less developed the collectivity, the more the conservative religious values prevail, which, for instance, may occur in agrarian societies, though there may be less conservative religious institutions. In this case, further development is not enough to strengthen children’s education.

In light of the analytical part, it is possible to formulate the following hypotheses to test.

**H.1 More conservative religions compared with less traditional religions curtail children’s educational attainments**\(^2\).

\(^2\) One can check it through the derivative of \( h_t^{*} \) with respect to \( \delta \) when \( R_t=1 \) in (4).
In a collectivity sufficiently developed, modern values thoroughly permeate religion so that they may:

- either reinforce the positive and relatively higher influence of less traditional religions with respect to conservative religions on children’s educational achievements;

- or counterbalance the curbing though positive influence of more traditional religions to such an extent as to improve children’s educational achievements.

When the development level is not sufficiently high, traditional values prevail and can further curtail the curbing effect of a conservative religion on children’s educational achievements.

These hypotheses are verified through the empirical model that is specified in the subsequent part.

3. Data and empirical framework

For the empirical part we have selected a sample of 1,684 individuals from the 2005 World Value Survey (WVS) dataset related to some Latin American countries, nominally Argentina, Brazil, Chile, Colombia, Guatemala, Mexico, Peru and Uruguay. The reason why these countries were chosen is that they present high heterogeneity in the data with respect to the more relevant variables – education, religion and development indicators – used in the empirical analysis. The WVS mainly reports people’s values and beliefs and also their religious affiliation.

In Table 1 there are the descriptive statistics, in particular, our dependent variable (Ed) concerns the individuals who have achieved either a university degree or some level of university education. The individuals with university education represent 26% of our sample. As far as religious affiliation is concerned, we distinguish between Catholics representing 93% of the sample and Protestants representing the remaining part. This allows testing the above hypotheses and, in particular, verifying whether the former have a stronger conservative dimension than the latter. As to this distinction, we take into account that in Latin America Protestantism grew very slowly starting from the grassroots during the nineteenth century and more rapidly during the following century. More than Catholics, Protestants have been able to consider modernization as a process leading to people’s empowerment and greater adaptability to the new system. This has helped the integration of lower classes into Latin American industrial societies (Escobar, 1997).

As belonging to a religious denomination does not necessarily embody individual religiosity, we also consider the Catholics and Protestants who define themselves as religious persons independently of going to church or not (Catholic*Religious). As to the other independent variables, males represent 46%, the mean age is 21.33 and leisure is important in one’s own life for 29% of the individuals considered. Given the characteristics of the WVS dataset, family educational background is captured by the chief wage earner profession/job expressed by fourteen dummies (see the empirical appendix). The geographical variation in human capital accumulation is taken into account through country dummies. Finally, as to the development level promoting modern values, our approach is in line with the contribution of Inglehart and Baker (2000). We
have used the World Bank data for the same period and defined two variables, Industry and Services, by assigning each country the percentage of employees respectively in the industrial and service sector with respect to agriculture.

Table 1

DESCRIPTIVE STATISTICS

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Std. Dev.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individuals with the highest</td>
<td></td>
<td></td>
</tr>
<tr>
<td>level of education (Ed)</td>
<td>0.26</td>
<td>0.437</td>
</tr>
<tr>
<td>Catholic</td>
<td>0.93</td>
<td>0.247</td>
</tr>
<tr>
<td>Catholic*Religious</td>
<td>0.75</td>
<td>0.435</td>
</tr>
<tr>
<td>Age</td>
<td>21.33</td>
<td>2.369</td>
</tr>
<tr>
<td>Male</td>
<td>0.46</td>
<td>0.499</td>
</tr>
<tr>
<td>Leisure</td>
<td>0.29</td>
<td>0.453</td>
</tr>
<tr>
<td><strong>Country Dummies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Argentina</td>
<td>0.08</td>
<td>0.279</td>
</tr>
<tr>
<td>Brazil</td>
<td>0.1</td>
<td>0.296</td>
</tr>
<tr>
<td>Chile</td>
<td>0.07</td>
<td>0.264</td>
</tr>
<tr>
<td>Colombia</td>
<td>0.3</td>
<td>0.458</td>
</tr>
<tr>
<td>Guatemala</td>
<td>0.11</td>
<td>0.316</td>
</tr>
<tr>
<td>Mexico</td>
<td>0.13</td>
<td>0.337</td>
</tr>
<tr>
<td>Peru</td>
<td>0.18</td>
<td>0.381</td>
</tr>
<tr>
<td>Uruguay</td>
<td>0.02</td>
<td>0.145</td>
</tr>
<tr>
<td><strong>Development Dummies</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Industry</td>
<td>24.53</td>
<td>8.23</td>
</tr>
<tr>
<td>Services</td>
<td>60.05</td>
<td>9</td>
</tr>
<tr>
<td><strong>Observations</strong></td>
<td></td>
<td>1,684</td>
</tr>
</tbody>
</table>

As far as the econometric framework is concerned, we have implemented a probit model in order to investigate the effects of religious affiliation on children’s human capital, proxied by the level of education:

$$ Ed_i = \alpha_0 + \alpha_1 R_i + \alpha_2 Z_i + \epsilon_i $$  \hspace{1cm} (6)
where $i$ is the individual index, $Ed_i$ is a dummy variable, taking the value of 1 if the individual $i$ has the highest level of education (University, with or without degree) and 0 otherwise (lower education). $R_i$ is a dummy variable (Catholic) taking the value of 1 if the individual is Catholic and 0 if Protestant. When we use religiosity in place of religious affiliation (Catholic*Religious), the left out category is religious Protestants. $Z_i$ is a vector including the other covariates partly described in Table 1, and $\varepsilon_i$ is the error term. Following the theoretical model we also include an interaction term between religious affiliation and the development dummy concerning the industrial sector (Catholic*Industry). In fact, industrialization may lead to the wide-spreading of modern values and generally religion may become less conservative and follow the cultural changes induced by the modernization process. In particular, coherently with the hypothesis $H1$, the religious variables - Catholic and Catholic*Religious - are expected to have a negative sign when Catholic religion is more conservative than Protestantism. Moreover, in light of the following hypotheses – $H2$, $H3$ – the total marginal effect of religion on the probability of university education with respect to lower education is expected to be positive in case of less traditional Catholic religion and a sufficiently developed economy. While it is expected to be negative if Catholic religion is more traditional and the economy is not sufficiently developed.

As religion can be endogenous with education, it has also been followed a two-stage estimation procedure where in the first stage religion is the dependent variable (Catholic_endog, model 3 in Table 2 below) and the instruments are some variables from Fox’s survey (Fox, 2008) ³. They embody government involvement in religion (GIR henceforth). These variables are believed to affect both religious adherence and religiosity. The first group of instruments measures the official role of religion in the state and consists of two dummies - GIR1, GIR3 - which correspond respectively to the following regimes: separationist where there is official separation between state and religion and the state is marginally hostile toward religion; civil religion where one religion unofficially is the state’s civil religion. The dummy Limitations individuates whether the state limits some religions with respect to others. Finally, we consider a group of two dummies identifying different types of religious legislation, which among other aspects measures legislation of religious law as state law, financial support for religion, religious education, and the commingling of religious and political positions (Fox, 2008, p. 53). These dummies are Legislation3 capturing the presence of optional religious education in public school and government funding of religious schools or of religious education in secular schools, and Legislation4, which entails that religious organizations must register with government in order to obtain official status besides the financial support to religious education. As religion can be endogenous also with respect to children’s educational level, we have also estimated a biprobit model, where religion is the dependent variable and education the explanatory one but the results are not significant⁴. In the second stage we used the fitted values for religion in the estimation of education.

³ As to the issue of religion endogeneity and of the choice of instrumental variables we refer to the contribution by McCleary and Barro (2006).

⁴ This robustness analysis is available from the authors upon request.
4. Empirical results

Equation (6) is estimated for the whole sample. Table 2 reports the results of the estimation of the probability of university education (Ed)\(^5\). In models 1 and 2 the religious variables are respectively Catholic and Catholic*Religious while in model 3 the results derive from the two-stage estimation. In order to test the validity of the instruments used in model 3, we ran an over-identification test, the Amemiya-Lee-Newey test, which is distributed as a \(\chi^2\) with three degrees of freedom. As we may observe in Table 4, the test statistic is 8.794 (p-value=0.0322), thus we could not reject the orthogonality of the set of instruments with a conventional error of 1%. The estimated probit coefficient on religious affiliation has a negative sign though it is not statistically significant both in model 1 and in model 2. The sign shows that Catholic religion with respect to Protestantism tends to curb the achievement of higher education and in this respect points to the fact that in the Latin American countries analysed, Catholicism is characterised by a conservative dimension. When religion is endogenous (model 3), not only is the negative impact of Catholic religion confirmed but it is also highly significant. Interestingly, in the first stage regression (Table 3) the variables entailing an active role of the state as to the limitations of some religions with respect to others and as to religious education, reduce the probability of adhering to Catholic religion with respect to Protestantism.

Table 2
EDUCATION AND RELIGION

<table>
<thead>
<tr>
<th>Variable</th>
<th>ME (SE) (Model 1)</th>
<th>ME (SE) (Model 2)</th>
<th>ME (SE) (Model 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Catholic</td>
<td>-0.19 (0.168)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Catholic*Religious</td>
<td></td>
<td>-0.07 (0.083)</td>
<td></td>
</tr>
<tr>
<td>Catholic_endog</td>
<td></td>
<td></td>
<td>-11.87*** (3.366)</td>
</tr>
<tr>
<td>Age</td>
<td>0.02*** (0.004)</td>
<td>0.01*** (0.004)</td>
<td>0.02*** (0.004)</td>
</tr>
<tr>
<td>Male</td>
<td>-0.01 (0.021)</td>
<td>-0.01 (0.021)</td>
<td>-0.01 (0.021)</td>
</tr>
<tr>
<td>Leisure</td>
<td>0.01 (0.027)</td>
<td>0.01 (0.027)</td>
<td>0.02 (0.026)</td>
</tr>
<tr>
<td>Industry</td>
<td>-0.01 (0.005)</td>
<td>-0.01 (0.003)</td>
<td>-0.38*** (0.112)</td>
</tr>
<tr>
<td>Services</td>
<td>-0.01 (0.002)</td>
<td>-0.01 (0.002)</td>
<td>-0.01 (0.002)</td>
</tr>
<tr>
<td>Catholic*Industry</td>
<td>0.01* (0.005)</td>
<td>0.01 (0.002)</td>
<td>0.44*** (0.128)</td>
</tr>
<tr>
<td>No. of observations</td>
<td>1,684</td>
<td>1,684</td>
<td>1,684</td>
</tr>
<tr>
<td>Pseudo R-squared</td>
<td>0.06</td>
<td>0.06</td>
<td>0.06</td>
</tr>
<tr>
<td>Log-likelihood</td>
<td>-903.16</td>
<td>-904.93</td>
<td>-906.82</td>
</tr>
</tbody>
</table>

\(^5\) In the empirical appendix, we present the results concerning the dummies for chief wage earner profession/job in all the models estimated.
The dependent variable is equal to one if the individuals have the highest level of education and 0 otherwise. For country dummies Argentina is the reference category and for chief wage earner profession/job dummies “other” type is the reference category. Standard errors are corrected for heteroskedasticity. The symbols ***, ** and * denote that the coefficient is significantly different from zero at the 1, 5 and 10 percent levels, respectively.

Table 3

ENDOGENOUS RELIGION – FIRST STAGE REGRESSION

<table>
<thead>
<tr>
<th>Variable</th>
<th>ME</th>
<th>(SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GIR1</td>
<td>0.04*</td>
<td>(0.281)</td>
</tr>
<tr>
<td>GIR3</td>
<td>-0.09***</td>
<td>(0.289)</td>
</tr>
<tr>
<td>Limitations</td>
<td>-0.05**</td>
<td>(0.204)</td>
</tr>
<tr>
<td>Legislation3</td>
<td>-0.16***</td>
<td>(0.384)</td>
</tr>
<tr>
<td>Legislation4</td>
<td>0.03***</td>
<td>(0.115)</td>
</tr>
</tbody>
</table>

No. of obsevations 1,684
Pseudo R-squared 0.07
Log-likelihood -376.62

Note. The dependent variable is equal to one if the individuals are Catholic. The symbols ***, ** and * denote that the coefficient is significantly different from zero at the 1, 5 and 10 percent levels, respectively.

Table 4

OVER-IDENTIFYING RESTRICTIONS TEST

<table>
<thead>
<tr>
<th>Amemiya-Lee-Newey minimum chi-sq statistic</th>
<th>8.794 $\chi^2(3)$</th>
</tr>
</thead>
<tbody>
<tr>
<td>p-value=0.0322</td>
<td></td>
</tr>
</tbody>
</table>

However, in order to examine the overall effect of religion - depending also on the development level according to the theoretical model - in Table 5 we report the total marginal effect from the three models evaluated respectively at the lowest level of development (the lowest percentage of employees in the industrial sector - TMELD) equal to 18.7 in Colombia and at the highest level of development (the highest percentage of employees in the industrial sector - TMEHD) equal to 41.87 in Peru. In the former case the coefficient is negative in all three models but it is significant only when religion is endogenous (model 3). The sign seems to confirm that when there is a low development level, traditional values prevail and Catholic religion overall
reduces the probability of children’s higher education.

Table 5

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>ME (SE) (Model 1)</th>
<th>ME (SE) (Model 2)</th>
<th>ME (SE) (Model 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TMELD</td>
<td>-0.04 (0.198)</td>
<td>-0.01 (0.099)</td>
<td>-11.42*** (3.22)</td>
</tr>
<tr>
<td>TMEHD</td>
<td>0.15** (0.267)</td>
<td>0.07 (0.177)</td>
<td>20.92*** (6.61)</td>
</tr>
</tbody>
</table>

No. of observations 1,684

Note: The dependent variable is equal to one if the individuals have the highest level of education and 0 otherwise. For country dummies Argentina is the reference category and for chief wage earner profession/job dummies “other” type is the reference category. Standard errors are corrected for heteroskedasticity. The symbols ***, ** and * denote that the coefficient is significantly different from zero at the 1, 5 and 10 percent levels, respectively.

The coefficient in the latter case with the highest level of development is positive and significant both in model 1 and 3. This result is in line with the theoretical model and shows that in a collectivity sufficiently developed, the presence of modern values improves children’s educational achievements by counterbalancing the negative influence of the conservative dimension of Catholic religion on higher education.

As to our empirical findings it is worth mentioning that Barboni and Treibich (2011) show a positive correlation between growth and Catholicism in the Golden Age of Latin American growth (1950 - 1975), which they interpret through the role of Catholic Church as an educational institution that contributed to raise the literacy rate. Interestingly it also emerges a negative correlation between Catholic religion and secondary school enrolment rate, which the authors explain with the prevalent interest of Catholic institutions in basic education. These phenomena seem coherent with our analytical and empirical results though they refer to different periods. In fact, they bring attention to conservative role of Catholicism in Latin America in promoting more primary education than higher education. Interestingly, the historical evidence shows that in Latin America Catholic religion during the colonization period was strongly linked to civil authority and provided the ideological buttress to the colonial feudal system by inducing the acceptance of the existing social order (Escobar, 1997). Following Esterlin (1981), in the postcolonial period, the persistent supremacy of church in the secular dimension hindered the diffusion of mass education. Only the shift in power from the church to the state triggered this process. With the Vatican II Council a renewal wave generally led the institutional hierarchies of Catholic Church to reduce their support to the ruling elites and to recognize the need for social change, individual consciousness and empowerment triggered by modernization (Romero, 2001; Escobar, 1997).
Nevertheless each country followed a different pattern depending on the ability of Catholic institutions to adapt to modernization and on the level of development. For instance, in the sixties Chile was characterized by both a sufficiently high development level and according to Vallier (1970) a high propensity of Catholic Church to change with modernization – high $\varphi$. Other countries like Mexico and Argentina though presenting the same level of industrialization as in Chile had more conservative Catholic institutions. In the latter case as the development level was coupled with a low $\varphi$, it was not so high as to disseminate modern values. In fact, in Chile the strength of political institutions allowed for the separation between religion and secular power. Moreover there was the competitive pressure of the communist party and Pentecostals more responsive to the claims for change of society in the access to and distribution of resources. All these factors, on the one hand, freed political and social organizations from the control of the Catholic Church, including the cultural control of education. On the other hand, they stimulated Chilean religious institutions to back the secular goals pursued by political institutions. Instead, in Mexico though there was a clear-cut separation between state and religion from the beginning of the twentieth century, the Church kept a traditional and conservative role as far as social needs were concerned. It did not receive enough stimuli from governmental institutions, from competing political and religious movement in order to further modernization – low $\varphi$. Differently, in Argentina the weakness and instability of political institutions allowed for the influence of Catholic institutions in some spheres of political power. Such impact, traditionally conservative and contrary to modernizations, was strengthened by the lack of competition by other political and religious movements. By this token Catholic institutions were not responsive at all to the claims for social change dictated by the modernization process – low $\varphi$. In light of our evidence and of these historical patterns described by Vallier (1970), it is not mistaken to hold that overall in the Latin American countries where there have been high development and modernization along with the ability of Catholic institutions to adapt to modernization, Catholic religion has been able to follow the cultural changes induced by modernization. Thus, it has transmitted values fostering higher educational achievements. While whenever there has been a strong resistance to change by religious institutions, it has been necessary a development level sufficiently high to overcome religious conservatism and to promote changing values, which has not always been the case.

5. Conclusions

According to our theoretical approach, religious values influence children’s attitudes and motivations towards education by emphasizing the importance of school performance and educational achievements. Any type of religion independently of its conservative dimension can promote hard work, discipline and responsibility. However religion may present a conservative dimension which promotes the acceptance of the status quo and hampers individual self-determination. Religious conservatism can shape children’s attitude in such a way that they do not believe that education leads to better jobs and socio-economic status and are not motivated to invest in a higher level of human capital. In this respect economic development may play a crucial role by driving the process of cultural change. A sufficiently high level of development may bring about the dissemination of modern values like self-determination, which may become deeply
rooted in society and permeate religious values as well. This ultimately promotes the diffusion of education and the achievement of higher levels of education. In line with the theoretical framework, the empirical evidence shown in the paper seems to point to some conservative dimension of Catholicism in the Latin American countries considered. In fact, Catholic religion with respect to Protestantism tends to curb children’s achievement of higher education. Nevertheless, the evidence points out the critical role of development in counterbalancing the latter effect. In fact, when the development level is taken into account, the overall marginal effect of religion on the probability of university with respect to lower education is negative at the lowest level of development. In this case, traditional values prevail and Catholic religion overall reduces the probability of children’s higher education. Whereas the same effect is positive if it is evaluated at the highest level of development, supporting the idea that the presence of modern values improves children’s educational achievements by counterbalancing the negative influence of the conservative dimension of Catholic religion on higher education.

In light of this analysis, it is not mistaken to believe that besides the key variables generally considered in the literature, religion and development may play a non-negligible role in explaining educational achievements.

Acknowledgements

We wish to thank Christian Di Pietro, Luigi Senatore ed Antonio Abatemarco for their remarkable help.

Analytical Appendix

1. Proof of proposition 2

Let us consider the following inequalities from (6) in the main text:
\[
\gamma \varphi \left( \delta + \varphi D_i \right)^{-1} > 1 \Rightarrow \delta + \varphi D_i > (\gamma \varphi)^{-1} \quad \text{[A.1]}
\]
\[
\gamma \varphi \left( \delta + \varphi D_i \right)^{-1} < 1 \Rightarrow \delta + \varphi D_i < (\gamma \varphi)^{-1} \quad \text{[A.1bis]}
\]

We set \( \gamma \varphi \left( \delta + \varphi D_i \right)^{-1} \equiv \Phi \)

\[
\delta + \varphi D_i = 1 \Rightarrow D_i = \frac{1 - \delta}{\varphi}
\]

\[
(\gamma \varphi)^{-1} = 1 \Rightarrow \varphi = \frac{1}{\gamma}
\]

Thus,

- if \( D_i > \frac{1 - \delta}{\varphi} \) and \( \varphi < \frac{1}{\gamma} \), \( \Phi > 1 \) and if \( D_i < \frac{1 - \delta}{\varphi} \) and \( \varphi > \frac{1}{\gamma} \), \( \Phi < 1 \)

When \( D_i < \frac{1 - \delta}{\varphi} \) and \( \varphi < 1 \) and of \( D_i > \frac{1 - \delta}{\varphi} \) and \( \varphi > 1 \), [A1] and [A1bis] are true if respectively:

\[
D_i > \frac{(\gamma \varphi)^{-1} - \delta}{\varphi} \quad \text{[A2]}
\]

\[
D_i < \frac{(\gamma \varphi)^{-1} - \delta}{\varphi} \quad \text{[A3]}
\]

Moreover, we consider:

\[
\gamma \varphi \left( \delta + \varphi D_i \right)^{-1} = 1 \Rightarrow D_i = \frac{(\gamma \varphi)^{-1} - \delta}{\varphi} \quad \text{[A.4]}
\]

with \( \frac{(\gamma \varphi)^{-1} - \delta}{\varphi} > 0 \) if \( \varphi > \frac{\delta^{\gamma}}{\gamma} \)

\[
(\delta + \varphi D_i)^{-1} = 1 \Rightarrow D_i = \frac{1 - \delta}{\varphi} \quad \text{[A.5]}
\]
It is easy to verify that:

\[
\frac{(\gamma \varphi)^{\frac{\gamma}{1-\delta}} - \delta}{\varphi} > \frac{1-\delta}{\varphi} \text{ if } \varphi > \frac{1}{\gamma} \\
\frac{(\gamma \varphi)^{\frac{\gamma}{1-\delta}} - \delta}{\varphi} < \frac{1-\delta}{\varphi} \text{ if } \varphi < \frac{1}{\gamma}
\]

and it is always true that \( \frac{1}{\gamma} > \frac{\delta^{\gamma-\gamma}}{\gamma} \).

Thus:

- when \( \varphi \in \left[ \frac{\delta^{\gamma-\gamma}}{\gamma}, \frac{1}{\gamma} \right] \), if \( \frac{D_i}{\varphi} < \frac{(\gamma \varphi)^{\frac{\gamma}{1-\delta}} - \delta}{\varphi} \), with \( \frac{(\gamma \varphi)^{\frac{\gamma}{1-\delta}} - \delta}{\varphi} < \frac{1-\delta}{\varphi} \), \( \Phi < 1 \)

- when \( \varphi > \frac{1}{\gamma} \), if \( \frac{D_i}{\varphi} > \frac{(\gamma \varphi)^{\frac{\gamma}{1-\delta}} - \delta}{\varphi} \), with \( \frac{(\gamma \varphi)^{\frac{\gamma}{1-\delta}} - \delta}{\varphi} > \frac{1-\delta}{\varphi} \), \( \Phi > 1 \).

Summarizing the above results:

- when \( \varphi < \frac{1}{\gamma} \), if \( \frac{D_i}{\varphi} > \frac{1-\delta}{\varphi} \), \( \Phi > 1 \) and when \( \varphi \in \left[ \frac{\delta^{\gamma-\gamma}}{\gamma}, \frac{1}{\gamma} \right] \), if \( \frac{D_i}{\varphi} < \frac{(\gamma \varphi)^{\frac{\gamma}{1-\delta}} - \delta}{\varphi} \),

with \( \frac{(\gamma \varphi)^{\frac{\gamma}{1-\delta}} - \delta}{\varphi} < \frac{1-\delta}{\varphi} \), \( \Phi < 1 \).

- when \( \varphi > \frac{1}{\gamma} \), if \( \frac{D_i}{\varphi} < \frac{1-\delta}{\varphi} \), \( \Phi < 1 \) and if \( \frac{D_i}{\varphi} > \frac{(\gamma \varphi)^{\frac{\gamma}{1-\delta}} - \delta}{\varphi} \), with \( \frac{(\gamma \varphi)^{\frac{\gamma}{1-\delta}} - \delta}{\varphi} > \frac{1-\delta}{\varphi} \), \( \Phi > 1 \).
### EMPIRICAL APPENDIX

#### DUMMIES FOR PARENTS HUMAN CAPITAL

<table>
<thead>
<tr>
<th>Variable</th>
<th>ME</th>
<th>(SE)</th>
<th>ME</th>
<th>(SE)</th>
<th>ME</th>
<th>(SE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Model 1)</td>
<td></td>
<td></td>
<td>(Model 2)</td>
<td></td>
<td></td>
<td>(Model 3)</td>
</tr>
<tr>
<td>Chief wage earner profession/job</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employer 10 employees</td>
<td>0.59***</td>
<td>-0.111</td>
<td>0.58***</td>
<td>-0.111</td>
<td>0.57***</td>
<td>-0.111</td>
</tr>
<tr>
<td>Employer less than 10 employees</td>
<td>0.24***</td>
<td>-0.097</td>
<td>0.23***</td>
<td>-0.097</td>
<td>0.26***</td>
<td>-0.082</td>
</tr>
<tr>
<td>Professional worker lawyer</td>
<td>0.33***</td>
<td>-0.083</td>
<td>0.32***</td>
<td>-0.083</td>
<td>0.35***</td>
<td>-0.065</td>
</tr>
<tr>
<td>Supervisory - office worker</td>
<td>0.08</td>
<td>-0.122</td>
<td>0.07</td>
<td>-0.122</td>
<td>0.12</td>
<td>-0.115</td>
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<tr>
<td>Non-manual - office worker:</td>
<td>0.05</td>
<td>-0.089</td>
<td>0.04</td>
<td>-0.089</td>
<td>0.09</td>
<td>-0.081</td>
</tr>
<tr>
<td>Foreman and supervisor</td>
<td>-0.02</td>
<td>-0.111</td>
<td>-0.02</td>
<td>-0.111</td>
<td>0.01</td>
<td>-0.104</td>
</tr>
<tr>
<td>Skilled manual worker</td>
<td>-0.03</td>
<td>-0.065</td>
<td>-0.03</td>
<td>-0.065</td>
<td>-0.01</td>
<td>-0.055</td>
</tr>
<tr>
<td>Semi-skilled manual worker</td>
<td>-0.09</td>
<td>-0.056</td>
<td>-0.08</td>
<td>-0.056</td>
<td>-0.06</td>
<td>-0.047</td>
</tr>
<tr>
<td>Unskilled manual worker</td>
<td>-0.08</td>
<td>-0.059</td>
<td>-0.07</td>
<td>-0.059</td>
<td>-0.04</td>
<td>-0.049</td>
</tr>
<tr>
<td>Farmer: has own farm</td>
<td>0.37***</td>
<td>-0.138</td>
<td>0.37***</td>
<td>-0.138</td>
<td>0.38***</td>
<td>-0.136</td>
</tr>
<tr>
<td>Agricultural worker</td>
<td>-0.17**</td>
<td>-0.047</td>
<td>-0.16</td>
<td>-0.047</td>
<td>-0.16**</td>
<td>-0.048</td>
</tr>
<tr>
<td>Member of armed forces</td>
<td>0.07</td>
<td>-0.146</td>
<td>0.07</td>
<td>-0.146</td>
<td>0.11</td>
<td>-0.136</td>
</tr>
<tr>
<td>Never had a job</td>
<td>-0.04</td>
<td>-0.184</td>
<td>-0.04</td>
<td>-0.183</td>
<td>-0.03</td>
<td>-0.191</td>
</tr>
</tbody>
</table>

No. Of observations: 1,684
Pseudo R-squared: 0.06
Log-Likelihood: -903.16

**Note:** For chief wage earner profession/job dummies “other” type is the reference category. Standard errors are corrected for heteroskedasticity. The symbols ***, ** and * denote that the coefficient is significantly different from zero at the 1, 5 and 10 percent levels respectively.

### 6. References


Sociology 94: S95-S120.


