WORKING PAPER

Religion and Economic Outcomes –
Household Savings Behavior in the USA

by

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4/30/2013

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Abstract

Assuming that certain religious beliefs, as a proxy for one's cultural background, may inhibit wealth accumulation, individual savings behavior in the USA with its vital religious market is examined. Using data from the US Panel Study of Income Dynamics (PSID), I found notable differences in saving rates and in the amount saved between religious and non-religious individuals as well as across religious groups. However, neither the fixed-effects approach nor the instrumental variables estimation, where the religious composition of the region of ancestry origin is used as an instrument for individual religious belief, support the findings from cross-sectional analysis. The longitudinal analysis yields no effect of religious belief on savings choices. Frequent religious church attendance, however, positively affects savings decisions. Further, based on the exogenous variation in religious composition of ancestry region, the instrumental variables approach shows that religious affiliation determines the binary savings decision negatively. However, the instrument is not valid for the continuous savings decision.

1 Introduction

Aggregate savings are the basis for business financing and investment, and, thus, economic growth. Likewise, savings at individual level is of exceptional importance for consumption smoothing, to insure against uncertain future income flows or to prepare for retirement. Further, leaving a bequest to and funding the education of descendants are strong motives for household savings decisions. Given the importance of both individual and aggregate saving for economic well-being, the United States are concerned about a considerable decrease in household savings during the past decades (Stafford et. al., 2012; Guidolin and La Jeunesse, 2007). Data from the National Income and Product Account (NIPA) indicate a personal saving rate of 9.8% at the beginning of the 1980s, reaching its lowest point in 2005, with rates of 1.5% and 4.7% in 2009. Prior research on heterogeneous individual savings behavior (e.g., Avery and Kennickell, 1991; Browning and Lusardi, 1996; Grossbard and Marvão Pereira, 2010) found differences across demographic characteristics, such as gender and race or a person's educational attainment, demographic change, and the social security system to be determinants of individual savings behavior.

The focus of this paper is on one particular demographic characteristic, mostly neglected as an explanation for the heterogeneity in household savings: an individual's cultural identity. Culture, meaning 'those customary beliefs and values […] that are inherited [mostly unchanged] by an individual from previous generations (Guiso et al., 2006, pp. 24), may directly shape personal norms, such as thriftiness and investment preferences. Those values may for their part be associated with one's savings and investment behavior. The aim of this paper is to test whether individual religious beliefs and religious activity, as the key determinants of one's cultural background, have explanatory power for heterogeneity in individual savings behavior in the USA. The United States religious market (Iannaccone, 1998) is an interesting one for studying the relation of religiosity and individual economic decision-making. Despite the ongoing secularization trend and the growing tendency of private forms of religiosity since the beginning of the 1990's, the majority of the population, 77%, claims religion to be an important part in their lives and even 84 % of the US population is still religiously affiliated (Pew Forum on Religion & Public Life, 2008). Second, due to immigration, there is substantial variety in the types of religious beliefs and a broad range of denominations.

By now, the author is aware of two other contributions pointing explicitly to cultural factors as determinants of individual savings behavior. Renneboog and Spaenjers (2012) analyzed the effect of religious affiliation on individual economic attitudes, such as thrift and risk, and investment behavior in the Netherlands. They found a positive relationship between individual religious affiliation and the individual propensity to save. Carroll et al. (1994, 1999) analyzed the savings behavior of immigrants to Canada and the United States. They found mixed empirical support for their hypothesis, that immigrants from different countries of origin with distinct cultural backgrounds exhibit distinct saving patterns. The recent paper contributes to that literature a within-country case study to provide further empirical evidence on the impact of cultural background factors on individual savings. Further, compared to previous attempts, this contribution explicitly uses panel estimation techniques as well as an instrumental variable approach to account for the endogeneity issue inherent in the relation between religion and economic outcomes. In addition to merely examine individual savings propensity, the actual amount saved by individuals is analyzed. Finally, given the importance of social networks for individual decision-making, a measure for social capital, namely religious involvement, is considered.

Using individual survey data, namely the Panel Study of Income Dynamics (PSID), covering the period from 2003 to 2009, substantial differences in savings behavior between religious individuals in comparison to non-religious ones were found in a cross-sectional analysis. Religious people save significantly more than non-religious individuals. These results attain robust once adding standard economic and social control variables, which were previously found to impact individual saving decisions. Further, being involved in religious activities is also positively correlated with savings behavior. Addressing the endogeneity problem of religiosity, longitudinal analyses are carried out. Applying a fixed effects model, religious affiliation was not found to be a statistically relevant determination factor of savings. The smaller fixed-effects coefficients and the substantially larger standard errors, however, may be an explanation for the absence of a statistically significant religion-induced heterogeneity in individual savings. In contrast, attending religious services frequently was found to positively affect the amount saved by individuals. To further address the endogeneity problem of religiosity, an instrumental variables approach is applied, where individual religious affiliation is instrumented with interaction terms of the proportion of individuals belonging to the respondent's religious tradition in the region of ancestry origin in 1900 with regional dummies. In contrast to previous cross-sectional results found by Renneboog and Spaenjers (2012), religious affiliation negatively affect the binary savings decision. However,

in light of interpreting these results as a local average treatment effect (LATE) instead of as an average effect for the whole population, it is argued that religious people who root strongly in their religious tradition may spend more money on religious activities than saving it.

However, the analysis carried out is limited by the available data. This paper suffers from the problem what Guiso et al. (2006) call the 'reduced form approach". Due to the unavailability of data on individual attitudes towards thriftiness and taking risks, the channel through which religiosity might affect individual saving decisions is not observed. Hence, the analysis has to focus on the direct association between religiosity and individual economic behavior, assuming that underlying preferences are originated in cultural norms and values. Second, it is an important issue that the different ancestries groups can only be assigned to broad regions in the world and not to specific countries. Consequently, quantitative variables on saving behavior in different countries of ancestry, such as the aggregate savings ratio, may not be used as instruments for own religious background. This would provide an explicit channel through which cultural norms of the ancestry's impact recent savings behavior (Fernández and Fogli, 2009). Finally, PSID merely provides rudimentary classification of Protestant denominations. However, most denominations, and especially Lutherans, Baptists, and Presbyterians, have multiple branches, some of which are conservative and some of which are mainline. Thus, the results might be distorted by an imprecise assignment to Mainline and Conservative Protestants.

The paper proceeds as follows. In the next section relevant contributions to the literature are discussed shortly. Furthermore, a theoretical background concerning the potential economic effects of religiosity is delineated as well as working hypotheses are developed. The data and the empirical strategy used are described in section 3. The results are analyzed in Section 4, and Section 5 concludes.

2 Religiosity and Savings Behavior

2.1 Institutional background

A central question is, whether differences in savings behavior may be partly influenced by religiosity or are merely reflect distinct socioeconomic and demographic differences across individuals. Since households choose how much to consume today and how much of their current income to set aside for future consumption, savings decisions about whether and how much to save are intertemporal choices. Thereby the motives for saving range from

consumption smoothing; via a household's willingness to save for precautionary reasons and preparing for retirement to the bequest motive or for the funding of education (Browning and Lusardi, 1996). These savings motives depend on the ability to save (income restrictions, stage in life-cycle, and availability of information) as well as on the willingness to save (Hussein and Thirlwall, 1999). On the one hand side, factors determining the willingness to save may be assumed not to differ across households, such as the rate of interest and inflation. On the other hand side, factors such as consumption and time preferences as well as opportunity sets vary substantially between individuals.

There are mainly two channels through which religious beliefs might shape capital accumulation. First, by internalization of specific religious teachings, which include a core set of beliefs about the structure of sins, piety and salvation, personal attitudes and preferences for savings may be directly impacted (Stets and Burke, 2000). Exemplarily, one can reasonably expect the savings motive of funding for education to differ by religious groups if these value educational attainment differently. Hence, saving rates may differ across religious groups. Religious teachings, furthermore, may emphasize different views regarding the discount rates of future consumption. If some religions stress longer planning horizons and emphasize future relative to present consumption, discount rates, and consequently savings rates, may also vary across religions. Further, religious teachings indirectly may shape individual savings behavior by establishing moral and ethical rules. Asking for different individual efforts to earn salvation, religions set divergent incentives to act according to religious rules (McCleary, 2007; Arruñada, 2010). While some faiths stress the importance of "productive efforts (such as hard work and saving)" (McCleary. 2007, p. 51) to earn salvation, other faiths emphasize the meaning "of activities that are not directly productive (such as giving alms to the [holy men] or daily prayer in a collective setting)" (McCleary. 2007, p. 51). Consequently, agents face distinct perceived benefits and costs when obeying religious rules and, thus, face different opportunity sets, which may also explain individual heterogeneity in savings choices.

Second, participation in religious services may also alter an individual's savings preferences and opportunity sets. Participants, who attend religious activities frequently, internalize religious rules related to economic behavior much stronger than religious individuals who are less strong involved, since "religious human capital" (Iannaccone, 1998), that is, "the religious knowledge [and] familiarity with church ritual and doctrine, and friendships with fellow worshipers" (Iannaccone, 1998, p. 1481) is simultaneously formed and increased by religious service participation. In effect, the religious belief of those

attending more often is strengthened, since they get higher returns on their investments of time and money in their "religious human capital" (Iannaccone, 1998). Moreover, the literature on social capital stresses the role of organizational membership for the building of individual social capital. Attending religious activities regularly creates a social network (Glaeser and Sacerdote, 2008; Guiso et al., 2003, 2006), which may be used to gather information required to make appropriate savings decisions or to adapt investment strategies from fellow attendees. Thus, attending church may alter one's information set available for savings decisions. Summing up, religion may influence savings behavior not only through its rules and norms, but also through its institutional character. Compared to individuals who attend services less often, more integrated individuals, are supposed to show a higher probability to accumulate financial capital.

2.2   Previous empirical findings

Tracing back to 'the most famous link between culture and economic development" (Acemoglu et al., 2005, p. 401), which is provided by Max Weber's seminal work the Protestant Ethic [2005 (1904/05)], a growing number of studies[1] retrieve the impact of religion on aggregate economic outcomes. Compared to the Catholic territories of ancient Europe, Weber linked the higher economic growth rates in Protestant regions to the higher propensity to save and work for Protestants. Today a wide range of macroeconomic factors, like (per capita) GDP growth (Barro and McCleary, 2003, 2006; Tabellini, 2010), income (Heath et al., 1995; Crain and Lee, 1999; Lipford and Tollison, 2003; Gruber, 2005); the savings ratio (Guiso et al., 2003, 2006), labor force participation (Feldmann, 2007) or measures of institutional quality (Stulz and Williamson, 2003), are considered to be, at least partly, determined by religious traditions. Using international survey data on religiosity for a panel of countries, Barro and McCleary (2003, 2006) offered evidence that the belief in hell, one aspect of religiosity, is positively correlated with per capita GDP, whereas the frequency of church-attendance, another aspect of religiosity, has negative effects on growth. Making use of two waves of the World Value Surveys from 1990–1991 and 1995–1997 and aggregating the individuals at the regional level, Tabellini (2010) established the causal effect of cultural factors, reflected by measures of trust, of respect for others, and of confidence in the link between individual effort and economic success, on economic development. After

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[1] Due to the variety of contributions to the impact of culture on economic outcomes, they are solely reviewed incompletely.

controlling for country fixed effects, contemporaneous regional education and past urbanization rates, he found that cultural differences proxied by those cultural individual traits are significant positively correlated with per capita GDP levels and growth rates across the 69 regions in 8 European countries. Heath et al., (1995) examined the influence of religious doctrine on per capita state income with data from the Statistical Abstract, church membership dataset, and the Jewish Yearbook within the United States for the years 1952, 1971, and 1980. In a pooled cross-section analysis they found that up to 1971 Jewish membership has a positive statistically significant impact on state per capita income. Whereas Catholicism and fundamentalist Protestantism are negatively correlated with it, liberal Protestantism is uncorrelated with state per capita income. In line with these findings are the results of Crain and Lee (1999) and Lipford and Tollison (2003). Using US state-level data for 1971, 1980, and 1990, the latter found that religious participation is negatively and significantly correlated with per capita income and vice versa. Making use of data on religious preference and religious participation from the General Social Survey (GSS) and micro-data on several important economic outcomes from IPUMS sample of the 1990 Census of the USA, Gruber (2005) addresses in his paper the endogeneity problem of religion, which might occur when examining its relation to economics. He estimates individual religious participation and economic outcomes as a function of religious market density, which he instrumented by the ancestral mix of area residents. He found that higher religious market density not only have a significant positive impact on individual religious participation, but also educational levels and income. Furthermore he found religious market density to negatively affect levels of welfare receipt. Guiso et al. (2006), using data from the GSS for the USA, found that the distinct positive attitude of Catholics towards the value of teaching thriftiness, compared to Protestants and non-religious people, have a positive impact on the national saving rate. Nevertheless, their analysis did not consider the impact of the attitude towards thriftiness fostered by religion on the individual saving ratio. Examining the link between labor supply and religious affiliation, Feldmann (2007) showed for 80 countries that labor force participation and employment rates for the total working-age population as well as for women, in particular, were higher in countries where the Protestant religion was actively practiced. Studying the relationship between diverse dimensions of religion and female employment with data from the 2005 wave of the World Values Survey for 48 countries, H'madoun (2010) showed that the intensity of religious belief is negatively associated to female labor force pa anticipation, while participation in religious activities were found to be positively correlated to it. Stulz and Williamson (2003) examine the correlation between a

country's predominant religion, as a proxy for its culture, and investor rights across countries. Their findings suggest a strong correlation of religion with creditor rights. Primary Protestant countries protect investors stronger than countries where a major part of the population is Catholic.

Nevertheless, mixed empirical evidence was found, since there might be various paths through which culture and especially religions may act on the macroeconomic level. Exemplary, Acemoglu et al. (2005) examining in a cross-section analysis of countries the economic effects of institutions, they did not find religion or culture to be significant determinants of income per capita when controlling for the effects of economic institutions. Mangeloja (2005) found for eight OECD countries between 1971 and 2001 that religious production efficiency, meaning the ratio of belonging to a religious denomination and believing in it, is not statistically significant for real GNP growth. Durlauf et al. (2008) employed an unbalanced panel dataset for the years 1965 to 1994 covering on average 54 countries and found that religious adherence is not a robust determinant of both the physical and human capital accumulation, and the total factor productivity growth. Looking at the aggregate saving ratio, Horioka (2007), for instance, doubted that culture is an important explanation of Japan's high saving rate in the past. He showed that the high saving rate might be traced to several economic, demographical and institutional factors, like the income growth rate, the age, and the household's wealth holdings. Although he gives a comprising descriptive explanation of Japans high saving rate, a further testing of cultural and religious impacts is missing. Alesina et al. (2003) did not find a clear pattern within the correlation of religious diversity and measures of economic growth, such as GDP per capita growth and schooling. However, as they stated, religious facilitation is positively correlated to measures of good governance, like corruption or tax compliance.

Although the link running from culture to aggregate economic outcomes is well established, it is, however, to a large extent unclear in how far it drives an individual's financial behavior. Next to the studies using aggregate data mentioned above, recent analysis use individual level data to examine the association between one's cultural background, and especially one's religious tradition, and an individual's process of economic decision-making (see Iannaccone, 1998 and Hoffmann, 2012 for a review). While numerous contributions to the literature dealt with the impact of religion on economic behavior, such as entrepreneurial decisions (Audretsch et al., 2007), labor market participation (Lehrer, 2008; Spenkuch, 2010; Heinick, 2004) and wage rates (Chiswick, 1993; Ewing, 2000) or investment decisions (Keister, 2003; Renneboog and Spaenjers, 2012), less attention has been paid to the

underlying economic attitudes, such as thrift, work ethic, (Guiso et al., 2006, 2003; Arruñada 2010) or individual risk taking preferences (Renneboog and Spaenjers, 2012). While Iannaccone (1998) argued that, since 'every […] sacred literature contains enough ambiguity to justify any number of economic positions" (Iannaccone, 1998, p. 1478) one should be careful in tracing back economic attitudes to religious beliefs, Guiso et al. (2003) showed that individual attitudes are driven by religious beliefs. Based on the World Values Survey for the years 1981 to 1997, among others, individual attitudes towards working woman and thriftiness were found to be determined by one's religious affiliation. While all considered religious denominations display a conservative attitude towards woman working, this effect is twice as strong for Muslims. Moreover, opposed to Weber's thesis, they found that merely Catholics strongly emphasize thriftiness. Protestants, however, trust others more and respond more to incentives. Recently Arruñada (2010) tested Weber's work ethic" hypothesis using cross-section individual survey data from the 1998 wave of the International Social Survey Programme (ISSP). After controlling for a wide range of demographic and country specific variables, the statistically significant differences in more working hours and greater personal success of Protestants disappears. However, he found support for a Protestant 'social ethic". He stated that Protestants support political and legal institutions more than Catholics and hold more homogenous values, which might lower transaction costs in anonymous transactions.

Although some studies found an impact of religious beliefs and belonging on the aggregate saving ratio and one contribution states a positive relationship between religious activities and thriftiness (Guiso et al. 2003, 2006), studies using micro data are scarce. Until now few authors have examined the individual saving ratio with respect to cultural conditions (Carroll et al., 1994, 1999; Renneboog and Spaenjers, 2012). Comparing the saving behavior of immigrants to Canada from different cultural backgrounds using data from the Canadian Survey of Family Expenditures for 1982 and 1986, the former did not find any evidence for cultural factors affecting the saving patterns. In contrast to these findings are their results when replicated their paper from 1994 for the United States in 1999. Using household data from the 1980 and the 1990 Censuses of Population and Housing in the United States, they showed that immigrants in the US from different countries of origin exhibit different saving patterns. However, their results do not support the hypothesis that cultural conditions of the country of origin impacts individual savings behavior, 'since the saving patterns of immigrants do not resemble the national saving patterns of their countries of origin" (Carroll et al., 1999, pp. 49). Renneboog and Spaenjers (2012) analyzed whether and how religious denominations influence the financial decisions of Dutch households. Using data from the

DNB Household Survey for the years 1995 to 2008, they showed that religious households report more frequently that they have saved in the previous year. Thereby the effect is similar in magnitude for Catholic and Protestant households, who are about 3% more likely to save than non-religious households. Besides the studies of Carroll et al. (1994, 1999) and Renneboog and Spaenjers (2012) the author is not aware of contributions which examine the impact of cultural factors on the individual decision to save. The question of whether religiosity has any relevant impact on a household's savings decisions therefore merits further examination.

3 Data and Econometric Specification

The data used here is drawn from the PSID, a representative longitudinal study of private households across the United State who were first interviewed in 1968. In 2005 there were 7,500 families and more than 65,000 individuals sampled. It covers a wide range of demographic, economic and social characteristics of individuals and households. In order to study the effect of religion on individual savings behavior an unbalanced panel for the years 2003 to 2009[2] is used. Since, according to life-cycle hypothesis, no clear statements with respect to the savings behavior of retired and elderly persons can be made, the study focuses on the civilian non-institutional working-age population within the USA. While, on the one hand side, elderly might dissave by using their savings, on the other hand side, it was found that they might save more due to precautionary saving and the bequest motive. Thus, the sample is limited to individuals between 18, the age of legal majority in most states of the USA, and 62, the earliest age to take retirement benefits. The estimation sample includes 26.724 observations of 9.522 heads of household.

Further, the World Christian Encyclopedia (Barnett, 1982) is used as data source for the percentage of the population in a given country of ancestry practicing a given religion in 1900, which is used as an instrument for individual religious affiliation. As mentioned above, PSID assigns the country of ancestry to fifteen bread regions in the world. An individual's ancestry or ethnic origin may be of American (meaning U.S.), Native American (American Indian, Eskimo, Aleut), British, Western European, Eastern European, Northern European, Middle Eastern, East Asian, South or Southeast Asian, Pacific Islander, Canadian, Caribbean,

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[2] Since 1997 the survey was conducted every two years.

Latin American (South and Central American), African, or Oceania (Australian, New Zealander, New Guinean) origin.[3]

Information on the main explanatory variable of interest, individual religiousness, is available in different ways. First, various religious groups are considered to show differing incentives set by religions to encourage their adherents to behave in a specific way. Every individual is attributed to be *Catholic*, *Jew*, or Protestant in the form of *Mainline* and *Conservative*, in the sense of more traditional Protestant denominations, or adherent to *Other religions*.[4] The religious composition in the sample used reflects the heterogeneity in the religious landscape of the USA. *Table 3.1* gives a description of the sample used. 85 percent of the sample belongs to a religious tradition. The Christian belief is mainly represented by Protestants, who account for almost two-thirds of the sample. With 40 percent Conservative Protestants are the major group. Almost one-fifth of the persons are affiliated to Mainline Protestantism respectively the Catholic Church. 1.6 percent is Jewish. Next to these main religions, there are further Other religions, like Islam, Hindus, Buddhists or Christian Orthodox religions, which account for 6 percent of the individuals. However, the shared norms and values hold by this group may be too heterogeneous to yield clear effects of individual religious preference on individual savings behavior. Finally, 15 percent do not belong to any religious affiliation.

Second, given that attending religious services on a regular basis is still an important part in religious life in the USA, the categorical variable church attendance is also included as a measure for religious commitment opposed to being affiliated. Answers to the question on the frequency of attending were recoded in a categorical variable with four categories ranging from 'Never ' to 'Weekly'. Since information about the frequency of church attendance is not available for the years 2007 and 2009, only the waves 2003 and 2005 can be used for the analysis of the impact of religious involvement on savings decisions. *Table 3.1* also reports the distribution of the regularity of church attendance in the sample. Almost half of the persons are taking regularly part in religious activities. 29 percent are going at least once a week to church, which reflects distributions found by the General Social Survey (2008). Half of the sample attends religious services never or less than once month.

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[3] A classification of world regions according to PSID can be found in Appendix A, Table A.1.

[4] Appendix B provides a categorization of the different world religions.

Variable	Mean	Std. Dev.	Minimum	Maximum
Savings behavior				
Saved (d)	0.7302		0	1
Stock of savings	13,549.98	65,353.51	0	5,500,000.00
Ln(stock of savings)	5.7462	4.0565	0	15.52026
Religious affiliation (ref. non):				
Jew (d)	0.0160		0	1
Catholic (d)	0.1870		0	1
Mainline Protestant (d)	0.1982		0	1
Conservative Protestant (d)	0.3968		0	1
Other Religion (d)	0.0551		0	1
Church attendance (ref.: never):				
Less than monthly (d)	0.2559		0	1
At least monthly (d)	0.1923		0	1
At least weekly (d)	0.2878		0	1
Exogenous control variables:				
Male (d)	0.7113		0	1
Age	40.2354	11.5089	18	62
Age squared / 100	17.5133	9.4134	3.24	38.44
Negro (d)	0.3550		0	1
Latino (d)	0.0692		0	1
Other race (d)	0.0284		0	1
Varying situation (d)	0.4381		0	1
Pretty well situation (d)	0.2334		0	1
High school father (d)	0.3063		0	1
Some college father (d)	0.1274		0	1
College graduated father (d)	0.1569		0	1
Exogenous control variables:				
ln(Net worth+1)	8.6858	5.1089	0	17.76567
ln(Income+1)	10.6885	1.2950	0	15.65877
Unemployed (d)	0.0841		0	1
Employed (d)	0.8077		0	1
High school graduated (d)	0.3258		0	1
Some college (d)	0.2488		0	1
College graduated (d)	0.1447		0	1
More than college (d)	0.0758		0	1
Marital status (d)	0.5556		0	1
Number of children	0.9640		0	9
Metropolitan area fixed effects	3.6928	1.7884	1	6
51 US states			1	51

Notes: Number of observations is 26.724 for all variables, except for Ln(stock of savings) (25.164) and church attendance (12.736). (d) denotes dummy variables

3.1 Pooled cross-sectional models

One way to model a household's savings decision would be to consider only cross-sectional information, ignoring the time dimension of the data used. The basic estimation framework for the empirical discussion of a household's decision on whether and how much to save may then be specified as

$$(1) \quad y_{it} = \alpha + \beta \, Religiosity_{it} + \lambda \, X'_{it} + \varepsilon_{it} \qquad\qquad i = 1,..., N, \, t = 1, ...,T.$$

In *Equation (1)* y_{it} reflects either the binary or the continuous savings choice. Consequently, depending on the nature of y_{it}, non-linear and linear regression models are considered. i specifies individuals in time t. α is a constant term common to all individuals. *Religiosity* denotes the vector of variables related to individual religious affiliation or church attendance. The effect of religiosity on the savings decision is measured by the coefficient β. X represents the linear combination of observed time-varying explanatory variables, such as age, income, wealth, educational attainment, employment status, metropolitan areas and state fixed effects, as well as observed variables capturing time-invariant individual heterogeneity, such as sex, race, economic situation in childhood and education of father, that are assumed to determine savings decisions. λ specifies the strength of this impact. ε_{it} is an unobserved stochastic error term. Robust standard errors clustered at the household level are used to deal with possible heteroskedasticity.

Analyzing the effects of religious affiliation and activity on the binary household decision on whether to save, an underlying, unobserved, taste to hold liquid assets, y^*, as given in *Equation (2)*, is assumed

$$(2) \quad S^*_{it} = \alpha + \beta \, Religiosity_{it} + \lambda \, X'_{it} + \varepsilon_{it}.$$

Although S^*_{it} is not observed, it is observed whether a household accumulates financial capital in the form of money in checking or savings accounts, money market funds, certificates of deposits, treasury bills, or government savings bonds, S_{it}.

$$(3) \quad S_{it} = \begin{cases} 1 & if \quad y^*_{it} > 0 \\ 0 & if \quad y^*_{it} \leq 0 \end{cases}.$$

Given the latent-variable models in *Equation (2**Fehler! Verweisquelle konnte nicht gefunden werden.)* and *Equation (3)*, the probability of savings, assuming ε_{it} to follow a normal distribution function Φ, is given by the pooled probit model in *Equation (4)*, which is estimated by maximum-likelihood (ML)

(4) $\quad Pr(S_{it}=1|\ Religiosity_{it},\ X_{it})=\Phi(\alpha+\beta\ Religiosity_{it}+\lambda\ X'_{it}).$

The empirical discussion of how much to save may be expressed by a log-linear specification of a pooled model using ordinary least squares (OLS) regressions, as in *Equation (5)*

(5) $\quad ln(stock\ of\ savings_{it})=\alpha+\beta\ Religiosity_{it}+\lambda\ X'_{it}+\varepsilon_{it}.$

The variables are defined as above. Further, all financial figures were adjusted for inflation with the rate of the Cost Of Living Adjustment (COLA) with a base year of 2009.

3.2 Fixed effects models

Although religious beliefs are seen as exogenously given (Guiso et al., 2006), at least to a large extent, to establish a causal link running from religion to savings outcomes, economists face the difficulty of the endogeneity of religion. Endogeneity, that is the correlation between religiosity and the error term, might arise partly due to unobserved factors and partly due to reverse causality. If there are time-constant unobserved individual effects, such as socialization effects, then both the probit and the OLS estimator of β are biased and inconsistent due to omitted variables. As a consequence, the effect of individual religiosity may rather reflect differences in unobserved variables on savings than the effect of religious belief itself. A fixed effects model is one method to deal with unobserved individual-specific-effects. Here the individual effects are permitted to be correlated with the independent variables. Analyzing the effect of religiosity on the probability to save, while considering explicitly unobserved factors, the fixed effects logit model is applied. An application of the fixed effects probit model would lead to inconsistent estimators due to the unsolvable 'incidental parameters problem'. For ε_{it}, independently logistic, based on Equation (6) the probability of savings is given by

(6) $\quad Pr\ (S_{it}=1|Controls_{it};z_i)=\Lambda\ (\alpha+\beta\ Controls_{it}+z_i)$

$\quad with\ \Lambda(\cdot)=\dfrac{exp(\alpha+Controls'_{it}\beta+z_i)}{1+exp(\alpha+Controls'_{it}\beta+z_i)},$

where Λ is the logistic cumulative distribution function for the error term. Further, z_i subsumes all, observed and unobserved, time-invariant individual effects. $Controls_{it}$ represents the set of time-varying explanatory variables, such as: religious affiliation or church attendance, age, age squared, employment, ln(income + 1) and ln(net-worth + 1) as well as the marital status, the number of children and metropolitan area fixed effects. One's

educational attainment is not considered in the fixed effects model, since normally it does not vary over the life cycle. Changes in education may rather occur for those differing systematically from others. Due to almost no within variation, state fixed effects were also excluded from the analysis. Such a fixed effects model may be estimated by conditional ML, as Chamberlain (1984) showed. In particular, the probability of a sequence of savings decisions occurring ($S_{i1}, \dots, S_{iT}$) conditioning on $s_i = \sum_{t=1}^{T} S_{it}$ is given by Equation (7)

$$(7) \quad Pr(S_{i1}, \dots, S_{iT} | controls_{i1}, \dots, controls_{iT}, z_i, s_i) = \frac{\prod_{t=1}^{T} exp(controls_{it}' \beta S_{it})}{\sum_{d \in D_i} \prod_{t=1}^{t} exp(controls_{it}' \beta d_t)} ,$$

where D_i is the set of all possible combinations of s_i ones and $T - s_i$ zeros. By conditioning on the minimal sufficient statistics for z_i, $\sum_{t=1}^{T} S_{it}$, z_i is eliminated from the likelihood function, which solves the 'incidental parameters problem'. However, including fixed effects not only 'controls' for unobserved individual heterogeneity, but also removes all individual characteristics which do not vary over time.

In order to study the determinants of the continuous savings decision, a log-linear model using the fixed-effects within estimator is applied, as shown in Equation (8)

$$(8) \quad ln(stock\ of\ savings_{it}) = \alpha + \beta\ Controls_{it} + z_i + \varepsilon_{it}$$

3.3 Instrumental variable approach

To deal with another source of the endogeneity issue, namely reverse causality, an instrumental variable (IV) approach is applied. It may be the case that religious beliefs are adapted to the current social and economic environment instead of influencing it. Since the opportunity costs of time determines religious behavior, individuals with higher opportunity cost of time, i.e. those with high wage rates, or high levels of income and education, choose less time-consuming religions, or chose more 'money-intensive' religious participation (Azzi and Ehrenberg, 1975; Iannaccone 1998).

Exogenous variation in individuals' religious beliefs, as measured by the proportion of individuals belonging to the respondent's religious tradition in the region of ancestry origin in 1900[5] may be used as an instrument for individual religious affiliation. However, the effect of religious affiliation may depend on the region of ancestry. For example, practicing Catholicism in Western Europe may be different to being Catholic in the Middle East. Thus, the same religion may shape individual values and norms differently depending on the region.

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[5] A classification religious affiliation in the world in 1900 can be found in Appendix 2.A, Table 2.A.2.

As a consequence, interaction terms of the proportion of individuals belonging to the respondent's religious tradition in the region of ancestry origin in 1900 with regional dummies are used as instruments. The methodological assumption is that ancestors emigrated from different regions tend to carry with them their values and norms to the United States and transmit them to their descendants (Guiso et al., 2006). Since 'a society's religious […] heritage leaves a lasting imprint" (Inglehart and Welzel, 2010, p. 552) on individuals, even on those who are non-religious, religious tradition in ancestry's region may influence uniquely individual worldviews and moral beliefs in present day life.

Following Angrist and Pischke (2008, pp. 158), in order to estimate the effect of religious tradition on the binary savings decision a linear probability approach is chosen. Further, a linear regression model for the decision on how much to save is applied. Using a two-stage least squares (2SLS) estimator, Equation (9) displays the first-stage in the IV framework

$$(9) \quad \widehat{Religious\ belief}_{it} = \delta(Share\ religion_{i;\ Ancestry\ origin} \times Region\ ancestry_i) + \varphi\ X'_{it} + u_{it}.$$

Here, the causal variable of interest, namely religious affiliation, *Religious belief*, is regressed on the instrument, *Share Religion $_{i,\ Ancestry\ origin}$ $\times$ Region ancestry,* which represents the proportion of individual *i's* religious belief in the region of ancestry depending on the region of ancestry. The parameter δ measures the strength of this effect. X_{it} represents a list of control variables which are exogenous per assumption. In the second-stage, as given in Equation (10), the predicted values on $\widehat{Religious\ belief}$ are used to estimate its effect on the savings behavior.

$$(10) \quad Savings_{it} = \beta \widehat{Religious\ belief}_{it} + \lambda\ X'_{it} + \varepsilon_{it},$$

where all symbols are as defined above. In effect, individual savings decisions are modeled as a function of the portion of one's own religious tradition in the country of ancestry instead of relying on self-reported religious tradition.

3.4   Explanatory variables

A variety of common control variables related to individual savings decisions is used. Age and a squared age term are included expecting them to capture the common u-shaped relationship between age and savings suggested by life-cycle hypothesis. The variable *Male* is a dummy for men. Due to the fact that the USA is a multicultural country, a set of dummy variables indicating race (*Negro, Latino, Other race*) with *White* as reference category are included. The economic milieu where the head grew up is taken into consideration, too. The

variables indicate whether the economic situation of the parents was *Varying*, *Pretty well* or *Poor*, while the latter category is the omitted group. Moreover, since the economic choices of the current head might be shaped by a direct learning effect from his father, the education of the head's father (*High school father, Some college father, College graduated father*) is also included as a control variable.

Further individual background characteristics, such as income, wealth, employment status, education, family composition and regional background, which may be endogenous to religiosity, are included in the second specification of any estimation. Including these variables will result in a more indirect rather than a 'pure' effect of religiosity on savings behavior. Income is used as the natural logarithm of the net household income (*ln(Income+1)*). The natural logarithm of total net worth, which is defined as the sum of all assets, including business and farm equity, minus debts, is included as *ln(Net Worth+1)*. It is considered as a proxy for household wealth. Since not all individuals indicated a money amount in every wealth category we imputed the missing values by an OLS regression. Both income and net worth are censored below at zero. However, including income and assets as repressors might cause simultaneity bias, since, according to the life-cycle hypothesis, a rise in wealth will, all other things equal, raise current consumption and, hence, partly reduce current savings, and the stock of savings affect future income expectations and wealth.[6] Since education was found to raise asset accumulation, educational levels (*High school graduated, Some college, College graduated, More than college*) are included as endogenous control variables. The composition of the household is captured by the *Marital status* and the *Number of children* under 18 living in the household. *Metropolitan area fixed effects* are considered as measured by dummies for the size of the largest city in the area of residence to control for social conditions related to urban environment. To account for structural differences and varying welfare systems across states *State* fixed effects are used. *Table 3.1* shows, furthermore, summary statistics for explanatory variables used in the regressions. The majority of individuals in the sample used own a savings account, namely 73 percent. However, while the median amount invested is $13,550, the standard deviation is $65,353. Thus, the amount saved by individuals is a noisy variable which varies substantially. Though, our sample is not equally split in males and females, as *Table 3.1* indicates, separate analyses for the genders did not yield noteworthy differences. Approximately 55 percent in the sample

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[6] Excluding income and asset holdings from the analysis may cause omitted variable bias. Regressions without controlling for both yielded the same direction of the effect of religious affiliation on savings. However, the size of the effect was larger.

are White and married persons. Further, a clear majority of individuals are employed. The empirical results are outlined in the following section.

4 Results

4.1 Results for cross-sectional analysis

In order to evaluate whether religious affiliation and church attendance are robust determinants of individual savings choices, in the first part of the empirical analysis we estimate cross-section non-linear and linear savings functions. The regression results for the binary savings decisions as dependent variable are outlined in *Table 4.1*. Given the nonlinearity of probit models, the coefficients represent marginal effects computed at the means of the explanatory variables[7].

Using the baseline specification, which considers religious affiliation and exogenously determined individual characteristics as explanatory variables, in column (1) of *Table 4.1* the direct effect of religiosity on savings is estimated. Consistent with my expectations that religious people compared to non-religious individuals behave differently due to distinct perceived incentives, the findings reveal a significant positive relationship between religious affiliation and the probability to save money. Religiously affiliated individuals display a higher affinity to save than non-religious people. Not only are the difference in the savings behavior between religious and non-religious highly statistically significant, the effects of religious affiliation on the savings probability are also economically relevant. Jews, as opposed to non-Jews, in the USA show the highest affinity to own money on a savings account. Mainline Protestants have a 9.2 percentage points higher probability to save money than non-religious people, whereas they have a statistically significant 5.4 percentage points higher propensity to save money than Conservative Protestants, who display the lowest savings affinity. Notwithstanding they have a 3.8 percentage points higher probability to save money than non-religious people. Catholics compared to Mainline Protestants own almost half less often money on a savings account. Both Catholics and adherents to Other religions also show a statistically higher likelihood to save money than non-religious individuals.

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[7] Assuming a linear probability model yielded equivalent results with respect to the direction of the effect, although the magnitude of the coefficients varied.

Even when controlling for commonly used background variables, possibly endogenous to religiosity, in column (2), the effects of religious preferences on the probability of positive saving remain positive and statistical significant, although the magnitude of the coefficients reduces. Thus, the effect of religious belonging on savings decisions strongly depends on explanatory factors such as educational attainment, employment status and income. Again Jews exhibit a higher willingness to save than non-religious people. Being Jewish as an explanation for individual savings is comparable in size to the effect of holding a high school degree on savings. As opposed to non-religious people, Mainline Protestants display a 4.7 percentage points higher probability to save money (6.5 percent of the sample mean). The correlation between being Mainline Protestant, compared to non-religious people, and the savings decision equals approximately the effect of being employed on the decision of whether to save money (6.3 percent of the sample mean). Further, the behavioral differences between Mainline and Conservative Protestants, who also display a higher likelihood of savings than non-religious people, are statistically significant at the 1%-level. In contrast to my hypothesis that adherents to Other religions may hold too distinct religious views to find an effect on savings, a clear relationship between belonging to an Other religion and one's probability to save decisions was found. Belonging to a Other religion, as opposed to being non-religious, increases the individual will to save by 5.3 percent of the sample mean. This may be explained by the composition of the group. Other religions mainly include minority religions as well as religions which define themselves by strict rule obeying and strong commitment. While religious minorities may tend to segregate from the majority, strict religious groups screen out less committed free riders (Iannaccone, 1998). Both mechanisms may lead to homogenous religious groups with highly committed adherents, and, thus, have a strong effect on savings behavior. Summing up, except for Catholics, for who no significant results were found, religiosity was found to be mainly indirectly correlated with savings decision by influencing potentially endogenous explanatory variables, Further, the findings indicate that religious affiliation is as important as commonly used life-cycle variables for explaining heterogeneity in individuals' savings decisions.

When adding the frequency of church attendance as a measure for individual involvement in religious activities in column (3) of *Table 4.1*, these findings solely remain robust for Jews and Mainline Protestants. The coefficient for Jews, which increases in size, shows a higher probability for them to save compared to non-religious individuals. Hence, being Jewish seems to be more influential on individual savings behavior than attending religious services regularly. In contrast, the coefficients on the other religious preferences become smaller when

controlling for religious participation. Except for Mainline Protestants and Jews, the significance of the positive effects of religious preferences on the savings propensity vanishes when controlling for religious commitment. Although Mainline Protestants indicate a 3.7 percentage points higher savings likelihood, being actively committed to a religion matters more than just being affiliated to mainline Protestantism. Column (3) further indicates, as expected, more religious commitment, compared to never attending religious services, is associated with a higher savings propensity. Participating in religious services at least weekly raises the probability of savings by 8.6 percent of the sample mean, while attending less than once a month is associated with a 7.4 percent higher savings willingness.[8]

Table 4.1: Cross-sectional analysis on the binary savings decision

	(1)	(2)	(3)
Religion (reference: non)			
Jews	0.1257***	0.0707**	0.0913**
	(0.0263)	(0.0326)	(0.0387)
Catholic	0.0493***	0.0104	-0.0046
	(0.0124)	(0.0126)	(0.0172)
Mainline Protestant	0.0924***	0.0476***	0.0370**
	(0.0113)	(0.0115)	(0.0155)
Conservative Protestant	0.0382***	0.0200*	0.0037
	(0.0112)	(0.0104)	(0.0142)
Other religion	0.0641***	0.0388***	0.029
	(0.0148)	(0.0146)	(0.0239)
Church attendance (ref.: never)			
Less than monthly			0.0543***
			(0.0107)
At least monthly			0.0586***
			(0.0115)
At least weekly			0.0626***
			(0.0113)
Exogenous control variables as in *Table 3.1*	yes	yes	yes
Endogenous control variables as in *Table 3.1*	no	yes	yes
Pseudo-R²	0.1552	0.2791	0.2792
Wald test	2345.688***	4023.093***	2317.766***

[8] Since the effect of religious affiliation on savings behavior may depend on the degree of religious involvement interaction terms of religious affiliation and church attendance were considered. However, there are only modest and statistically insignificant effects of the combined affiliation-commitment effect on the propensity to save. Therefore, I don't look further at them in the following analysis. Full results on interaction terms are available upon request.

In order to avoid that the results are driven by individual background characteristics, in column (2) and (3) further explanatory variables are added. To economize on space these results are omitted from the tables. Full results from the cross-sectional models as well as from fixed effects and IV estimation are available upon request. The estimates for control variables were found to be significant and in line with previous findings (Browning and Lusardi, 1996; Avery and Kennickell, 1991). Women have a higher probability of savings than men. The closer an individual gets to retirement age, the lower is the probability of holding money on a savings account, since they may choose forms of investments with higher returns. Further, different savings pattern were found for racial minorities. Black and Hispanic households are less likely to hold savings accounts. A good financial background of the parents influences positively the decision to save (Charles and Hurst, 2003). The educational attainment of the head's father was also found to increase the probability of savings. The higher is the father's grade, the higher is the respondent's savings propensity. Both family net worth and income are positively related to savings decisions, as employment is. Higher educational attainment is associated with accumulate more often assets in the form of money on a savings account (Bernheim, 1997). Both marital status and the number of children in the family display the expected signs. Being married raises the probability to save, while having more children decreases it.

I now turn to the analysis of the actual amount saved being the dependent variable. In *Table 4.2* a log-linear regression is estimated using OLS. Since not all individuals indicate their stock of savings, the sample size is reduced by 5.8 percent. Consistent with the results on the decision of whether to save money, the baseline specification in column (1), which considers exogenous variables only, shows a positive, highly statistically significant, relationship between one's religious affiliation and the amounts saved. That is, religious individuals save more money than non-religious people. Regarding the distinct religious groups, Jews, again, save the highest amount of money, followed by Mainline Protestants and Catholics. While adherents dot Other religions have saved 61 percent more money, compared to non-religious people, Conservative Protestants save the fewest amount of all religions.

Table 4.2: Cross-sectional analysis on the ln(Stock of savings)

	(1)	(2)	(3)
Religion (reference: non)			
Jews	1.7066***	0.6193***	0.5824***
	(0.2216)	(0.1911)	(0.2240)
Catholic	0.6684***	0.2046**	0.0622
	(0.1175)	(0.0941)	(0.1215)
Mainline Protestant	0.7588***	0.3355***	0.2100*
	(0.1105)	(0.0900)	(0.1152)
Conservative Protestant	0.2530**	0.1468*	-0.0126
	(0.1041)	(0.0828)	(0.1086)
Other religion	0.4772***	0.2270*	0.0598
	(0.1558)	(0.1264)	(0.1954)
Church attendance (ref.: never)			
Less than monthly			0.2940***
			(0.0834)
At least monthly			0.4791***
			(0.0931)
At least weekly			0.4814***
			(0.0908)
Exogenous control variables as in *Table 3.1*	yes	yes	yes
Endogenous control variables as in *Table 3.1*	no	yes	yes
Constant	1.2416***	-3.5590***	-4.3823***
	(0.3719)	(0.4601)	(0.6181)
R²	0.2753	0.4485	0.4435
F-test	330.5651***	204.6419***	118.6016***

Notes: OLS regressions for the ln(Stock of savings). Number of observations is 25.164 in specifications (1) and (2) and 11.987 in specification (3). Specification (1) controls for gender, age, age squared, race, economic situation in childhood, education of father. Specifications (2) and (3) further control for ln(Income +1), ln(Net worth+1), employment status, education, marital status, number of children, metropolitan area and state fixed effects. Robust standard errors in parentheses. At the bottom, results for chi-square F-test on the joint significance of regression coefficients are shown. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Including commonly used controls in column (2), which may be endogenous to individual religiosity, further empirical evidence on the role of religious adherence for savings behavior is found. Compared to non-religious people, religious ones save more money on savings account. While the effects for Jews, Catholics and Mainline Protestants are significant at the 1%-level, the estimates for Conservative Protestants and adherent to Other religions were merely found to be significant at the 10%-level. However, the coefficients on individual religious affiliation are more than halved when controlling for these additional controls. Thus, an individual's religious belief influences savings decisions mainly through channels, such as educational attainment, income or the wealth status. Being Jewish, as opposed to being non-religious, is associated with a 10.9 percent of the sample mean higher stock of savings.

Furthermore, they save 32 percent more money on savings accounts than Mainline Protestants. There exist again behavioral differences between Mainline and Conservative Protestants. While Mainline Protestants save 40 percent more than non-religious people, Conservative Protestants save 16 percent more money than non-religious individuals. Catholics and Other religions also show a higher stock of savings than non-religious people. To sum up, different economic preferences of the religions may partly explain different savings pattern.

Since these results might vary with levels of religious participation, the last column of Table 4.2 considers the frequency of church attendance. The positive relation between being Jews respectively being Mainline Protestant and the amount saved remain stable and statistically significant, though, for Mainline Protestant on the 10%-level. Further, the results reveal, that being actively involved in religions and having access to the religious network is more important than just being affiliated. The coefficients on the other religions were not found to be statistically different from zero. Column (3), further, shows, that participating in religious services, as opposed to never attending, is positively and statistically significant correlated with a higher amount saved. While attending less than monthly increase the amount saved by 5.1 percent of the mean, attending weekly is associated with a 8.4 percent higher savings amount compared to the mean amount saved. The results indicate that there are statistically significant differences between attending less than monthly and attending more frequently.[9]

As in the analyses of the probability of positive savings, each specification controls for a wide range of individual and regional characteristics as a source for heterogeneity. Again, the coefficients for the explanatory variables included all behave as expected. Since the obtained findings are consistent with the results found for the binary savings choice, they are not presented here. To sum up, analyzing the relation between savings behavior and individual religiosity yielded that religious people not only show a higher portability to save, but also save a higher money amount on their checking accounts compared to non-religious individuals. However, being actively committed to one's religion is more important for economic behavior than just being religiously affiliated.

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[9] Although I expect the effect of religious affiliation to vary with the degree of religious involvement, the results do not support my hypothesis. Thus, I do not look further at them. Detailed results on interaction are available upon request.

4.2 Results for the fixed-effects model

However, the positive effects found for religiosity on individual savings behavior in the cross-sectional analysis may be biased due to endogeneity of religiosity. Making use of the longitudinal structure of the data, fixed effects models were estimated in *Table 4.3* in order to mitigate the endogeneity issue stemming from unobserved individual heterogeneity. Note, that each specification includes a set of time-varying explanatory variables, namely age, age squared/100, ln(Income+1), ln(Net worth+1), employment and marital status, number of children and metropolitan area fixed effects. These results, which are all well behaving, are not discussed further and are omitted from the tables for brevity.

Model 1 in columns (1) and (2) examines the effect of religiosity that is religious beliefs and participation, respectively, on the binary savings decision. Both columns give logit estimates for the fixed-effects logit model estimated by conditional maximum likelihood. Model II in columns (3) and (4) show estimates for the effect of religiosity on the amount saved, as measured by the ln of the stock of savings, applying the within estimator. Due to almost no within variance considering the impact of religious affiliation and religious participation in one model is not feasible. Thus, their effect on savings is estimated separately.

Model I shows findings regarding the influence of religiosity on the decision whether to save money, which is coded as 1 if the individual saved money on a savings account and zero otherwise. Testing for individual fixed-effects, results based on a Hausman-type specification test on the difference between the estimates obtained from conditional ML and the usual logit ML, which ignores the individual effects, indicate that there is unobserved individual heterogeneity. Thus, using a fixed-effects estimator is the appropriate estimation technique. Further, testing the null hypothesis that the unobserved individual effects are uncorrelated with the other explanatory variables was rejected with a ρ value of 0.0000. Thus, estimating random-effects models is not appropriate due to the likely correlation of the unobserved individual effects with other explanatory variables.

Interpreting the findings in Model I one has to keep in mind that, although, the fixed effects approach addresses the endogeneity issue due to omitted variable bias, there is a trade-off between reduced bias and loss of information. Since a fixed effects model is not using the between-variation, this approach identifies the effect of religiosity on savings for those who change their savings status. Thus, a substantial amount of information cannot be used for the estimation, since individuals who either saved or did not save money are dropped out of the conditional likelihood function. Analyzing the effects of religious beliefs on the savings

decision, 7,870 out of 26,724 observations are used, while analyzing the effect of religious participation on savings, 2,000 out of 12,736 observations are used. Further, fixed effects models produce inefficient estimates of variables with low within variance, which would lead to high standard errors, as one may see in *Table 4.3*. In fact, most variance in religious affiliation and church attendance is due to between-variation.

Compared with pooled probit in columns (1) and (2) of *Table 4.1*, results from the fixed-effects model in column (1) of *Table 4.3* contradict prior expectations on the role of religious belief for the decision on whether to save money. While the coefficients for Jews were dropped due to no within-group variation, the point estimates for religious beliefs are substantially smaller in magnitude and even negative for Mainline Protestants and adherents to Other religions. Further, the findings suggest that religious beliefs are not significantly associated with savings behavior. Turning to the analysis of religious participation, column (2) shows that being actively involved in religion, is not found to be statistically significant related to the probability of savings, although the estimates point in the direction expected. On the one hand side, one possible explanation for those results is that the estimates for the positive effect of religious affiliation and participation found in the cross-sectional regression is driven by some unobserved time-invariant variables, which affect savings decisions and are correlated with religiosity. On the other hand side, finding no evidence for religion induced heterogeneity in savings behavior may be explained by the smaller magnitude of the fixed-effects coefficients and the substantially larger standard errors.

Using the full set of observations in the log-linear fixed-effects approach, Model II in columns (3) and (4) of *Table 4.3* show findings regarding the influence of religiosity on ln(stock of savings). The F-test for joint significance of the fixed effects found unobserved individual heterogeneity. Bearing in mind that the within estimator is imprecise for time-varying variables with only little within variation, such as religious affiliation and church attendance, compared to the cross-sectional log-linear regressions, the impact of religious affiliation on the amount saved vanishes in column (3). While the direction of the effect as well as the magnitude of being Jew or Catholic is comparable to the findings obtained by the cross-sectional analysis, negative effects for Protestants and for adherents to Other religions were found. However, little within-variation in religious affiliation may prevent the fixed-effects estimator to obtain results statistically different from zero. Considering the effect of religious participation, as proxied by religious service attendance, on the stock of savings, column (4) shows comparable effects to cross-sectional analysis, though, less statistically significant. While attending religious services at least monthly or less than monthly does not

affect an individual's decision on how much to save, attending religious services at least once a week determines the amount saved positively. Consequently, it may be argued that participating frequently in religious activities indeed effects savings decisions.

Table 4.3: Fixed effects estimates for the effect of religiosity on the binary and continuous (ln(Stock of savings)) savings decisions

	Binary savings decision Model I		Continuous savings decision Model II	
	(1)	(2)	(3)	(4)
Religion (reference: non)				
Jews	*dropped*		2.1823	
			(3.2622)	
Catholic	0.5593		0.2380	
	(0.9400)		(0.7310)	
Mainline Protestant	-0.4193		-0.7605	
	(0.6089)		(0.5200)	
Conservative Protestant	0.0211		-0.3825	
	(0.5153)		(0.4935)	
Other religion	-0.2795		-0.9053	
	(0.6146)		(0.5935)	
Church attendance (ref.: never)				
Less than monthly		0.2545		0.1235
		(0.1617)		(0.1208)
At least monthly		0.2284		0.2197
		(0.1877)		(0.1444)
At least weekly		0.2897		0.3240**
		(0.1983)		(0.1515)
Constant			0.3685	0.1756
			(0.7623)	(1.9914)
Pseudo-R²	0.0225	0.0245		
R²			0.0146	0.0107
Hausman type specification test	332.90***	88.97***		
F-test for individual effects			3.65***	2.87***
Number of observations	7,870	2,000	25,164	11,987
Number of individuals	2,249	1,000	9,276	7,192

Notes: Column (1) and (2) show conditional ML-logit fixed-effects regressions for the probability to hold a savings account. Column (3) and (4) show fixed-effects linear regressions for the ln(Stock of savings) as dependent variable. All specifications control for age, age squared/100, ln(Income+1), ln(Net worth+1), employment and marital status, number of children and metropolitan area fixed effects. Standard errors are in parentheses. At the bottom, results Hausmann type test and a F-test, respectively, testing for individual effects, are displayed. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

4.3 Results for the IV approach

In order to further mitigate the endogeneity problem and to rule out a second source of endogeneity, namely reverse causality, an IV approach is applied to estimate the effect of religious affiliation on savings behavior. The proportion of individuals belonging to the respondent's religious tradition in the region of ancestry origin in 1900 interacted with regional dummies is used as an instrument for individual religious affiliation. Since the sample has been restricted to those individuals indicating their ancestry's origin, the number of observations used for the analysis of whether to save money dropped to 16,716 and to 15,762 in the case of the continuous savings decision. *Table 4.5* presents the 2SLS estimates for the influence of religious affiliation on the binary savings decision in Model I as well as on the continuous savings decision in Model II. Both models includes a set explanatory variables, namely gender, age, age squared, race, economic situation in childhood, education of father, ln(income +1), ln(net worth+1), employment status, education, marital status, number of children, metropolitan area fixed effects and state of residence. Since these explanatory variables all behave well, they are neither discussed in further detail nor are they shown in *Table 4.5*.

Evaluating the appropriateness of the IV used in Model I, a robust Durbin-Win-Hausman test is performed testing the fact that religious affiliation is exogenous. With a ρ value of 0.0086, the null hypothesis that religious affiliation is exogenous is rejected. Thus, IV is an appropriate estimation technique to estimate the effect of religious affiliation on the binary savings decision and leads to more efficient estimates compared to OLS. However, IV relies on two further estimation assumptions: relevance and validity of instruments. For religious composition in ancestry region to be a relevant instrument it has to be correlated with contemporary religious affiliation. Table 2.5 displays results for the first-stage regression of contemporary religious affiliation on religious composition in ancestry region interacted with the region of ancestry. The F-test of excluded instruments in the first-stage regression passed the often-used rule of thumb of 10, except for Jews. Finding the share of Jewish people in the region of ancestry to be a weak instrument for being Jewish seems plausible due to diaspora of Jewish people throughout the globe before 1948. Consequently, biased results for Jews are likely. Further, to test weak identification in the presence of clustered standard errors, i.e. non-i.i.d standard errors, the Kleibergen-Paap rk F-statistic may be used. Since no critical values for strong instruments exist for the Kleibergen-Paap statistic, the test statistics may be compared to the Stock-Yogo critical values (2005) for the non-robust Cragg-Donald F-

statistic. However, since in the present analysis five endogenous variables are used, there are no critical values to compare to, because those are only defined for up to 3 endogenous variables. Thus, I focus on the Angrist-Pischke (A.-P.) first-stage F-statistic to test whether the instruments are weakly correlated with religious affiliation. The obtained values may then be compared to critical values for strong instruments for the Cragg-Donald F-statistic in the case of one endogenous regressor provided by Stock and Yogo (2005).

Table 4.4: First stage estimates

	First stage for binary savings decision				First stage for continuous savings decision			
	Catholic	Jew	Protestant	Other religion	Catholic	Jew	Protestant	Other religion
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Share of individual religion * British	0.6836***	-0.0825***	0.3606***	-0.1487***	0.6879***	-0.0825***	0.3660***	-0.1527***
	(0.0360)	(0.0113)	(0.0417)	(0.0154)	(0.0366)	(0.0116)	(0.0422)	(0.0156)
Share of individual religion * Western European	1.1295***	-0.0693***	-0.2141***	-0.1305***	1.1314***	-0.0692***	-0.2070***	-0.1342***
	(0.0174)	(0.0097)	(0.0306)	(0.0131)	(0.0176)	(0.0099)	(0.0310)	(0.0133)
Share of individual religion* Eastern European	1.9545***	-0.0708***	-1.1239***	0.4254***	2.0531***	-0.0691***	-1.1291***	0.3684***
	(0.2320)	(0.0160)	(0.0804)	(0.1138)	(0.2306)	(0.0167)	(0.0827)	(0.1127)
Share of individual religion* Northern European	0.0224	-0.0435***	0.5108***	-0.0731***	0.0215	-0.0431***	0.5152***	-0.0751***
	(0.0136)	(0.0066)	(0.0214)	(0.0084)	(0.0140)	(0.0067)	(0.0217)	(0.0086)
Share of individual religion * Middle Eastern	-0.0042	-0.0509***	-0.4975***	1.0079***	-0.0062	-0.0530***	-0.4766***	1.0041***
	(0.0391)	(0.0122)	(0.0447)	(0.0140)	(0.0420)	(0.0135)	(0.0467)	(0.0136)
Share of individual religion * East Asian	-0.0636**	0.0020	-0.6315***	0.9836***	-0.0690**	0.0025	-0.6386***	0.9867***
	(0.0307)	(0.0116)	(0.0802)	(0.0203)	(0.0331)	(0.0134)	(0.0909)	(0.0195)
Share of individual religion * South / Southeast Asian	-0.1082***	-0.0350***	-0.4743***	0.9656***	-0.1131***	-0.0375***	-0.4753***	0.9737***
	(0.0312)	(0.0083)	(0.0387)	(0.0197)	(0.0325)	(0.0089)	(0.0405)	(0.0199)
Share of individual religion * Pacific Islander	1.2561***	-0.0662***	-0.9532***	0.5967**	1.1835***	-0.0701***	-0.9330***	0.6484***
	(0.3844)	(0.0221)	(0.1355)	(0.2348)	(0.3875)	(0.0228)	(0.1360)	(0.2370)
Share of individual religion * Canadian	0.5710***	-0.0856***	0.5099***	-0.1419***	0.5654***	-0.0853***	0.5180***	-0.1452***
	(0.2067)	(0.0215)	(0.1711)	(0.0191)	(0.2053)	(0.0223)	(0.1724)	(0.0189)
Share of individual religion * South American	0.9924***	-0.0094***	-0.4415***	-0.1117***	0.9942***	-0.0092**	-0.4427***	-0.1146***
	(0.0188)	(0.0036)	(0.0349)	(0.0203)	(0.0194)	(0.0036)	(0.0361)	(0.0212)
Share of individual religion * Caribbean	0.7838***	-0.0681***	-0.0379	-0.0960***	0.8372***	-0.0651***	-0.0761	-0.1022***
	(0.1320)	(0.0163)	(0.1155)	(0.0252)	(0.1359)	(0.0165)	(0.1192)	(0.0269)
Share of individual religion * African	-0.0391***	-0.0023	-0.8269***	1.0740***	-0.0363***	-0.0020	-0.8274***	1.0731***
	(0.0090)	(0.0021)	(0.0166)	(0.0041)	(0.0090)	(0.0022)	(0.0172)	(0.0042)
R2	0.5768	0.0897	0.3379	0.5388	0.5776	0.0888	0.3325	0.5189
Overall F-test	868.8617***	0.7409	170.5333***	2872.302***	877.183***	0.7076992	163.7161***	2798.996***
F-test of excluded instruments	639.30***	4.60***	344.70***	6499.05***	619.28***	4.40***	326.46***	6342.53***
A.-P. multivariate F-test of excluded instruments	42.55***	3.07***	8.59***	131.43***	39.49***	2.95***	8.57***	124.43***
Number of observations	16,716	16,716	16,716	16,716	15,762	15,762	15,762	15,762

All regressions control for endogenous and exogenous explanatory variables as given in Table 3.1 and include a constant. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Instruments are seen as strong if the A.-P. F-statistic exceeds these critical values. The null hypothesis that the maximal relative bias of the IV estimator due to "weakness" is more than 5 percent can be rejected for the effect of Catholicism and Other religions. The maximal relative bias of the IV estimator for the effect of Protestantism on the binary savings decision is 20 percent. However, the estimated coefficient for Jews will be strongly biased with more than 30 percent. Further, for religious composition in ancestry region to be a valid instrument, the excluded instruments have to be distributed independently of the error. Given the null hypothesis that the used instruments are uncorrelated with the error, the Hansen's test does strongly not reject the hypothesis of overidentification restrictions with a ρ value of 0.1116 for the binary savings decision.

Model I of Table 4.5, where the dependent variable is one's decision whether to save money, shows in column (2) that the coefficients for religious affiliation using the IV approach are significantly smaller than the coefficients using the probit model in column (1). These differences point to the endogeneity of religious affiliation. Further, the standard errors are substantially higher compared to cross-sectional analysis, indicating a loss in efficiency due to using IV estimation. Another source of imprecision may be the use of the linear probability model instead of the probit approach. Analyzing the point estimates of the coefficients in column (2), no statistically significant results were found for Jews, which corresponds to my findings above that religious composition in ancestry region only predicts recent Jewish belief weakly. However, against my expectations, Protestants display a lower probability to save money compared to non-religious people. The effect of Protestantism equals approximately 55 percent of the sample mean. Further, both Catholics and adherents to other religions display a statistically significant lower likelihood of savings compared to non-religious people.

However, instead of interpreting the point estimates, it is more plausible to abstract from the assumption of constant effects throughout the population and interpret IV estimates as local average treatment effects (LATE). First stage regressions results indicate that higher the share of individuals who belonged to the respondent's religious tradition in the region of origin, depending on the region of ancestry, the higher is the probability that the respondent belongs to that religion and, thus ancestries also practiced that religion. Consequently, a causal impact of religious affiliation on savings may be established only for those individuals who rely on a specific religious belief since their ancestries belonged to it. These individuals may be seen in a sense as deeply rooted in their religious tradition. Given the LATE interpretation it is not surprising to find these very large coefficients for traditional

religionists, however, the direction of the influence is against my expectations. Following Lipford and Tollison (2003), the negative effects for these traditional religionists may be explained by their favoring of "treasures in heaven" as opposed to "treasures on earth" (Lipford and Tollison, 2003, p. 251). Thus, they have a relatively lower valuation of present economic outcomes because they may favor Further, to the extent that traditionalist religionists express their strong faith by donating to their congregation. Since religious charitable giving is assumed to be an integral part of all major world religions (McCleary, 2007), this financial support may be seen as opportunity costs for saving. Summing up, although the results for the impact of religious affiliation on the decision whether to save money may be imprecise due to a loss of precision, the obtained results suggest, however, that prior results on a positive relation between religiosity and savings are driven partially by reverse causation.

Table 4.5: Probit, OLS and 2SLS estimates for the effect of religious affiliation on binary and continuous (ln(Stock of savings)) savings decisions

	Binary savings decision Model I		Continuous savings decision Model II	
	Probit	2SLS	OLS	2SLS
	(1)	(2)	(3)	(4)
Religion (reference: non)				
Jews	0.0682**	-3.6862***	0.5918***	-40.5084***
	(0.0332)	(1.2636)	(0.1910)	(12.6557)
Catholic	0.0087	-0.3419***	0.1901**	-3.3471***
	(0.0127)	(0.1032)	(0.0938)	(0.9994)
Protestant	0.0292***	-0.3987***	0.2170***	-4.1253***
	(0.0103)	(0.1297)	(0.0773)	(1.2831)
Other religion	0.0400***	-0.3212***	0.2367*	-3.2871***
	(0.0146)	(0.1122)	(0.1264)	(1.0943)
Constant		0.3108**	-3.5989***	2.8201
		(0.1312)	(0.4604)	(3.0640)
Control variables as in *Table 3.1*	yes	yes	yes	yes
Robust Durbin-Wu-Hausman test		13.622***		20.551***
Hansen's J statistic		13.008		15.689**

Notes: The dependent variable in Model I is the binary savings decision. Column (1) shows marginal effects for the probability to hold a savings account. Column (2) shows 2SLS estimates. The dependent variable in Model II is the ln(Stock of savings). Column (3) shows OLS estimates and column (4) displays 2SLS estimates. All specification control for gender, age, age squared, race, economic situation in childhood, education of father, ln(income +1), ln(net worth+1), employment status, education, marital status, number of children, metropolitan area and state of residence. Robust standard errors are in parentheses. At the bottom, results for the Durbin-Wu-Hausman test for erogeneity and Hansen's J-test of overidentifying restrictions. * denotes statistical significance at the 10% level, ** at the 5% level and *** at the 1% level.

Model II, where the dependent variable is one's decision on how much to save, also found substantial differences between the estimated coefficients for religious affiliation obtained by

OLS in column (3) and the IV approach in column (4) as well as substantially higher standard errors compared to cross-sectional analysis. Given a ρ value of 0.0004 of the robust Durbin-Win-Hausman test, e null hypothesis that religious affiliation is exogenous is rejected. As in the analysis of the binary savings decision, except for Jews, the rule of thumb of 10 of the F-test of excluded instruments in the first-stage regression is easily passed. Using the A-P F-statistic, the null hypothesis that the maximal relative bias of the IV estimator due to "weakness" is more than 5 percent can be rejected for the effect of Catholicism and Other religions, while for the effect of Protestantism the maximal relative bias is 20 percent and for being Jew more than 30 percent. However, since the null hypothesis that the used instruments are uncorrelated with the error, is rejected with a ρ value of 0.0471 for the continuous savings decision, the share of one's religious tradition in the region of ancestry, depending on the ancestry origin, cannot be used as valid instruments. Consequently, the IV estimates for the impact of individual religious belief on the amount saved are not highly reliable, and, thus, are not going to be discussed in further detail. On the one hand side, given a noisy measure of household savings which may point to a measurement error in the stock of savings, which is likely to be correlated with independent variables such as education, the rejection of the overidentification-restriction was somehow expectable. On the other hand side, one may argue that, while religious belief influence the willingness to save negatively for highly individuals tied strongly to their religious tradition, it is not a good predictor for individual choices on how much to save.

5 Conclusion

Assuming that both religious teachings and religious participation alters an individual's preference and opportunity sets, in this paper I have argued that religiosity, as measured by religious affiliation and participation, enhances individual savings decisions. In contrast to Caroll et al. (1994, 1999), my results mirror that cultural factors, such as one's religiosity, are robust determinants of individual savings choices, even once I control for differences in individual characteristics. Religions endow their adherents with special beliefs and influence their opportunity sets of behavior which enables them to save more.

In line with Renneboog and Spaenjers (2012), there are substantial differences in savings behavior for religious and non-religious people as well as between distinct religious groups. Being aware of the endogeneity problem within this relation, fixed-effects models were

estimated. However, due to little within-variation in output as well as in explanatory variables, no statistically significant results were found for an effect of religiosity on savings behavior. In contrast, instrumenting individual religious affiliation with one's religious heritage yields strong negative effects of religious affiliation on the binary savings choice. Although the instrument was not found to be valid for the continuous savings decision, the same direction of the influence was found. These results, however, are reasonably explained in light of an LATE interpretation, and are, thus, applicable for religious individuals highly tied to tradition. Summing up, the findings suggests, that while the underlying decision on whether to save are not was found to be influenced positively by religious belief, and for those individuals tied strongly to their religious belief due to a strong religious heritage, the effect was found to be negative. However, the decision on how much to save was found to be less influenced. Further, being actively religiously involved matters more than being religiously affiliated for an individual's savings choice. Thus, it seems plausible to argue that religions enhance their adherents to establish social networks through which they may gain access to financial relevant information.

Analyzing the impact of religiosity on the individual's savings behavior may contribute to a more realistic picture of individual economic decision making. Although it is unlikely that religious background is the dominant factor in determining individual savings behavior, moral standards and rules, set by religions, may play a role for savings and investment decisions. To understand how religious beliefs and religious commitment are associated with distinct individual economic behavior provides the basis for culture-induced heterogeneity in aggregate economic outcomes, although a significant relationship between religiosity and savings at the individual level does not automatically imply a similar relationship at the national level (Inglehart and Welzel, 2010).

Understanding a household's savings motives are a matter of concern for policy makers in the USA, since it has implications for the wealth distribution and therefore redistribution policy (Guiso et al., 2006). Further, whether individuals were able to save adequately for retirement, education or healthcare expenditure is crucial information for welfare spending of governments.

Appendix A

Table .A.1: Classification of world regions according to PSID

American (meaning U.S. including American Indian, Eskimo, Aleut	Canada
British (UK, Ireland)	Latin America South and Central America
Western European (France, Germany, Italy, Portugal, Spain, Switzerland, Netherlands, Belgium, Luxembourg, Liechtenstein, Malta)	Pacific Islander (Filipino Islands, Indonesia)
Eastern European (Romania, Poland, USSR, Greece, Bulgaria, Yugoslavia, Bosnia, Herzegovina, Croatia, Slovenia, Slovakia, Czech Republic, Albania)	East Asian (China, Japan, Korea)
Middle Eastern (Iran, Turkey, Iraq, Syria, Lebanon, Egypt, Afghanistan, Pakistan, Oman, Yemen, Jordan, Georgia, Armenia, Azerbaijan, Uzbekistan, Tajikistan, Turkmenistan, Saudi Arabia, Israel)	Northern European (Norway, Sweden, Denmark, Finland)
Oceania	South or Southeast Asian (India, Vietnam, Cambodia, Laos, Thailand)
African	Caribbean (etc., Cuba, Haiti, Aruba, Bahamas, Barbados, Guadalupe, Jamaica, Puerto Rico, Republican Dominican)

Table .A.2: Categorization of religious affiliation in the world

Catholic Roman Catholics; Catholics (Non Roman)	Non-religious Non-religious; Atheists
Protestants Protestants; Anglicans; Marginal Protestants	Other Orthodox; Muslims; Hindus; Buddhists; Non-White-Indigenous (Christian); Tribal religionists; Baha'is; Spiritists; Jains; Sikhs; Chinese folk-religionists; New religionists; Parsis; Neo Pagans; Other religionists; Shamanists; Crypto Christians; Mandeans; Shintoists; Confucian; Christo pagans
Jews	

Appendix B

Religious affiliation according to PSID was dived into 5 categories:

Conservative Protestants
Baptist; Amish; Mennonite; Christian; Church of God; Seventh Day Adventist; Pentecostal/Assembly of God; Churches of Christ; Christian Science

Mainline Protestants
Lutheran; Methodist/African; Methodist; Presbyterian; Episcopalian; Disciples of Christ; United Christian; Quaker; Friends; Unitarian; Universalist; United Church of Christ; Congregational Church; Reformed, Christian Reformed; First Christian; Christian Holiness; Protestant unspecified, Other Protestant

Catholics

Other religions
Greek/Russian/Eastern Orthodox; Hindu/Buddhist; Latter Day Saints; Mormon; Jehovah's Witnesses; Other non-Christian: Muslim, Rastafarian, etc.; Other religions

Jews

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Appendix A

Table A.1: Classification of world regions according to PSID

American (meaning U.S. including American Indian, Eskimo, Aleut

Canada

British
(UK, Ireland)

Latin America
South and Central America

Western European
(France, Germany, Italy, Portugal, Spain, Switzerland, Netherlands, Belgium, Luxembourg, Liechtenstein, Malta)

Pacific Islander
(Filipino Islands, Indonesia)

Eastern European
(Romania, Poland, USSR, Greece, Bulgaria, Yugoslavia, Bosnia, Herzegovina, Croatia, Slovenia, Slovakia, Czech Republic, Albania)

East Asian
(China, Japan, Korea)

Middle Eastern
(Iran, Turkey, Iraq, Syria, Lebanon, Egypt, Afghanistan, Pakistan, Oman, Yemen, Jordan, Georgia, Armenia, Azerbaijan, Uzbekistan, Tajikistan, Turkmenistan, Saudi Arabia, Israel)

Northern European
(Norway, Sweden, Denmark, Finland)

Oceania

South or Southeast Asian
(India, Vietnam, Cambodia, Laos, Thailand)

African

Caribbean
(etc., Cuba, Haiti, Aruba, Bahamas, Barbados, Guadalupe, Jamaica, Puerto Rico, Republican Dominican)

Table A.2: Categorization of religious affiliation in the world

Catholic

Non-religious

Roman Catholics; Catholics (Non Roman)	Non-religious; Atheists
Protestants Protestants; Anglicans; Marginal Protestants	Other Orthodox; Muslims; Hindus; Buddhists; Non-White-Indigenous (Christian); Tribal religionists; Baha'is; Spiritists; Jains; Sikhs; Chinese folk-religionists; New religionists; Parsis; Neo Pagans; Other religionists; Shamanists; Crypto Christians; Mandeans; Shintoists; Confucian; Christo pagans
Jews	

Appendix B: Categorization of religious affiliation in the USA

Religious affiliation according to PSID was dived into 5 categories:

Conservative Protestants Baptist; Amish; Mennonite; Christian; Church of God; Seventh Day Adventist; Pentecostal/Assembly of God; Churches of Christ; Christian Science	Mainline Protestants Lutheran; Methodist/African; Methodist; Presbyterian; Episcopalian; Disciples of Christ; United Christian; Quaker; Friends; Unitarian; Universalist; United Church of Christ; Congregational Church; Reformed, Christian Reformed; First Christian; Christian Holiness; Protestant unspecified, Other Protestant
Catholics	Other religions Greek/Russian/Eastern Orthodox; Hindu/Buddhist; Latter Day Saints; Mormon; Jehovah's Witnesses; Other non-Christian: Muslim, Rastafarian, etc.; Other religions
Jews	

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